SCANDINAVIAN ENERGY CONTRACTOR

Project	1017 **Newport Energy from Waste Plant**	Document no.	Rev.no.
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Subject	**System J10 - Fire Fighting, Fire Prevention Plan, Document References**		Page 1/3

FIRE PREVENTION PLAN

Rev.	Date	Description	Issuer	Reviewer	Approver
00	2023.01.02	First issue	SIBB	EDRM	PEJO

Contents

1 Appendices

No.	Doc. No.	Title	Revision
1		Schedule 33, Feedstock specification	Contract
2	9000.M0.J01.203	Fire Prevention Plan, EWC codes for materials	R00
3	9000.RP.500.002	Fire Risk Management	R00
4	2031.E4.C01.001	Equipment Layout of CCTV, Access Control & DCS Wifi System	As-built
5	9000.RP.500.001	Plant Housekeeping	R00
6	9000.RP.500.004	Emergency response and preparedness	R00
7	9000.RP.500.003	Hot Work	R00
8	1017.M0.Z02.001	Technical Process Description	R00
9	1017.CS.070.000	Newport Drainage Description	R00
10	1017.M0.J01.001	Fire safety strategy report	R04
11	1017.S0.X04.001	Fire Risk Assessment	R00

2 Drawings

No.	Doc. No.	Title	Revision
1	1017.C0.750.000	Site Drainage. Overall Layout	R01
2	1017.C0.750.001	Site Drainage. Surface Water. Sheet 1	R01
3	1017.C0.750.002	Site Drainage. Surface Water. Sheet 2	R01
4	1017.C0.750.003	Site Drainage. Surface Water. Sheet 3	R01
5	1017.C0.750.004	Site Drainage. Surface Water. Sheet 4	R01
6	1017.C0.750.005	Site Drainage. Surface Water. Sheet 5	R01
7	1017.C0.750.011	Site Drainage. Foul & Trade Effluent. Sheet 1	R02
8	1017.C0.750.012	Site Drainage. Foul & Trade Effluent. Sheet 2	R02
9	1017.C0.750.013	Site Drainage. Foul & Trade Effluent. Sheet 3	R02
10	1017.C0.750.014	Site Drainage. Foul & Trade Effluent. Sheet 4	R02
11	1017.D2.001.101	GENERAL NEW EFW PLANT	R01
12	1017.D2.005.101	SECTION A-A & B-B	R01
13	1017.D2.007.101	SECTION C-C & D-D	R01
14	1017.D2.091.101	3D VIEW LOOK EAST 45~0 NORTH 55~0 DOWN (PROJECT)	R01
15	1017.D2.092.101	3D VIEW LOOK EAST 45~0 SOUTH 55~0 DOWN (PROJECT)	R01
16	1017.D2.093.101	3D VIEW LOOK WEST 45~0 SOUTH 55~0 DOWN (PROJECT)	R01
17	1017.D2.094.101	3D VIEW LOOK WEST 45~0 NORTH 55~0 DOWN (PROJECT)	R01

33

SCHEDULE 33

Feedstock Specification

1. **FEEDSTOCK SPECIFICATION**

Non-hazardous waste originating from Municipal, Commercial and Industrial Waste (as each is defined in section 75 of the Environmental Protection Act 1990), which:

(a) falls within the ranges set out in the Table of Parameters in paragraph 2 below;

(b) does not contain Prohibited Items set out at paragraph 3 below; and

(c) falls within at least one of Permitted Waste Types listed in paragraph 4 below.

2. **TABLE OF PARAMETERS**

Required specification for the composition and properties of all Feedstock delivered to the Site:

Feedstock Specification	Units	Min	Max	Comments
Combustion Limitations				
Net calorific value (as received)	MJ/kg	8	16	Design 11 MJ/kg
Each dimension	mm		500	All Feedstock
Sum of any two dimensions (i.e. length + width)	mm		725	All Feedstock
Rods (length x diameter)	mm		500 x 50	not more than 5% of as delivered weight; All Feedstock
Foils/sheets (length x width)	mm		400 x 400	All Feedstock
Tapes (length)	mm		500	All Feedstock
Ash content (dry)	% wt/wt		20	Per tonne
Metal content	% (dry)		4	Per tonne
Glass content	% (dry)		5	Per tonne
Earth Soil	% (dry)		5	Per tonne
Dust Percentage Grain Size <1mm	% (dry)		10	residue at the 1mm filter 90% material; Per tonne
Dust Percentage Grain Size <0.5mm	% (dry)		5	residue at the 0.5mm filter 95% material; Per tonne
Ceramics, stones, porcelain, sand, metals	% (dry)		1	Per tonne
Metallic aluminium (foils, composite films)	% (dry)		0.80	Per tonne
Moisture content	% wt/wt		40	Per tonne
Abatement Limitations				
Sulphur content (dry)	% wt/wt		0.6	Daily average
Chlorine content (dry)	% wt/wt		1	Daily average
Mercury (Hg) (as received)	mg/MJ		0.06	Daily average
Cadmium (Cd) (as received)	mg/MJ		5	Daily average
Sum of heavy metals (HM (as received)	mg/MJ		100	Daily average

3. **PROHIBITED ITEMS**

3.1 The Feedstock shall not contain any of the following substances, materials or items, except for de minimis amounts that are normally found in residual municipal solid waste after separation of recyclable materials or in commercial and industrial wastes:

(a) items or material that from a visual inspection which would place the load outside of any of the specification parameters in the Table of Parameters in paragraph 2 above;

(b) radioactive waste;

(c) explosives/munitions;

(d) gas cylinders;

(e) pathological and biological waste;

(f) oil sludges, cesspool and other human waste, human and animal remains;

(g) toxic and carcinogenic materials posing a threat to operating staff and the environment;

(h) liquid wastes and sludges;

(i) snow and ice;

(j) non-combustible construction material and/or demolition debris;

(k) hazardous refuse of any kind, such as cleaning fluids, crank case oils, cutting oils, paints acids, caustics, poisons, drugs, asbestos residues;

(l) any Load which does not appear to be 500 mm or less;

(m) shredded material from motor vehicles, motor cycles, automobile engines, transmissions, rear ends, springs, bodywork or major parts of motor vehicles;

(n) significant quantities of powders;

(o) hazardous or clinical waste (save to the extent permitted in writing from time to time by the Purchaser);

(p) any car batteries or concentrations of disposal batteries;

(q) trailers, agricultural equipment, marine vessels or similar items, farm and other large machinery;

(r) significant quantities of plasterboard, plaster, tyres and/or waste sludges (for example from biological or paper recycling process), which are unusually high for commercial and industrial waste or municipal solid waste;

(s) significant quantities of wiring, cabling, scrap car frag, PVC pipe work, ducting and/or UPVC window frames, which are unusually high for commercial and industrial waste or municipal solid waste;

(t) any other waste that is not processable waste and/or excessive quantities of materials which could result in the IBA or APC residues being outside of the specification for such residues in their respective offtake contracts;

(u) whole glass bottles exceeding 500ml in crates (single bottles permitted);

(v) glass greater than 50 x 50 x 5 mm in dimension; and

(w) plastic containers that are in aggregate over three dimensions (length + height + width) greater than 1800 mm.

4. **PERMITTED WASTE TYPES BY EUROPEAN WASTE CODE**

4.1 19 12 10 Combustible waste (refuse derived fuel)

4.2 19 12 12 Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11

4.3 20 03 01 Mixed municipal waste

EWC codes for materials

EWC codes are used in the United Kingdom to classify waste according to the European Waste Catalogue (EWC). RDF stands for Refuse-Derived Fuel, which is a fuel produced by shredding and dehydrating solid waste, which is then used to generate electricity. The EWC code for RDF in the UK is 20 01 16. This code is used to classify waste that is intended for energy recovery through the production of refuse-derived fuel. This code is used in the UK to ensure that waste is properly managed and disposed of in an environmentally-friendly manner.

Maximum Quantity:

230,400 tonnes per annum for thermal conversion.

The facility has a maximum continuous rate of 88 MWth of fuel input, and the throughput depends upon the fuel CV

Fuel input rate average 28.8 t/h for aggregate gross power generation of 24 MW at design LCV 11 MJ/kg.

Waste code	Description
19	**Wastes from waste management facilities off site water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 12	**Wastes from the mechanical treatment of waste (for example sorting crushing compacting pelletizing) not otherwise specified**
19 12 10	Combustible waste (refuse derived fuel)
19 12 12	Other wastes (including mixtures of materials) form mechanical treatment of wastes other than those mentioned in 19 12 11*)
20	**Municipal wastes (household waste and similar commercial industrial and institutional wastes) including separately collected fractions**
20 03	**Other municipal wastes**
20 03 01	Mixed municipal wastes

19 12 11* other wastes (including mixtures of materials) from mechanical treatment of waste containing hazardous substances

Table of Content

1. Purpose

The purpose of fire risk management is to identify foreseeable fire hazards, establish control measures that are required to reduce the identified fire risks to an acceptable level, establish emergency procedures and establish emergency procedures and establish safe areas of work.

2. Scope

This Plant Management Instruction (PMI) covers the requirement for general fire precautions at all SECO Ltd. plants.

2.1 Definitions

2.1.1 Area assessment

An area of the site, which is clearly identified with regards to its boundaries and the hazards, contained within that area.

2.1.2 Fire Warden

The duty Shift Team Leader or person identified as responsible for carrying out fire risk management.

2.1.3 Assessment team

A person or persons who, through their technical background or position within the company, can be consulted to provide guidance on relevant aspects of the assessment, (such as the QHSE Team Leader or an external Health, Safety and Environmental Advisor).

3. Prerequisites

Appoint roles to carry out duties under this PMI.
Arrangements for actions in the event of fire are included in the plant emergency response plan.

4. References

- Health and Safety at Work Act 1974.
- The Regulatory Reform Fire Safety Order 2005.
- Fire (Scotland) Act 2005.
- The Fire Safety Regulations (Northern Ireland) 2010.

- Management of Health and Safety at Work Regulations 1999.
- Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR).
- 9000.805.MS.MS02.A.09.QA93.001 Emergency Response and Preparedness.
- SMI/HSE/SG/018/GP Fire System Testing and Impairment.
- http://www.hse.gov.uk/toolbox/fire.htm
- http://www.hse.gov.uk/fireandexplosion/dsear-regulations.htm
- Fire RA, Fire Plan and Fire Safety File.

5. Responsibilities

5.1 Plant Manager

The Plant Manager is designated as the 'responsible person' as is required by the Regulatory Reform Fire Safety Order (RRFSO). As such he has the responsibility to ensure that the RRFSO is complied with and that suitable resources are allocated to enable this.

As the responsible person he must ensure that a Fire Safety Risk Assessment is carried out by a competent person who must consider all relevant persons i.e., everyone who might be on the premises and immediate vicinity, whether they are employees, visitors, or members of the public. It should pay particular attention to those at special risk, such as someone with a disability, those who have special needs, and children, and it must include consideration of any dangerous substances liable to be on the premises. The significant findings of the assessment must be recorded.

In order to comply with the legislation, the responsible person is required to undertake the following additional duties:

- Appoint one or more competent persons, depending on the size and use of the premises, to carry out the preventative and protective measures required.

- Provide employees with clear and relevant information on the risks to them identified by the Fire Risk Assessment, about the measures that have been taken to prevent fires, and how these measures will protect them if a fire breaks out.

- Consult with employees about nominating people to carry out particular roles in connection with fire safety and about proposals for improving the fire precautions.

- Inform non-employees, such as volunteers and temporary or contract workers, of the relevant risks to them, and provide them with information about who the nominated competent persons are, and about fire safety precautions in the premises.
- Co-operate and co-ordinate with the responsible persons of other neighbouring organisations or businesses that share premises in the same building, to inform them of any significant risks, and how the responsible person will seek to reduce or control those risks which might affect the safety of their employees.
- Provide the employer of any person from an outside organisation who is working in the premises (e.g., agency providing temporary staff) with clear and relevant information on the risks to those employees and the preventative and protective measures taken.
- Establish a suitable means of contacting the emergency services and provide them with any relevant information about the location of any dangerous substances or critical systems that need to be saved (e.g., servers and confidential files).
- Provide appropriate information, instruction, and training to employees about fire precautions in the workplace. This should take place during normal working hours at the start of, and periodically throughout, their time of employment.
- Ensure that the premises and any equipment provided in connection with firefighting, fire detection or emergency routes and exits, are covered by a suitable system of maintenance, and are maintained by a competent person in an efficient state, in working order and in good repair.
- With the exception of the first and last, these responsibilities can be delegated, but the responsible person remains accountable in law for any failures of fire safety arrangements.

5.2 Shift Team Leader

Ensure that assessments and reviews of assessments are carried as per schedule, assigning teams (or individuals) to carry out the assessments, agreeing actions, which have been identified, ensuring that progress is being made on actions and signing off assessments where appropriate. Responsible for ensuring, that the findings are adequately communicated.

The QHSE Team Leader is responsible for the day-to-day coordination of activity such as keeping up to date the fire safety file, arranging safety checks and fire drills and the maintenance of equipment.

5.3 Fire Risk Assessor

The Fire Risk Assessor is responsible for coordinating the undertaking of the Fire Risk Assessment and Fire Safety File by a competent person and for maintaining both documents. Reviewing and maintaining this PMI through the UK group office and the plants Fire Safety File.

They should coordinate the development of an action plan for fire risk reduction as part of the QHSE committee and provide support and advise on fire protection and control measures.

They are also responsible for ensuring that individuals receive relevant information and training about evacuation procedures and actions to take in the event of a fire. They should monitor compliance of fire control measures and liaise with the local fire service.

5.4 All staff

Workers must not interfere with any equipment provided for safety; this will include fire extinguishers and fire blankets.

Portable fire extinguishers are intended for use under certain conditions only:

- To save life, for example if someone’s clothing was on fire.
- To aid escape, for example if the only available fire escape route was on fire.
- To stop a manageable fire spreading.

Workers must never wedge open fire doors (or otherwise hold them open against self-closing devices) as this prevents the protective arrangements for fire safety working as designed and may put lives at risk. If a through-put of air is required or if the amount of traffic requires doors to be open this should be raised with the manager to arrange remedial measures such as door hold open devices that are connected to alarm system.

6. Procedure

6.1 Initial Fire Risk Assessments

The initial Fire Risk Assessment was undertaken by an external contractor organised through EPC.

6.2 Timing of assessments

Fire Risk Assessments are initiated as various areas of the plant become operational/live or alternatively, as new plant or machinery is installed, new legislation published, or changes in work methods affecting quantities of combustible materials or ignition sources.

All Fire Risk Assessments must be reviewed as per item 6.7 Review Periods of this procedure.

6.3 New Fire Risk Assessments

A Fire Risk Assessment shall be undertaken to identify fire hazards and associated risks, including:

- Task based operations (SECO Ltd. & Contractor).
- Operational based risks.
- Structural layouts that may prevent individuals being able to escape in the event of a fire.
- The impact on the environment as a result of fire.

The risks identified by the assessment shall be controlled to reduce the risk(s) to As Low As is Reasonably Practicable (ALARP).

Following a change of use of a building/structure or any major modification to the system or building, the Fire Risk Assessment shall be reviewed for effectiveness.

Activities with the potential to increase the likelihood of a fire, such as hot works, shall be assessed but controlled through task-based risk/assessment/procedures.

6.3.1 The Fire Risk Assessor

- Identifies specific areas that require assessment. This area may be broken down into smaller areas where fewer generic assessments are deemed necessary.

- Discusses with the Plant Manager the requirements for team make up (if required).

- Utilising the plant specific Fire Risk Assessment form, identifies and records the following:
  - Potential fire hazards.
  - Potential sources of heat/ignition.
  - Protection by fire detection systems.
  - Firefighting equipment.
  - Personnel affected.
  - Escape routes.
  - Emergency signage.

- When considering fire hazards, utilises the following:
  - Incident reports.
  - Manuals.
  - Guidance from external authorities.
  - Determines fire risk level according to the risk matrix incorporated in the Fire Risk Assessment form.
  - Where additional controls are identified should discuss them with the relevant Team Leader or Plant Manager and draw up a control action plan.
  - Approve the Fire Risk Assessment form.
  - Agrees the distribution of the Fire Risk Assessment form with the Plant Manager.
  - Arranges distribution with the Document Controller and the filing of the master copy.

6.3.2 *The Plant Manager in conjunction with the Fire Risk Assessor*

- Determines the method of communicating the findings with those who are affected by the assessment including any special groups identified.

- Ensures that the document reference is entered onto the document system so that the assessment may be referenced in any future work orders that may be affected by the assessment.

6.4 Emergency Response Plan

The Operations and/or Maintenance Manager shall ensure this PMI remains aligned and integrated with the fire action, within the Emergency Response and Preparedness procedure 9000.RP.500.004.

The Fire Emergency Plan shall be tested at periodic intervals to access effectiveness. Amendments shall be made to the plan based on the assessment of the test findings.

Changes to the Emergency Response Plan shall be communicated to all individuals and groups affected.

6.5 Firefighting equipment

Portable and fixed firefighting equipment as determined by the Fire Risk Assessment shall be recorded in the Fire Safety File. The location of portable and fixed firefighting equipment shall be clearly signed.

Portable firefighting equipment (fire extinguishers and hose reels) shall be inspected at set intervals (annually unless otherwise indicated through the Fire Safety File) by a competent person. A regular visual inspection (weekly) shall be undertaken by a competent person. Records shall be kept of the inspection and maintenance of portable equipment within the CMMS.

During the annual inspection all hose reels should be tested, and any fire bagging similarly tested.

Portable extinguishers shall only be used by individuals who are trained in their use.

Fixed systems and equipment shall have a schedule for maintenance, testing and inspection. Fixed equipment shall be tested at set intervals and following any major work.

Where a system or part of a system is taken out of service an assessment should be carried out and appropriate control measures put in place before any work is undertaken.

Fire suppression (deluge) systems should be tested and maintained every four years aligning with an outage period.

Records of inspection and maintenance shall be maintained within the CMMS.

6.6 Fire alarms and fire detection systems

The Fire Risk Assessment shall identify the position and type of fire alarm and detecting systems, both of which shall be recorded within the Fire Safety File.

The fire alarm shall be tested weekly, ensuring all alarms sound, and can be heard. The test shall be recorded in the CMMS. Periodic checking of 'break glass' alarms shall be undertaken to determine they remain fit for use.

Any defects associated with the fire system alarms or detection shall be raised within the CMMS system and be given priority status for rectification.

6.7 Review periods

The Fire Risk Assessment must be reviewed upon:

- The review date being reached.
- Any plant modifications.
- New legislation being published.
- Changes in work methods affecting quantities of combustible materials or ignition sources, audit findings.
- Following any fire incident or significant near miss.

6.8 Review of existing assessments

The Fire Risk Assessor:

- Checks the contents of the current assessment to see if they are still valid.
- Determines whether there are any new hazards that need to be recorded.
- If no new hazards are identified, then the Fire Risk Assessor:
    - Revises the assessment review date after agreement with the Plant Manager.
    - Signs the assessment form.
    - Obtains from the Plant Managers signature on the assessment.
    - Arranges with the Document Controller the re-issue and distribution of the revised assessment.
    - Communicates the fact that the assessment has been reviewed t those affected.
    - Arranges for the master copy to be updated.

6.9 Control Action Plan

Where additional controls are required the Fire Risk Assessor:

- Discusses them with the relevant manager and agrees a Control Action Plan with target completion dates. All action will be tracked using the HSE tracking system.
- Reviews the progress and completion targets.
- Informs the relevant manager where progress is not being made.
- When actions have been completed updates the Fire Risk Assessment form.
- The QHSE Team Leader assigns personnel to carry out the agreed actions and monitors progress against the plan.

6.10 Means of escape

Emergency routes and exits shall lead as directly as possible to a place of safety. Escape routes shall be clearly signed indicating the direction of travel, maintained, and kept clear from obstruction.

Escape routes shall have emergency lighting fitted with an alternative means of power, in the event power fails during an evacuation. Doors shall open in the direction of travel and shall not be locked.

All means of escape equipment will be subject to a planned programme of preventative maintenance to include:

- Testing of automatic door release mechanisms.
- Testing emergency lighting systems.
- Visual inspection of fire exit doors and associated door furniture.
- Records of the above shall be maintained within the CMMS.

6.11 Fire Training Register

The Operations and/or Maintenance Manager ensures that a register of trained fire wardens is maintained, giving the following information:

- Name.
- Date of training.
- Trainer.

- The approved trainer appointed by the Plant Manager adds the trainee's name to the register on completion of an approved training course.

New staff, agency workers, contractors and volunteers must be shown:

- The main fire safety arrangements on the first day of their employment.

This must include:

- How to raise the alarm.
- What the alarm sounds like and when it is tested.
- The location of fire exits.
- The location of fire assembly points.
- The details of who takes charge of the situation and how to recognise them.
- How to report any concerns regarding fire safety.
- If they have a disability how any special requirements will be provided.

6.12 Fire Wardens duties

The Operations and/or Maintenance Manager will appoint the sufficient numbers of fire wardens required to ensure that the fire procedures and the fire safety risk assessment can be implemented. At plants this means that each shift has a designated Fire Warden on duty at all times, in all cases this will be the duty Shift Team Leader.

Fire Wardens are expected to be the "eyes and ears" in terms of fire safety for their workplace and act on any shortcomings in terms of fire safety found by or reported to them.

Fire Wardens receive the training required to fight manageable fires in order to prevent them becoming large ones. However, they are instructed never to put themselves at risk including not actively seeking a fire in order to put it out.

Fire Wardens take charge in real and practice fire situations even if there are more senior personnel present. All workplaces are expected to have procedures in place to determine who takes charge if there happens to be more than one fire marshal on duty. In all cases the duty Fire Warden will be the duty Shift Team Leader.

All persons with a disability or a medical condition which means they would require assistance to in an emergency must have a Personal Emergency Evacuation Plan (PEEP). The Fire Warden is responsible for ensuring that all PEEPs are carried out as and when required.

During a fire emergency Fire Wardens are expected to:

- Ensure that the emergency services are contacted.
- Assist with and organise the evacuation process.
- Monitor the situation via fire panels if present and safe to do so.
- Ensure a roll call is taken.
- Liaise with the attending fire service, communicating any relevant information to them including any persons not accounted for who are thought to be still in the building, the likely location of the fire, any fire or explosion hazards present and any other information the fire fighters may need to ensure their safety.

6.13 Fire maintenance

All fire safety equipment should be subject to a planned programme of preventative maintenance as follows:

- Fire alarm systems, including automatic door release mechanisms, are tested.
- Emergency lighting systems are tested.
- Fire doors, fire exit doors and associated door furniture are examined and tested.
- Firefighting appliances are examined and tested.
- Records of all checks/inspections and servicing are maintained within the CMMS system and/or in a fire logbook as appropriate.

6.14 Fire Safety File

A Fire Safety File shall detail the equipment installed as determined by the Fire Risk Assessment and shall be incorporated into the plant's Emergency Response Plan.

Refuges required for disabled persons to await assistance from the emergency services shall be identified in the Fire Safety File.

The Fire Safety File shall include the following documentation:

- A plan of the plant including a layout of the workplace, escape routes and self-closing fire doors provided to protect the means of escape.
- The locations of manually operated fire alarm call-points.
- Arrangements for personal evacuation plans (PEEP).

- The significant findings of the most recent Fire Safety Risk Assessment.
- The means of fighting fires (details of the number, type, and location of the firefighting equipment) include both portable and fixed.
- Details of service and maintenance requirements of any fire alarm/detection system and records of any maintenance conducted.
- Emergency lighting test and service details (CMMS).
- Routine inspections of any automatic fire door closers (CMMS).
- Call-points, a record of any tests conducted (CMMS).
- Location and maintenance records of firefighting equipment.
- Records of fire drills including any significant issues (CMMS).
- Fire safety training records (this can be a summary giving dates and numbers attending).
- Details of all fire alarm activations including false alarms.
- The location of the main isolation points for the following:
  - Main electrical supply switch.
  - Main water and oil shut off valves.
- The location of hazardous and flammable products.

SHEET	REV.	SUBJECT:
001	5	EQUIPMENT LAYOUT OF CCTV, ACCESS CONTROL & DCS WIFI SYSTEM, COVER SHEET
002	3	EQUIPMENT LAYOUT OF CCTV SYSTEM, CAMERA ADJUSTMENT SETTINGS
003	3	EQUIPMENT LAYOUT OF CCTV SYSTEM, ACCESS CONTROL SETTINGS
011	5	EQUIPMENT LAYOUT OF CCTV SYSTEM, EXTERIOR CAMERAS
012	2	EQUIPMENT LAYOUT OF CCTV SYSTEM, EL ANNEX & SERVICE BUILDING (UBB), PLAN VIEW, LEVEL: +8.200m
013	2	EQUIPMENT LAYOUT OF CCTV SYSTEM, STEAM TURBINE BUILDING (UMA), GROUND FLOOR PLAN, LEVEL: +0.000m
014	2	EQUIPMENT LAYOUT OF CCTV SYSTEM, BOILER BUILDING (UHA), PLAN VIEW, LEVEL: +3.500m
015	2	EQUIPMENT LAYOUT OF CCTV SYSTEM, BOILER BUILDING (UHA), PLAN VIEW, LEVEL: +17.000m
016	2	EQUIPMENT LAYOUT OF CCTV SYSTEM, BOILER BUILDING (UHA), PLAN VIEW, LEVEL: +20.000m
017	2	EQUIPMENT LAYOUT OF CCTV SYSTEM, BOILER BUILDING (UHA), PLAN VIEW, LEVEL: +31.500m
018	3	EQUIPMENT LAYOUT OF CCTV SYSTEM, WASTE FUEL UNLOADING AREA (UEA) & WASTE FUEL STORAGE AREA (UEB), GROUND FLOOR PLAN, LEVEL: +0.000m
019	3	EQUIPMENT LAYOUT OF CCTV SYSTEM, WASTE FUEL UNLOADING AREA (UEA) & WASTE FUEL STORAGE AREA (UEB), PLAN VIEW, LEVEL: +8.000m & +18.500m
020	3	EQUIPMENT LAYOUT OF CCTV SYSTEM, ADMINISTRATION BUILDING (UYC), GROUND FLOOR PLAN, LEVEL: +0.000m
021	2	EQUIPMENT LAYOUT OF CCTV SYSTEM, ACC & TURBINE BUILDING EL ROOM (UBV), GROUND FLOOR PLAN, LEVEL: +0.000m
022	2	EQUIPMENT LAYOUT OF CCTV SYSTEM, FLUE GAS TREATMENT EL BUILDING (UBW), GROUND FLOOR PLAN, LEVEL: +0.000m
023	3	EQUIPMENT LAYOUT OF CCTV SYSTEM, SECURITY GATE HOUSE (UYF), GROUND FLOOR PLAN, LEVEL: +4.000m
031	2	ACCESS CONTROL SYSTEM, EL ANNEX & SERVICE BUILDING (UBB), PLAN VIEW, LEVEL: +8.200m & DO & AMMONIA TANK AREA (UEK), GROUND FLOOR PLAN, LEVEL : -0.210m
032	3	ACCESS CONTROL SYSTEM, WASTE FUEL UNLOADING AREA (UEA), GROUND FLOOR PLAN, LEVEL: +2.000m & PLAN VIEW, LEVEL: 8.000m
033	2	ACCESS CONTROL SYSTEM, SECURITY GATE HOUSE (UYF), GROUND FLOOR PLAN, LEVEL: +4.000m
034	2	ACCESS CONTROL SYSTEM, MAIN GATE AREA (UZA), GROUND FLOOR PLAN, LEVEL: +0.000m
035	2	ACCESS CONTROL SYSTEM, ADMINISTRATION BUILDING (UYC), GROUND FLOOR PLAN, LEVEL: +0.000m
211	5	SUMMARY OF ELECTRICAL MATERIALS

2031.E4.C01.001

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
5	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
4	2021.03.01	GELMA	CBVI/JOPE	REVISED ISSUE FOR CONSTRUCTION	SNZ
3	2021.02.16	GELMA	CBVI/MAGA	REVISED ISSUE FOR CONSTRUCTION	RNM
2	2020.07.02	GELMA	JOMS/CBVI	REVISED ISSUE FOR CONSTRUCTION	CUA
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:

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PROJECT MANAGER:

CoGen

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CONTRACTOR:

BWSC

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TECHNOLOGY PROVIDER:

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Sartech ENGINEERING
L&L LEROUX & LOTZ Groupe Altawest

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PROJECT:

HOOTON BIO
POWER PROJECT

SUB-CONTRACTOR:

SUBJECT:

EQUIPMENT LAYOUT OF CCTV, ACCESS CONTROL & DCS WIFI SYSTEM
COVER SHEET

SCALE:

BWSC DWG.NO.: 2031 : E4 . C01 . 001 (PROJECT NO. / GR. / NO. / SHT.) REV. 5

NO.	NAME	MODEL	LOCATION	HEIGHT(m)	IP ADDRESS
1	GN101	AXIS P3245-LVE	STEAM TURBINE BUILDING +15 (UMA)	15	192.168.109.11
2	GN102	AXIS P3245-LVE	STEAM TURBINE BUILDING +7 (UMA)	7	192.168.109.12
3	GN201	AXIS P1435-LE	PERIMETER N3 (UZA)	7	192.168.109.21
4	GN202	AXIS P1435-LE	PERIMETER E1 (UZA)	7	192.168.109.22
5	GN203	AXIS P1435-LE	PERIMETER N4 (UZA)	7	192.168.109.23
6	GN204	AXIS P1435-LE	PERIMETER E2 (UZA)	7	192.168.109.24
7	GN205	AXIS P1435-LE	DIESEL UNLOADING (UEH)	7	192.168.109.25
8	GN206	AXIS P1435-LE	FLY ASH UNLOADING FRONT	4	192.168.109.26
9	GN207	AXIS P1435-LE	FLY ASH UNLOADING SIDE	4	192.168.109.27
10	GN208	AXIS P1435-LE	SLAG STORAGE CUBICLES WAS (UEW)	4	192.168.109.28
11	GN301	AXIS P3245-LVE	UNLOADING PIT CABINE VIEW	9	192.168.109.31
12	GN302	AXIS P3245-LVE	LINE SIGHT SHREDDERS/CRANE MAINTENANCE (UEA)	23.5	192.168.109.32
13	GN303	AXIS P3245-LVE	SHREDDERS TOP (UEA)	29	192.168.109.33
14	GN304	AXIS P3245-LVE	SHREDDER TOP & SHREADDER OUTLET	20	192.168.109.34
15	GN305	AXIS P3245-LVE	UNLOADING PIT OVERVIEW/CRANE MAINTENANCE (UEA)	27	192.168.109.35
16	GN306	AXIS P3245-LVE	FUEL STORAGE OVERVIEW/LINE SIGHT FEEDERS	29	192.168.109.36
17	GN307	AXIS P3245-LVE	FUEL STORAGE OVERVIEW (UEB)	24	192.168.109.37
18	GN308	AXIS P3245-LVE	TOP CRANE OVERVIEW (UEB)	28.5	192.168.109.38
19	GN309	AXIS P3245-LVE	CRANE MAINTENANCE (UEA)	7	192.168.109.39
20	GN310	AXIS P3245-LVE	REJECT CONTAINER (UEA)	6	192.168.109.40
21	GN311	AXIS P1435-LE	SLAG STORAGE REJECT CONTAINERS (UEW)	4	192.168.109.41
22	GN401	AXIS P1435-LE	SLAG STORAGE CUBICLES EAST (UEW)	5	192.168.109.42
23	GN402	AXIS P3245-LVE	UNLOADING PIT WATER CANNON W	11	192.168.109.43
24	GN403	AXIS P5666-E	PTZ (UZA)	16	192.168.109.44
25	GN404	AXIS P3807-PVE	WIDEVIEW (UZA)	16	192.168.109.45
26	GN405	AXIS P3245-LVE	TIPPING HALL TRAFFIC SITUATION (UEA)	16	192.168.109.46
27	GN406	AXIS P3245-LVE	UNLOADING PIT OPPOSITE VIEW (UEA)	9	192.168.109.47
28	GN501	AXIS P1435-LE	PERIMETER N2 (UZA)	8	192.168.109.51
29	GN502	AXIS P1435-LE	PERIMETER W2 (UZA)	9	192.168.109.52
30	GN503	AXIS P1435-LE	PERIMETER N1 (UZA)	10	192.168.109.53
31	GN504	AXIS P1435-LE	CAR PARK SOUTH (UZD)	10	192.168.109.54
32	GN505	AXIS P1435-LE	CAR PARK NORTH (UZD)	10	192.168.109.55
33	GN601	AXIS P1435-LE	PERIMETER S3 (UZA)	13	192.168.109.61
34	GN602	AXIS P1435-LE	PERIMETER W1 (UZA)	13	192.168.109.62
35	GN603	AXIS P1435-LE	WEIGHBRIDGE OUT REAR (UZA)	11	192.168.109.63
36	GN604	AXIS P1435-LE	WEIGHBRIDGE IN FRONT/PERIMETER S1 (UZA)	11	192.168.109.64
37	GN605	AXIS P1435-LE	WEIGHBRIDGE OUT FRONT/IN REAR (UZA)	13	192.168.109.65
38	GN606	AXIS P1435-LE	WEIGHBRIDGE IN REAR (UZA)	11	192.168.109.66
39	GN607	AXIS P1435-LE	PERIMETER S2 (UZA)	11	192.168.109.67
40	GN701	AXIS P1435-LE	ROAD BARRIER 1 (UZA)	11	192.168.109.71
41	GN702	AXIS P1435-LE	SITE ENTRANCE (UZA)	11	192.168.109.72
42	A00CYP11 GN001	AXIS Q2901-E	THERMAL CAMERA, UNLOADING PIT W	9	192.168.109.91
43	A00CYP11 GN002	AXIS Q2901-E	THERMAL CAMERA, UNLOADING PIT E	9	192.168.109.92
44	A00CYP11 GN003	AXIS Q2901-E	THERMAL CAMERA, SHREDDERS TOP	29	192.168.109.93
45	A00CYP11 GN004	AXIS Q2901-E	THERMAL CAMERA, WASTE HOPPERS 20	24	192.168.109.94
46	A00CYP11 GN005	AXIS Q2901-E	THERMAL CAMERA, WASTE HOPPERS 10	24	192.168.109.95
47	A00CYP11 GN006	AXIS Q2901-E	THERMAL CAMERA, WASTE FUEL STORAGE TOP S	29	192.168.109.96
48	A00CYP11 GN007	AXIS Q2901-E	THERMAL CAMERA, WASTE FUEL STORAGE TOP C	20	192.168.109.97
49	A00CYP11 GN008	AXIS Q2901-E	THERMAL CAMERA, WASTE FUEL STORAGE TOP N	29	192.168.109.98
50	A10CYP10 GN101	AXIS P3245-LVE	WASTE HOPPER 1	24	192.168.109.101

NO.	NAME	MODEL	LOCATION	HEIGHT(m)	IP ADDRESS
51	A10CYP10 GN102	AXIS P3245-LVE	WASTE HOPPER 2	24	192.168.109.102
52	A10CYP10 GN103	AXIS P3245-LVE	WASTE FEEDING CONVEYOR 1	22.8	192.168.109.103
53	A10CYP10 GN104	AXIS P3245-LVE	WASTE FEEDING CONVEYOR 2	22.8	192.168.109.104
54	A10CYP10 GN105	AXIS P3245-LVE	WASTE FEEDING CONVEYOR 1 TOP	22.8	192.168.109.105
55	A10CYP10 GN106	AXIS P3245-LVE	WASTE FEEDING CONVEYOR 2 TOP	22.8	192.168.109.106
56	A10CYP10 GN107	AXIS P1375-E	GASIFICATION FURNACE 10	17	192.168.109.107
57	A10CYP10 GN108	AXIS P3245-LVE	MELTING FURNACE	5.5	192.168.109.108
58	A10CYP10 GN109	AXIS P3245-LVE	MELTING FURNACE SLAG	5.5	192.168.109.109
59	A10CYP10 GN110	AXIS P3245-LVE	INCOMBUSTIBLES DISCHARGER	4.5	192.168.109.110
60	A10CYP10 GN111	AXIS Q3515-LVE	BOILER METER	33	192.168.109.111
61	A20CYP10 GN101	AXIS P3245-LVE	WASTE HOPPER 1	23	192.168.109.201
62	A20CYP10 GN102	AXIS P3245-LVE	WASTE HOPPER 2	23	192.168.109.202
63	A20CYP10 GN103	AXIS P3245-LVE	WASTE FEEDING CONVEYOR 1	22.8	192.168.109.203
64	A20CYP10 GN104	AXIS P3245-LVE	WASTE FEEDING CONVEYOR 2	22.8	192.168.109.204
65	A20CYP10 GN105	AXIS P3245-LVE	WASTE FEEDING CONVEYOR 1 TOP	22.8	192.168.109.205
66	A20CYP10 GN106	AXIS P3245-LVE	WASTE FEEDING CONVEYOR 2 TOP	22.8	192.168.109.206
67	A20CYP10 GN107	AXIS P1375-E	GASIFICATION FURNACE 20	17	192.168.109.207
68	A20CYP10 GN108	AXIS P3245-LVE	MELTING FURNACE	5.5	192.168.109.208
69	A20CYP10 GN109	AXIS P3245-LVE	MELTING FURNACE SLAG	5.5	192.168.109.209
70	A20CYP10 GN110	AXIS P3245-LVE	INCOMBUSTIBLES DISCHARGER	4.5	192.168.109.210
71	A20CYP10 GN111	AXIS Q3515-LVE	BOILER METER	33	192.168.109.211

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
3	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
2	2020.07.02	GELMA	JOMS/CBVI	REVISED ISSUE FOR CONSTRUCTION	CUA
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

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PROJECT:
HOOTON BIO
POWER PROJECT

SUB-CONTRACTOR:

SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
CAMERA ADJUSTMENT SETTINGS

SCALE:

BWSC DWG.NO.: 2031.E4.C01.002 (PROJECT NO. / GR. / NO. / SHT.)

REV. 3

2031.E4.C01.002

NO.	NAME	MODEL	LOCATION	IP ADDRESS
72	A00CYU51 GN001	AXIS A8207	VIDEO DOOR STATION WITH KEYPAD & RFID SCANNER, SERVICE BUILDING MAIN DOOR OUTSIDE	192.168.109.171
73	A00CYU51 GH001	AXIS A1001	DOOR CONTROLLER, SERVICE BUILDING MAIN DOOR INSIDE	192.168.109.151
74	A00CYU41 GN001	AXIS A8105	VIDEO DOOR STATION/INTERCOM, DO & AMMONIA TANK AREA	192.168.109.161
75	A00CYU71 GN001	AXIS A8207	VIDEO DOOR STATION WITH KEYPAD & RFID SCANNER, LOX OFFLOADING	192.168.109.178
76	A00CYU22 GN001	AXIS A4010	RFID SCANNER, CRANE OPERATOR CABINE OUTSIDE	–
77	A00CYU22 GH001	AXIS A1001	DOOR CONTROLLER, CRANE OPERATOR CABIN	192.168.109.152
78	A00CYU24 GN001	AXIS A4010	RFID SCANNER, TIPPING HALL NORTH ENTRANCE DOOR OUTSIDE	–
79	A00CYU24 GH001	AXIS A1001	DOOR CONTROLLER, TIPPING HALL NORTH ENTRANCE DOOR INSIDE	192.168.109.153
80	A00CYU25 GN001	AXIS A8105	VIDEO DOOR STATION/INTERCOM, TIPPING HALL NORTH ENTRANCE DOOR INSIDE	192.168.109.162
81	A00CYU26 GN001	AXIS A4010	RFID SCANNER, TIPPING HALL SOUTH ENTRANCE DOOR OUTSIDE	–
82	A00CYU26 GH001	AXIS A1001	DOOR CONTROLLER, TIPPING HALL SOUTH ENTRANCE DOOR INSIDE	192.168.109.154
83	A00SQB10 GH012	AXIS A8105	VIDEO DOOR STATION/INTERCOM, D3	192.168.109.163
84	A00SQB20 GH012	AXIS A8105	VIDEO DOOR STATION/INTERCOM, EGRESS WEIGHBRIDGE	192.168.109.164
85	A00SQE11 GH011	AXIS A8207	VIDEO DOOR STATION WITH KEYPAD & RFID SCANNER, MAIN GATE ENTRANCE INGRESS	192.168.109.172
86	A00SQE11 GH012	AXIS A8207	VIDEO DOOR STATION WITH KEYPAD & RFID SCANNER, MAIN GATE ENTRANCE EGRESS	192.168.109.173
87	A00SQE11 GH013	AXIS A1001	DOOR CONTROLLER, MAIN GATE ENTRANCE INSIDE	192.168.109.157
88	A00SQE21 GH001	AXIS A8207	VIDEO DOOR STATION WITH KEYPAD & RFID SCANNER, ROAD BARRIER LORRY HEIGHT INGRESS	192.168.109.174
89	A00SQE21 GH002	AXIS A8207	VIDEO DOOR STATION WITH KEYPAD & RFID SCANNER, ROAD BARRIER CAR HEIGHT INGRESS	192.168.109.175
90	A00SQE21 GH003	AXIS A1001	DOOR CONTROLLER, INGRESS ROAD BARRIER, MAIN GATE	192.168.109.158
91	A00SQE31 GH001	AXIS A8207	VIDEO DOOR STATION WITH KEYPAD & RFID SCANNER, ROAD BARRIER LORRY HEIGHT EGRESS	192.168.109.176
92	A00SQE31 GH002	AXIS A8207	VIDEO DOOR STATION WITH KEYPAD & RFID SCANNER, ROAD BARRIER CAR HEIGHT EGRESS	192.168.109.177
93	A00SQE31 GH003	AXIS A1001	DOOR CONTROLLER, EGRERSS ROAD BARRIER, MAIN GATE	192.168.109.159
94	A00CYU23 GN001	AXIS C3003–E	HORN SPEAKER, TIPPING HALL ROOF	192.168.109.181
95	A00CYU21 GN002	AXIS 2N SIP MIC	CONFERENCE MICROPHONE, CRANE CABIN ALONGSIDE CCTV OPERATOR STATION	–
96	A00CYU61 GN002	AXIS A4010–E	RFID SCANNER, ADMIN BUILDING ALONGSIDE CCTV OPERATOR STATION	–
97	A00CYU62 GN001	AXIS A4010–E	RFID SCANNER, PARKING AREA	–
98	A00CYU62 GN002	AXIS A8105–E	VIDEO DOOR STATION/INTERCOM, PARKING AREA	–

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
3	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
2	2021.02.16	GELMA	CBVI/MAGA	REVISED ISSUE FOR CONSTRUCTION	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

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HOOTON BIO POWER LTD.
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PROJECT MANAGER:
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CONTRACTOR:
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TECHNOLOGY PROVIDER:
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PROJECT:
HOOTON BIO POWER PROJECT

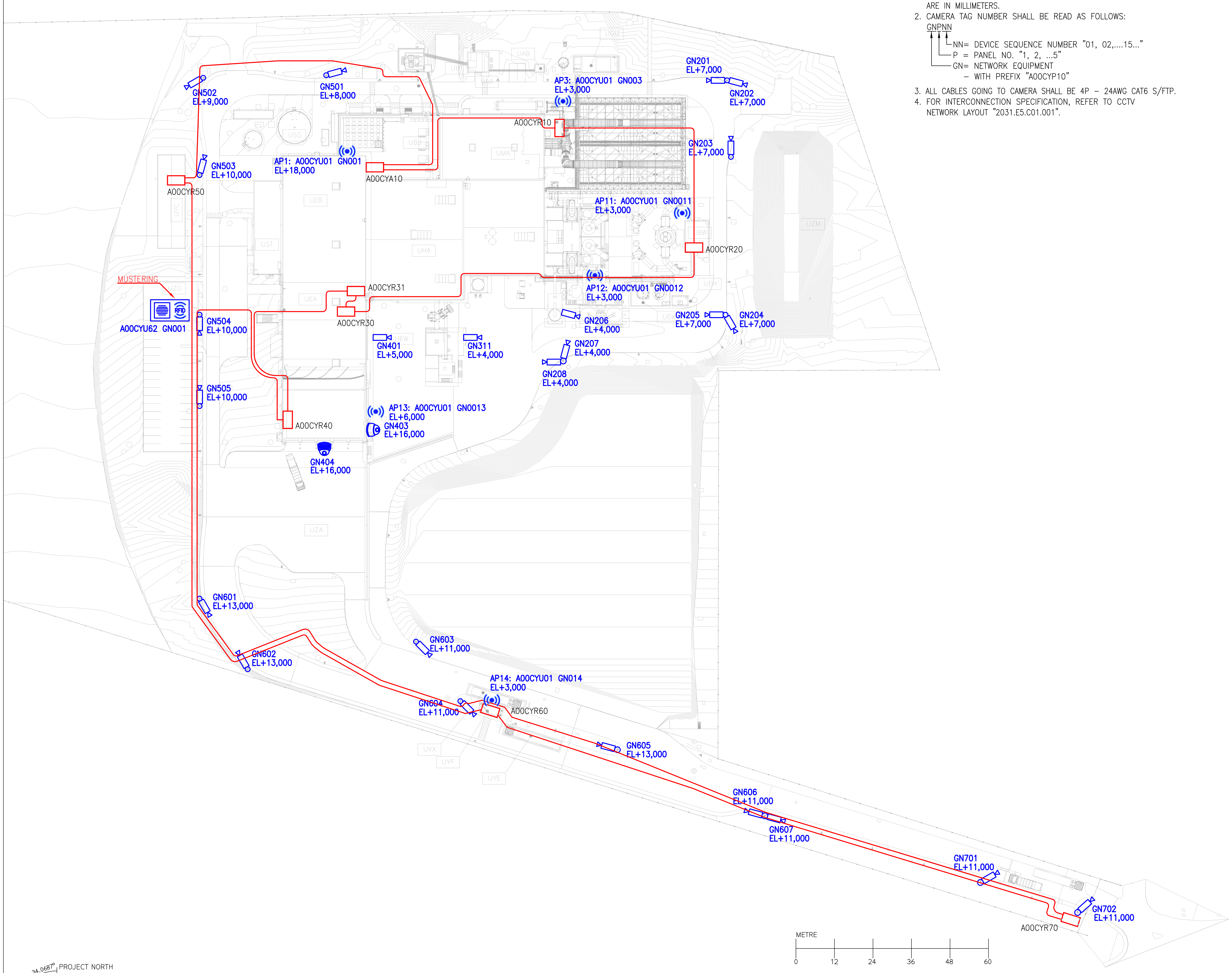
SUB-CONTRACTOR:

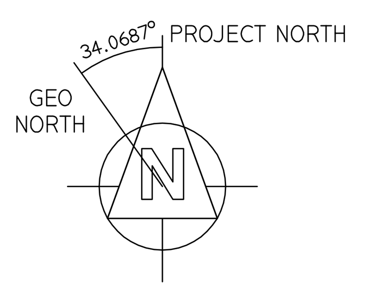
SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
ACCESS CONTROL SETTINGS

SCALE: 2

BWSC DWG.NO.: 2031 E4 C01 003 (PROJECT NO. / GR. / NO. / SHT.) REV. 3

2031.E4.C01.003





NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. CAMERA TAG NUMBER SHALL BE READ AS FOLLOWS:
   GNPNN
   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
   - P = PANEL NO. "1, 2, ...5"
   - GN= NETWORK EQUIPMENT
     - WITH PREFIX "A00CYP10"
3. ALL CABLES GOING TO CAMERA SHALL BE 4P – 24AWG CAT6 S/FTP.
4. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P1435–LE FULL HD BULLET NETWORK CAMERA 3–10.5mm, F1.4 – FIELD OF VIEW: H: 95°–35° V: 51°–20° IP66, IR LED 30m TEMPERATURE: –30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
	AXIS P1375–E FULL HD BOX NETWORK CAMERA 8–50mm, F1.6 CS MOUNT – ANGLE OF VIEW: 34°–6° IP66 TEMPERATURE: –40°C to 60°C PoE: TYPICAL 5.9W, max. 10.3W
	AXIS Q2901–E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/–5°C(+/–9°F) ACCURACY BELOW 150°C (302°F): +/–5% ACCURACY ABOVE 150°C (302°F): +/–20% ACCURACY IP66 TEMPERATURE: –40°C to 60°C PoE: max. 10W
	AXIS P3807–PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 – FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
	AXIS P5666–E FULL HD PTZ NETWORK CAMERA 4.3–137.6mm, F1.4–4.0 – FIELD OF VIEW: H: 58.3°–2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 10W, max. 19W
	AXIS P3245–LVE FULL HD DOME NETWORK CAMERA 3.4–8.9mm, F1.8 – FIELD OF VIEW: H: 100°–36° V: 53°–20° IP66, IR LED 40m TEMPERATURE: –40°C to 60°C PoE: TYPICAL 6.4W, max. 11.3W
	AXIS Q3515–LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°–36° V: 57°–21° IP69K, IR LED 40m TEMPERATURE: –50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W
OTHER CENTRAL EQUIPMENT	
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
	WIRELESS ACCESS POINT: NFT–2AC OUTDOOR
CAMERA POSTS	
	10 METER LAMP POST
CABLES	
	FIBER RING
ACCESS CONTROL	
RFID	AXIS A8207–VE NETWORK VIDEO DOOR STATION WITH RFID PoE IP66

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.001.001	LAYOUT DRAWING	EXTRACTED

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
5	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
4	2021.03.01	GELMA	CBVI/JOPE	REVISED ISSUE FOR CONSTRUCTION	SNZ
3	2021.02.16	GELMA	CBVI/MAGA	REVISED ISSUE FOR CONSTRUCTION	RNM
2	2020.07.02	GELMA	JOMS/CBVI	REVISED ISSUE FOR CONSTRUCTION	CUA
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:

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PROJECT:

HOOTON BIO POWER PROJECT

SUB–CONTRACTOR:

SUBJECT:

EQUIPMENT LAYOUT OF CCTV SYSTEM
EXTERIOR CAMERAS

SCALE:
A1 = 1:600
A3 = 1:1200

BWSC DWG.NO.: 2031:E4.C01.011 (PROJECT NO. : GR. : NO. : SHT.)

REV. 5

2031.E4.C01.011

LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P1435–LE FULL HD BULLET NETWORK CAMERA 3–10.5mm, F1.4 – FIELD OF VIEW: H: 95°–35° V: 51°–20° IP66, IR LED 30m TEMPERATURE: –30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
	AXIS P1375–E FULL HD BOX NETWORK CAMERA 8–50mm, F1.6 CS MOUNT – ANGLE OF VIEW: 34°–6° IP66 TEMPERATURE: –40°C to 60°C PoE: TYPICAL 5.9W, max. 10.3W
	AXIS Q2901–E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/–5°C(+/–9°F) ACCURACY BELOW 150°C (302°F): +/–5% ACCURACY ABOVE 150°C (302°F): +/–20% ACCURACY IP66 TEMPERATURE: –40°C to 60°C PoE: max. 10W
	AXIS P3807–PVE FULL HD PANAROMIC NETWORK CAMERA FIXED 3.2mm, F2.0 – FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
	AXIS P5666–E FULL HD PTZ NETWORK CAMERA 4.3–137.6mm, F1.4–4.0 – FIELD OF VIEW: H: 58.3°–2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 10W, max. 19W

LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P3245–LVE FULL HD DOME NETWORK CAMERA 3.4–8.9mm, F1.8 – FIELD OF VIEW: H: 100°–36° V: 53°–20° IP66, IR LED 40m TEMPERATURE: –40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W
	AXIS Q3515–LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°–36° V: 57°–21° IP69K, IR LED 40m TEMPERATURE: –50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W
OTHER CENTRAL EQUIPMENT	
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
	WIRELESS ACCESS POINT: NFT–2AC OUTDOOR
CAMERA POSTS	
	10 METER LAMP POST
CABLES	
	FIBER RING

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. CAMERA TAG NUMBER SHALL BE READ AS FOLLOWS:
   GNPNN
   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
   - P = PANEL NO. "1, 2, ...5"
   - GN= NETWORK EQUIPMENT
     – WITH PREFIX "A00CYP10"
3. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:
   APN: PPGNNNN
   - NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05"
     – WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P – 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.713.001	LAYOUT DRAWING	EXTRACTED

METRE
0 1.5 3 4.5 6 7.5

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
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BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11–9RD, UK
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CONTRACTOR:
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TECHNOLOGY PROVIDER:
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Sartech ENGINEERING
L&L LEROUX & LOTZ Groupe Altawest
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KOBE 651–0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

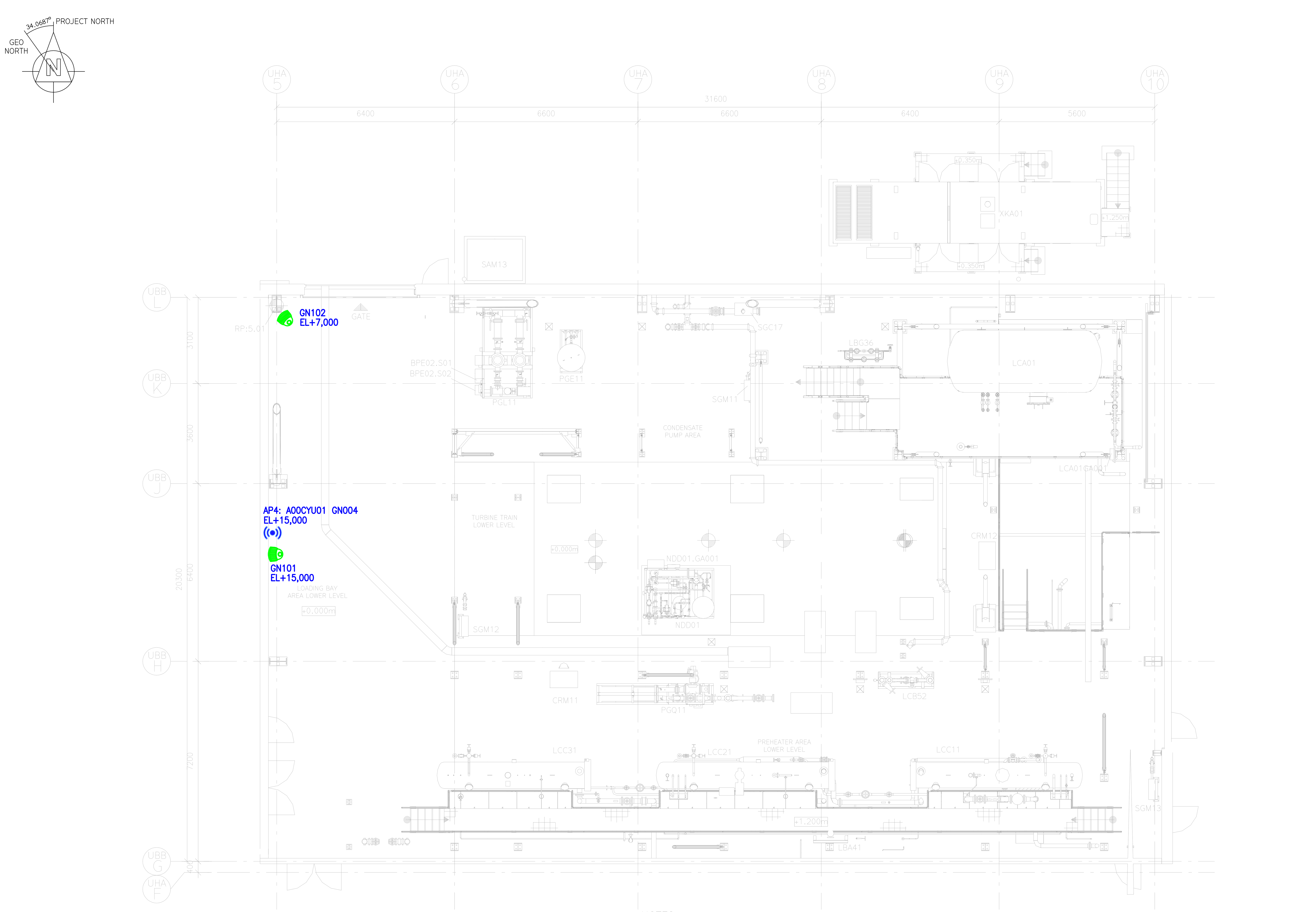
SUB–CONTRACTOR:

SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
EL ANNEX & SERVICE BUILDING (UBB)
PLAN VIEW, LEVEL: +8.200m

SCALE:
A1 = 1:75
A3 = 1:150

BWSC DWG.NO.: 2031.E4.C01.012 (PROJECT NO. / GR. / NO. / SHT.)
REV. 2

2031.E4.C01.012



LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P1435–LE FULL HD BULLET NETWORK CAMERA 3–10.5mm, F1.4 – FIELD OF VIEW: H: 95°–35° V: 51°–20° IP66, IR LED 30m TEMPERATURE: –30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
	AXIS P1375–E FULL HD BOX NETWORK CAMERA 8–50mm, F1.6 CS MOUNT – ANGLE OF VIEW: 34°–6° IP66 TEMPERATURE: –40°C to 60°C PoE: TYPICAL 5.9W, max. 10.3W
	AXIS Q2901–E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/–5°C(+/–9°F) ACCURACY BELOW 150°C (302°F): +/–5% ACCURACY ABOVE 150°C (302°F): +/–20% ACCURACY IP66 TEMPERATURE: –40°C to 60°C PoE: max. 10W
	AXIS P3807–PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 – FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
	AXIS P5666–E FULL HD PTZ NETWORK CAMERA 4.3–137.6mm, F1.4–4.0 – FIELD OF VIEW: H: 58.3°–2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 10W, max. 19W
	AXIS P3245–LVE FULL HD DOME NETWORK CAMERA 3.4–8.9mm, F1.8 – FIELD OF VIEW: H: 100°–36° V: 53°–20° IP66, IR LED 40m TEMPERATURE: –40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W
	AXIS Q3515–LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°–36° V: 57°–21° IP69K, IR LED 40m TEMPERATURE: –50°C to 50°C PoE: TYPICAL 5.6W, max. 12.5W
OTHER CENTRAL EQUIPMENT	
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
	WIRELESS ACCESS POINT: NFT–2AC OUTDOOR
CAMERA POSTS	
	10 METER LAMP POST
CABLES	
	FIBER RING

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. CAMERA TAG NUMBER SHALL BE READ AS FOLLOWS:
   GNPNN
   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
   - P = PANEL NO. "1, 2, ...5"
   - GN= NETWORK EQUIPMENT
     – WITH PREFIX "A00CYP10"
3. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:
   APN: PPGNNNN
   - NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05"
     – WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P – 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.500.001	LAYOUT DRAWING	EXTRACTED

METRE 0 1.5 3 4.5 6 7.5

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
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PROJECT MANAGER:
CoGen
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CONTRACTOR:
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TELEPHONE :+45 48140022
TELEFAX :+45 48140150

TECHNOLOGY PROVIDER:
KOBELCO ECO-SOLUTIONS CO.,LTD.
Sartech ENGINEERING
LEROUX & LOTZ Groupe Altawest
WAKINOHAMACHO
CHUOKU
KOBE 651–0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

SUB–CONTRACTOR:

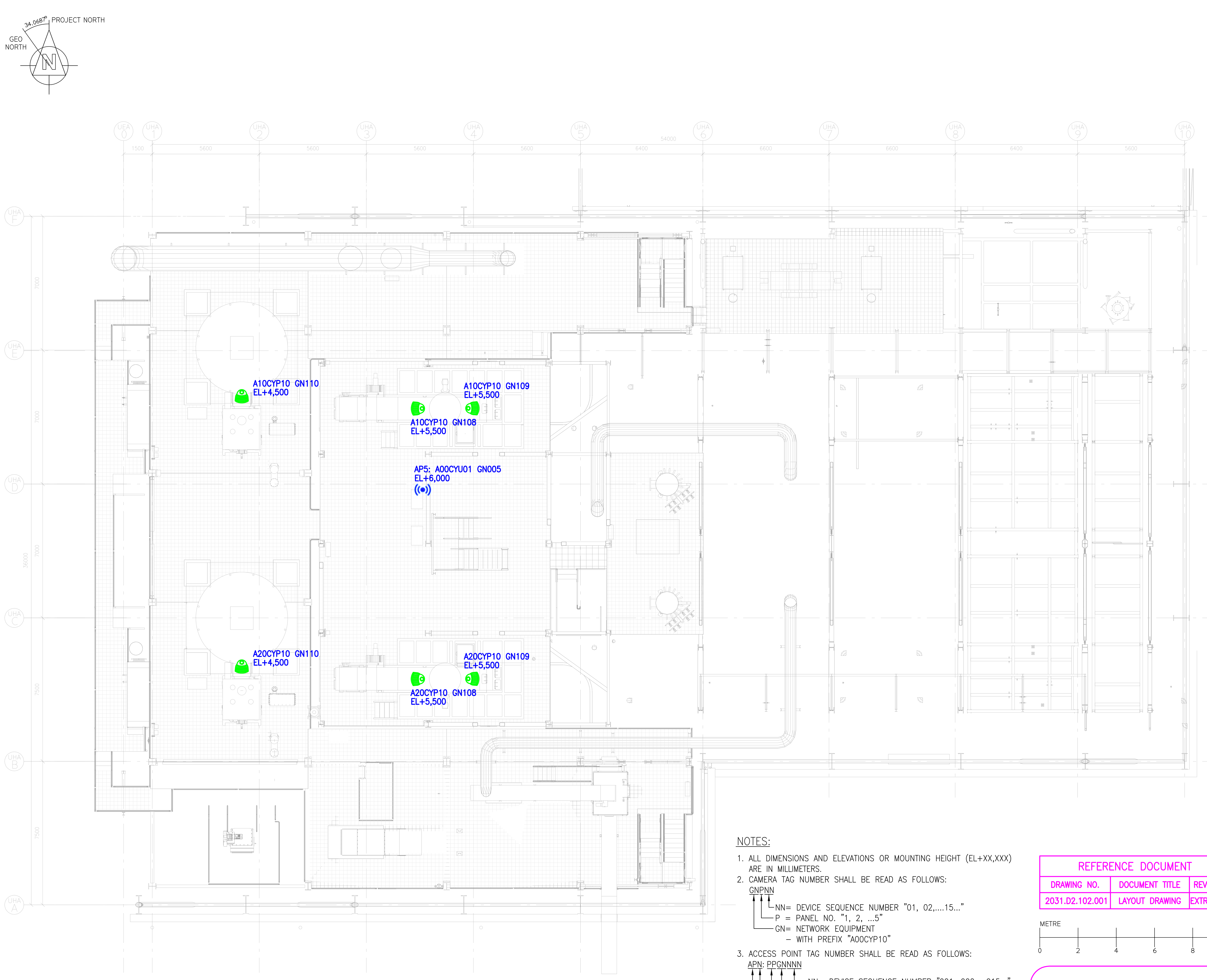
SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
STEAM TURBINE BUILDING (UMA)
GROUND FLOOR PLAN, LEVEL: +0.000m

SCALE: A1 = 1:75, A3 = 1:150

BWSC DWG.NO.: 2031.E4.C01.013 (PROJECT NO. / GR. / NO. / SHT.)

REV. 2

2031.E4.C01.013



LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P1435–LE FULL HD BULLET NETWORK CAMERA 3–10.5mm, F1.4 – FIELD OF VIEW: H: 95°–35° V: 51°–20° IP66, IR LED 30m TEMPERATURE: –30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
	AXIS P1375–E FULL HD BOX NETWORK CAMERA 8–50mm, F1.6 CS MOUNT – ANGLE OF VIEW: 34°–6° IP66 TEMPERATURE: –40°C to 60°C PoE: TYPICAL 5.9W, max. 10.3W
	AXIS Q2901–E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/–5°C(+/–9°F) ACCURACY BELOW 150°C (302°F): +/–5% ACCURACY ABOVE 150°C (302°F): +/–20% ACCURACY IP66 TEMPERATURE: –40°C to 60°C PoE: max. 10W
	AXIS P3807–PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 – FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
	AXIS P5666–E FULL HD PTZ NETWORK CAMERA 4.3–137.6mm, F1.4–4.0 – FIELD OF VIEW: H: 58.3°–2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 10W, max. 19W
	AXIS P3245–LVE FULL HD DOME NETWORK CAMERA 3.4–8.9mm, F1.8 – FIELD OF VIEW: H: 100°–36° V: 53°–20° IP66, IR LED 40m TEMPERATURE: –40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W
	AXIS Q3515–LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°–36° V: 57°–21° IP69K, IR LED 40m TEMPERATURE: –50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W
OTHER CENTRAL EQUIPMENT	
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
((•))	WIRELESS ACCESS POINT: NFT–2AC OUTDOOR
CAMERA POSTS	
O	10 METER LAMP POST
CABLES	
	FIBER RING

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. CAMERA TAG NUMBER SHALL BE READ AS FOLLOWS:
   GNPNN
   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
   - P = PANEL NO. "1, 2, ...5"
   - GN= NETWORK EQUIPMENT
     – WITH PREFIX "A00CYP10"
3. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:
   APN: PPGNNNN
   - NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05"
     – WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P – 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.102.001	LAYOUT DRAWING	EXTRACTED

METRE 0 2 4 6 8 10

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11–9RD, UK
TELEPHONE :+44 01782 384898

PROJECT MANAGER:
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BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11–9RD, UK
TELEPHONE :+44 01782 384898

CONTRACTOR:
BWSC
BURMEISTER & WAIN SCANDINAVIAN CONTRACTOR A/S DENMARK
GYDEVANG 35
POST OFFICE BOX 235
DK 3450 ALLEROED, DENMARK
TELEPHONE :+45 48140022
TELEFAX :+45 48140150

TECHNOLOGY PROVIDER:
KOBELCO ECO-SOLUTIONS CO.,LTD.
Sartech
L&L LEROUX & LOTZ
WAKINOHAMACHO
CHUOKU
KOBE 651–0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

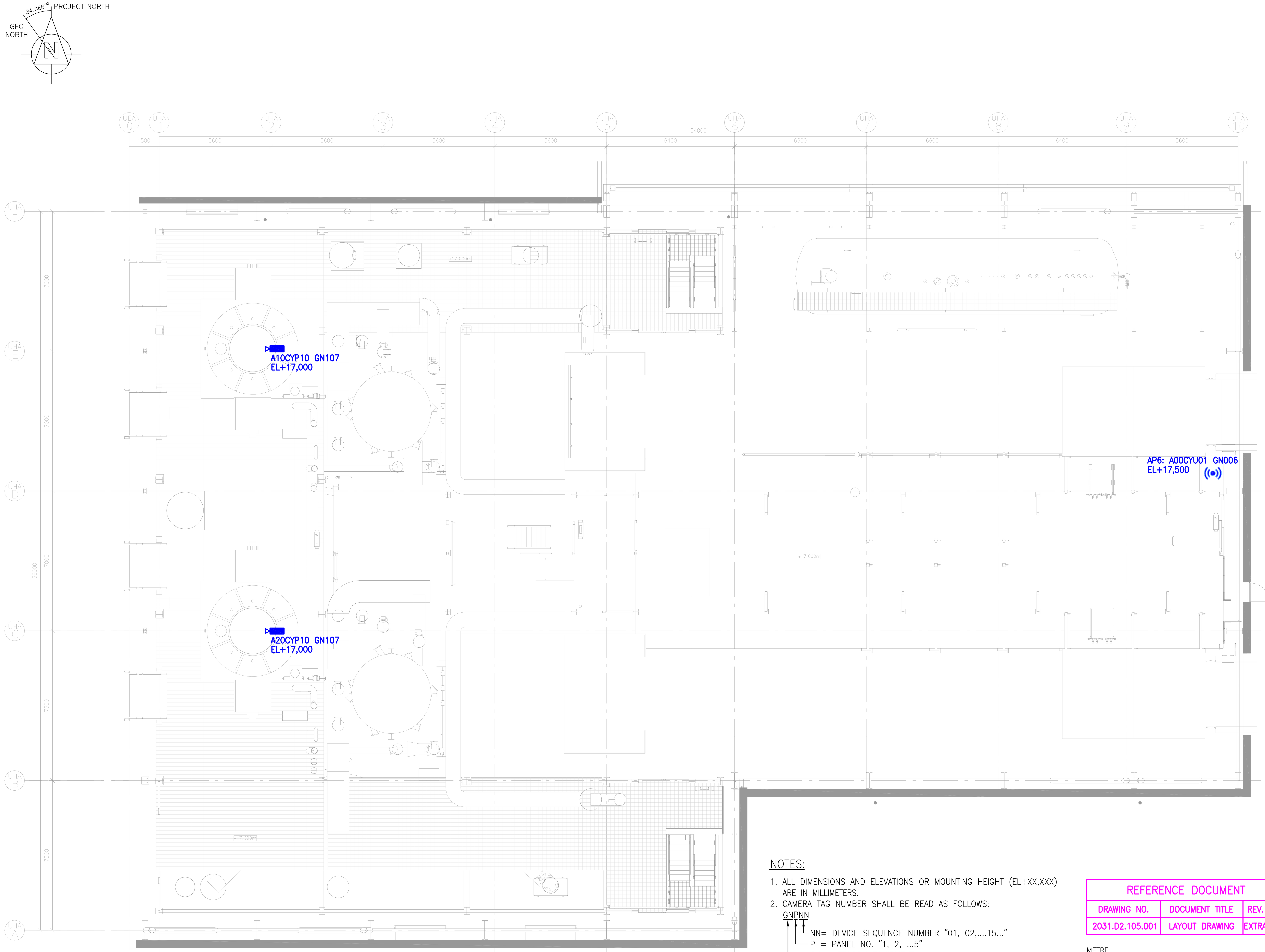
SUB–CONTRACTOR:

SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
BOILER BUILDING (UHA)
PLAN VIEW LEVEL: +3.500m

SCALE:
A1 = 1:100
A3 = 1:200

BWSC DWG.NO.: 2031.E4.C01.014 (PROJECT NO. / GR. / NO. / SHT.) REV. 2

2031.E4.C01.014



LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P1435-LE FULL HD BULLET NETWORK CAMERA 3-10.5mm, F1.4 – FIELD OF VIEW: H: 95°-35° V: 51°-20° IP66, IR LED 30m TEMPERATURE: -30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
	AXIS P1375-E FULL HD BOX NETWORK CAMERA 8-50mm, F1.6 CS MOUNT – ANGLE OF VIEW: 34°-6° IP66 TEMPERATURE: -40°C to 60°C PoE: TYPICAL 5.9W, max. 10.3W
	AXIS Q2901-E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/-5°C(+/-9°F) ACCURACY BELOW 150°C (302°F): +/-5% ACCURACY ABOVE 150°C (302°F): +/-20% ACCURACY IP66 TEMPERATURE: -40°C to 60°C PoE: max. 10W
	AXIS P3807-PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 – FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: -30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
	AXIS P5666-E FULL HD PTZ NETWORK CAMERA 4.3-137.6mm, F1.4-4.0 – FIELD OF VIEW: H: 58.3°-2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: -30°C to 50°C PoE: TYPICAL 10W, max. 19W
	AXIS P3245-LVE FULL HD DOME NETWORK CAMERA 3.4-8.9mm, F1.8 – FIELD OF VIEW: H: 100°-36° V: 53°-20° IP66, IR LED 40m TEMPERATURE: -40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W
	AXIS Q3515-LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°-36° V: 57°-21° IP69K, IR LED 40m TEMPERATURE: -50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W
OTHER CENTRAL EQUIPMENT	
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
((•))	WIRELESS ACCESS POINT: NFT-2AC OUTDOOR
CAMERA POSTS	
O	10 METER LAMP POST
CABLES	
	FIBER RING

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. CAMERA TAG NUMBER SHALL BE READ AS FOLLOWS:
   GNPNN
   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
   - P = PANEL NO. "1, 2, ...5"
   - GN= NETWORK EQUIPMENT
     – WITH PREFIX "A00CYP10"
3. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:
   APN: PPGNNNN
   - NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05"
     – WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P – 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.105.001	LAYOUT DRAWING	EXTRACTED

METRE
0 2 4 6 8 10

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11-9RD, UK
TELEPHONE :+44 01782 384898

PROJECT MANAGER:
CoGen
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11-9RD, UK
TELEPHONE :+44 01782 384898

CONTRACTOR:
BWSC
BURMEISTER & WAIN SCANDINAVIAN CONTRACTOR A/S DENMARK
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TELEPHONE :+45 48140022
TELEFAX :+45 48140150

TECHNOLOGY PROVIDER:
KOBELCO ECO-SOLUTIONS CO.,LTD.
Sartech
L&L LEROUX & LOTZ
WAKINOHAMACHO
CHUOKU
KOBE 651-0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

SUB-CONTRACTOR:

SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
BOILER BUILDING (UHA)
PLAN VIEW, LEVEL: +17.000m

SCALE:
A1 = 1:100
A3 = 1:200

BWSC DWG.NO.:
2031.E4.C01.015
PROJECT NO. GR. NO. SHT.
REV. 2

2031.E4.C01.015

LEGEND:

EXTERNAL/INTERNAL CAMERAS	
(bullet camera symbol)	AXIS P1435–LE FULL HD BULLET NETWORK CAMERA 3–10.5mm, F1.4 – FIELD OF VIEW: H: 95°–35° V: 51°–20° IP66, IR LED 30m TEMPERATURE: –30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
(box camera symbol)	AXIS P1375–E FULL HD BOX NETWORK CAMERA 8–50mm, F1.6 CS MOUNT – ANGLE OF VIEW: 34°–6° IP66 TEMPERATURE: –40°C to 60°C PoE: TYPICAL 5.9W, max. 10.3W
(temperature camera symbol)	AXIS Q2901–E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/–5°C(+/–9°F) ACCURACY BELOW 150°C (302°F): +/–5% ACCURACY ABOVE 150°C (302°F): +/–20% ACCURACY IP66 TEMPERATURE: –40°C to 60°C PoE: max. 10W
(panoramic camera symbol)	AXIS P3807–PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 – FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
(PTZ camera symbol)	AXIS P5666–E FULL HD PTZ NETWORK CAMERA 4.3–137.6mm, F1.4–4.0 – FIELD OF VIEW: H: 58.3°–2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 10W, max. 19W
(dome camera symbol)	AXIS P3245–LVE FULL HD DOME NETWORK CAMERA 3.4–8.9mm, F1.8 – FIELD OF VIEW: H: 100°–36° V: 53°–20° IP66, IR LED 40m TEMPERATURE: –40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W
(dome camera symbol)	AXIS Q3515–LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°–36° V: 57°–21° IP69K, IR LED 40m TEMPERATURE: –50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W
OTHER CENTRAL EQUIPMENT	
(red rectangle)	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
((•))	WIRELESS ACCESS POINT: NFT–2AC OUTDOOR
CAMERA POSTS	
○	10 METER LAMP POST
CABLES	
(red line)	FIBER RING

2031.E4.C01.016

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. CAMERA TAG NUMBER SHALL BE READ AS FOLLOWS:
   GNPNN
   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
   - P = PANEL NO. "1, 2, ...5"
   - GN= NETWORK EQUIPMENT – WITH PREFIX "A00CYP10"
3. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:
   APN: PPGNNNN
   - NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05" – WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P – 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.107.001	LAYOUT DRAWING	EXTRACTED

METRE 0 2 4 6 8 10

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11–9RD, UK
TELEPHONE :+44 01782 384898

PROJECT MANAGER:
CoGen
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11–9RD, UK
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CONTRACTOR:
BWSC
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GYDEVANG 35
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TELEPHONE :+45 48140022
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TECHNOLOGY PROVIDER:
KOBELCO ECO-SOLUTIONS CO.,LTD.
Sartech
L&L LEROUX & LOTZ
WAKINOHAMACHO
CHUOKU
KOBE 651–0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

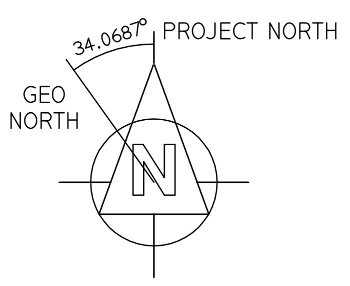
SUB–CONTRACTOR:

SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
BOILER BUILDING (UHA)
PLAN VIEW, LEVEL: +20.000m

SCALE:
A1 = 1:100
A3 = 1:200

BWSC DWG.NO.: 2031.E4.C01.016 (PROJECT NO. / GR. / NO. / SHT.)

REV. 2



NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. CAMERA TAG NUMBER SHALL BE READ AS FOLLOWS:
   GNPNN
   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
   - P = PANEL NO. "1, 2, ...5"
   - GN= NETWORK EQUIPMENT – WITH PREFIX "A00CYP10"
3. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:
   APN: PPGNNNN
   - NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05" – WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P – 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P1435–LE FULL HD BULLET NETWORK CAMERA 3–10.5mm, F1.4 – FIELD OF VIEW: H: 95°–35° V: 51°–20° IP66, IR LED 30m TEMPERATURE: –30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
	AXIS P1375–E FULL HD BOX NETWORK CAMERA 8–50mm, F1.6 CS MOUNT – ANGLE OF VIEW: 34°–6° IP66 TEMPERATURE: –40°C to 60°C PoE: TYPICAL 5.9W, max. 10.3W
	AXIS Q2901–E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/–5°C(+/–9°F) ACCURACY BELOW 150°C (302°F): +/–5% ACCURACY ABOVE 150°C (302°F): +/–20% ACCURACY IP66 TEMPERATURE: –40°C to 60°C PoE: max. 10W
	AXIS P3807–PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 – FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
	AXIS P5666–E FULL HD PTZ NETWORK CAMERA 4.3–137.6mm, F1.4–4.0 – FIELD OF VIEW: H: 58.3°–2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 10W, max. 19W
	AXIS P3245–LVE FULL HD DOME NETWORK CAMERA 3.4–8.9mm, F1.8 – FIELD OF VIEW: H: 100°–36° V: 53°–20° IP66, IR LED 40m TEMPERATURE: –40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W
	AXIS Q3515–LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°–36° V: 57°–21° IP69K, IR LED 40m TEMPERATURE: –50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W
OTHER CENTRAL EQUIPMENT	
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
	WIRELESS ACCESS POINT: NFT–2AC OUTDOOR
CAMERA POSTS	
	10 METER LAMP POST
CABLES	
	FIBER RING

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
–	LAYOUT DRAWING	EXTRACTED

METRE
0 2 4 6 8 10

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

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KOBE 651–0072, JAPAN
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PROJECT:
HOOTON BIO POWER PROJECT

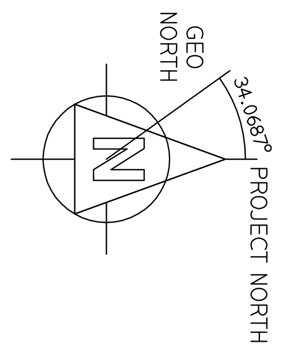
SUB–CONTRACTOR:

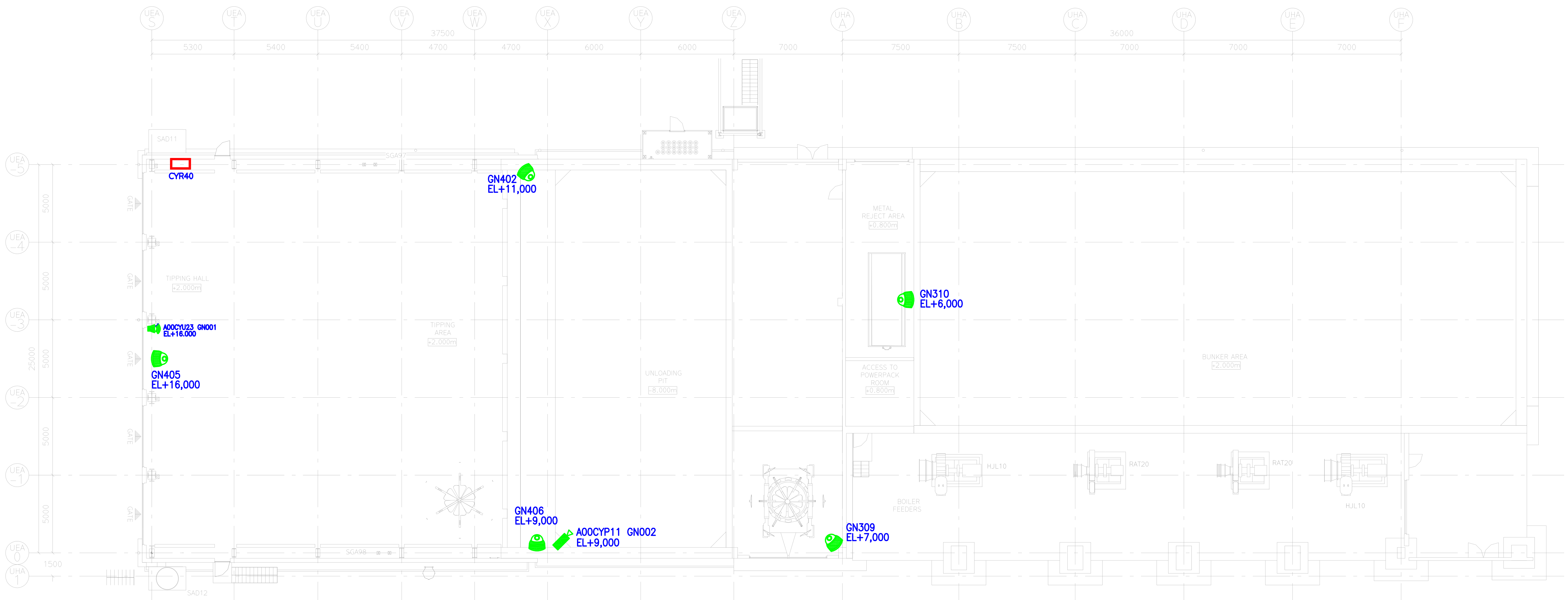
SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
BOILER BUILDING (UHA)
PLAN VIEW, LEVEL: +31.500m

SCALE:
A1 = 1:100
A3 = 1:200

BWSC DWG.NO.:
2031.E4.C01.017 (PROJECT NO. / GR. / NO. / SHT.)
REV. 2

2031.E4.C01.017





LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P1435–LE FULL HD BULLET NETWORK CAMERA 3–10.5mm, F1.4 – FIELD OF VIEW: H: 95°–35° V: 51°–20° IP66, IR LED 30m TEMPERATURE: –30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
	AXIS P1375–E FULL HD BOX NETWORK CAMERA 8–50mm, F1.6 CS MOUNT – ANGLE OF VIEW: 34°–6° IP66 TEMPERATURE: –40°C to 60°C PoE: TYPICAL 5.9W, max. 10.3W
	AXIS Q2901–E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/–5°C(+/–9°F) ACCURACY BELOW 150°C (302°F): +/–5% ACCURACY ABOVE 150°C (302°F): +/–20% ACCURACY IP66 TEMPERATURE: –40°C to 60°C PoE: max. 10W
	AXIS P3807–PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 – FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
	AXIS P5666–E FULL HD PTZ NETWORK CAMERA 4.3–137.6mm, F1.4–4.0 – FIELD OF VIEW: H: 58.3°–2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 10W, max. 19W

	AXIS P3245–LVE FULL HD DOME NETWORK CAMERA 3.4–8.9mm, F1.8 – FIELD OF VIEW: H: 100°–36° V: 53°–20° IP66, IR LED 40m TEMPERATURE: –40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W
	AXIS Q3515–LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°–36° V: 57°–21° IP69K, IR LED 40m TEMPERATURE: –50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W
	AXIS C3003–E HORN SPEAKER
OTHER CENTRAL EQUIPMENT	
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
	WIRELESS ACCESS POINT: NFT–2AC OUTDOOR
CAMERA POSTS	
	10 METER LAMP POST
CABLES	
	FIBER RING

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. CAMERA TAG NUMBER SHALL BE READ AS FOLLOWS:
   GNPNN
   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
   - P = PANEL NO. "1, 2, ...5"
   - GN= NETWORK EQUIPMENT
     – WITH PREFIX "A00CYP10"
3. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:
   APN: PPGNNNN
   - NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05"
     – WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P – 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
–	LAYOUT DRAWING	EXTRACTED

METRE 0 3 6 9 12 15

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
3	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
2	2020.07.02	GELMA	JOMS/CBVI	REVISED ISSUE FOR CONSTRUCTION	CUA
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
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PROJECT MANAGER:
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Sartech ENGINEERING
L&L LEROUX & LOTZ Groupe Altawest
WAKINOHAMACHO
CHUOKU
KOBE 651–0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

SUB–CONTRACTOR:

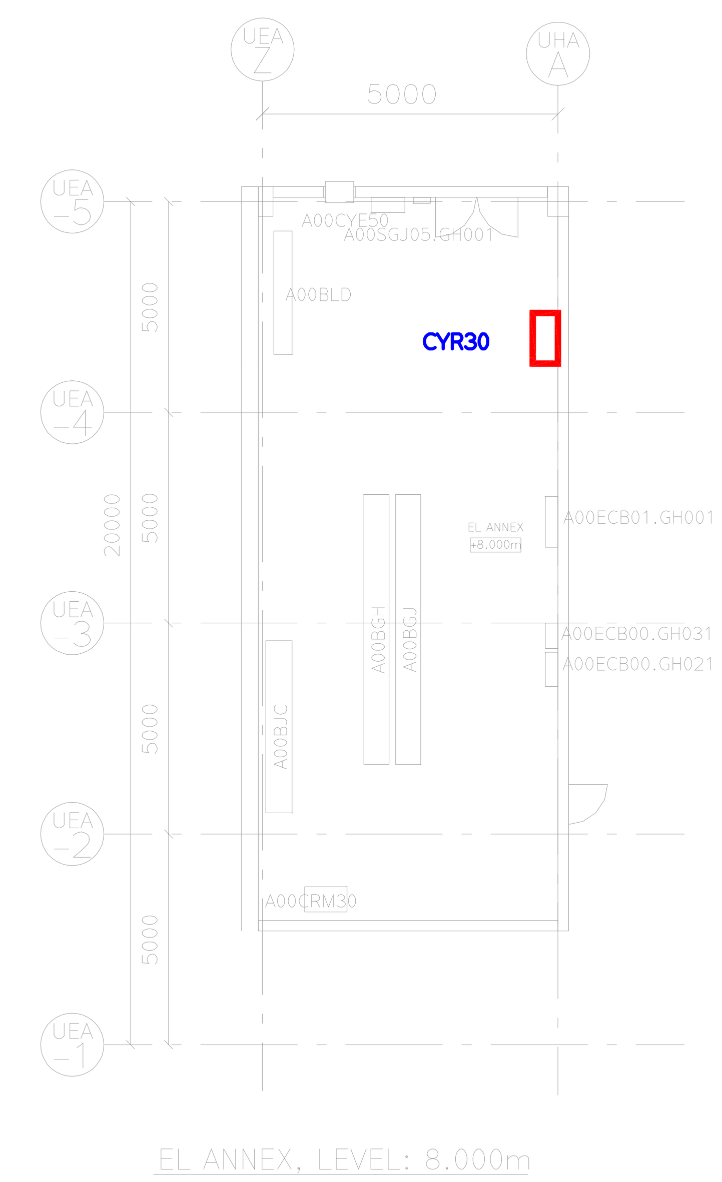
SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
WASTE FUEL UNLOADING AREA (UEA) & WASTE FUEL STORAGE AREA (UEB)
GROUND FLOOR PLAN, LEVEL: +0.000m

SCALE:
A1 = 1:150
A3 = 1:300

BWSC DWG.NO.: 2031.E4.C01.018 (PROJECT NO. GR. NO. SHT.)

REV. 3

2031.E4.C01.018



LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P1435-LE FULL HD BULLET NETWORK CAMERA 3-10.5mm, F1.4 - FIELD OF VIEW: H: 95°-35° V: 51°-20° IP66, IR LED 30m TEMPERATURE: -30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
	AXIS P1375-E FULL HD BOX NETWORK CAMERA 8-50mm, F1.6 CS MOUNT - ANGLE OF VIEW: 34°-6° IP66 TEMPERATURE: -40°C to 60°C PoE: TYPICAL 5.9W, max. 10.3W
	AXIS Q2901-E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/-5°C(+/-9°F) ACCURACY BELOW 150°C (302°F): +/-5% ACCURACY ABOVE 150°C (302°F): +/-20% ACCURACY IP66 TEMPERATURE: -40°C to 60°C PoE: max. 10W
	AXIS P3807-PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 - FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: -30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
	AXIS P5666-E FULL HD PTZ NETWORK CAMERA 4.3-137.6mm, F1.4-4.0 - FIELD OF VIEW: H: 58.3°-2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: -30°C to 50°C PoE: TYPICAL 10W, max. 19W
	AXIS P3245-LVE FULL HD DOME NETWORK CAMERA 3.4-8.9mm, F1.8 - FIELD OF VIEW: H: 100°-36° V: 53°-20° IP66, IR LED 40m TEMPERATURE: -40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W
	AXIS Q3515-LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 - FIELD OF VIEW: H: 105°-36° V: 57°-21° IP69K, IR LED 40m TEMPERATURE: -50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W

OTHER CENTRAL EQUIPMENT	
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
((•))	WIRELESS ACCESS POINT: NFT-2AC OUTDOOR
CAMERA POSTS	
o	10 METER LAMP POST
CABLES	
	FIBER RING

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. CAMERA TAG NUMBER SHALL BE READ AS FOLLOWS:
   GNPNN
   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
   - P = PANEL NO. "1, 2, ...5"
   - GN= NETWORK EQUIPMENT
   - WITH PREFIX "A00CYP10"
3. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:
   APN: PPGNNNN
   - NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05"
   - WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P - 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

* CONNECTED TO NETWORK INTERFACE SUBPANEL A00CYR31

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
-	LAYOUT DRAWING	EXTRACTED

METRE 0 3 6 9 12 15

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
3	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
2	2021.02.16	GELMA	CBVI/MAGA	REVISED ISSUE FOR CONSTRUCTION	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11-9RD, UK
TELEPHONE :+44 01782 384898

PROJECT MANAGER:
CoGen
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11-9RD, UK
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CHUOKU
KOBE 651-0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

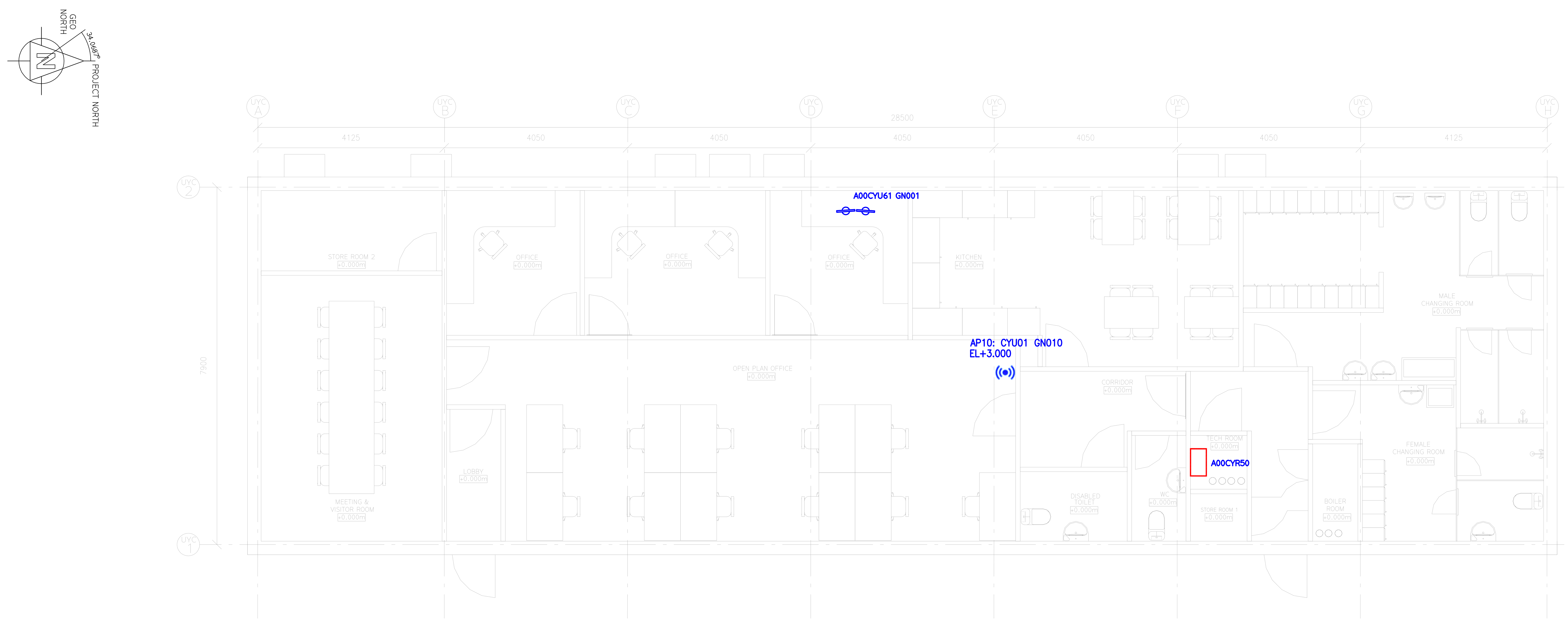
SUB-CONTRACTOR:

SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
WASTE FUEL UNLOADING AREA (UEA) & WASTE FUEL STORAGE AREA (UEB)
PLAN VIEW, LEVEL: +8.000m & +18.500m

SCALE:
A1 = 1:150
A3 = 1:300

BWSC DWG.NO.:
2031.E4.C01.019
PROJECT NO. GR. NO. SHT.
REV. 3

2031.E4.C01.019



LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P1435–LE FULL HD BULLET NETWORK CAMERA 3–10.5mm, F1.4 – FIELD OF VIEW: H: 95°–35° V: 51°–20° IP66, IR LED 30m TEMPERATURE: –30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
	AXIS P1375–E FULL HD BOX NETWORK CAMERA 8–50mm, F1.6 CS MOUNT – ANGLE OF VIEW: 34°–6° IP66 TEMPERATURE: –40°C to 60°C PoE: TYPICAL 5.9W, max. 10.3W
	AXIS Q2901–E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/–5°C(+/–9°F) ACCURACY BELOW 150°C (302°F): +/–5% ACCURACY ABOVE 150°C (302°F): +/–20% ACCURACY IP66 TEMPERATURE: –40°C to 60°C PoE: max. 10W
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	AXIS P5666–E FULL HD PTZ NETWORK CAMERA 4.3–137.6mm, F1.4–4.0 – FIELD OF VIEW: H: 58.3°–2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 10W, max. 19W
	AXIS P3245–LVE FULL HD DOME NETWORK CAMERA 3.4–8.9mm, F1.8 – FIELD OF VIEW: H: 100°–36° V: 53°–20° IP66, IR LED 40m TEMPERATURE: –40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W

	AXIS Q3515–LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°–36° V: 57°–21° IP69K, IR LED 40m TEMPERATURE: –50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W
OTHER CENTRAL EQUIPMENT	
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
	WIRELESS ACCESS POINT: NFT–2AC OUTDOOR
CAMERA POSTS	
	10 METER LAMP POST
CABLES	
	FIBER RING

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
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   APN: PPGNNNN
   - NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05"
     – WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,...15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P – 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.811.001	LAYOUT DRAWING	EXTRACTED

METRE
0 1 2 3 4 5

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
3	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
2	2021.02.16	GELMA	CBVI/MAGA	REVISED ISSUE FOR CONSTRUCTION	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
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BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11–9RD, UK
TELEPHONE :+44 01782 384898

PROJECT MANAGER:
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TELEPHONE :+44 01782 384898

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L&L LEROUX & LOTZ Groupe Altawest
WAKINOHAMACHO
CHUOKU
KOBE 651–0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

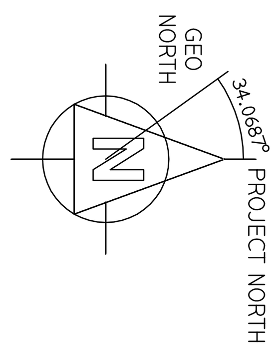
SUB–CONTRACTOR:

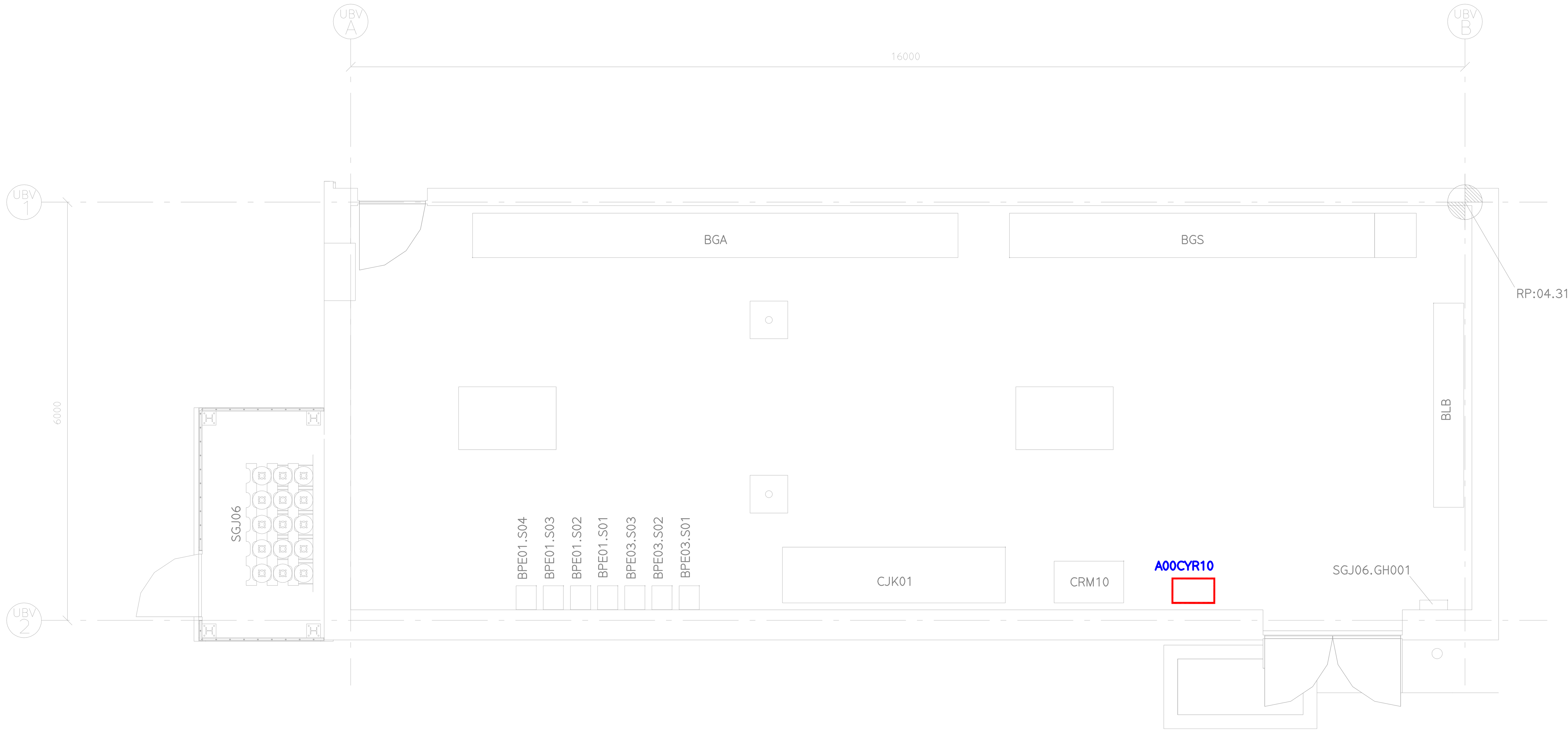
SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
ADMINISTRATION BUILDING (UYC)
GROUND FLOOR PLAN, LEVEL: +0.000m

SCALE:
A1 = 1:50
A3 = 1:100

BWSC DWG.NO.: 2031.E4.C01.020 (PROJECT NO. / GR. / NO. / SHT.)
REV. 3

2031.E4.C01.020





LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P1435–LE FULL HD BULLET NETWORK CAMERA 3–10.5mm, F1.4 – FIELD OF VIEW: H: 95°–35° V: 51°–20° IP66, IR LED 30m TEMPERATURE: –30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
	AXIS P1375–E FULL HD BOX NETWORK CAMERA 8–50mm, F1.6 CS MOUNT – ANGLE OF VIEW: 34°–6° IP66 TEMPERATURE: –40°C to 60°C PoE: TYPICAL 5.9W, max. 10.3W
	AXIS Q2901–E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/–5°C(+/–9°F) ACCURACY BELOW 150°C (302°F): +/–5% ACCURACY ABOVE 150°C (302°F): +/–20% ACCURACY IP66 TEMPERATURE: –40°C to 60°C PoE: max. 10W
	AXIS P3807–PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 – FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
	AXIS P5666–E FULL HD PTZ NETWORK CAMERA 4.3–137.6mm, F1.4–4.0 – FIELD OF VIEW: H: 58.3°–2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 10W, max. 19W
	AXIS P3245–LVE FULL HD DOME NETWORK CAMERA 3.4–8.9mm, F1.8 – FIELD OF VIEW: H: 100°–36° V: 53°–20° IP66, IR LED 40m TEMPERATURE: –40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W
	AXIS Q3515–LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°–36° V: 57°–21° IP69K, IR LED 40m TEMPERATURE: –50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W

OTHER CENTRAL EQUIPMENT	
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
	WIRELESS ACCESS POINT: NFT–2AC OUTDOOR
CAMERA POSTS	
	10 METER LAMP POST
CABLES	
	FIBER RING

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. CAMERA TAG NUMBER SHALL BE READ AS FOLLOWS:
   GNPNN
   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
   - P = PANEL NO. "1, 2, ...5"
   - GN= NETWORK EQUIPMENT
     – WITH PREFIX "A00CYP10"
3. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:
   APN: PPGNNNN
   - NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05"
     – WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P – 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.301.001	LAYOUT DRAWING	EXTRACTED

METRE
0 1 2 3 4 5

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
BLYTHE HOUSE, BLYTHE PARK,
CRESSWELL, STOKE ON TRENT,
STAFFORDSHIRE ST11–9RD, UK
TELEPHONE :+44 01782 384898

PROJECT MANAGER:
CoGen
BLYTHE HOUSE, BLYTHE PARK,
CRESSWELL, STOKE ON TRENT,
STAFFORDSHIRE ST11–9RD, UK
TELEPHONE :+44 01782 384898

CONTRACTOR:
BWSC
BURMEISTER & WAIN
SCANDINAVIAN CONTRACTOR A/S
DENMARK
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DK 3450 ALLEROED, DENMARK
TELEPHONE :+45 48140022
TELEFAX :+45 48140150

TECHNOLOGY PROVIDER:
KOBELCO ECO-SOLUTIONS CO.,LTD.
Sartech ENGINEERING
L&L LEROUX & LOTZ Groupe Altawest
WAKINOHAMACHO
CHUOKU
KOBE 651–0072, JAPAN
TELEPHONE :+81 78 262 7026

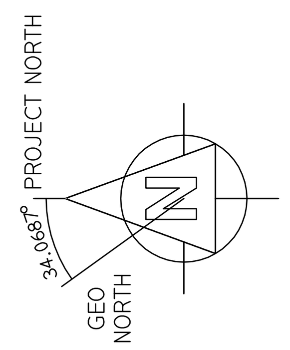
PROJECT:
HOOTON BIO
POWER PROJECT

SUB–CONTRACTOR:

SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
ACC & TURBINE BUILDING EL ROOM (UBV)
GROUND FLOOR PLAN, LEVEL: +0.000m

SCALE:
A1 = 1:50
A3 = 1:100

BWSC DWG.NO.:
2031.E4.C01.021
PROJECT NO. GR. NO. SHT.
REV. 2



LEGEND:

EXTERNAL/INTERNAL CAMERAS	
	AXIS P1435–LE FULL HD BULLET NETWORK CAMERA 3–10.5mm, F1.4 – FIELD OF VIEW: H: 95°–35° V: 51°–20° IP66, IR LED 30m TEMPERATURE: –30°C to 55°C PoE: TYPICAL 4.6W, max. 11W
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	AXIS P3807–PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 – FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
	AXIS P5666–E FULL HD PTZ NETWORK CAMERA 4.3–137.6mm, F1.4–4.0 – FIELD OF VIEW: H: 58.3°–2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: –30°C to 50°C PoE: TYPICAL 10W, max. 19W
	AXIS P3245–LVE FULL HD DOME NETWORK CAMERA 3.4–8.9mm, F1.8 – FIELD OF VIEW: H: 100°–36° V: 53°–20° IP66, IR LED 40m TEMPERATURE: –40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W
	AXIS Q3515–LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°–36° V: 57°–21° IP69K, IR LED 40m TEMPERATURE: –50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W
OTHER CENTRAL EQUIPMENT	
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION
	WIRELESS ACCESS POINT: NFT–2AC OUTDOOR
CAMERA POSTS	
	10 METER LAMP POST
CABLES	
	FIBER RING

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
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   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
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   - GN= NETWORK EQUIPMENT
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   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05"
     – WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P – 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.401.001	LAYOUT DRAWING	EXTRACTED

METRE
0 .5 1 1.5 2 2.5

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11–9RD, UK
TELEPHONE :+44 01782 384898

PROJECT MANAGER:
CoGen
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11–9RD, UK
TELEPHONE :+44 01782 384898

CONTRACTOR:
BWSC
BURMEISTER & WAIN SCANDINAVIAN CONTRACTOR A/S DENMARK
GYDEVANG 35
POST OFFICE BOX 235
DK 3450 ALLEROED, DENMARK
TELEPHONE :+45 48140022
TELEFAX :+45 48140150

TECHNOLOGY PROVIDER:
KOBELCO ECO-SOLUTIONS CO.,LTD.
Sartech ENGINEERING
L&L LEROUX & LOTZ Groupe Altawest
WAKINOHAMACHO
CHUOKU
KOBE 651–0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

SUB–CONTRACTOR:

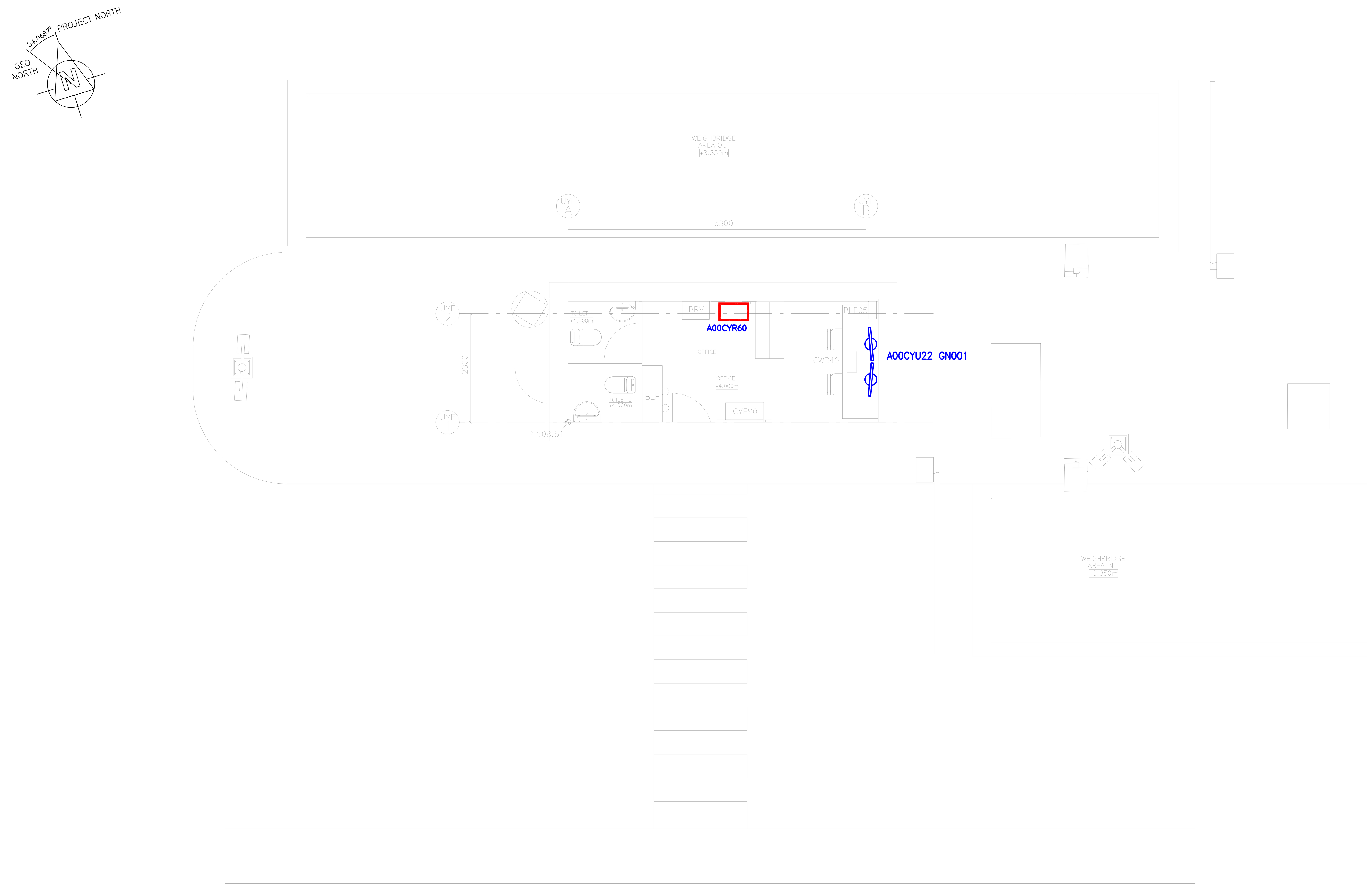
SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
FLUE GAS TREATMENT EL BUILDING (UBW)
GROUND FLOOR PLAN, LEVEL: +0.000m

SCALE:
A1 = 1:25
A3 = 1:50

BWSC DWG.NO.: 2031.E4.C01.022 (PROJECT NO. / GR. / NO. / SHT.)

REV. 2

2031.E4.C01.022



LEGEND:

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	AXIS Q2901-E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/-5°C(+/-9°F) ACCURACY BELOW 150°C (302°F): +/-5% ACCURACY ABOVE 150°C (302°F): +/-20% ACCURACY IP66 TEMPERATURE: -40°C to 60°C PoE: max. 10W
	AXIS P3807-PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 - FIELD OF VIEW: H: 180° V: 90° IP66 TEMPERATURE: -30°C to 50°C PoE: TYPICAL 7W, max. 12.9W
	AXIS P5666-E FULL HD PTZ NETWORK CAMERA 4.3-137.6mm, F1.4-4.0 - FIELD OF VIEW: H: 58.3°-2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 TEMPERATURE: -30°C to 50°C PoE: TYPICAL 10W, max. 19W
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	AXIS Q3515-LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 - FIELD OF VIEW: H: 105°-36° V: 57°-21° IP69K, IR LED 40m TEMPERATURE: -50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W
OTHER CENTRAL EQUIPMENT	
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	WIRELESS ACCESS POINT: NFT-2AC OUTDOOR
CAMERA POSTS	
	10 METER LAMP POST
CABLES	
	FIBER RING

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. CAMERA TAG NUMBER SHALL BE READ AS FOLLOWS:
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   - NN= DEVICE SEQUENCE NUMBER "01, 02,....15..."
   - P = PANEL NO. "1, 2, ...5"
   - GN= NETWORK EQUIPMENT
     - WITH PREFIX "A00CYP10"
3. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:
   APN: PPGNNNN
   - NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05"
     - WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT
4. ALL CABLES GOING TO CAMERA SHALL BE 4P - 24AWG CAT6 S/FTP.
5. FOR INTERCONNECTION SPECIFICATION, REFER TO CCTV NETWORK LAYOUT "2031.E5.C01.001".

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.850.001	LAYOUT DRAWING	EXTRACTED

METRE 0 1 2 3 4 5

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
3	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
2	2021.02.16	GELMA	CBVI/MAGA	REVISED ISSUE FOR CONSTRUCTION	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11-9RD, UK TELEPHONE :+44 01782 384898

PROJECT MANAGER:
CoGen
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11-9RD, UK TELEPHONE :+44 01782 384898

CONTRACTOR:
BWSC
BURMEISTER & WAIN SCANDINAVIAN CONTRACTOR A/S DENMARK
GYDEVANG 35 POST OFFICE BOX 235 DK 3450 ALLEROED, DENMARK TELEPHONE :+45 48140022 TELEFAX :+45 48140150

TECHNOLOGY PROVIDER:
KOBELCO ECO-SOLUTIONS CO.,LTD.
Sartech
L&L LEROUX & LOTZ
WAKINOHAMACHO CHUOKU KOBE 651-0072, JAPAN TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

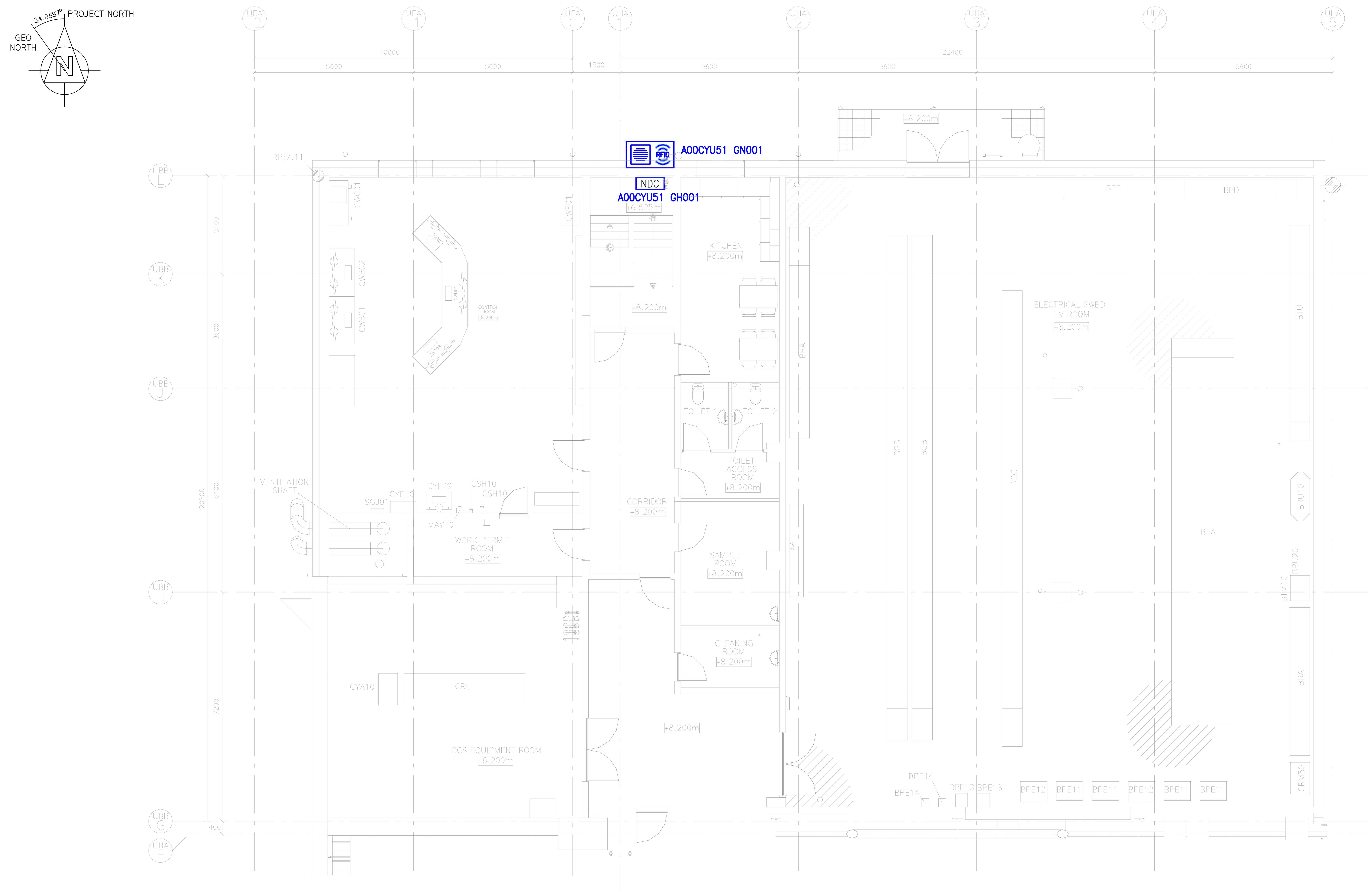
SUB-CONTRACTOR:

SUBJECT:
EQUIPMENT LAYOUT OF CCTV SYSTEM
SECURITY GATE HOUSE (UYF)
GROUND FLOOR PLAN, LEVEL: +4.000m

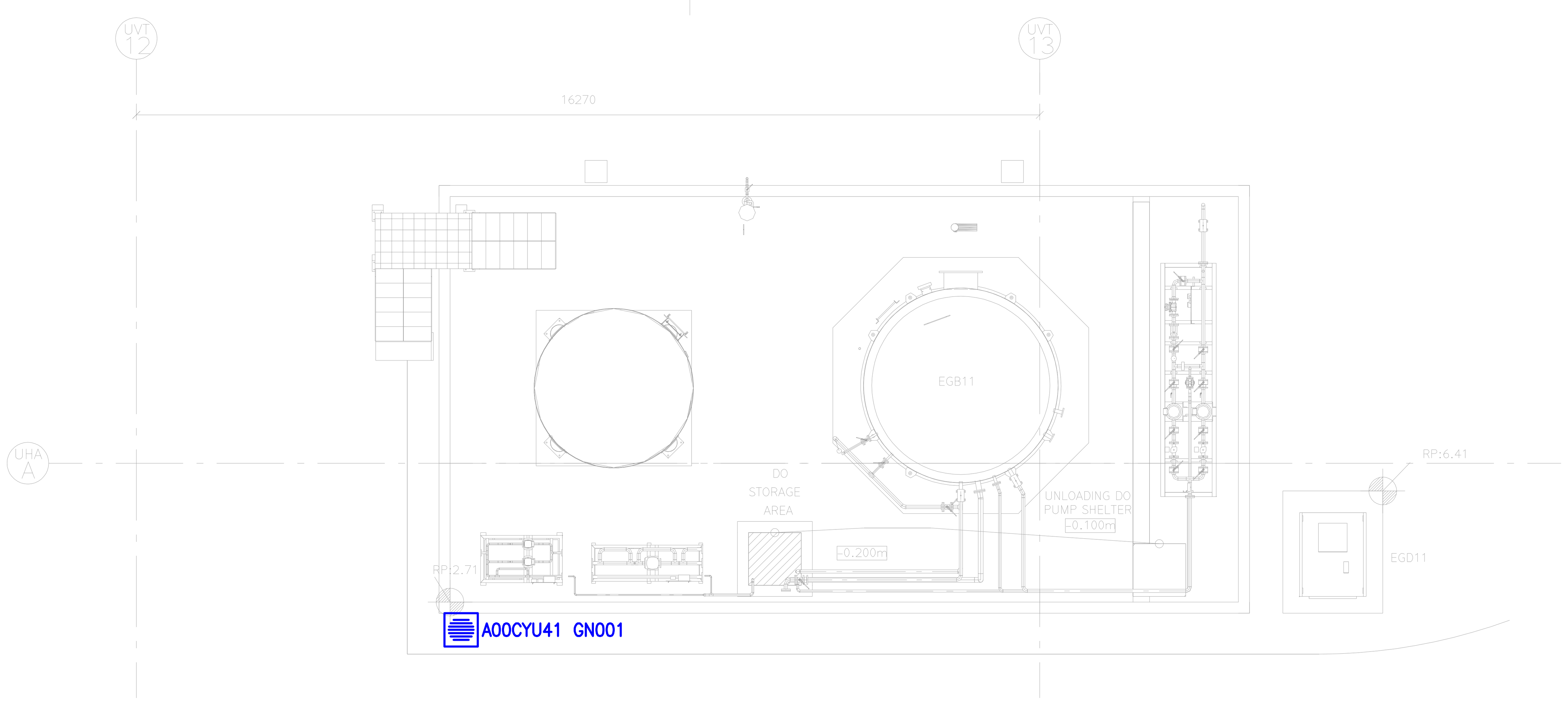
SCALE:
A1 = 1:50
A3 = 1:100

BWSC DWG.NO.:
2031.E4.C01.023
PROJECT NO. GR. NO. SHT.
REV. 3

2031.E4.C01.023



EL ANNEX & SERVICE BUILDING (UBB), LEVEL: +8.200m



DO & AMMONIA TANK AREA (UEK), LEVEL : -0.210m

LEGEND:

ACCESS CONTROL	
	AXIS A8207-VE NETWORK VIDEO DOOR STATION WITH RFID PoE IP66
	AXIS A8105-E NETWORK VIDEO DOOR STATION PoE IP65
	AXIS A4010-E RFID READER PoE IP65
NDC	AXIS A1001 NETWORK DOOR CONTROLLER PoE, POWER BUDGET FOR LOCKS: 625mA@12V IP22

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:

APN: PPGNNNN

- NN= DEVICE SEQUENCE NUMBER "001, 002,...015..."
- GN= NETWORK EQUIPMENT
- PP= PANEL NO. "01, 02, ...05"
  - WITH PREFIX "A00CYU"
- N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
- AP= ACCESS POINT

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
-	LAYOUT DRAWING	EXTRACTED

METRE

0 1.5 3 4.5 6 7.5

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:

HOOTON BIO POWER LTD.

BLYTHE HOUSE, BLYTHE PARK,
CRESSWELL, STOKE ON TRENT,
STAFFORDSHIRE ST11-9RD, UK
TELEPHONE :+44 01782 384898

PROJECT MANAGER:

CoGen

BLYTHE HOUSE, BLYTHE PARK,
CRESSWELL, STOKE ON TRENT,
STAFFORDSHIRE ST11-9RD, UK
TELEPHONE :+44 01782 384898

CONTRACTOR:

BWSC

BURMEISTER & WAIN SCANDINAVIAN CONTRACTOR A/S DENMARK

GYDEVANG 35
POST OFFICE BOX 235
DK 3450 ALLEROED, DENMARK
TELEPHONE :+45 48140022
TELEFAX :+45 48140150

TECHNOLOGY PROVIDER:

KOBELCO ECO-SOLUTIONS CO.,LTD.

Sartech ENGINEERING

L&L LEROUX & LOTZ Groupe Altawest

WAKINOHAMACHO
CHUOKU
KOBE 651-0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:

HOOTON BIO POWER PROJECT

SUB-CONTRACTOR:

SUBJECT:

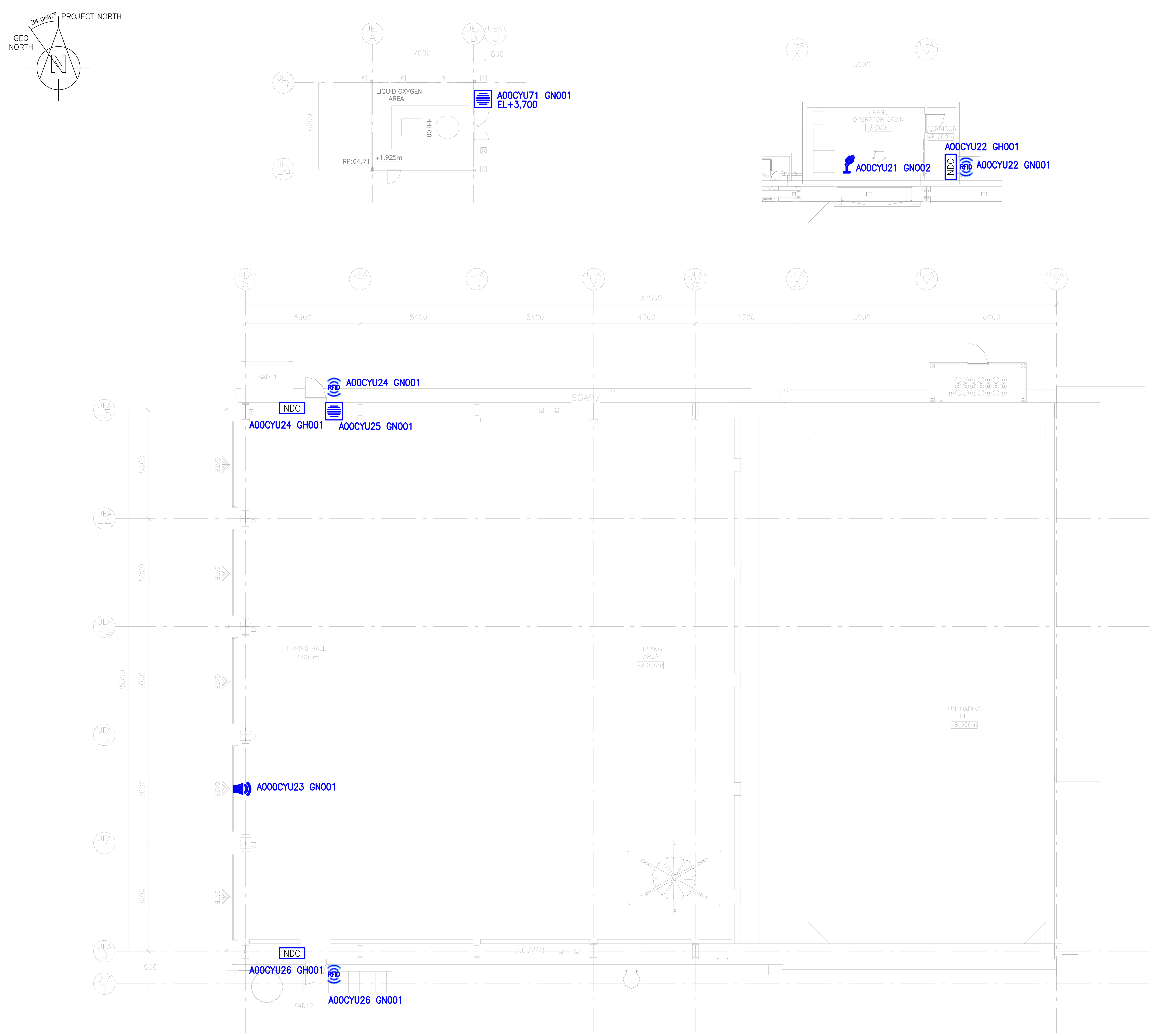
ACCESS CONTROL SYSTEM
EL ANNEX & SERVICE BUILDING (UBB), PLAN VIEW, LEVEL: +8.200m &
DO & AMMONIA TANK AREA (UEK), GROUND FLOOR PLAN, LEVEL : -0.210m

SCALE:
A1 = 1:75
A3 = 1:150

BWSC DWG.NO.: 2031.E4.C01.031 (PROJECT NO. 2031, GR. E4, NO. C01, SHT. 031)

REV. 2

2031.E4.C01.031



LEGEND:

ACCESS CONTROL	
	AXIS A8207-VE NETWORK VIDEO DOOR STATION WITH RFID PoE IP66
	AXIS A8105-E NETWORK VIDEO DOOR STATION PoE IP65
	AXIS A4010-E RFID READER PoE IP65
NDC	AXIS A1001 NETWORK DOOR CONTROLLER PoE, POWER BUDGET FOR LOCKS: 625mA@12V IP22
	AXIS 3003-E NETWORK HORN SPEAKER PoE IP66
	AXIS 2N SIP MIC 01208-001 CONFERENCE MICROPHONE, 88dB WIRED, 3.5mm (1/8")

NOTES:

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   APN: PPGNNNN
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   - GN= NETWORK EQUIPMENT
   - PP= PANEL NO. "01, 02, ...05"
     - WITH PREFIX "A00CYU"
   - N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
   - AP= ACCESS POINT

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
-	LAYOUT DRAWING	EXTRACTED

METRE 0 2 4 6 8 10

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
3	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
2	2021.02.16	GELMA	CBVI/MAGA	REVISED ISSUE FOR CONSTRUCTION	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11-9RD, UK
TELEPHONE :+44 01782 384898

PROJECT MANAGER:
CoGen
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11-9RD, UK
TELEPHONE :+44 01782 384898

CONTRACTOR:
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TECHNOLOGY PROVIDER:
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L&L LEROUX & LOTZ Groupe Altawest
WAKINOHAMACHO
CHUOKU
KOBE 651-0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

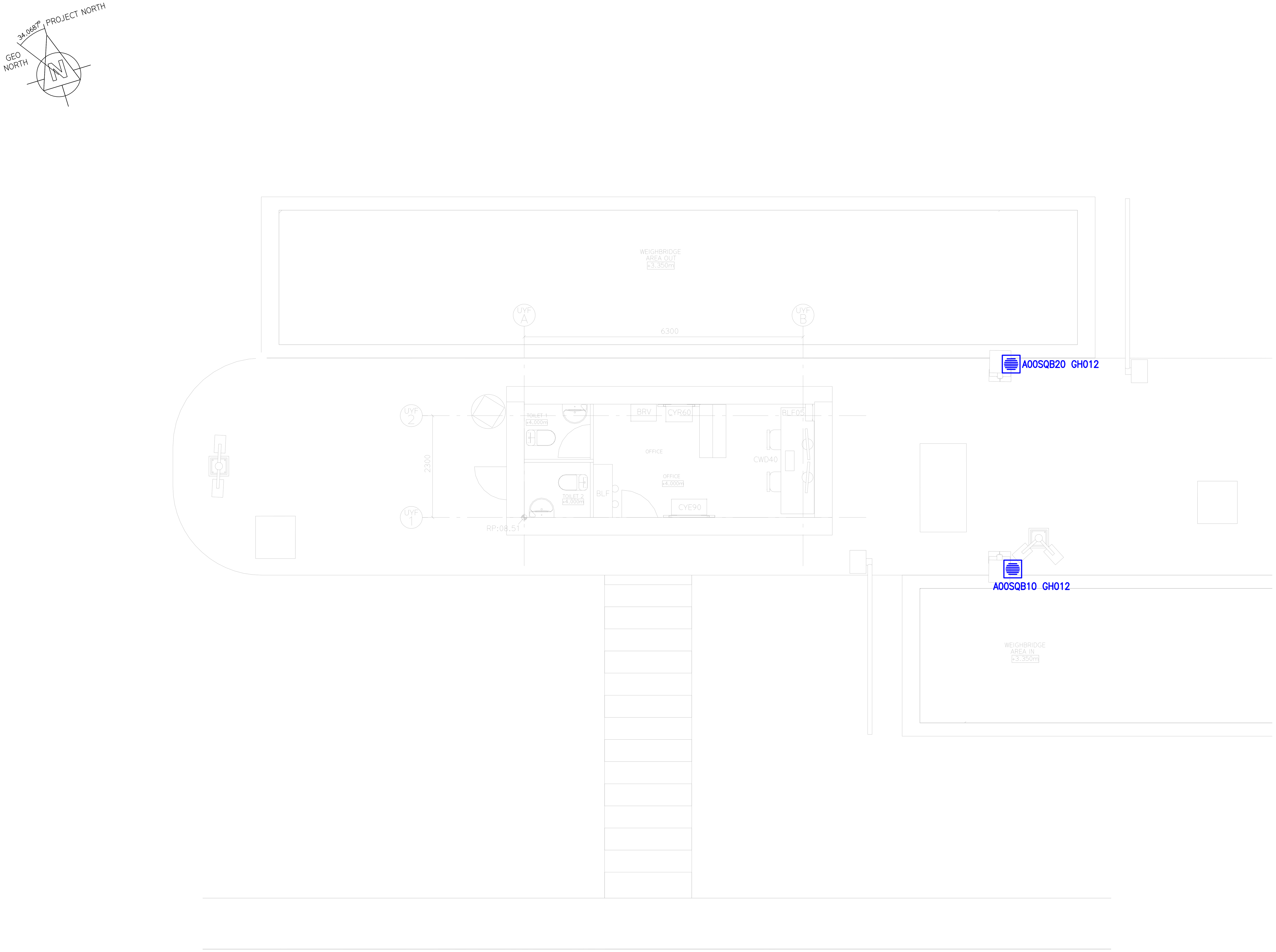
SUB-CONTRACTOR:

SUBJECT:
ACCESS CONTROL SYSTEM
WASTE FUEL UNLOADING AREA (UEA)
GROUND FLOOR PLAN, LEVEL: +2.000m & PLAN VIEW, LEVEL: 8.000m

SCALE:
A1 = 1:100
A3 = 1:200

BWSC DWG.NO.: 2031.E4.C01.032 REV. 3

2031.E4.C01.032



LEGEND:

ACCESS CONTROL	
	AXIS A8207-VE NETWORK VIDEO DOOR STATION WITH RFID PoE IP66
	AXIS A8105-E NETWORK VIDEO DOOR STATION PoE IP65
	AXIS A4010-E RFID READER PoE IP65
NDC	AXIS A1001 NETWORK DOOR CONTROLLER PoE, POWER BUDGET FOR LOCKS: 625mA@12V IP22

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:

APN: PPGNNNN

- NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
- GN= NETWORK EQUIPMENT
- PP= PANEL NO. "01, 02, ...05"
  - WITH PREFIX "A00CYU"
- N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
- AP= ACCESS POINT

2031.E4.C01.033

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.850.001	LAYOUT DRAWING	EXTRACTED

METRE
0 1 2 3 4 5

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11-9RD, UK
TELEPHONE :+44 01782 384898

PROJECT MANAGER:
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CONTRACTOR:
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TECHNOLOGY PROVIDER:
KOBELCO ECO-SOLUTIONS CO.,LTD.
Sartech ENGINEERING
L&L LEROUX & LOTZ Groupe Altawest
WAKINOHAMACHO
CHUOKU
KOBE 651-0072, JAPAN
TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

SUB-CONTRACTOR:

SUBJECT:
ACCESS CONTROL SYSTEM
SECURITY GATE HOUSE (UYF)
GROUND FLOOR PLAN, LEVEL: +4.000m

SCALE:
A1 = 1:50
A3 = 1:100

BWSC DWG.NO.:
2031 : E4 . C01 . 033 (PROJECT NO. : GR. . NO. . SHT.)

REV. 2

PROJECT NORTH
34.068°
GEO NORTH

LEGEND:

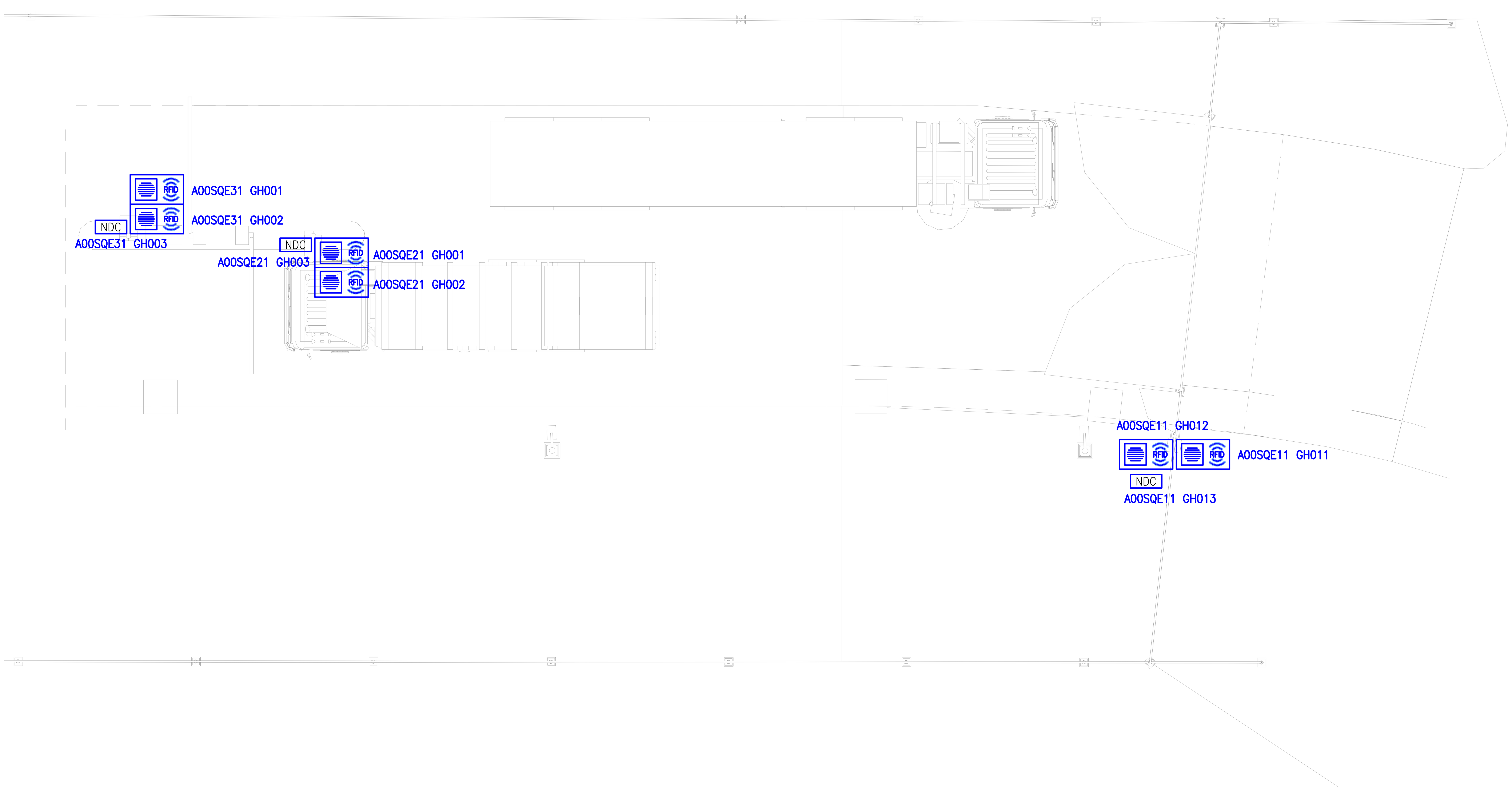
ACCESS CONTROL	
	AXIS A8207-VE NETWORK VIDEO DOOR STATION WITH RFID PoE IP66
	AXIS A8105-E NETWORK VIDEO DOOR STATION PoE IP65
RFID	AXIS A4010-E RFID READER PoE IP65
NDC	AXIS A1001 NETWORK DOOR CONTROLLER PoE, POWER BUDGET FOR LOCKS: 625mA@12V IP22

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:

APN: PPGNNNN

- NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
- GN= NETWORK EQUIPMENT
- PP= PANEL NO. "01, 02, ...05"
  - WITH PREFIX "A00CYU"
- N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
- AP= ACCESS POINT



REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.061.001	LAYOUT DRAWING	EXTRACTED

METRE
0 1.5 3 4.5 6 7.5

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
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PROJECT MANAGER:
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TECHNOLOGY PROVIDER:
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Sartech
LEROUX & LOTZ
WAKINOHAMACHO
CHUOKU
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TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO
POWER PROJECT

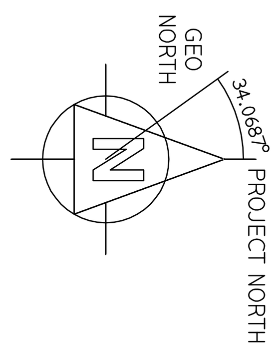
SUB-CONTRACTOR:

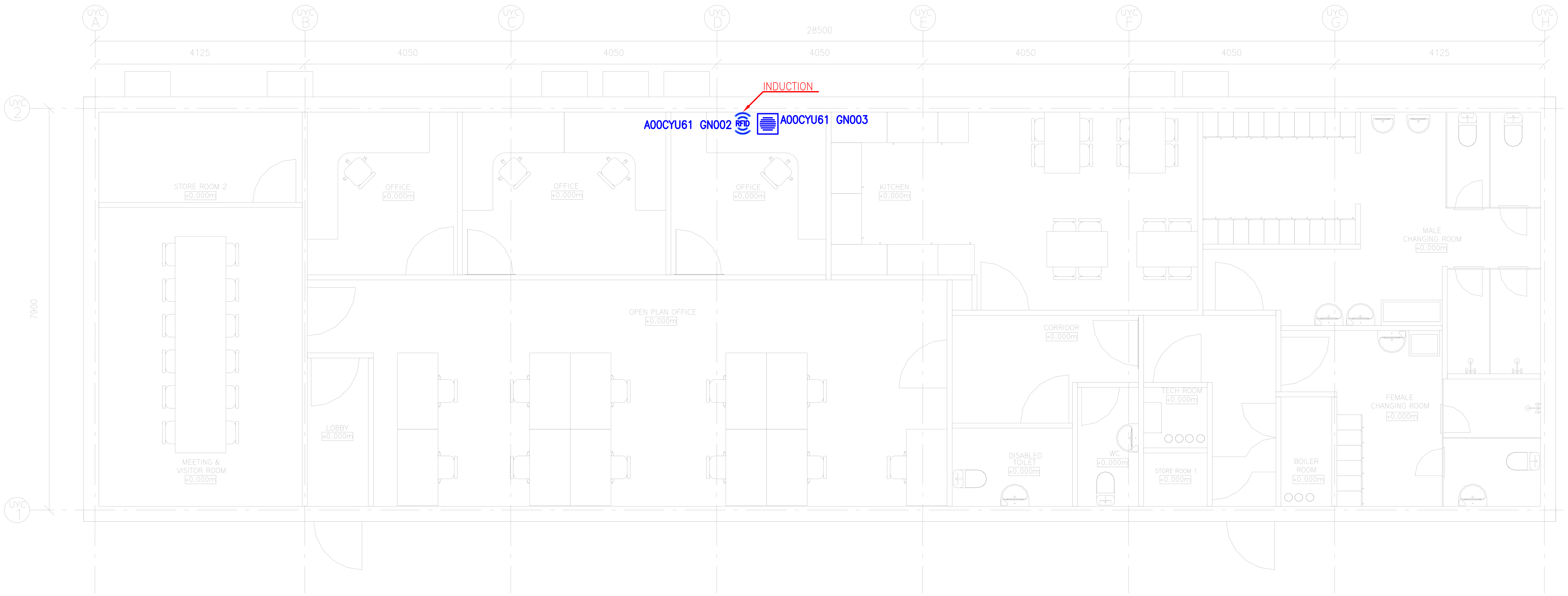
SUBJECT:
ACCESS CONTROL SYSTEM
MAIN GATE AREA (UZA)
GROUND FLOOR PLAN, LEVEL: +0.000m

SCALE:
A1 = 1:75
A3 = 1:150

BWSC DWG.NO.:
2031.E4.C01.034
PROJECT NO. GR. NO. SHT.
REV. 2

2031.E4.C01.034





2031.E4.C01.035

LEGEND:

ACCESS CONTROL	
	AXIS A8207-VE NETWORK VIDEO DOOR STATION WITH RFID PoE IP66
	AXIS A8105-E NETWORK VIDEO DOOR STATION PoE IP65
	AXIS A4010-E RFID READER PoE IP65
NDC	AXIS A1001 NETWORK DOOR CONTROLLER PoE, POWER BUDGET FOR LOCKS: 625mA@12V IP22
	AXIS 3003-E NETWORK HORN SPEAKER PoE IP66
	AXIS 2N SIP MIC 01208-001 CONFERENCE MICROPHONE, 88dB WIRED, 3.5mm (1/8")

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS OR MOUNTING HEIGHT (EL+XX,XXX) ARE IN MILLIMETERS.
2. ACCESS POINT TAG NUMBER SHALL BE READ AS FOLLOWS:

APN: PPGNNNN
- NN= DEVICE SEQUENCE NUMBER "001, 002,....015..."
- GN= NETWORK EQUIPMENT
- PP= PANEL NO. "01, 02, ...05"
  - WITH PREFIX "A00CYU"
- N = DEVICE SEQUENCE NUMBER "1, 2,....15..."
- AP= ACCESS POINT

REFERENCE DOCUMENT		
DRAWING NO.	DOCUMENT TITLE	REV. NO.
2031.D2.811.001	LAYOUT DRAWING	EXTRACTED

METRE
0 1 2 3 4 5

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
2	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
1	2021.03.01	GELMA	CBVI/JOPE	REVISED ISSUE FOR CONSTRUCTION	SNZ
0	2021.02.16	GELMA	CBVI/MAGA	CERTIFIED FOR CONSTRUCTION	RNM

OWNER:
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TECHNOLOGY PROVIDER:
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Sartech ENGINEERING
L&L LEROUX & LOTZ Groupe Altawest
WAKINOHAMACHO
CHUOKU
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TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO POWER PROJECT

SUB-CONTRACTOR:

SUBJECT:
ACCESS CONTROL SYSTEM
ADMINISTRATION BUILDING (UYC)
GROUND FLOOR PLAN, LEVEL: +0.000m

SCALE:
A1 = 1:50
A3 = 1:100

BWSC DWG.NO.: 2031.E4.C01.035 (PROJECT NO. / GR. / NO. / SHT.)

REV. 2

LEGEND:

SYMBOL	DESCRIPTION	QUANTITY
	AXIS P1435–LE FULL HD BULLET NETWORK CAMERA 3–10.5mm, F1.4 – FIELD OF VIEW: H: 95°–35° V: 51°–20° IP66, IR LED 30m PoE: TYPICAL 4.6W, max. 11W	24
	AXIS P1375–E FULL HD BOX NETWORK CAMERA 8–50mm, F1.6 CS MOUNT – ANGLE OF VIEW: 34°–6° IP66 PoE: TYPICAL 5.9W, max. 10.3W	2
	AXIS Q2901–E TEMPERATURE ALARM CAMERA 9mm: F1.25, HORIZONTAL FIELD OF VIEW: 35°, MIN. FOCUS DISTANCE, 2.1m (78.7in) BELOW 100°C (212°F): +/–5°C(+/–9°F) ACCURACY BELOW 150°C (302°F): +/–5% ACCURACY ABOVE 150°C (302°F): +/–20% ACCURACY IP66	8
	AXIS P3807–PVE FULL HD PANORAMIC NETWORK CAMERA FIXED 3.2mm, F2.0 – FIELD OF VIEW: H: 180° V: 90° IP66 PoE: TYPICAL 7W, max. 12.9W	1
	AXIS P5666–E FULL HD PTZ NETWORK CAMERA 4.3–137.6mm, F1.4–4.0 – FIELD OF VIEW: H: 58.3°–2.4 PAN: 360°, TILT: 180° ZOOM: 32x OPTICAL, 12x DIGITAL, 384x TOTAL IP66 PoE: TYPICAL 10W, max. 19W	1
	AXIS P3245–LVE FULL HD DOME NETWORK CAMERA 3.4–8.9mm, F1.8 – FIELD OF VIEW: H: 100°–36° V: 53°–20° IP66, IR LED 40m TEMPERATURE: –40°C to 50°C PoE: TYPICAL 6.4W, max. 11.3W	33
	AXIS Q3515–LVE FULL HD DOME NETWORK CAMERA 3.9mm, F1.3 – FIELD OF VIEW: H: 105°–36° V: 57°–21° IP69K, IR LED 40m TEMPERATURE: –50°C to 60°C PoE: TYPICAL 5.6W, max. 12.5W	2
	WIRELESS ACCESS POINT: NFT–2AC OUTDOOR	13
	AXIS A8207–VE NETWORK VIDEO DOOR STATION WITH RFID PoE IP66	8
	AXIS A8105–E NETWORK VIDEO DOOR STATION PoE IP65	6
	AXIS A4010–E RFID READER PoE IP65	4
NDC	AXIS A1001 NETWORK DOOR CONTROLLER PoE, POWER BUDGET FOR LOCKS: 625mA@12V IP22	7
	AXIS 3003–E NETWORK HORN SPEAKER PoE IP66	1
	AXIS C3003–E HORN SPEAKER	1
	CCTV NETWORK INTERFACE PANEL (W)600mm x (H)850mm x (D)350mm IP 66, 19" RACK PROFILE, AC DISTRIBUTION	9
	AXIS 2N SIP MIC 01208–001 CONFERENCE MICROPHONE, 88dB WIRED, 3.5mm (1/8")	1

AS BUILT

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
5	2021.06.15	GELMA	JOMS/SLBE	AS BUILT	RNM
4	2021.03.01	GELMA	CBVI/JOPE	REVISED ISSUE FOR CONSTRUCTION	SNZ
3	2021.02.16	GELMA	CBVI/MAGA	REVISED ISSUE FOR CONSTRUCTION	RNM
2	2020.07.02	GELMA	JOMS/CBVI	REVISED ISSUE FOR CONSTRUCTION	CUA
1	2020.05.15	GELMA	JOMS/CBVI	CERTIFIED FOR CONSTRUCTION	CUA
0	2019.10.14	CHAJU	JOMS/CBVI	ISSUE FOR APPROVAL	SNZ

OWNER:
HOOTON BIO POWER LTD.
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PROJECT MANAGER:
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CONTRACTOR:
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TECHNOLOGY PROVIDER:
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L&L LEROUX & LOTZ Groupe Altawest
WAKINOHAMACHO
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TELEPHONE :+81 78 262 7026

PROJECT:
HOOTON BIO
POWER PROJECT

SUB–CONTRACTOR:

SUBJECT:
SUMMARY OF ELECTRICAL MATERIALS

SCALE:

BWSC DWG.NO.: 2031 : E4 . C01 . 211 (PROJECT NO. / GR. / NO. / SHT.)

REV. 5

Table of Content

SCANDINAVIAN ENERGY CONTRACTOR A/S | Gydevang 35 | DK-3450 Allerød | Denmark | **T:** +45 3226 6400 | http://www.secontractor.dk | VAT no.: 42249963

1. Purpose

To implement a housekeeping and cleanliness program that provides for a clean, sanitary, and orderly work environment at all SECO Ltd. plants.

2. Scope

To maintain the material condition and safe working environment of all assigned employee work areas, building interiors, plant exteriors, and plant access routes at all SECO Ltd. plants.

3. References

- Health and Safety at Work Act 1974.
- Management of Health and Safety at Work Regulations 1999.
- Health, Safety, and Welfare Regulations 1992.
- SECO Ltd. and SEC A/S HSE Policies.
- SECO Ltd Safety Rules.

4. Responsibilities

4.1 Plant Manager

- Ensure that this procedure is approved, issued, and implemented.
- Ensure that resources are available to implement this procedure.
- Ensure that waste management procedures are followed.
- Ensure HSE procedures are followed.

4.2 Shift Team Leader

- Ensure site procedures are enforced with respect to plant housekeeping, with regular inspections of the plant, HSE, COSHH, and waste management are key areas.
- Ensure all personnel are aware of their housekeeping responsibilities and the procedures to support the task.

4.3 All shift personnel

- Co-ordinate the prevention of accumulation of combustible dust on horizontal areas, elevated surfaces, and building structures through routine dust removal and periodic cleaning.

- Maintain the cleanliness, material condition, and access to such equipment, which includes spill kits.
- Establish and implement a plant housekeeping cleaning program.
- Develop plant housekeeping and cleanliness check sheet.
- Maintain waste disposal provisions such as oily waste, chemical waste, solid waste, etc. in segregated, labelled containers to prevent cross contamination.

4.4 Cleaning contractor

- Make arrangements for sealable metal containers, for the disposal of oily rags, volatile liquids, and similar combustible waste.
- Make arrangements for the disposal of waste from the plant.

4.5 All personnel

All personnel on this plant have a legal and moral obligation to contribute to the maintenance and upkeep of site housekeeping, using the site procedures to support the task.

5. Procedure

Areas of plant will be cleaned as identified in **Appendix A** or in the case of spills as soon as it is safe to do so.

Office areas, contractor's accommodation and the Operations Control Room are cleaned each working day by contract domestic cleaning services.

The Plant Cleaner will obtain permission from control room prior to carrying out housekeeping tasks in process areas. He shall remain in radio contact with the control room at all times.

The control room is to be informed when outside services are onsite to remove waste.

Particular areas for concentration are:

- Keeping stairwells, passageways, doorways, exits and other emergency routes clean, clear of debris and obstructions.
- Keeping floors in clean and dry condition, whenever possible.

- Keeping horizontal and vertical surfaces free of drips, spills, and accumulated residue.
- Keeping work surfaces and benches in a clean, orderly, and good condition.
- Storing personal belongings in designated changing areas, lockers, desks, and cabinets, not in process-work areas and areas of possible contamination.
- Keep designated tool and equipment storage locations clean and organised.
- Clean, inspect, and return reusable materials to designated storage locations following completion of maintenance tasks.
- Maintain the sanitary conditions of restrooms, locker rooms, kitchen, and rest areas.
- Promptly dispose of all waste generated in the performance of a job assignment, including rags, oils and chemicals using the designated bins/drums/containers provided, using the correct waste management procedures.

6. Appendix A – Area cleaning matrix

As per local plant instructions.

MANAGEMENT PROCEDURE

Created date	20/01/2023	**IMS Doc.no. + Rev.no.**
Revised date	-	9000.RP.500.004.R00
Document responsible	Jens Peter Eckberg (JPE)	
Document reviewer(s)	xxxxxxx (XXX)	
Document approver	xxxxxxx (XXX)	

Table of Content

1. Purpose

The Management of Health & Safety at Work Regulations 1999 requires an employer to have procedures in place in the event of "Serious and Imminent Danger".

The purpose of this procedure is to lay down procedures to be carried out in the event of a range of emergencies at any Scandinavian Energy Contractor UK Sites (Plants) so as to ensure the safety and wellbeing of all SECO staff, their contractors and neighbours in the event that an emergency should arise.

Check lists found in the accompanying Appendix A will also be available in a RED folder, which is located in the Control Room.

COSHH data sheets are kept and upheld by the QHSE Team Leader.

2. Validity

This document describes actions that Scandinavian Energy Contractor Operations Ltd. (SECO) personnel should take in the event of an emergency at any SECO site. This instruction is designed to identify roles and responsibilities for staff in dealing with emergencies and to provide a working document for staff providing a structured pack of information, which can be accessed quickly in the case of a site emergency. All emergency events irrespective of their nature can be classified in to 2 main scenarios:

Scenario 1 The emergency occurs during normal office hours Monday to Friday or when the site is manned by the normal complement of staff.

Scenario 2 The emergency occurs outside of normal office working hours, i.e. at night or at the weekend when a minimum complement of site staff are on site and possibly contractors are also on site.

NOTE: Fire during an outage will be as Scenario 1 but adhering to 3.6.1.

3. Responsibilities

Where the procedure delegates a responsibility to a specific individual, the responsibility may be performed by a designee.

3.1. Power Plant Staff

All site personnel shall ensure that they have read and understood this procedure, furthermore that any visitors or contractors for which they are responsible are familiar with what to do in an emergency.

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3.2. Shift Team Leader

In the event of an emergency the Shift Team Leader will assume the role of Incident Controller, and decide what level of emergency response is required. He will assess each situation and decide whether or not outside assistance is required. At all times, the duty Shift Team Leader will be responsible for ensuring that all actions are performed as per section 5.3 "Mustering

3.3. Incident controller

The Incident Controller (IC) assumes responsibility for the coordination of emergency response. The IC shall sound the site alarms and contact any or all of the following as required:

- Emergency services, e.g. Fire, Ambulance etc.
- Site Security (gatehouse) – when manned
- Power station management and/or Duty Manager

The IC shall:

- Maintain responsibility for, and to ensure that, the plant is in a safe state until relieved by another member of staff
- Give the 'All Clear', informing staff and contractors that they may return to work

3.4. Forward controller

The Forward Controller (FC) will set up a forward control point as agreed with the Incident Controller. In the event that emergency services have been called to site, the FC will liaise with the emergency services and the Incident Controller to help co-ordinate the Emergency Response.

3.5. On Shift Assistant Team Leader (ASTL)

In the event of a site emergency, the On Shift ASTL will report to the Incident Controller in the CCR. They will carry out tasks as requested by the IC. This may include shutting down the plant, manning of communications, Incident Recording and logging. They will assume the role of Control Room Controller.

3.6. Security Guard

Responsible in an emergency to:

- Allow the emergency services onto site.
- Not allow any other non-essential personnel on site during an emergency.

N.B. Different arrangements may apply during outage periods.

3.6.1. Fire Alarm during outage

As per local instructions

3.7. Plant Manager

Press and media arrangements will be handled on behalf of SECO by the Plant Manager, in conjunction with the Emergency Services. The Plant Manager, once he has reported to the Muster Point, shall return to the Administration building in order to assist with the external communications.

3.8. Operations and/or Maintenance Manager/Plant Manager

The Operations and Maintenance Manager/Plant Manager may, depending on the nature of the emergency, be requested by the Incident Controller to aid them in their duties. In the event of an onsite emergency, the Operations and Maintenance Manager may muster at the Central Control Room and contact the HSE dependent of nature of the incident:

- Following a work-related death
- Following a serious incident where there have been multiple casualties
- Following an incident which has caused major disruption such as evacuation of people, closure of roads, large numbers of people going to hospital etc.

Contact numbers: XXXXX

As per local communication routes.

3.9. Muster Point Controller

The first senior member of staff to arrive at a muster point shall assume the role of Muster Point Controller, and co-ordinate movement of personnel as directed by the Incident Controller.

4. Procedure / Emergency Arrangement

4.1. Raising alarm

An incident can be rapidly reported in two ways. The primary method is by activation of one of the many Fire Alarm Call Points located strategically around the site. If you have a site radio this can be used to inform the Control room, this is manned 24 hours per day. Please ensure you have agreed the channel number you will be using when using the site radios.

4.2. Site Emergency Alarm

Where a site emergency requires all staff, visitors and contractors to be moved to a safe location, broadly speaking the requirement shall be to muster at the: • Primary Muster Point – as per local site procedures • Secondary Muster Point (if the primary muster point cannot be reached) – as per local site procedures On hearing a fire alarm all staff, visitors and contractors shall proceed to the external muster point, where they shall be accounted for. **In the event of a bomb threat the site alarm will NOT be activated.**

If the emergency services are called to site to attend an incident, the site alarm will only be turned off with the consent of the attending Senior Fire Officer. In the event that emergency services are not called to site, the alarm will be turned off at the Incident Controller's discretion.

The site evacuation alarm is tested in line with local site procedures.

4.3. Mustering

4.3.1. Mustering point

THE PRIMARY MUSTER POINTS ARE LOCATED AS PER LOCAL SITE PROCEDURES.

If this location cannot be reached then all personnel should go to the secondary muster point, as per local site procedures.

Scenario One – (Normal office hours)

All personnel on site will go directly to the muster point during an evacuation. The MPC will also take any contractor signing in sheets and any staff IN/OUT boards from the administration building to the Muster Point. A roll call will be carried out, if electronic head count is not available, by the Muster Point Controller who will then inform the Central Control Room of any missing persons (preferably via telephone). The roles will be as follows:

1) Incident Controller – **On shift STL**
2) Control Room Controller – **ASTL**
3) Forward Controller – **A member of staff selected by the STL (usually QHSE Team Leader)**
4) Muster Point Controller – **A Senior Member of site personnel**

Scenario two – (Night shift, 2/3 persons on site)

This scenario is based on a minimum level of site staff, i.e. outside of normal office hours when the site is manned by a two/three man shift consisting of an STL, ASTL and/or SOT. If an evacuation alarm sounds during a night shift then the ASTL and/or SOT will head directly to the Central Control Room unless directed otherwise by the Incident Controller. A roll call will not be necessary due to only 2/3 persons on site. Although supervisors will carry out a role call for their staff if contractors are on site. The roles will be as follows:

1) **Incident Controller** – On shift STL
2) **Control Room Controller** – ASTL
3) **Forward Controller** – On shift SOT/Security Guard
4) **Muster point controller** – On site contractor supervisor

4.3.2. Mustering and accounting for people

The Incident Controller will be informed of any unaccounted-for personnel, and if possible their last known location. This information will be passed on to the emergency services when they arrive on site.

4.4. Fire

The purpose of this section is to set out the measures to be taken by all personnel at SECO sites in the event of an outbreak of fire.

The Procedure covers the actions to be taken by persons hearing the fire alarm or external muster site alarm, by those persons discovering a fire, and by those persons who have been given specific duties to carry out in the event of fire.

4.4.1. On Discovering a fire

Any person discovering a fire shall immediately sound a Fire Alarm by operating the break glass unit at the nearest Fire Call Point.

If they have a site radio they should immediately contact the control room. The communication should include as much detail as known regarding the location and nature of the fire, and where he/she is radioing from.

The person reporting a fire may only tackle the fire using an appropriate portable fire extinguisher provided that he is satisfied that he will not be exposing himself to unnecessary risks, and has been trained in the use of fire extinguishers.

If ONE fire extinguisher does not put the fire out, exit by the safest fire exit and proceed to the muster point.

4.4.2. Central Control Room Action Report of a Fire

On receipt of a call reporting FIRE, the Operator receiving the call shall, note the name of the person making the call and his location and inform the Shift Team Leader.

The Site alarm should be sounded if the fire is confirmed or if instructed to do so by the Incident Controller.

The Shift Team Leader (Incident Controller) will decide whether to call the fire brigade immediately, or once having assessed that the incident cannot be managed internally. The Control Room Controller shall request the assistance of the Fire Brigade by calling:

999

When the exchange operator answers, ask for the **FIRE BRIGADE** and give the telephone number of the Central Control Room:

.... (insert site telephone number).

When connected to the Fire Services, give the following information:

This is SEC at: (insert site address)

....
....
....
....
....

WE HAVE A FIRE!

Relay any other information to hand such as the nature of the fire and whether any persons are known to be missing, in danger, and any known casualties.

The Incident Controller shall confirm the safety of the person(s) reporting the fire, inform the on-call Manager, and take whatever measures are necessary until the arrival of the Fire Brigade. The Incident Controller shall assess whether the immediate state of the plant is at threat from the incident and carry out appropriate measures to safeguard the plant, and await arrival of the Fire Brigade.

4.4.3. Automatic Fire Extinguishing Systems

Where automatic fire extinguishing systems are provided, the Incident Controller shall ensure that they have operated, and shall keep them in service as long as is required. If it is safe to do so, the Incident Controller should ensure that water is flowing and that isolation valves are locked in the open position. He should also ensure that the fire pumps are running correctly, all pump. auxiliaries are in order and that there is sufficient diesel to supply the diesel fire pump.

When an Inergen fire suppression system has been activated, no one should enter the area until it has been established the area is safe.

The Incident Controller shall take appropriate steps to remove any other hazards from the area if it is safe to do so and he has considered fully the results that his actions will have. For example, if the fire is located near fuel gas or oil systems, it may be necessary to shutdown various systems or the entire plant.

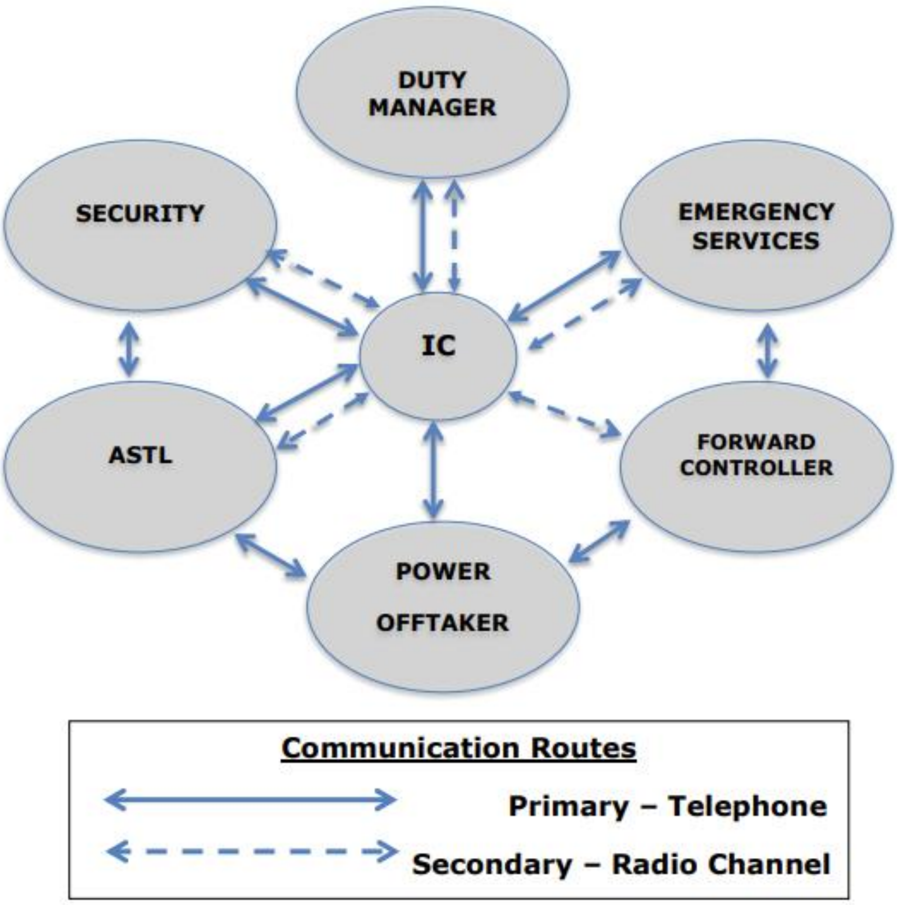
Lube, Hydraulic and Seal oil systems can only be isolated by opening supply isolators in the local switch rooms and should only be done if it is safe to do so.

In the case of an oil fire the Incident Controller shall consider as to whether the relevant oil system or systems should be shut down by taking the following into account;

- The additional risk to personnel caused by the oil leak feeding the fire
- The size and ferocity of the fire.
- The size and spread of the oil leak feeding the fire
- The type of oil leak involved in the fire i.e. atomisation of the
- leaking oil feeding the fire.
- The risk of the fire spreading.
- The potential damage that the fire will cause in comparison to the
- damage that will occur by isolating the oil system or systems.

If the Fire Brigade has been summoned, the Incident Controller will establish a Forward Control Point to meet and co-ordinate with the emergency services when they arrive on site.

4.4.4. Communication Routes



During an emergency situation, it is imperative that a strict communications regime is employed.

All sensitive information, which includes missing persons and casualties, must be passed via the telephone system, not by radio.

Radio communications should refrain from using individual's names whenever possible and use Emergency Response roles, Plant Manager, Operations and/or
Maintenance Manager, Security, Incident Controller, etc.

4.5. Casualties

In the event that casualties are taken to hospital, every effort should be made to ensure that a member of site staff accompanies them. The paramedics and/or police can advise on which hospital the casualty has been taken to.

4.6. Chemical and oil spillage

The purpose of this section is to provide guidance to staff on how to effectively deal with oil and chemical spillage's that may occur around site. The spillage control procedure may involve on-site equipment as well as the use of external agencies.

This instruction is designed to identify roles and responsibilities for staff in providing a structured pack of information, which can be accessed quickly in the case of a site emergency. It should be noted that this instruction is based upon the requirements of the Environmental Protection Act, 1990 and that a breach is an offence with a penalty of an unlimited fine.

4.6.1. Spillage response equipment

Equipment shall be provided, in the form of spillage response kits at various locations around the site, in order to deal with oil and chemical spillage. Staff that are expected to utilise this equipment and shall be trained in its use.

The equipment consists of various absorbent materials in the form of booms, pillows, blankets, and particulate granules. The three varieties of absorbent materials held on site are;

A)	Oil Absorbents	Oil Selective/Environmental Sorbents – this material is used to rapidly absorb light and medium oils. This does not absorb water and can be used for separating oil from water.
B)	Maintenance Sorbent	Oil Absorbent – a loose particulate material, which is chemically inert and absorbs both oil and water, this is normally in the form of granules.

C)	Chemical Sorbent	A minimum stock of the above materials is held in the stores and appropriate customised kits with a contents list and directions for use are located at the following locations: • At all spill kit locations there are suitable empty containers for waste disposal. • Oil selective pillows, booms, graduals and absorbent matting is available in the warehouse stores and should be used for minor oil spillage in other locations such as storm water pond areas.

4.6.2. Action in the event of a spillage

Minor spillage of chemicals or oils during routine operation and maintenance procedures will be dealt with according to the instructions given, and in accordance with the substance Material Safety Data Sheets. Spillage Control Units are distributed around the site in clearly labelled containers in accordance with section 4.6.1. Once the spill has been effectively dealt with, any waste materials should be disposed of correctly i.e. segregated and stored in a clearly labelled receptacle prior to disposal.

Spillage in other areas of the site may result in contamination of the site drainage system or storm water management system, potentially contaminating the final discharge to sewer. This can include contamination from Fire Brigade Hoses, therefore sewer discharge pumps should shut down.

In the event of a significant spillage:

- Any member of staff made aware of a leakage or spillage should contact the Central Control Room by radio.
- They must immediately inform the Shift Team Leader (STL) on the severity, location and nature of the incident.
- The STL should ensure that other personnel cannot approach the spillage by means of suitable barriers if appropriate.
- The STL shall take the necessary action to prevent further spillage (e.g. Shutting of appropriate valves) if it is safe to do so.
- The STL should assess the severity of the incident, the risk to site personnel and the possibility of off-site contamination. The STL should then consider the following possible actions:

  a) Close the appropriate storm water drainage valve to prevent contamination of the storm water ponds.

b) Barrier off drains to the storm water basin to prevent contamination of the storm water pond.
c) Switch the storm water pumps to OFF in manual to prevent offsite contamination.
d) Use the equipment provided in the strategically placed Spillage Control Units to contain the spillage and reduce access to the storm water drains system.
e) The appropriate Personal Protective Equipment should be worn by anyone likely to come into contact with the spillage.
f) Barrier off the area of the spill and inform the Security gatehouse to prevent vehicles and visitors from entering the spillage zone. Notify the Plant Manager, Operations Manager and QHSE Team Leader as appropriate.

To assist with spillage control, waste specialists in line with local site procedures and contracts will respond to any emergency release on site. They can be contacted by phone or email:

Emergency number: ....

Email: ....

Spill incident contractors will bring appropriate vehicles and staff to site to provide assistance and where necessary remove contaminated materials from the site. They will require information on the nature of the incident, an estimate of the volume and COSHH data (MSDS, H&S data sheets).

Call the Fire Brigade (**999**) for assistance if required or put them on standby.

Contact the Environment Agency Emergency Number: ....

Arrange to take samples of the storm water pond, one for analysis and one for future reference. Sewer discharge pumps shall be disabled until water is cleared for discharge.

Record details and times of the incident occurrence and complete the appropriate incident report form.

5. Reference documents

Document no.	Document title
-	The Environmental Protection Act, 1990
-	Health and Safety at Work Act 1974
-	Management of Health & Safety at Work Regulations 1999
-	Environmental, Health and Safety Policy

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6. Appendix A - Emergency check lists

No.	Description
1	SITE FIRE – Scenario 1 Normal office hours
2	SITE FIRE – Scenario 2 Other than normal office hours
3	SITE FIRE – During an Outage
4	MISSING PERSON
5	MAN DOWN ALARM
6	SITE EVACUATION
7	TERRORIST ACTION
8	PROPANE GAS FIRE
9	HV SUB-STATUION OR TRANSFORMER INCIDENT (Major oil leak or fire)
10	INTRUDER ON SITE (Actual or threatened)
11	MAJOR SPILLIGE OF HYDRAULIC OIL OR LUBRICATING OIL
12	MAJOR PLANT FAILURE
13	AMMONIA SPILLIAGE
14	SAFETY HARNESS RESCUE PLAN
15	UNPLANNED LOSS OF ELECTRICAL SUPPLIES (Simultaneous loss of both main generator and step-up transformer)
16	FLOOD WARNING OR INCIDENT

6.1. SITE FIRE – Scenario 1 Normal office hours

Description	✓
On confirmation of a FIRE, or when the fire alarm has sounded the Incident Controller will implement this procedure	
The ASTL will assume the role of Control Room Controller and go directly to the Central Control Room unless directed otherwise by the Incident Controller	
The following roles will be assumed; • **Incident Controller** – On shift STL • **Control Room Controller** – On shift ASTL • **Forward Controller** – Selected by Incident Controller • **Muster Point Controller** – A senior member of staff located at the muster point.	
The Incident Controller will go to the location of the incident and assess the seriousness of the fire and risk to personnel, environment and plant	
The **Incident Controller** shall take appropriate steps to remove any other hazards from the area if it is safe to do so and he has considered fully the results that his actions will have. For example, if the fire is located near fuel gas or oil systems, It may be necessary to shutdown various systems or the entire plant	
The **Incident Controller** will decide whether to call in the Fire Brigade and/or Ambulance	
Once the personnel on site have been confirmed at the Muster Point, **the Muster Point Controller** will inform the Central Control Room of any missing persons. The **Control Room Controller** will log any missing persons and their last known location & contact details and then update the Incident Controller	
IRE BRIGADE TO BE SUMMONED	
The **Control Room Controller** will dial 999	

When the exchange operator answers, ask for the FIRE BRIGADE and give the telephone number of the Central Control Room ………………… **When connected to the Fire Services, give the following information:** THIS IS: (add site address) ………………………………… ………………………………… ………………………………… ………………………………… ………………………………… ………………………………… ………………………………… **WE HAVE A FIRE!** Relay any other information to hand such as the nature of the fire and whether any persons are known to be missing, in danger, and any known casualties.	
The **Incident Controller** will send the Forward Controller to the Main Gate to await the arrival the emergency services	
The **Incident Controller** will instruct the Forward Controller to ensure that the route to the FIRE is unobstructed and the main gate is OPEN	
The **Forward Controller** will maintain contact with the Incident Controller at all times and direct Emergency Services as appropriate	
The **Incident Controller** will assess the actual or potential effect on plant operation and instruct the **Control Room Controller** to take necessary actions to minimise risks	
UPON ARRIVAL OF FIRE SERVICES: The **Incident Controller** will coordinate with the **Fire Brigade Senior Officer**, ensuring that they are aware of special risks (e.g. Chemicals, electrical supplies, gas supply, propane, gas cylinders and high pressure/temperature systems.)	

6.2. SITE FIRE – Scenario 2 Outside of normal office hours

Description	✓
On confirmation of a FIRE, or when the fire alarm has sounded the **Incident Controller** will implement this procedure	
The **ASTL** will assume the role of **Control Room Controller** and go directly to the Central Control Room unless directed otherwise by the **Incident Controller**	
The following roles will be assumed; • **Incident Controller** – On shift STL • **Control Room Controller** – On shift ASTL • **Forward Controller** – On shift STL • **Muster Point Controller** – The contractor supervisor (If contractors are on site). If no contractors are on site then a role call is not required	
The **Incident Controller** will go to the location of the incident and ensure the safety of any personnel that may have reported the fire. The IC will assess the seriousness of the fire and risk to personnel, environment and plant	
The **Incident Controller** shall take appropriate steps to remove any other hazards from the area if it is safe to do so and he has considered fully the results that his actions will have. For example, if the fire is located near fuel gas or oil systems, It may be necessary to shutdown various systems or the entire plant	
The **Incident Controller** will decide whether to call in the Fire Brigade and/or Ambulance as required	
The **Incident Controller** shall inform the on-call Manager of the incident at the earliest opportunity	
If a roll call is required and has been completed at the Muster Point, **the Muster Point Controller** will inform the Central Control Room of any missing persons. The **Control Room Controller** will log any missing persons and their last known location & contact details and then update the **Incident Controller**	

6.3. SITE FIRE – During an Outage

Description	
On confirmation of a FIRE, or when the fire alarm has sounded the Incident Controller will implement this procedure	
The ASTL will assume the role of **Control Room Controller** and go directly to the Central Control Room unless directed otherwise by the Incident Controller	
The following roles will be assumed; • **Incident Controller** – On shift STL • **Control Room Controller** – On shift ASTL • **Forward Controller** – Selected by Incident Controller • **Muster Point Controller** – A senior member of staff located at the muster point.	
The **Incident Controller** will go to the location of the incident and assess the seriousness of the fire and risk to personnel, environment and plant	
The **Incident Controller** shall take appropriate steps to remove any other hazards from the area if it is safe to do so and he has considered fully the results that his actions will have. For example, if the fire is located near fuel gas or oil systems, it may be necessary to shutdown various systems or the entire plant	
The **Incident Controller** will decide whether to call in the Fire Brigade and/or Ambulance	
Once the roll call has been completed at the Muster Point, the **Muster Point Controller** will inform the Central Control Room of any missing persons. The **Control Room Controller** will log any missing persons and their last known location & contact details and then update the **Incident Controller**	
FIRE BRIGADE TO BE SUMMONED	
The **Control Room Controller** will dial **999**	

When the exchange operator answers, ask for the **FIRE BRIGADE** and give the telephone number of the Central Control Room (insert site control room telephone number): .... When connected to the Fire Services, give the following information: THIS IS (insert site address) .... **WE HAVE A FIRE!** Relay any other information to hand such as the nature of the fire and whether any persons are known to be missing, in danger, and any known casualties.	
The **Forward Controller** will direct the Emergency Services as appropriate	
During the incident the **Incident Controller** will assess the actual or potential effect on plant operation and instruct the **Control Room Controller** to take necessary actions to minimise risks	
UPON ARRIVAL OF FIRE SERVICES: **The Incident Controller** will coordinate with **the Fire Brigade Senior Officer** on their arrival, ensuring that they are aware of special risks (e.g. Chemicals, electrical supplies, gas supply, propane, gas cylinders and high pressure/temperature systems)	

6.4. MISSING PERSON

Description	✓
OUTSIDE OFFICE HOURS – 2/3 MAN OPERATIONS	
The **Control Room Controller** (member of staff in the control room) will log the following details regarding the missing member of staff: A. Name: B. Time presumed missing: C. Last known location:	
The **Control Room Controller** will then try to make contact with the missing person via radio	
The third member of staff on shift or **Security guard** if only two persons are on shift, will carry out a brief search for the missing person starting at the last known location.	
If no contact is made then the **On Call Duty Manager** will be contacted using the control room contact book to report the situation and receive further instructions.	

DURING OFFICE HOURS	
The **Control Room Controller** (member of staff in the control room) will log the following details regarding the missing member of staff: A. Name: B. Time presumed missing: C. Last known location:	
The **Control Room Controller** will then try to make contact with the missing person vi radio	
If no contact is made then the **On Site Duty Manager** will be notified immediately and a search party sent around site to look for the missing person	

6.5. MAN DOWN ALARM

Description	✓
OUTSIDE OFFICE HOURS – 2/3 MAN OPERATIONS	
The Control Room Controller (member of staff in the control room) will log the following details regarding the man down: A. Name: B. Time of Man Down reported: C. Last known location:	
The **Control Room Controller** will then try to make contact with the missing person via radio	
The third member of staff on shift/security will attempt to locate the man down starting at the last known location	
If no contact is made then the **On Call Duty Manager** will be contacted using the control room contact book to report the situation	
The **On Call Duty Manager** will travel to site immediately	
THE MAIN GATE will be opened in preparation for the **On Call Duty Manager**	
The third member of staff on shift/security should continue to search for the man down, providing regular reports to the **Control Room Controller** as to the areas searched	
Upon arrival, the **On Call Duty Manager** will go directly to the control room and receive an update to the situation	

DURING OFFICE HOURS	
The **Control Room Controller** (member of staff in the control room) will log the following details regarding the man down: D. Name: E. Time of Man Down reported: F. Last known location:	
The **Control Room Controller** will then try to make contact with the missing person via radio	
The third member of staff on shift/security will attempt to locate the man down starting at the last known location	
If no contact is made then the **On Call Duty Manager** will be contacted using the control room contact book to report the situation	
If no contact is made then the **On Site Duty Manager** will be notified immediately and a search party sent around site to look for the Man Down	

6.6. SITE EVACUATION

Description	✓
The **Evacuation Alarm** is the same as the site **Fire alarm** and this is initiated either automatically (by the fire detection system) or manually via the control room. The following roles will be assumed. • **Incident Controller** – On shift STL • **Control Room Controller** – On shift ASTL • Forward Controller – Selected by **Incident Controller** • **Muster Point Controller** – A senior member of staff located at the muster point.	
Manually Sound "Evacuation Alarm" (see above) after assessing the situation or after consultation with Fire or Police Officers as appropriate	
Summon Fire Service and/or Police as appropriate under the direction of the **Incident Controller.**	
If The Control Room is to be evacuated, the **Incident Controller** shall instruct the plant operator to make plant safe in accordance with Local Site Operation Instructions	
The **Incident Controller** will select a **Forward Controller** to go directly to the Main Gate. The Incident Controller will give the following instructions to the **Forward Controller**: • Ensure that the route to any incident is unobstructed • Stop any other vehicles or personnel entering the site • Give the Emergency Services clear directions to incident	
The **Incident Controller** will co-ordinate with the **Emergency Services** and contact the Plant Manager (or nominated deputy) at the earliest opportunity to report the situation	
A roll call will be carried out by the **Muster Point Controller** and any missing persons reported to the **Incident Controller**	
The **Incident Controller** and **Emergency services will** Co-ordinate search for and rescue of unaccounted persons and eventual re-entry to plant	
If necessary to direct staff to evacuate the site boundary, discuss appropriate secondary muster point with **Emergency Services**	

6.7. TERRORIST ACTION

Description	✓
On receipt of a report from the Police, carry out their instructions as soon as possible	
On receipt of significant information from a member of staff or a vehicle driver, contact Police immediately	
On receipt of a report from a member of the public (e.g. telephone call), complete questionnaire (**Appendix B)**, which will always be located by the site phone. The Police should then be contacted immediately	
If required, arrange for emergency vehicles to be admitted via main gate. (Ensure a site representative is available as **Forward Controller**)	
Co-ordinate with Police (and other emergency services) personnel on arrival	
In certain circumstances it may be prudent to restrict use of Radios. (Risk of triggering a device)	
If required, prepare to evacuate the site in line with local site procedures and use communications other than the Fire Alarm. The **Muster Point Controller** will maintain contact with the **Incident Controller**	
Contact Plant Manager (and/or nominated deputy) at the earliest opportunity	
The **Plant Manager** (and/or nominated deputy) to report to SEC head office as appropriate	

6.8. PROPANE GAS FIRE

Description	✓
Assess seriousness of fire and risk to personnel and plant	
Sound Site Fire Alarm immediately, (if not already sounding automatically). The following roles will be assumed; • **Incident Controller** – On shift STL • **Control Room Controller** – ASTL • **Forward Controller** – Selected by the IC • **Muster Point Controller** – A senior member of staff The **Control Room Controller** will contact Emergency Services if required under instruction from the **Incident Controller**. The **Forward Controller** will go directly to Main Gate to await further instruction	
If the FIRE BRIGADE are required then the **Control Room Controller will** call 999. When the exchange operator answers, ask for the FIRE BRIGADE and give the telephone number of the Central Control Room (insert site telephone number): ……………………………. When connected to the Fire Services, give the following information: THIS IS: (insert site address) ………………………………… ………………………………… ………………………………… ………………………………… ………………………………… ………………………………… ………………………………… **WE HAVE A FIRE!** Relay any other information to hand such as the nature of the fire and whether any persons are known to be missing, in danger, and any known casualties.	

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N.B. In most cases, the most effective method is to shut off propane gas supply and allow propane to burn out	
Cordon off area, without personal risk	
Arrange fixed water spray onto propane storage tanks if practicable AND if the person is trained in use of fire hoses, without personal risk.	
Contact Plant Manager (and/or nominated deputy) as soon as possible to inform them of the incident	
Once the roll call has been completed at the Muster Point, the **Muster Point Controller** will inform the Central Control Room of any missing persons. The **Control Room Controller** will log any missing persons and their last known location & contact details and then update the **Incident Controller**.	

6.9. HV SUBSTATION OR TRANSFORMER INCIDENT (major oil leak or fire)

Description	✓
Assess seriousness of fire and risk to personnel and plant	
If fire (or risk of fire) sound the Site Fire Alarm. The following roles will be assumed; **Incident Controller** – On shift STL **Control Room Controller** – ASTL **Forward Controller** – Selected by the IC **Muster Point Controller** – A senior member of staff located at the muster point	
Summon the Fire Brigade by calling **999.** When connected to the Fire Services, give the following information: THIS IS (insert site address): …………………………………… …………………………………… …………………………………… …………………………………… …………………………………… …………………………………… …………………………………… **WE HAVE A FIRE!** The Forward Controller will go directly to the main gate to greet the emergency services and await further instruction.	
Summon Ambulance if required	
Contact site's distribution network provider, apprise them of the situation and follow the Control Engineers' instructions. Telephone ……………………..	
Arrange for the DNP personnel to be admitted via main gate. Ensure route to the incident is unobstructed	
No access to the substation compound is permitted without clearance from the DNP Control Engineer	

Co-ordinate with Fire Brigade Senior Officer on arrival, ensuring that they are aware of the sites DNP instructions. (The sites DNP will agree access for Authorised Persons when appropriate)	
Direct firefighting and rescue operations, without personal risk. WATER MUST NEVER BE USED ON LIVE HIGH VOLTAGE APPARATUS	
Prepare to island mode or shut down plant as fast as practicable, in accordance with local site procedures, (plant may already have tripped to "Island" mode), in order to isolate and earth Step-up transformer	
Take preventative measures to prevent any oil entering any part of the site drainage system	
Minimize actual or potential sources of ignition near oil or oil vapour. (Isolate all non-essential electrical supplies, e.g. Transformer cubicle heating / lighting / cooling / tap changer etc. when off load)	
Cordon off area to prevent unauthorised access. (Fire Brigade to decide on precautions regarding public right of way and transport links adjacent)	
Carry out Site Evacuation when fire alarm has sounded	
Contact Plant Manager (and/or nominated deputy). Plant Manager (or nominated deputy) to report to BWSC head office	

6.10. INTRUDER ON SITE (ACTUAL OR THREATENED)

Description	✓
Summon Police Immediately	
Do not put staff at any personal risk	
Attempt to minimise intruder access to sensitive/dangerous plant areas	
Attempt to minimise intruder access to sensitive/dangerous plant areas	
Contact Plant Manager (and/or nominated deputy)	
Plant Manager (or nominated deputy) to report to BWSC head office as appropriate.	

6.11. MAJOR SPILLAGE OF HYDRAULIC OR LUBRICATING OIL

Description	✓
In case of a major oil spill (or any other chemical liquid) and where there is a possibility of discharge to the public sewer from the plant the surface water drainage system can be isolated from the outside by closing of penstock at the site discharge or by turning of the discharge pump station	
The site and road drains discharge via the surface water drainage system into an oil separator, that separates oil from water, before discharging water via an attenuation/retention system into the public sewer or waterway. The Interceptor tank oil storage capacity is limited and will not cope with a large quantity of oil.	
Isolate source of leakage if possible and call sites environmental incident contractor if required.	
Cordon off area and ensure that fire risks are minimised.	
Protect road and site drains to prevent oil from entering the drainage systems using spill kits located around site (Minimal contamination will be contained by the oil separator tank if oil enters those drains connected to this system). If oil enters site drains oil separator tank use portable submersible pump to discharge contaminated water into empty oil drums or other secure storage. Oil contaminated water must not be discharged into the public sewer.	
In case of a major oil spill (or any other chemical liquid), where there is a possibility of discharge to the public sewer from the plant, the surface water drainage system can be isolated from the outside by closing of penstock at the site discharge or by turning of the discharge pump station.	
Pump free oil into drums for disposal via waste oil contract	
Recover remaining oil using oil absorbent materials	
Collect all oil contaminated materials and store in suitable area. Contact Plant Manager (and/or nominated deputy).	
Plant Manager (or nominated deputy) to report to SEC head office as appropriate	

6.12. MAJOR PLANT FAILURE

Description	✓
This will include loss of significant Plant and/or Apparatus, which stops the plant process	
As per operating instructions the plant controller will endeavour to minimise damage and restore essential systems, however safety of personnel must be the priority	
The operator must endeavour to prevent secondary damage	
Initiate short-term remedial actions where possible, but do not destroy any potential evidence	
If the incident requires Site Evacuation then refer to Incident Sheet 6 – Site Evacuation	
Contact Plant Manager (and/or nominated deputy). **Plant Manager** (or nominated deputy) to report to SEC head office as appropriate.	

6.13. AMMONIA SPILLAGE

Description	✓
If a significant Ammonia spillage occurs during delivery then the staff member supervising the delivery should put on the 'Full face mask with breathing canister' immediately. Follow local site operating procedure, which should contain the following:	
Evacuate the local area and cordon off to prevent unauthorised access	
Contact the Central Control Room immediately to report the situation	
The **STL** may consider **Full Site Evacuation** (see Incident Sheet 6), which should be carried out in a controlled manner with the use of radios and communication via the Central Control Room. The STL on shift will consider wind direction and the nature of the Ammonia plume It may be safer to direct people to stay indoors, switch off air conditioning and close windows	
Call Fire Brigade and environmental incident contractor if required – state the nature of the emergency, as they will send appropriate response equipment	
Summon an Ambulance if required: **Note to physician:** Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote, administer corticosteroid dose aerosol to prevent pulmonary oedema	
Identify the source of leakage and control by isolation, if possible, i.e. stop injection pumps	
If safe to do so, dilute with water (to reduce vapour) using the emergency hose. Wash chemicals directly to drain, which will flow into the Ammonia spillage tank	
Assess the effects on plant and take appropriate measures to prevent breach of **Environmental Authorisation**	
During delivery of Ammonia 'pen stock' valves will manually have to be or will automatically be shut to redirect any spillages from local drains to an underground storage tank. This can then be pumped into suitable containers for removal off site.	
Contact Plant Manager (and/or nominated deputy) Plant Manager (or nominated deputy) to report to SEC head office as appropriate	

6.14. SAFETY HARNESS RESCUE PLAN

Description	✓
An unconscious or conscious individual suspended in a harness can suffer fatal injuries in as little as 10 minutes due to poor blood circulation	
Alert Control Room via radio or site phone and gather a rescue party of 3 people.	
The rescue party must all be wearing safety harnesses	
Attempt to rescue the individual by hooking his harness line and pulling him over to the nearest handrail, then hauling the individual over the railing. (Hook pole required)	
Keep the rescued individual standing if possible, or at least maintain a vertical upper body – for at least 20 minutes	
Under no circumstances lay the rescued person flat, as the sudden return of blood to organs may cause death due to shock	
Summon Ambulance Service and send the **Forward Controller** to greet them at the main gate	
Contact Plant Manager (and/or nominated deputy)	
Plant Manager (or nominated deputy) to report to SEXC head office as appropriate	

6.15. UNPLANNED LOSS OF ELECTRICAL SUPPLIES (SIMULTANEOUS LOSS OF BOTH MAIN GENERATOR AND STEP-UP TRANSFORMER)

Description	✓
Simultaneous loss of both Main Generator and Step-up Transformer	
Confirm that no persons are placed at risk due to the electrical failure and are not trapped in lifts. Arrange for release of persons that are trapped and in **IMMEDIATE DANGER**	
Contact sites distribution network provider Telephone ……………………………	
Endeavour to make plant safe in accordance with local site operating procedures	
Ensure emergency generator has started and is synchronised	
Check UPS power supply is LIVE and supplying UPS fed equipment	
Contact Plant Manager (and/or nominated deputy). Plant Manager (or nominated deputy) to report to BWSC head office as appropriate	

6.16. FLOOD WARNING OR INCIDENT

Description	✓
The Shift Team Leader, as **Incident Controller** is to be informed of any reported flooding or flood warnings	
Incident Controller shall monitor the situation around plant locally and via CCTV. The **Incident Controller** should monitor weather reports via the internet and local radio stations. Levels of site drains and decantation pit shall be monitored. Monitor Environment Agency website for adverse weather conditions. The Duty Manager shall be informed of the situation	
The **Incident Controller** may consider an evacuation of all non-essential staff by sounding site fire alarm. The following roles will be assumed; • **Incident Controller** – On shift STL • **Control Room Controller** – On shift ASTL • **Forward Controller** – Selected by Incident Controller • **Muster Point Controller** – A senior member of staff located at the muster point. The **Incident Controller** and **Control Room Controller** will co-ordinate the incident via the central control room. The **Forward Controller** shall go directly to the main gate if Emergency Services are required. The Muster Point Controller will report any missing personnel to the Central Control Room	
The **Incident Controller** may request all non-essential staff to leave the Sleaford site	
The Emergency Services will be summoned if required by calling **999** When connected to the Emergency Services, give the following information: **THIS IS:** (insert site address) …………………………………… …………………………………… …………………………………… …………………………………… …………………………………… **WE HAVE A FLOOD**	
Consider plant shutdown in a controlled manor.	

7. APPENDIX B – Bomb Threat Telephone Check List

Call received at:	**On:**	**By:**
MESSAGE READS:		

QUESTIONS TO CALLER	**ANSWER**
When will it go off?	
Where is it located?	
What kind of bomb is it?	
Where are you now?	
How do you know so much about it?	
Why have we been chosen for this action?	
What is your grievance?	
What is your name and address?	

After the call	**Observations** (tick of)					
CALLER	Gender?	Age?	Accent?	Foreign?	Child?	
VOICE	Loud?	Soft?	High?	Deep?	Intoxicated?	Pleasant?
SPEECH	Fast?	Slow?	Distinct?	Slurred?	Stutter?	Distorted?
MANNOR:	Calm?	Laughing?	Angry?	Emotional?	Rational?	
CALL	Local?	Long distance?				
NOISE	Machines?	Traffic?	Animals?	Voices?	Quiet?	Music?
Did the caller appear familiar with the site?						
Other comments:						

8. APPENDIX C – Contractors signing in sheet

Contractor	Name	Tick – if issued with permit	Date	Time in	Time out

SCANDINAVIAN ENERGY CONTRACTOR A/S | Gydevang 39-41 | DK-3450 Allerød | Denmark | **T:** +45 3226 6400 | http://www.secontractor.dk | VAT no.: 42249963

Table of Content

SCANDINAVIAN ENERGY CONTRACTOR A/S | Gydevang 35 | DK-3450 Allerød | Denmark | **T:** +45 3226 6400 | http://www.secontractor.dk | VAT no.: 42249963

1. Purpose

Control of activities involving the temporary application of heat.

2. Scope

- Identify the **hazards** inherent with work involving the application of heat.
- Define procedures to control Hot Work carried out on or near the **system** at SECO Ltd. **locations**.
- Control of specific **Hot Work** activities carried out in workshops or other designated areas at the **location** is covered by workshop safe working procedures and **location** risk assessments, consequently this procedure does not apply to Hot Work in those designated areas.

3. References

- SECO Ltd. Safety Rules

4. Definitions

Terms in bold type shall have the same defined meanings as laid down in the definitions section of the SECO Ltd. Safety Rules.

- Hot Work **-** Any temporary operation involving the introduction of open flames or production of heat or sparks including, but not limited to brazing, cutting, grinding, soldering, and welding.
- **Acceptor** – Hot Work – An **Acceptor** who has been trained and assessed in SECO Ltd. Hot Work procedures.
- Fire Watch Person – A person who has been trained and assessed in fire watch duties and responsibilities and is competent to use the firefighting equipment appropriate to the hot work task being undertaken.

5. Responsibilities

5.1 Safety Controller

- Responsible for ensuring that this Hot Work procedure is followed for all Hot Work activities carried at SECO Ltd. **locations.**
- Responsible for ensuring **safety documents** and Hot Work certificates are completed for all hot work tasks on or near the **system.**

5.2 Appointed person – Hot Work assessment

- Responsible for reviewing the Hot Work and deciding whether there is a practicable alternative to Hot Work.
- Deciding if it is practicable to carry out the Hot Work in a designated Hot Work area.
- Responsible for preparing and signing the Hot Work certificate.
- Responsible for checking that the person receiving the Hot Work certificate is an **Acceptor** - Hot Work**.**

5.3 Acceptor – Hot Work

- Responsible for following the Hot Work procedure as detailed in this SECO Ltd. Plant Management Instruction, the Hot Work certificate and in the associated **safety document**.
- Responsible for designating suitably trained Fire Watch Person(s) during and after Hot Work activities.

6. Requirements

6.1 Hazards associated with work involving the application of heat

- Hot Work has inherent **hazards** with various causes, which may include but are not limited to the following:
    - Fire caused by heat transfer onto a flammable material.
    - Explosion caused by flammable materials reaching their explosive limit.
    - Burns caused by heat transfer from work area.
    - Poisonous fumes or vapours produced by work carried out (such as welding, grinding, or cutting certain materials with galvanised coatings).

6.2 Control of Hot Work

- The **Appointed Person** – Hot Work Assessment and the **Acceptor** responsible for the hot work shall discuss alternatives to Hot Work including the option of moving the work to a designated hot work areas at the **location**
- The **Acceptor** – Hot Work shall be in receipt of a **safety document** consenting to hot work under that **safety document** before the Hot Work certificate is issued.
- No Hot Work shall be commenced until the Hot Work certificate and an appropriate **safety document** have been issued.

6.3 Hot Work procedure

- The Hot Work procedure is detailed in the flow diagram Appendix B.
- The person in charge of the Hot Work activities shall be an **Acceptor** – Hot Work and shall be in receipt of a **safety document** and a Hot Work certificate before allowing Hot Work to commence.
- A Fire Watch Person trained and assessed in the **location** fire watch procedures shall be in attendance for the duration of the Hot Work including any breaks and for of 60 minutes after completion of all Hot Work activities. This is mandatory and is the responsibility of the **Acceptor** – Hot Work**.**
- The **Appointed Person** – Hot Work assessment shall decide whether additional fire monitoring beyond the 60-minute mandatory fire watch is required.
- Where additional fire monitoring has been identified the **Appointed Person** - Hot Work assessment shall:
  - Inform the **Plant Controller** at the time of issue of the Hot Work certificate.
  - Clearly identify the requirement for additional monitoring on the Hot Work certificate.
- Where additional monitoring has been identified on the Hot Work certificate the minimum duration is 3 hours and the **Plant Controller** is responsible for deciding how it shall be carried out.
- Some examples of how additional monitoring may be achieved are:
  - Reinstatement of fire alarms and detectors.
  - Use of installed cameras.
  - Regular checks by personnel.
- The Hot Work certificate shall be secured by the **Appointed Person** – Hot Work assessment in a weatherproof transparent folder and clearly displayed at the Hot Work location.
- A copy of the Hot Work certificate shall be maintained in the Permit Office for the duration of the Hot Work**.**

- The Hot Work area shall be clearly marked; no Hot Work shall take place outside the designated Hot Work area.
- All Hot Work must cease before the expiry time and date on the Hot Work certificate.
- Where an atmosphere test is required for the Hot Work area a copy of the Gas Free certificate shall be issued to the **Acceptor** – Hot Work.
- The **Fire Watch Person** shall:
  - Maintain a fire watch for the duration of the work including breaks and for 60 minutes after all Hot Work activities have ceased.
  - Not be engaged in any other activities during the fire watch period.
  - Be trained to use the firefighting equipment designated for the Hot Work task.

6.4 Training and assessment

- **Acceptors –** Hot Work and **Fire Watch Persons** shall be trained and assessed in their duties, roles, and responsibilities under this Hot Work procedure.
- Records of current **Acceptors** - Hot Work and Fire Watch Persons shall be available to **Safety Controllers** and **Appointed Persons** – Hot work assessment for checking prior to issue of **safety documents** or Hot Work certificates.

6.5 Records

- All **Hot Work** certificates are numbered sequentially and are referenced to the **safety document** that allows Hot Work.
- Completed Hot Work certificates shall be securely archived in numerical order including any that are spoilt or prepared but not issued.
- Archiving requirements shall be the same as those designated for **safety documents.**

SCANDINAVIAN ENERGY CONTRACTOR

Project	1017 **Newport energy from waste plant**	Document no.	Rev.no.
Created	12 December 2022	1017.M0.Z02.001	00
Subject	**Technical Process Description**		Page 1/28

TECHNICAL SPECIFICATION

Rev.	Date	Description	Issuer	Reviewer	Approver
00	2022.XX.YY	Issue for RFQ	PEJO		

Table of Content

Attachments

1.

No.	Doc.no.	Rev.no.	Description
1	Attachment 01. Grate Technical description		Grate Technical description
2	Attachment 2. Flue Gas Cleaning		Flue Gas Cleaning
4	Attachment 3. SNCR M&S		Selective Non-Catalytic Reduction

2. Introduction

The purpose of the project is to establish a net 20MWe RDF fuelled Energy from Waste (EfW) facility to be located in Alexandra Docks in the Port of Newport in accordance with the description **in this** Schedule and attachments.

The supply covered by this specification is intended for use in the New Port Energy from Waste plant, for which Scandinavian Energy Contractor (SEC) has entered a contract for the design, manufacturing, delivery to site, erection and commissioning. SEC is the principal contractor responsible for the complete plant.

The expected average fuel Lower Calorific Value (LCV) for continuous operation is 11 MJ/kg, though the design range for the boiler is from 8 – 16 MJ/kg

2.1. Layout

2.1.1. Main Data

Subject	Details	Comment
Fuel type	Refuse Derived Fuel (RDF)	As per Specification section 22
Number of streams	One	Single Boiler, single turbine
Gross electricity output	24 MW at 100% boiler MCR	At 11 kV
Net electricity exported to the grid	20.0 MW	At 33 kV
Net electricity exported to potential future private wire	3.0 MW maximum	At 11 kV
Total electricity exported	20.0 MW at 100% MCR	
Fuel input rate at 100% MCR	28.8 t/h1 37.3 t/h	At design LCV 11 MJ/kg At min. LCV 8 MJ/kg

TECHNICAL SPECIFICATION

Subject	Details	Comment
	19.8 t/h	At max. LCV 16 MJ/kg
Fuel input rate average	28.8 t/h	For aggregate gross power generation of 24 MW At design LCV 11 MJ/kg
Steam conditions	41 bara, 415 °C	At steam turbine inlet
Steam boiler capacity	105 t/hr at boiler MCR	115 t/hr maximum capacity
Ambient air temperature	15 °C	Design -5 °C minimum 35 °C maximum
Exhaust gas emissions	Commission Implementing Decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration	Upper emission limits to be applied

Notes:

1) Design fuel specification:
    a. LHV 11.0 MJ/kg
    b. Chemical analysis (by mass): Carbon 27.49%, Hydrogen 4.20%, Nitrogen 0.71%, Oxygen 16.65%, Water 33.30%, Ash 17.0%, Sulphur 0.31%, Chlorine 0.51%, Fluorine 0.00% - SEC: Needs to be confirmed.
2) Gross power generation and net power output reduced at higher ambient temperatures.

The Plant will be designed to operate with an R1 factor above the 0.65 threshold for new installations after 31 December 2008, as defined in the R1 Energy Efficiency Formula for Incineration Facilities Dedicated to the processing of Municipal Solid Waste according to Annex II of Directive 2008/98/EC on Waste.

The overall Energy and Mass Balance is include in section 8 and the Firing Diagram in section 9 of this application

2.1.2. Operational Functionality

Plant cold start-up will be fully automated and require no operator intervention except for the initiation of such start-up process, and the opening/closing of manual valves, switchgear etc. that are normally not operated during normal online running. Start-up will require 5-6 operation staf Plant warm/hot restart will be fully automated and require no operator intervention except for the initiation of the re-start process.

The plant will safely shutdown following a trip or loss of grid at any level of power output without any damage to equipment by way of the 100% steam turbine bypass capability. The plant shutdown will be fully automated and require no operator intervention.

3. Waste Reception

3.1. Feedstock Reception

The waste reception hall is designed with 2 side-by-side storage bunkers, divided by a wall. Each storage bunker has 3 unloading lanes each, 6 in total.

Feedstock arrives from 7.00-19.00 Monday to Saturday and possibly 8.00-16.00 Sundays. There will be 1 – 6 mainly 90 m³ walking floor types of lorries arriving each hour.

3.2. Treatment of raw waste

A mobile shredder will be installed for loosing bales or to shred oversized fuel in accordance with EPC contract schedule 33 attached in section 22 of this application and will be placed in one lane to directly conveying the shredded RDF into the storage bunker. Shredding is estimated to be <10% of the fuel throughput. Shredding is not normal pre-condition for the received fuel as it will frequently be used during long weekend and holidays.

The loose RDF from the lorries will be unloaded directly into one of the two storage bunkers. Feedstock unloading can take place as lorries reverse into one of six lanes. The sub-contractor shall consider crane grab design based on the waste characteristics as described in the feedstock specification.

3.3. Feedstock Storage Bunker

For design and arrangement of the waste fuel reception bunker, feeding bunker and the external bale storage please refer to 1017.S1.U00.000 "Plan E waste fuel handling conclusions" attached in section 24 of this application.

3.4. Waste Crane

At the lower level, 2 cranes ,1 for each bunker, will move, mix, and stack the pre-shredded RDF. When the RDF is stacked on the east side of the bunker, 2 redundant cranes will feed the stacked waste from the storage bunker into the boiler feeding hopper at the higher level. The feeding hopper will call the cranes for RDF when needed.

The cranes shall be designed for feeding the hopper as the priority and stacking and mixing as the secondary priority.

The cranes are designed for fully automatic mode for stacking in unloading-bunker and feeding the Feeding Bunker. It will be possible to operate the unloading cranes manually.

3.4.1. Lower-level cranes

The feedstock reception building where walking floor lorries unload into the bunker at one side furthest from the boiler feed chute, there are 2 cranes. These runs on separate sets of rails side-by-side from the unloading end to the wall towards the boiler. These cranes can move, stack, and mix the raw feedstock in the bunker. The cranes will also be able to service the shredder with oversized waste. Feeding of bales into the shredder will be done by a front loader.

The grabs on the cranes can also be lowered down to the unloading deck on a grab trolley for servicing and maintaining.

One crane shall be able to supply 100% fuel to the feeding cranes/boiler.

3.4.2. Upper-level cranes

2 cranes operate on rails at the top of the feedstock building above and perpendicular to the two parallel lower cranes. The working area of these feeding cranes overlap that of the two lower cranes and can feed the boiler at the elevated boiler feed chute.

The cranes are able to clear the feeding hopper in case of blockage.

For service or maintenance of the grabs, a jib-crane is placed on the SE end of the building to hoist down the grab to ground level on a grab trolley.

The installed cranes are 2 x 100% (one duty one stand by).

3.5. Dust and Odour

To mitigate dust and odour in the fuel storage bunker and tipping hall, the combustion air will be taken from the storage bunker to facilitate a local negative pressure in the building. In case of one line being taken out for service, or an unforeseen stoppage, the building facility has an extraction ventilation system facilitating a local negative pressure. The plant shall be equipped with source specific dust removal system based on individual filters for suppression of dust or similar. Furthermore, the equipment shall be equipped with odour-handling devices designed to meet the appropriate permit limits for dust and odour.

4. Grate Combustion System

4.1. From Storage to Combustion

4.1.1. Charging hopper

The hopper receives the waste from the grab and leads the waste down into the charging chute succeeding the hopper. The design of the upper opening is similar to the expected diameter of the grab in open condition.

4.1.2. Charging chute

The chute, leading the waste to the furnace feeding pusher, is constantly filled with waste during operation, thus creating a seal between the combustion chamber and the exterior atmosphere.

4.1.3. Charging pusher

The charging pusher placed under the charging chute slowly pushes the waste onto the first section of the grate.

4.1.4. Grate section

The main task of the grate is to transport and distribute the waste on the grate area in the furnace to obtain the best possible contact between combustion air and waste.

The incineration of the waste fuel at the grate and in the furnace convert the waste fuel to flue gas leading to the boiler.

4.2. Grate

4.2.1. Overview

The RDF combustion system will be a moving grate, both air and water cooled, to suit the RDF Specification set out in the Specification, including ranges of calorific value, water content, ash content and physical dimensions.

The grate combustion supplier is Mitsubishi Power Europe gmbh. Technical description and scope of supply can be found in Attachment 01 of this schedule.

The combustion grate system has feed control range of 60% to 100% of the thermal design basis, achieved by speed and stroke length of the RDF pushers in the metering section. The range of the grate system is given in the Firing Diagram in section 09 of this application.

There are four sections of the moving grate. 2 sections are water cooled and 2 sections are air cooled. There is no "tipping point" or switch over as the cooling is in continuous operation.

The water-cooling system is sufficient for the maximum LCV of the feedstock.

Control of the combustion air (primary-air and secondary-air) is done by frequency (speed) controlled fans as well as motor driven dampers for each air zone.

The primary air enters the combustion chamber through the combustion grate. Its task is to control the main combustion and the thermal output out of the combustion.

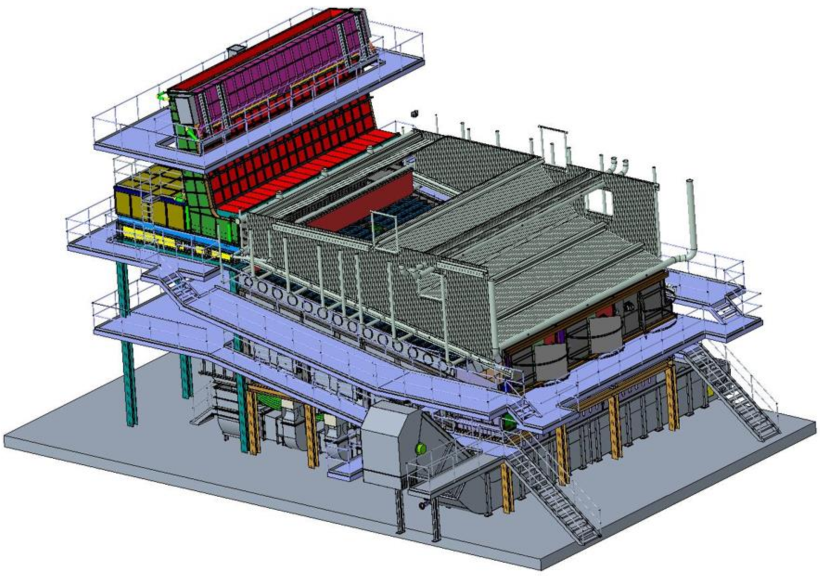
The secondary air enters the combustion chamber at the upper end of the combustion chamber. Its task is to ensure the complete burnout of the flue gas from the combustion chamber. The secondary air flow is controlled by the O_2 controller to keep the flue gas O_2 concentration constant.

4.3. Summary Description of Grate

The combustion grate incorporates staged combustion with primary air, preheated secondary air and recirculated flue gas supplies. Air suction will be from strategic areas of the feedstock handling/storage hall (shredder discharges, push-floors) to minimise and extract dust and any odour and to induce a negative pressure in the feedstock hall.

Heat will be recovered from the grate cooling system. The grate will be integrated to the boiler, sited beneath the first vertical path.

In below drawing the grate and combustion arrangement is shown:



The lower section of the boiler first pass radiation room will incorporate two auxiliary start-up / support burners firing diesel oil. Compressed air will be used as the fuel oil atomizing medium during the short and infrequent periods of diesel oil firing operation.

Riddling, Slag and Boiler Ash

Riddling, slag, and boiler ash will be mixed in the slag bunker.
Riddling from the grate is led by the riddling conveyors beneath the grate system to the slag
5. conveyor which will collect the slag as-well and transport the mix of riddling and slag to the chain
conveyor which deliver the slag/riddling to the slag/ash bunker.
The riddling conveyor and slag conveyor are water filled.

Under the 2/3erd pass water cooled screw conveyors is located. Boiler ash from the hopper beneath the 2/3rd pass is led by the screw conveyors and duct to the above-mentioned slag conveyor to be transported to the bunker together with the mix of the wet slag/riddling. Due to the moisture of the mix of slag and riddling no dust is foreseen. The chain conveyors will be covered by plates.

Boiler ash from the 4th pass (horizontal) is lead is collected in hoppers below the pass and lead to the chain conveyor beneath the hoppers. Rotary valves are installed below the hoppers to provide an airtight connection. The chain conveyor leads the boiler ash to another chain conveyor which transports the boiler ash to the slag /ash bunker. The chain conveyors will be covered by plate to ensure safety. The boiler ash will be led into a humidifier before entering the bunker to prevent dust emission.

In a similar way, the boiler ash is collected in the economizers in the lower hoppers to be led down to a chain conveyor. The (inclined) chain conveyor lead the boiler ash to the bunker. Rotary valves prevent falls air inlet to the economizer hopper. The chain conveyor is covered by plates. Likewise, the ash from the horizontal pass, the boiler ash from the economizers will be lead into a humidifier before entering the bunker to prevent dust emission.

The slag/ash bunker is concreted lined bunker with effective storage volume of at least 500m3 providing approx. 4-6 days storage, to be located on the SE end of the boiler building, to allow drive through loading of the slag and ash removal lorries by mobile telehandler or overhead crane. The clockwise circuit of the site for the ash removal lorries includes weighing on entry and exit.

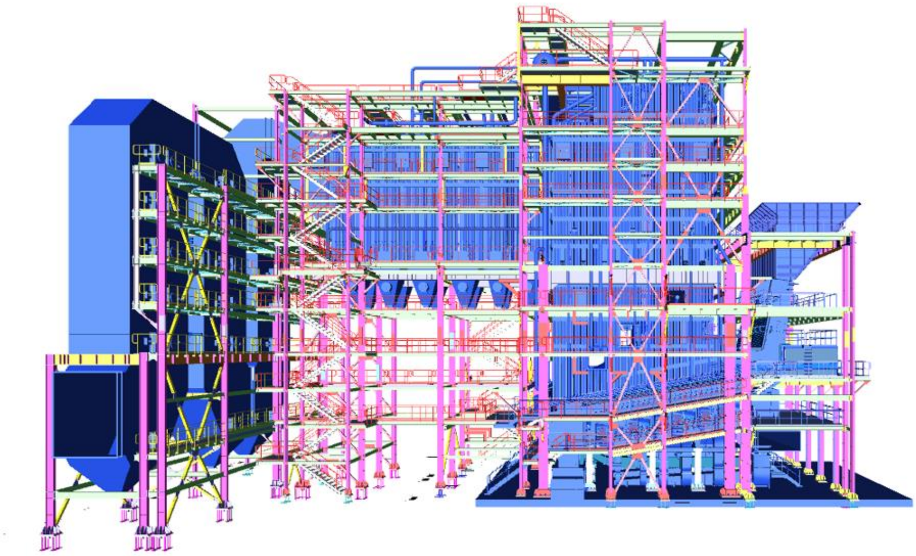
Riddling, slag and Boiler Ash generation rate is approx. 100 t/d (77 m3/d), thus assuming 25-ton loads, lorry collection frequency is 4-6 per day, or higher after Sundays and Bank Holidays when collections may not be taken place.

6. Boiler Description

6.1. Introduction

The boiler would be a Corner Tube, single drum, water tube boiler with vertical and horizontal passes.

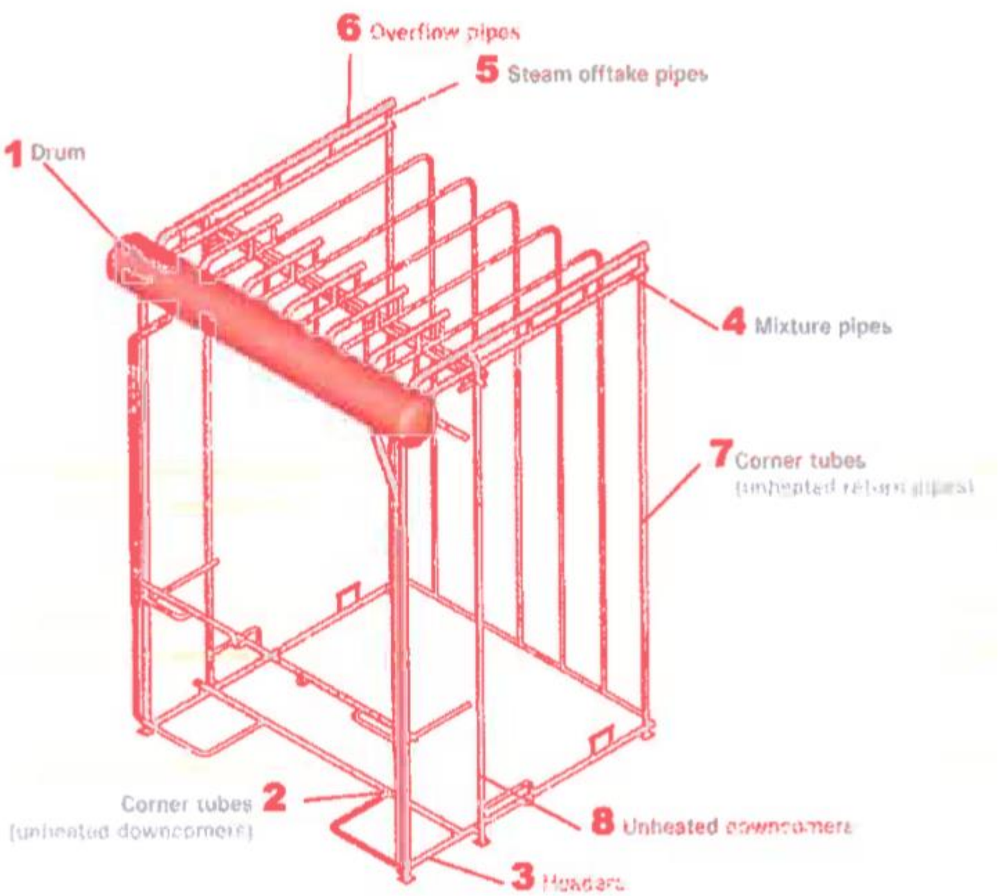
Below pictures shown the overall arrangement of the grate and boiler.



The boiler will comply with the minimum 2 seconds at >850 °C residence time requirements under all boiler operation conditions included in the full extent of the firing diagram. The boiler tube panel walls for the first two vertical passes will include multiple openings for thermal temperature mapping instruments to be fitted to enable proof of this requirement, with velocity and residence time being calculated from the boiler thermal design model.

The boiler is self-supporting with a fully welded construction, designed for extended service life and reduced maintenance requirements for minimum down time.

The ERK Corner Tube Boiler are a single drum natural circulation water tube boilers characterised by the following attributes:



- Pre-separation of steam: The steam generated in the boiler is separated through the overflow pipe (6) as shown in the figure above before it enters the steam drum (1). The steam is separated through the overflow pipes (6) and steam offtake pipes (5) before entering the stream drum.
- Corner tube cage: The corner tube cage is a monocoque body make up of a stable, rectangular arranged framework of downcomers (2, 8), unheated return pipes (7) and headers (3). The headers and distributors are welded to flue gas-tight tube walls, creating a closed body of tubes making the boiler self-supporting. Furthermore, the boiler framework can be identified through 8 components as seen in the drawing above.

- Steam Drum: ERK Corner Tube Boilers have only one drum, the steam drum. The steam drum is located outside the corner tube cage and is isolated from the heat generated in the combustion chamber. The mixture pipes (4) connected to steam drum delivers a mixture of steam / water. The annular steam drum (provided at the upper portion of boiler) is constructed from high quality boiler steel plates suitably stiffened with stay bars. The steam drum is furnished with necessary drum internals and various nozzles for mounting of required valves and instruments.
- Membrane Walls: The membrane walls are made of riser tubes welded to form a skin-tight casing, which absorbs the radiant heat from the combustion chamber.
- All boiler parts/segments will be drainable.
- The boiler internal surfaces will be chemical cleaned (flushed) prior to first introduction of treated boiler feedwater.
- Start-up from cold to operating drum pressure will be maximum 12 hours.
-

6.2. Superheaters

The superheaters shall be of the vertical convection type and consist of hanging U bent tube elements forming multi passages and two headers per superheater. Each element tube will be rolled and welded into the headers.

The superheater tubes will be 57 mm diameter with cross pitch 150 mm, to reduce the risk of slagging/blockage from ash.

The first rows of superheater tubes will be fitted with “half-moon” 3 mm thick NI-Cr steel cover plates in order to reduce tube corrosion/erosion and hence increase tube life. Fin al design by ERK to determine number of rows to which cover plates will be applied.
A two-stage external control attemperator will be installed between the first and second superheater and will consist of spray type desuperheaters.

6.3. Economisers

The boiler will be equipped with multiple economizer tube banks made of closely spaced continuous loop elements, which shall be welded at both ends to the terminal headers. Each element shall be of straight steel tubes and be connected by U-bends forming an integral loop. Economizer design and sizing has been done to ensure the exhaust gas exit exceeds the dew point of the flue gas, taking into account the FW temperature of 145 °C .
An automatically controlled water-side economiser bypass will be included to maintain a final exhaust gas temperature >150 °C, as required for the flue gas treatment system.
Shielding will be provided if required by detail design by ERK) on rows of economiser and evaporator tubes that are subject to impingement by steam soot blowers.

6.4. Condensate Pre-heater

The boiler will be equipped with a condensate pre-heater tube bank (after the economisers) made of closely spaced continuous loop elements, which shall be welded at both ends to the terminal headers. Each element shall be of straight steel tubes and be connected by U-bends forming an integral loop.

6.5. Refractory and Inconel Cladding

For the protection of the boiler water tube walls, the first vertical pass of the boiler will be refractory lined up to approximately 2/3rd of the height (radiation room 1 of the drawing below). The top of the first vertical pass and top 1/3rd of the second vertical pass (roof sections included) will have Inconel clad tubes, 2 mm thick (radiation room 2 and 3 of the drawing below).

7. Steam Turbine

7.1. Overview

Produced steam from the boiler will be led to the steam turbine to covert the energy in the steam to power by the generator.

The steam turbine generator will be sized to produce electricity at the steam parameters defined in the Specification. When running at the optimal Plant design point this will result in a maximum amount of electricity exported to the local grid. The Plant will be optimized for electricity production. The STG will be located in a separate building (turbine hall) with overhead gantry crane for major maintenance works.

The Steam turbine will be the condensing type with radial upwards or axial exhaust and with pressure casing and oil system to DIN 4312. Overspeed protection is included.

The turbine extractions, or bleeds, will be used to for the feed water heater and deaerator tank. The unit will be positioned directly on a separate foundation slab, designed to absorb the static and dynamic loads of the turbine generator set. The steam turbine will be of a proven design applied in several reference plants. The steam path will be tailor engineered for the parameters of the Plant. The steam turbine will have vibration monitoring.

The design exhaust pressure of the turbine will be around 0.10 bar(a) in conditions where the ambient air temperature is 15°C. The last blading of the turbine will be designed to be able to withstand the loads associated with a lower exhaust pressure than 0.10 bar(a). The turbine set will include a generator, gear box, glands, gland steam system, balance piston, oil system (lubrication, power and control) and protection and control.

7.2. Extraction provisions

The turbine will supply bleed steam for low pressure users including:

- Deaerator heating
- Feed Water Pre-Heater;
- Turbine LP sealing steam;

A gland steam condenser will be included in the scope of supply. The gland steam will not be vented into the atmosphere but condensed in a heat exchanger with the condensate discharged into the foul water drainage system. The exchanged heat can be recovered and used to preheat the condensate. The gland steam system supplier for turbine, including gland steam condenser, is Siemens.

7.3. Turbine Bypass System

If the turbine for some unusual operational reason cannot accept the produced steam a 100% MCR bypass valve with steam cooling water injection will be included and will operate to provide safe shut-down in case of such an emergency. Additionally, as a further safety backup measure pressure safety valve will be included as part of the boiler construction and this bypass system will be included in order to prevent the operation of these pressure safety valves, unless as a last resort if the bypass system also fails.

Furthermore, this bypass valve will be required for start-up purposes in the closed cycle, without the need to blow-off steam to the atmosphere. The bypass provision will be designed to allow long term continuous operation of the plant whilst not running the steam turbine.
Design capacity of the turbine bypass system to equal the boiler maximum continuous rate (105 t/h at 44 bara).

Pressure Reducing Station to comprise of a Pressure Reducing valve, and spray water de-superheating valve using feedwater from feedwater pumps.
At turbine start-up steam will be vented until it's possible to seal the turbine and generate a vacuum. Air extraction ejectors are included to provide this.

The by-pass system will be insulated to ensure the noise level at 1 m and at 1,5 m elevation will be below 85 dB(A).

7.4. Turbine Auxiliary Systems

A lube oil supply unit will be incorporated into the baseframe of the STG comprising lube oil tank, main oil pump, motor driven auxiliary 100 % oil pump, DC motor driven emergency 30% oil pump, oil tank heater, oil coolers and oil filters.

Battery (UPS) for 30 minutes' drive of the emergency DC motor driven oil pump is included.
Jacking oil systems for the turbine and generator are included
Turning gear for the turbine is included

7.5. Turbine Control System

The turbine control system will be supplied by the STG supplier, based on Siemens PLCs, thus ensuring seamless integration with the DCS.

7.6. Generator

The Steam turbine will be coupled to a 11 kV 50 Hz 24.9 MW 29.29 MVA 0.85pf generator to IEC standards, via a double helical parallel-shaft gear unit to AGMA 421.06.

The generator will be water-cooled and connected to a closed (dry) cooling system. The cooling system will also provide cooling for the oil system. The oil system will be provided with a duplex oil cooler to provide high reliability.

8. Steam, Feedwater and Water Treatment System

8.1. Condensate

After condensing, the condensate from the steam turbine will be collected in a condensate tank which also collects other smaller flow steam condensate returns. The condensate will then be pumped back to the deaerator via a condensate pre-heater using boiler exhaust gas.
Condensate pumps will be 2 x 100 %, continuously rated duty/standby.

8.2. Deaerator & Feedwater Tank

The deaerator and feedwater tank will be heated by a bleed steam supply from the steam turbine, which is regulated to control the deaerator operating pressure (4 bara) and hence temperature to 145 °C.

As the deaerator will be operating above 100 °C, any air (and hence oxygen) is vented, thus providing oxygen free feedwater to the boiler and steam system thus minimising corrosion.
The deaerator level will be controlled by the introduction of fresh make-up water to account for steam and condensate losses from blowdown, sootblowing, steam traps losses etc.

8.3. Feedwater

The feedwater from the deaerator tank will be fed by 2 x 100%, high pressure duty/standby continuously rated pumps to the boiler economiser. The high pressure feedwater is also used for boiler steam temperature control by two spray-water type attemperator valves.

8.4. Boiler Water Treatment

Boiler water treatment (and blowdown) will be provided in order to achieve the steam purity according to IEC TS 61370 2002-06.

Boiler water treatment chemicals (oxygen scavenger (Carbohydrazide) and alkalinity builder) will be injected into the boiler feedwater between the deaerator tank outlet and the feedwater pumps. Dosage rates will be controlled from outputs from the continuous online sampling and monitoring system to ensure the feedwater always meets the requirements of the boiler and steam turbine.

8.5. Make-up Water (Water Treatment Plant/WTP)

Make-up water for the boiler and steam system will be taken from the raw water storagebreak tank. It is treated by a water treatment plant comprising base-exchange softening, carbon filtration, reverse osmosis, electro-deionisation units and mixed bed polisher to provide high quality demineralised water to meet the requirements of the boiler and steam turbine.
The de-mineralised make-up water will be fed to the blowdown system where it is pre-heated by waste heat from the boiler blowdown before entering the deaerator.

8.6. Drains & Effluent Water Treatment

Various process and floor drains, water treatment plant drains, will be collected in a sedimentation basin, then will be pH neutralized and send to effluent treatment plant for further treatment and storage. Treated effluent will be reused as much as possible.

9. Flue Gas Treatment (FGT)

9.1. Introduction

The FGT system will comply with the following emission to air limits:

- Daily averages per Commission Implementing Decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration (upper limits), namely:

Dust	5 mg/Nm^3	At 11% O_2 dry
HCl	6 mg/Nm^3	At 11% O_2 dry
HF	1 mg/Nm^3	At 11% O_2 dry
SO_2	30 mg/Nm^3	At 11% O_2 dry
NO_x	120 mg/Nm^3	At 11% O_2 dry
NH_3	10 mg/Nm^3	At 11% O_2 dry
CO	50 mg/Nm^3	At 11% O_2 dry
TVOC	10 mg/Nm^3	At 11% O_2 dry
Hg	20 µg/Nm^3	At 11% O_2 dry

The emission limits will be achieved by a combination of combustion technology, dry-scrubbing, urea injection and filtration.

The FGT supplier (other than the SNCR system) is DP Cleantech (UK) who have a strong track record in waste-to-energy. The supplier proposal detail, technical data and scope of supply can be found in attachment 2.

The flue gas flow and emission data for the following 12 operating cases for each supplier is given in attachment 3, for the full extent of the Firing Diagram, encompassing:

- Design RDF fuel LCV.
- Min RDF fuel LCV.
- Max RDF fuel LCV.
- Boiler nominal output.
- Boiler maximum output.
- Boiler 50 % load.
- Average RDF fuel Cl and S contents.
- Maximum fuel Cl and S contents.

9.2. NOx

The NOx emission limit will be achieved by air flow control across the multiple combustion zones in the grate (thus reducing flame temperature and reducing atmospheric NOx) and **Selective Non-Catalytic Reduction** (SNCR) NOx removal by the diluted urea injection in the first pass of the boiler, above the grate.

Multiple nozzles across multiple rows of the boiler first pass will be installed to allow for system optimization during commissioning.

Urea solution will be stored in a tank to provide a minimum of 4 days supply. The solution will be further diluted according to the vendor's recommendations, prior to injection into the boiler. Technical proposals for suppliers for the SNCR system are given in attachment 3.

9.3. HCL, SO2 and HF

The acid gases in the exhaust gas will be removed by a dry scrubber reactor tower after the boiler economiser with hydrated lime injection. The tower will be sized for approximately 4 seconds' reaction time.
Lime is stored in a silo. The silo will be located next to the scrubber with feed by two conveyors via metering systems to a blower, then onto the base of the scrubber tower.

For the extreme cases of maximum chlorine and sulphur in the RDF feedstock (cases 10, 11 and 12 in the FGT data in appendix 2), the HCl and SO2 emission limits required) are guaranteed with increased reagent consumptions as stated.

9.4. Hg, Cd, and Ti

The hazardous metal oxide gases in the exhaust gas will be removed within the same dry scrubber reactor tower as for the acid gases by powdered activated carbon (PAC) injection.
PAC will be stored in a silo. The silo is located next to the scrubber with feed by conveyor via a metering system to a blower, then onto the base of the scrubber tower

9.5. Particulates/Fly Ash and APCR

The particulates/fly ash and used reagents (APCR) will be removed by fabric filter elements. The captured product is recycled back to the reactor tower via a recirculation surge hopper and conveyors. An additional conveyor, rotary valve arrangements and pneumatic conveyor transports the APCR (fly ash and FGT residue) to a silo for final removal from site by suitable dry ash handling lorries.

The fabric filter system comprises compartments allowing one compartment to be isolated for maintenance purposes while the other five compartments remain online and meeting the Plant's regulated emission requirements.

Clean gas then exits the fabric filters and passes to the exhaust stack via the induced draft (ID) fan. The FGT fabric bags are automatically and sequentially cleaned on-line by compressed air injected into a row of filter bags, thus creating an over-pressure in the relevant bag which momentarily stops the filtration on that bag and abruptly inflates the filter bag, causing the dust cake to break away and fall into the lower hoppers. There is one hopper for each of the 6 compartments.
Boiler fly-ash and APCR generation rate, based on average HCl and S content in the RDF feedstock, (including residue from FGT scrubber) is approx. 36 t/d, thus assuming 18ton loads, frequency is 2 per day, or higher after Sundays and Bank Holidays when collections may not take place. Such collection frequencies will increase with higher HCl and S content in the RDF feedstock, due to increased FGT residue generated.

Induced Draft Fan, Continuous Emission Monitoring (CEMS) and Exhaust Stack

10.1. Induced Draft Fan

10. An induced draft fan will be installed after the FGT system at the base of the exhaust stack outdoors. It will be sized for the full duty of the boiler and to maintain a negative pressure through the boiler system, thus ensuring no escape of exhaust or ash from the system.
It will be directly driven by a electric motor, pedestal mounted, via a coupling with flexible bellows on its inlet and outlet. The motor speed will be controlled by a variable speed drive from the motor control centre (MCC).
The fan will be mounted on anti-vibration mounts, to concrete foundations.
The fan will be fitted with temperature and vibration monitoring sensors.

10.2. CEMS

A dual redundant (2 x 100 %) continuous emission monitoring systems will be installed for the measurement and monitoring of CO, NO (NO_x), NH_3, SO_2, HCl, H_2O, TOC and O_2.

Please refer to separate description include in this application.

10.3. Exhaust Stack

The exhaust stack will be designed according to EN1993-3-2 and will be self-supporting and double walled. The overall height will be 50m (per Planning Permission) and have an outside diameter of 2.5 m. Design life shall be 25 years (50 years for structure) based on corrosion classification of chemical attack class "low" according to EN13084-1:2000. Structural design life shall be 50 years. The structural shell shall be made from EN 10025 S235JR G2/S275JR/S355J2G3 steel according to EN 10025-2 with plate thicknesses according to calculations.

The baseplate shall be circular with stiffeners for anchor bolts into the cast concrete foundation. The inner liner will be made from 3 mm 316Ti steel and insulated with 2 x 30 mm rockwool bats (100 kg/m^3) on steel wire with joints between layers staggered. Insulation is retained by means of wire nails welded to the liner.

The exhaust stack will include one inspection door (600 mm dia.), one drain (50 mm dia.) and emission sampling points as necessary.

Externally, there will be one ladder with back support from ground level to a measuring platform to provide access to the CEMS instrumentation for operational purposes, with sidesteps per each 6 m according to EN ISO standard 14122-4.
Above the measuring platform a safety ladder with safety harness and retaining carriage will continue to the chimney top. The measuring platform will include a certified lifting davit fitted with a capacity of 250kg.

External surface treatment will be blast cleaned to SA 2.5 followed by the application of 1 x 60 microns zinc rich epoxy primer, 2 x 100 microns high build epoxy paint, 1 x 60 microns polyurethane enamel to give a total dry film thickness of approximately 320 microns, according to DS / EN ISO 12944-5:2000 class C4.

The colour to be chosen from RAL standard colours, excluding RAL 9006 and 9007.

Air Cooled Condenser (ACC)

11.1. Overview

The air-cooled condenser (ACC) will be of the A-frame type and comprise numerous finned parallel tubes.

11.

The ACC shall be arranged to minimise the recirculation of air including a windboard fitted around the outside periphery of the condenser to minimise air recirculation. Physical wind barriers will be provided to protect ACC tube bundles from wind gusts that otherwise can upset equilibrium operating conditions.

The low-pressure steam from the axial turbine exhaust will flow towards the ACC through an exhaust duct, designed for low vacuum conditions. The low pressure steam duct will include a hot well to prevent any condensate running back into the turbine. This condensate will be pumped to the condensate tank. The steam will be distributed to a steam distribution header on top of the ACC.

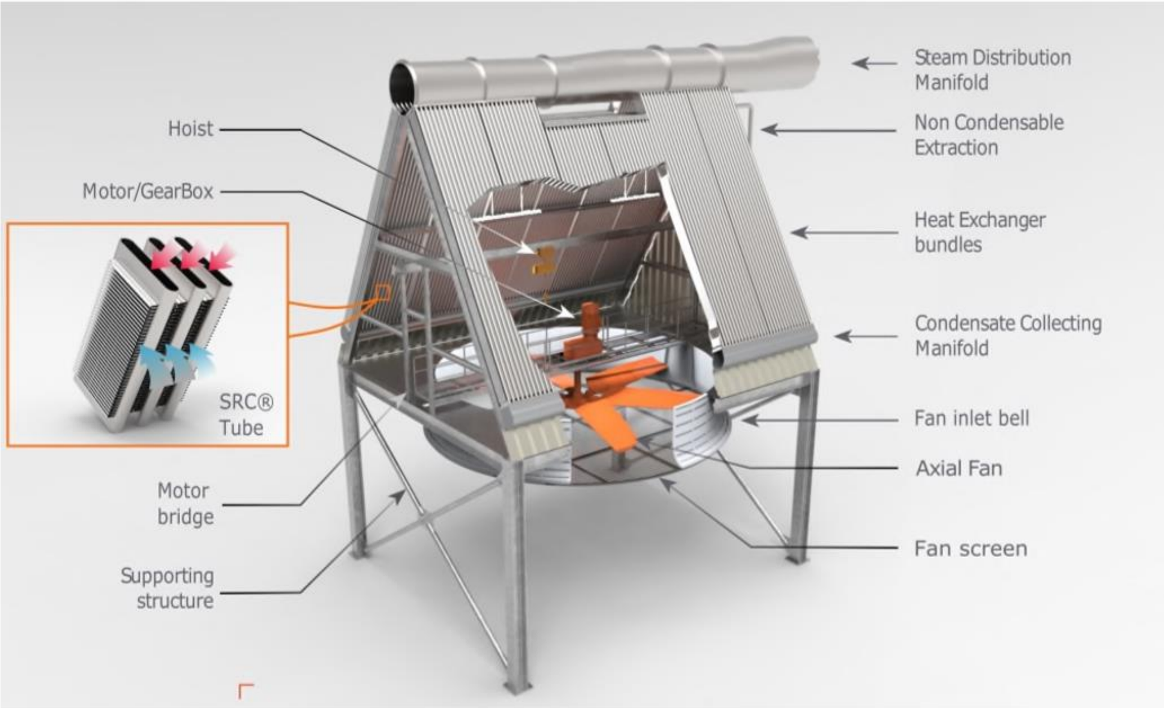
When operating in turbine bypass mode the bypass steam will be injected into the low pressure steam duct through a dump tube inside the turbine hall. The ACC will be designed for operation below 1.5 bar (a). A rupture disc and safety relief valve will be installed to limit the maximum pressure inside the ACC.

11.2. Description of ACC

Exhaust steam from the STG will pass to an air-cooled condenser operating under vacuum to condense the steam to water using axial fans driven by electric motors via reducing gearboxes. Fan speeds will be variable according to demand by motor frequency inverters (variable speed drives).

Condensed water will be collected in bottom manifolds and drained by gravity or pumped to the condensate tank.

A sectional arrangement drawing (SPG) is shown below:



Emergency power supply

An emergency diesel generator (approx.800 kWe) shall be supplied to provide sufficient power to
be able to shut down the plant in a controlled manner without damage to plant, in the event of
12. total loss of normal supplies to the main HV switchboard. The Emergency Diesel Generator (EDG)
will be able to synchronize to the grid through a separate low voltage circuit breaker located in the
Main low voltage switchboard and be capable of back synchronization to allow a seamless
reconnection to the grid on resumption of supply.
DC and UPS system.

A duplicate 110 V DC battery/charger systems and a 230 V UPS System will be supplied to provide power to the control and safety systems for the duration of one (1) hour after public grid failure. It will also remain operating the fire and smoke detection systems and CCTV etc. within the buildings.
UPS.

Floor standing UPS / battery panel sized to support a 15 kVa Load @ 400 Vac for 1 hour
Floor standing UPS / battery panel sized to support a 2.0 kVa Load @ 230 Vac for 1 hour

To	Sol Environment	Document no.	Rev.no.
From	EDRM / SEC	1017.CS.070.000	00
Created	30 January 2023		
Subject	**Drainage Description for Environmental Permit Application**		Page 1/5

MEMO

1 Surface Water Drainage

1.1 General

The surface water drainage system will drain areas of the site unlikely to be contaminated with oil and discharge to the Dock via an attenuation tank. Most of the surface water will be typical of surface water run-off from areas of roofs, hardstanding, and roads.

An underground storage tank will be used to attenuate runoff in storm conditions.

Rainwater harvesting shall be used to collect run-off from the main building roofs within the development. Overflow from the harvesting tank is directed to surface water discharge.

1.2 Oily Water drainage

Storage for chemicals and oils will be provided in appropriately bunded and secure areas or on-site stores. Water draining from areas where oil is potentially used, stored or transported will pass through an oil interceptor.

The oil interceptors will be strategically located around the site, to allow spillages of oils to be intercepted and retained.

The areas liable to oil spillage are:

- oil unloading areas
- transformers (which will contain insulating oil)
- bunded areas around oil storage tanks, emergency/blackstart diesel generator & diesel fire pump(s)
- parking areas

Oil interceptors will be regularly emptied and de-sludged to ensure efficient operation. The sludge will be disposed of off-site by a suitably licensed contractor.

In case of a major oil spill (or any other chemical liquid), where there is a possibility of release from the plant, the surface water drainage system can be isolated from the outside by turning off the discharge pump station.

1.3 Micro-drainage Simulations

Micro-drainage software will be used to simulate the Surface Water Sewer & Rainwater Harvesting drainage networks to accommodate the various storm profiles, storm durations, return periods and climatic change factors.

The principles followed are as follows:

- 1 & 2 year return periods, no surcharging* in the drainage network,
- 30 year return periods, surcharging & flood risk acceptable, but no flooding,

- 100 year return periods plus 30% climatic change factor, surcharging & flood risk acceptable; and, some flooding is accepted as long as it does not affect buildings or populations on site and that any flood volume contained is within the site.

Note *: surcharge of sewers upstream of flow restrictions is expected due to the restriction itself; hence, accepted

1.4 Surface Water Discharge Point and Rate

Further to an infiltration test it has been concluded that the site is not suitable to receive the provision of a Soakaway Drainage System.

Surface Water discharge to Alexandra Dock is therefore proposed at a flow rate of up to 100l/s. This will be achieved by installing a pump station, and a new rising main to the dock.

1.5 SuDS

Sustainable drainage systems (SuDS) are drainage solutions that provide an alternative to the direct channelling of surface water through networks of pipes and sewers to nearby watercourses.

By mimicking natural drainage regimes, SuDS aim to reduce surface water flooding, improve water quality and enhance the amenity and biodiversity value of the environment. SuDS achieve this by lowering flow rates, increasing water storage capacity and reducing the transport of pollution to the water environment.

The drainage design has incorporated three SuDS features. These are:

- A rainwater harvesting tank which collects and recycles rainwater from the main roofs of the plant
- Permeable paving to the car park area to the East of the Welfare Building (ZWA)
- A circa 900m3 attenuation tank made of 2.2m HDPE pipes

2 Foul Water Drainage

A Foul Water drainage network is proposed to accommodate discharge from foul appliances such as WC's, wash hand basins, showers, internal floor gullies etc. from within the Welfare Building as well as the Control Room.

Due to the lack of a public foul water sewer within the vicinity of the development, all foul water from welfare facilities will be treated on site by a packaged sewage treatment plant. The treated effluent from the sewage plant will be discharged to the Dock.

3 Trade Effluent Drainage

3.1 General

Trade Effluent generated by the site is directed to the Sedimentation Basin (UGM). From the Sedimentation Basin (UGM) discharge will be drained to the Trade Effluent Treatment (AGM) unit. This unit will treat the water in accordance with NRW requirements before discharge to Alexandra docks, or store the water in suitable tanks for tankering off site for treatment and disposal by a licensed contractor.

3.2 Bale Storage Area Drainage

The area labelled the Feedstock Transit Area on the site layout will act as the storage area for all bales delivered to the plant. The Feedstock Transit Area has an area of circa 1200m2. It is designed as an impermeable concrete surface complete with linear drains and road gullies that will capture all surface water that falls within it.

All waste delivered in bales will be wrapped in two layers of plastic film in order to contain the fuel, prevent foul odours and risk of leakage.

Bale size will be an average of 1.1mx1.1mx1.5m, equating to a volume of 1.815m3 per bale. Bale density will be circa 1150kg/bale; equating to a waste density of 634kg/m3. The Feedstock Transit Area is designed to accommodate five piles of containing 250 bales per pile; 1250 bales in all, equating to a total maximum storage volume of circa 2250m3, or circa 1426 tonnes of fuel.

The unloading bunker has been dimensioned to accommodate the required volume to fuel normal operation, assuming up to two days per week without any fuel deliveries. The additional 1426 tonnes of storage provided by the Feedstock Transit Area will only be required to provide sufficient fuel for public holidays and/or long weekends where there are more than two days, and up to four days, without any fuel deliveries.

As such it is foreseen that the Feedstock Transit Area will for most of any year be vacant and not store any bales. Assuming the need to provide for two long weekends with a duration of more than two days in any year, we estimate that the Feedstock Transit Area will only have bales stored on it for up to 20 days of any year.

In times of normal operation, when the Feedstock Transit Area is redundant and no bales are stored on it, surface water drainage will be led to the surface water drainage network, through the attenuation tank and discharge to Alexandra docks.

Whenever bales are stored on the Feedstock Transit Area, all surface water that falls on the yard will be diverted to the Trade Effluent drainage network. This will drain all water captured to the Trade Effluent Treatment unit, which will then be tested for any contamination, and treated as per the requirements of NRW, before onward discharge or storage for tankering off-site.

3.3 FGT & Slag Area Drainage

Whilst the drainage network serving the FGT & Slag areas is external and therefore receives surface water from rainfall, the drainage network is designed to suit the usual surface water criteria, but forms part of the Trade Effluent system.

Surface water from the Slag areas will be used for cooling processes etc. as a recycled system. Essentially a SUDS measure provided, which reduces the use of potable water in tandem with reducing discharge volumes off-site. Any remaining water not used within the cooling process system will be directed to the Sedimentation Basin (UGM), before onward pumping to the Trade Effluent Treatment Unit (AGM).

Surface water collected from the FGT area will be led directly to the Sedimentation Basin (UGM) before onward pumping to the Trade Effluent Treatment Unit (AGM).

Hence, the FGT & Slag area drainage will be designed to suit bespoke requirements; however, maintaining the various storm profiles, storm durations, return periods and climatic change factors.

4 Fire Water run-off

In the event of a fire, water polluted by fire detritus and firefighting foam etc. will be retained on site by means of isolation valve (Penstock) and if required, thereafter pumped out and transported for appropriate disposal, reused in the process, or released in accordance with regulatory requirements.

CIRIA C736 gives guidance as to the control of pollution from firefighting events. This requires that
- firefighting water
- any rainfall retained from a 24-hour preceding the event
- rainfall during the period of the fire and
- rainfall for 8 days after the event (all based on a 1 in 10-year storm event)

…must be retained on the site.

Fire water retention capacity is maintained for the full plant area including volume included in the drainage system, the discharge attenuation tanks, the sedimentation basin, the trade water treatment tanks and main RDF bunkers.

Fire water retention is, as far as practicable, designed separate for clean rainwater and other sources like firefighting and trade water etc. Initial volume planned for rainwater (clean) is 1750 m3 and some 5000 m3 will be available for overflow from rainwater, firefighting water, foul and trade (polluted).

In the event of a fire on site, a penstock linked to the building management system, will shut off water discharge to the Newport docks. Once the attenuation system is full, a pump station will begin to pump surface water to the waste unloading bunker (overflow). Any water drained to the attenuation system during a fire event shall initially be treated as polluted. The water is tested and removed for treatment if polluted or finally discharged to the Alexandra dock.

Any area inside buildings (except the fuel storage) is drained via the sedimentation basin and the trade water treatment tanks during a fire event. Overflow is pumped to the waste unloading bunker. In the fuel storage, the unloading area (reception) drains directly to the waste unloading bunker. Any water drained or pumped to the waste unloading bunker during a fire event shall be treated as polluted and removed for treatment as described above.

The site will therefore be able to accommodate the fire water retention requirements via retention of surface water and fire water and trade in the event of a fire, with no risk of pollution or flooding.

5 Conclusion

The drainage proposed for the various networks have been proposed to accommodate current design requirements, whilst incorporating flow restrictions, SUDS measures, & anticipated NRW requirements.

The surface water drainage networks themselves will be designed within Micro-drainage Software, which is owned and maintained by Innovyse. Micro-drainage is a recognised software product within the water industry in the UK, which is accepted by organisations in the public sector (Water Authorities, Local Authorities, Environment Agency etc.) and therefore used in the private sector.

Rev.	Date	Description	Issuer	Reviewer	Approver
00	2022.06.22	First issue (Draft)	MUKH	BWJ	PEJO
01	2022.07.29	First issue (2nd Draft)	SIBB	MUKH	PEJO
03	2022.09.02	Issued for consultation	SIBB	MUKH	PEJO
04	**2023.02.01**	**Issued for consultation – Update**	**SIBB**	**MUKH**	**PEJO**

Table of Content

1 Introduction

1.1 General

This fire safety strategy report is issued for the development of Newport Energy from Waste (EfW) Power Plant. The Newport EfW is located on the Alexandra Docks, Tom Lewis way, Newport, Wales.

The postal address is:
Newport Energy from Waste (EfW)
Land South of 14,
Tom Lewis Way,
Alexandra Dock,
Newport,
Wales,
NP20 2WZ

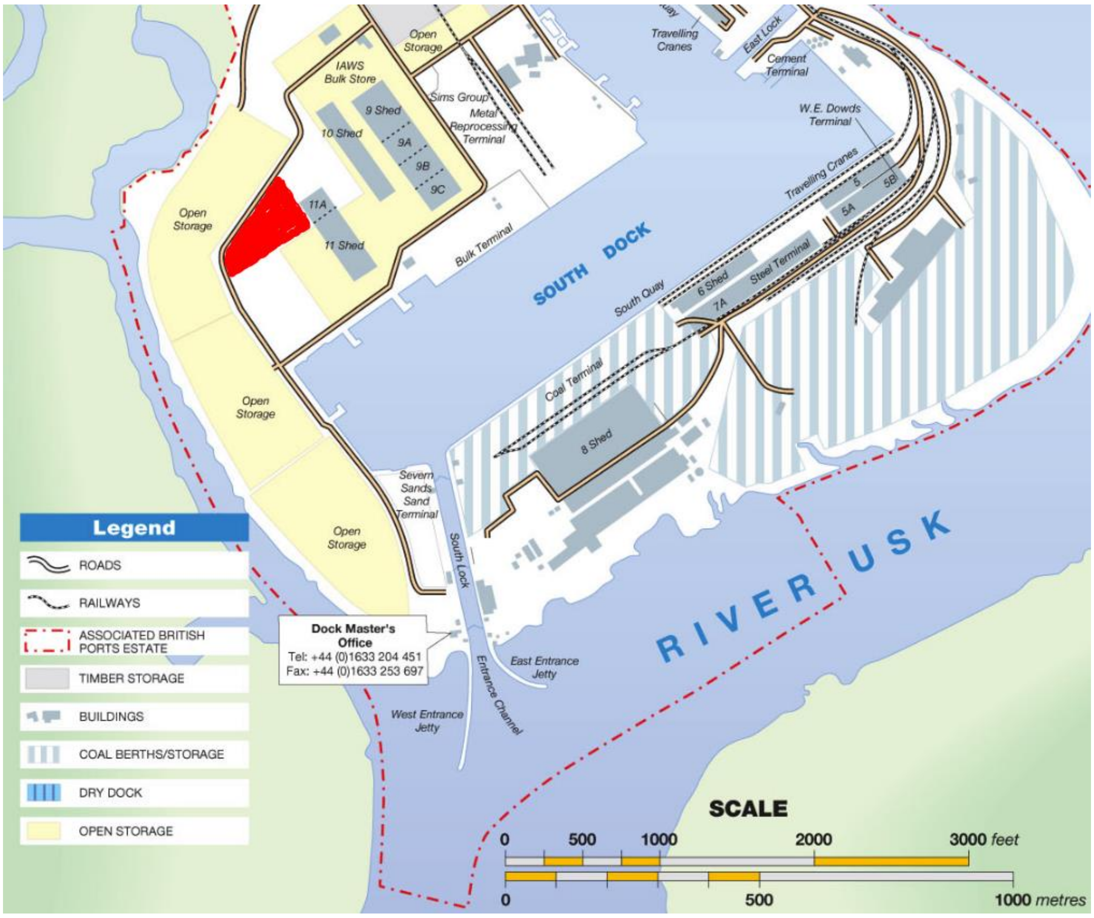


Figure 1 Newport Port Plan (development area in red)

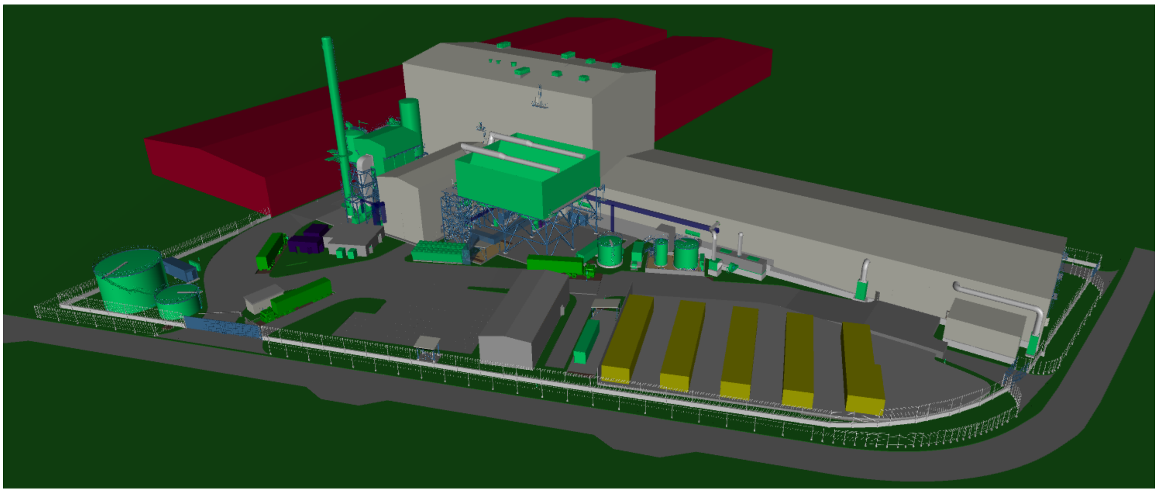


Figure 2 Site 3D model

Adjacent property to the Newport EfW Project is various mixed use open storage facilities to the North and West and APB warehouses to the South and East. Located to the South of APB warehouses is the South Dock. The total size of the development site is approx. 2 hectares.

1.2 Purpose

The purpose of this fire safety strategy report is to outline the fire safety features for the power plant incorporating both life safety and property protection features.

To demonstrate the fulfilment of the functional requirements, the BR2010, BS 9999:2017 and NFPA101:2018 will be used and referred to, where applicable.

With a project of this nature there are additional fire safety features that are recommended for incorporation to limit the potential for loss of productivity and property in the event of fire. In this regard the employer's specification, Insurer's requirements and the application of NFPA 850 are described in section 15 of this report.

1.3 Building Occupancy

The total occupancy of the Power Plant during normal operation is estimated to be maximum 30 people including operatives and fuel delivery drivers.

1.4 Layout of the Power Plant

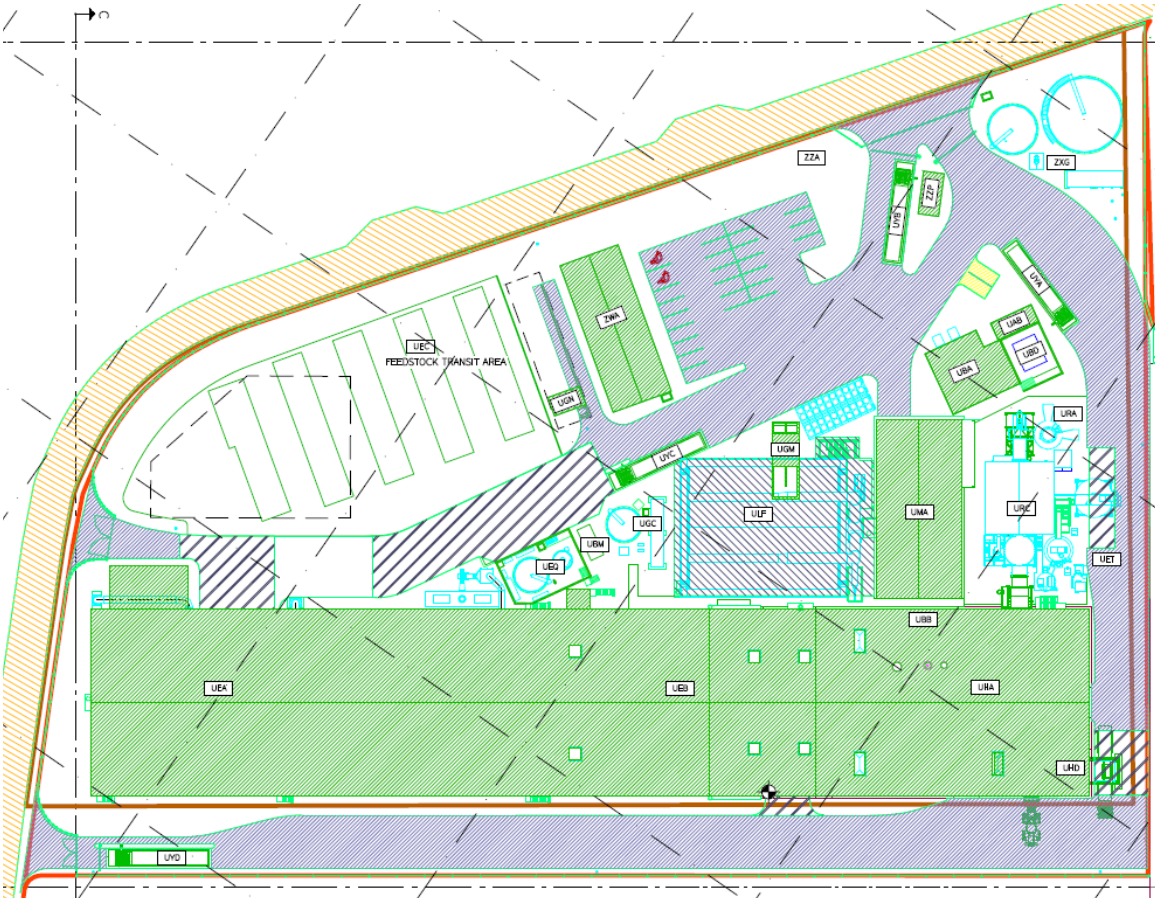


Figure 3 Site Layout

The following abbreviations (RDS-PP) for the buildings will be used throughout this report:

RDS-PP	Building
UAB	33 kV Substation
UBA	Switchgear Building
UBB	Electrical Annex
UBD	Step-up Transformer Area
UBM	Diesel Generator
UCT	Control Room
UEA	Unloading Solid Fuels Building
UEB	Fuel Bunker Building
UEC	Unloading Solid Fuel Building
UEQ	Fuel & Urea Tank Area

UET	Ash & Residues Storage Area
UGC	Water Treatment Area
UGM	Sedimentation Basin
UGN	Trade Effluent Treatment
UHA	Boiler Building
UHD	Slag Storage Building
ULF	Air Cooled Condenser Area
UMA	Turbine Building
URA	Stack Area
URC	Flue Gas Treatment Area
UYA	Weighbridge Area In
UYB	Weighbridge Area Out
UYC	Weighbridge Area In
UYD	Weighbridge Area Out
ZWA	Welfare Building
ZXG	Raw Water & Fire Equipment Area
ZXT	Workshop Building
ZST	Mechanical Workshop
ZZA	Remaining Site
ZZP	Gate House

Table 1 - RDS-PP

1.5 Plant description

The Newport EfW Project is a single line waste to energy Power Plant, which at full load, generate approximately 20 MW electrical power to the grid. The fuel for the Power Plant will be non-hazardous waste originating from Municipal, Commercial and Industrial Waste (as each is defined in section 75 of the Environmental Protection Act 1990). The Power Plant infeed fuel requirement at full load is some 27 tonnes per hour.

The Power Plant is designed to provide an enclosed process, from delivery, processing and storage of the feedstock, steam production in the boiler to the steam turbine generator set and finally electrical distribution. Open baled RDF storage (Feedstock Transit Area) is an emergency measure, planned for use during “long” weekends only.

Fuel is delivered to the Waste Fuel Unloading Area (Feedstock receiving area) by a single ISO accredited fuel supplier and unloaded directly into the reception/storage bunker by truck. Alternatively, the Fuel is delivered as baled RDF and temporarily stacked in the open Feedstock Transit Area. From the Transit Area, the bales are then transferred into the reception/storage bunker by telehandler.

From the reception/storage bunker the Fuel will be transferred by crane to the transfer area in the same bunker and from here the fuel is finally transferred by a second set of cranes to the receiving hopper for the boiler for combustion.

Combustion gas provides the heat to the boiler which produces steam for the steam-turbine-generator set producing electricity.

2 Relevant Legislation

2.1 Building Regulations 2010 (BR2010)

With regard to fire related issues, Newport EfW Project must be demonstrated to achieve compliance with the Building Regulations 2010.

2.1.1 Approved Document B (ADB)

It should be observed that ADB is not legislative and provides only one method by which BR2010 compliance can be achieved.

The "Use of Guidance" section of ADB states that:
"*The Approved Documents are intended to provide guidance for some or more common building situations. However, there may well be alternative ways of achieving compliance with the requirements.* ***Thus, there is no obligation to adopt any particular solution contained in an Approved Document if you prefer to meet the relevant requirement in some other way.***"

Therefore, BR2010 may be demonstrated to have been satisfied by:

- Compliance with the prescriptive guidance contained in ADB, BS 9999, CIBSE Guide E or any other associated documents referenced therein; or
- A fire engineered solution that is demonstrated to provide an acceptable level of protection to the occupants of the building, by use of the guidance of BS 7974, its associated published documents and/or any other relevant engineering documentation; or
- The use of one document to supplement the other in support of a fire engineered solution.

Where applicable the design of the Power Plant will be based on the recommendations contained in BS 9999. Where an element of the development cannot be assessed against BS 9999 (for example the boiler building, turbine hall, fuel storage etc.) then appropriate alternative guidance will be applied such as NFPA or a risk engineered approach adopted.

2.2 The Regulatory Reform (Fire Safety) Order 2005 (FSO 2005)

Once the building is completed and handed over to the client, the FSO 2005 becomes the governing legislation. The FSO 2005 replaces legislations such as the Fire Precautions (Workplace) Regulation 1997 and the Fire Precaution Act 1971 and imposes the general duty to take relevant fire precautions to ensure the safety of the building users and those in the vicinity.

As mentioned in the FSO 2005, the responsible person is required to carry out a risk assessment of the premises which must be suitable and sufficient to minimize the risk and exposure of the occupants to such risks.

In the FSO 2005 “responsible person” means:
(a) in relation to a workplace, the employer, if the workplace is to any extent under his control;
(b) in relation to any premises not falling within paragraph (a)—
(i) the person who has control of the premises (as occupier or otherwise) in connection
with the carrying on by him of a trade, business or other undertaking (for profit or not);
or
(ii) the owner, where the person in control of the premises does not have control in connection with the carrying on by that person of a trade, business or other undertaking.

The order also places responsibility on the relevant person for the servicing and maintenance of all fire safety systems throughout the life of the building.

2.3 Construction (Design and Management) Regulations 2015

Under the Construction (Design and Management) Regulations 2015 (CDM) designers are required to minimize or design out hazards.

2.4 Construction Phase Plan and Health and Safety Manual

During the construction phase the Regulatory Reform (Fire Safety) Order 2005 and the Construction (Design and Management) Regulations 2015 comes into act as well.

3 Supplementary Fire Safety Recommendations

3.1 Adopted Guidance

In addition to the scope of BR2010 there is a requirement to minimize the potential for loss of production and loss of capital investment in the event of fire. International standards will be adopted for particular risk items (ref. section 15 of this report)

The provision of additional fire safety measures is incorporated into the fire safety strategy as a whole and provides an integrated fire safety regime for the Power Plant.

The following guidance has been adopted in this report:

- Employer's Specification, room data sheets etc.
- Guidance Document, Waste Processing Plant – Fire Systems, Issue 2.0, dated 19 May 2017(*1)
- Guidance Document, Energy from Waste – Fire Systems, Issue 3.0, dated 19 May 2017(*1)
- NFPA850 (2020) - Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations.

4 Risk Profiles – BS 9999

Central to the application of the recommendations contained within BS 9999 is a risk assessment of all buildings within the premises recommended to be carried out to determine the risk profile or profiles, as different areas might result in different risk profiles. The risk profiles indicate the potential for fire risk to the building occupants and are used in the design of fire safety systems, compartmentation, means of escape etc.

Risk profiles are given as a combination of occupancy characteristic and fire growth rate.

4.1 Occupancy characteristic

Ref. BS 9999, table 2
The occupancy characteristic covering all areas within the premises is determined in accordance with Table 2 to be: Occupancy (including people with disabilities) characteristic A
Based on the following:

- Occupants who are awake and familiar with the building
- Office and Industrial premises

Further, the Power Plant occupants will be aware of the fire safety provisions and precautions and visitors including contractors to the site will be accompanied and/or inducted in order to maintain characteristic A.

Occupancy characteristic	Description	Examples
A	Occupants who are awake and familiar with the building	Office and industrial premises
B	Occupants who are awake and unfamiliar with the building	Shops, exhibitions, museums, leisure centres, other assembly buildings, etc.
C (Ci to Ciii)	Occupants who are likely to be asleep	(Ci) Individual flats without 24 h maintenance and management control on site (Cii) Serviced flats, halls of residence, sleeping areas of boarding schools (Ciii) Hotels
D	Occupants receiving medical care	Hospitals, residential care facilities

Table 2 - Occupancy Characteristics

4.2 Fire growth rate

Ref. BS 9999, table 3

The fire growth rate is the rate at which it is estimated that a fire will grow. The fire growth rates are divided into four categories 1 to 4 as per the following:

Category	Fire growth rate	Fire growth parameter (kJ/s^3)	Description	Typical examples
1	Slow	0.003	Evenly distributed low level fire load, small discrete packets of fuel or material of limited combustibility	Reception areas, concourses (without concession outlets) and halls with limited fire load such as sports stadia and foyers
2	Medium	0.012	Evenly distributed low to mid-level fire load comprising a mix of combustible materials	Offices, lounges, class-rooms, auditoria, seating areas, galleries and car parks
3	Fast	0.047	Stacked combustibles (on or off racking and shelving but excluding high rack storage), some small quantities of materials other than materials of limited combustibility (or where larger quantities are stored in separate fire-resisting enclosures), process, manufacturing or storage of combustible materials	Shop sales area, workshops, factories and small storage buildings
4	Ultra-fast	0.188	Medium to large quantities of materials other than materials of limited combustibility, high racked storage, flammable liquids and gases or were rapid uncontrolled fire growth could occur	Warehousing, processing plants and car parks E) utilizing a car stacker or similar method where there is no fire separation between stacked cars

Table 3 - Fire Growth Rate Categories

Within table 3 – Descriptions, various types of combustible and flammable materials are listed for each category, as well as Typical examples of commodities (refer to BS 9999 for further details).

Additionally, to assist in determining the fire growth parameter for the various areas the following document has been consulted: 11th IAFSS Symp. pp. 517-530

4.3 Risk profile

The following table indicates the risk profiles allocated to each of the main areas of the Power Plant:

Area	**RDS**	**Risk profile**	**Comment / Fire growth parameter [kJ/s^3]**
External RDF Stockyard	EAE	A3 (4)	(1)
33kV Substation	UAB	A1	(2) ~0,0009 (<0,002) Note: The building is not addressed regarding fire detection, fire suppression or means of escape within this report. The building is operated and owned by the utility company.
11kV Substation - Dry-type transformer	UAB	A1	(2) ~0,0009 (<0,002)
Step-Up Transformer Area	UAB	A2 (3)	(1)
Electrical rooms	UBB	A1	(2) ~0,0029 (<0,012)
Control Room	UCT	A1	(2) ~0,00883 (<0,012)
Welfare Building	ZWA	Mixed	Mixed
- Electrical rooms		A1	(2) ~0,0029 (<0,012)
- Spare part storage room		A2	(2) ~0,0232 (<0,047)
- Office		A2	(1)
Waste Fuel Unloading Area	UEA		(7) Recommended storage time for waste
- Bunker		A3 (5)	(1)
- Tipping hall		A3 (3)	(1)
Waste Fuel Storage Area	UEB		(7) Recommended storage time for waste
- Bunker		A3 (5)	(1)
- Boiler feed hopper		A3 (3)	
Service Tank Farm - Diesel oil (combustible liquid	UEQ	A3	(8) The diesel oil flashpoint will be minimum 56 °C and stored in the diesel oil storage tank having a capacity up to 120 m^3

with flash point at or above 37.8°C).			
Slag Storage Area	UHD	NA	
Effluent Area	UGM	NA	
Trade Effluent Treatment	AGM	NA	
Boiler Building	UHA	A1	Except for the boiler front and the area for the auxiliary burners, the building holds none or a limited amount of combustible materials.
Boiler building boiler front and auxiliary burner area.	UHA	A3 (3)	(1)(6)
Turbine Building	UMA		
- Turbine Hall		A3 (3)	(1)(6)
- Compressor room Annex		A1	(2) ~0.00803 (<0,012)
Air Cooled Condenser Area (ACC)	ULF	A1	(2) ~0,0029 (<0,012)
Fire Equipment Area	ZXG	A2 (3)	(1)
Workshops	ZXT ZST	A2	(2) ~0,0171 (<0,047)
Flue Gas Treatment Area (FGT)	URA URC UET	NA	
Weighbridges	UYA-D	NA	
Security Gate House	ZZP	A2	(1)

(1)/(2)/(6)	Fire growth rate (kW/s^2). (1) The fire growth rates are based on BS 9999, table 3 (2) The fire growth rates are based the 11th IAFSS Symp. pp. 517-530 (6) Category considered high due to the possible quantities of combustible liquids.	
(3)	Areas are installed with fixed fire suppression system at risk areas. The risk profile has typically been reduced accordingly to the level indicated.	
(4)	The area is external and covered by the site hydrant provision.	
(5)	Fire water monitors are installed to cover the area. The fire water monitors will be located to allow for coverage of all pit areas with two (2) streams operating simultaneously. The risk profile has not been reduced.	
(7)	Combustible waste type	Max. storage time
	Non-shredded or similarly treated wastes (that is wastes whose particle size has not been reduced)	6 months
	Baled and compacted wastes	6 months

	Shredded and similarly treated wastes (that is wastes whose particle size has been reduced)	3 months
	Combustible fines/dusts and very small particle size wastes	1 month
	Ref. *WASTE 28 Reducing fire risk at waste management sites issue 2 – April 2017*	
(8)	The HSE guidelines HSG176, Storage of flammable liquids in tanks. Section 10: The document defines flammable liquids as liquids having a flashpoint of 60 °C or below. Section 78: table 1, recommend a minimum separation distance of 8 m for single ‘small’ tanks (larger than 33 m3 and less than or equal to 100 m3) from site boundaries, buildings, process areas and fixed sources of ignition. Section 14: The precautions described in this document may not be necessary for those flammable liquids whose temperature is always likely to be significantly below the flashpoint and where there is no potential for a flammable mist or spray to form. Advice on less restrictive measures for these liquids is given in the chapter ‘Higher flashpoint liquids. Where no variation is given, the advice in the main text applies. Section 277: Where the flashpoint of the liquid is significantly above the highest operational temperature, some of the precautions described may be relaxed. Under these circumstances such liquids will not normally produce a flammable atmosphere. The risk assessment required under regulation 5 of DSEAR (see paragraph 17–18) should be used to determine which, if any, of the precautions can be relaxed. In general, a difference of at least 10 °C between the highest temperature and the flashpoint is recommended before such relaxations are permitted. **The temperature of the diesel oil inside the storage tank should not, with the given maximum ambient temperature of 33 °C, be able to increase to a temperature to 10 °C less than the flashpoint of 56 °C. Consequently, the separation distance is considered acceptable to be less than 8m.** NFPA 30 (2018), Flammable and Combustible liquid code Chapter 22.8.2: Fixed-roof tanks storing Class II and Class III liquids at temperatures below their flashpoint and floating-roof tanks storing any liquid shall not require protection when installed in accordance with this chapter (i.e. Chapter 22). **The diesel oil tank is not installed with a fire suppression system.**	

Table 4 - Risk Profiles

Means of escape provisions are assessed in the following sections using the above risk profiles where appropriate for the area concerned.

5 Means of warning

5.1 Requirements

The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used at all material times.

5.2 Fire detection and alarm system

A fire detection system is installed for monitoring the power plant. The fire detection system shall -

1. by means of the installed visual and audible devices, alert occupants for evacuation of the area in which the detection system is activated.
2. inform the plant operator about location in which the detection system is activated for immediate action (firefighting, require assistance etc.) to prevent a possible fire to develop.

The fire detection system comprises the following main elements:

- a main fire alarm panel
- a mimic panel for the fire department for easy identification of the area in which the detection system is activated. The mimic panel will be located in the gate house (to be agreed with the local Fire Authority)
- fire control panels
- fire detectors and visual and audible alarm devices.

The following fire detection and alarm provisions are to be included as part of the fire safety measures:

Area	RDS	Manual call point	Automatic detection	Alarm
External RDF Stockyard	EAE	NA	NA	NA
33kV Substation (refer to note in table 4)	UAB	NA	NA	NA
11kV Substation	UAB	Yes	Yes	Yes
Electrical Rooms	UBB	Yes	Yes	Yes
Welfare Building	ZWA	Yes	Yes	Yes
Step-Up Transformer Area	UAB	Yes	Glass bulb (sprinkler release)	Yes
Waste Fuel Unloading Area	UEA	Yes	Yes	Yes

			(flame detectors and thermal cameras)	
Waste Fuel Storage Area	UEB	Yes	Yes (flame detectors and thermal cameras)	Yes
Diesel Fuel and Urea Tanks	UEQ	Yes	Yes	Yes
Slag Storage Area	UHD	None	None	None
Effluent Area	UGM	None	None	None
Trade Effluent Treatment	AGM	None	None	None
Boiler Building	UHA	Yes	Yes	Yes
Turbine Building.	UMA	Yes	Yes	Yes
Air Cooled Condenser Area (ACC)	ULF	None	None	None
Fire Equipment Area	ZXG	Yes	Yes	Yes
Workshops	ZXT ZST	Yes	Yes	Yes
Flue Gas Treatment Area (FGT)	URA URC UET	Yes	Yes	Yes
Weighbridges	UYA UYB UYC UYD	None	None	None
Security Gate House	ZZP	Yes	Yes	Yes
Attenuation Pond	ZXH	None	None	None

Table 5 - Fire Detection and Alarm Provisions

Fire detection and alarm system is designed in accordance with BS5839 Pt 1. Manual call points are provided at all storey and final exits, plant stair landings. Distribution of manual call points should, after final fit out of the premises, be such that no one need travel more than 45 m to reach the nearest manual call point.

The following categories of detection and alarm are considered appropriate:

- Administration and ancillary areas (offices etc.) – L1/P1 (systems installed throughout all areas of the building)
  and -

- Process and plant areas (Indoor, - boiler building, turbine hall, fuel storage and transportation etc.) – L2/P2 (systems installed only in defined parts of the building)

Note:
Designing the fire detection system to comply with level L2/P2; - the detection system will be provided and installed to monitor areas that have been identified as risk areas during review of the plant and carrying out the fire risk assessment. As the fire risk assessment most likely will develop throughout execution of the project and should this call for additional areas to be installed with fire detectors, the fire detection system to be installed will allow for extension.

Automatic detectors will be selected to minimise the risk of false alarms caused by ambient conditions (e.g. dust levels in fuel storage areas, shredder areas etc.).

5.3 Battery room

In case of black-out on the Power Plant various systems e.g. the DC systems and the emergency lube oil pump are emergency supplied by the batteries (UPS - Uninterruptable Power Supplies) located in the battery room.

Small amounts of hydrogen gas are released during charging of the batteries.

As hydrogen gas is flammable with a lower explosive limit of 4 vol. % and an upper explosive limit of 75 vol. %, an explosive mixture with air may form if the room is not sufficiently ventilated.

To maintain the hydrogen concentration below the lower explosive limit, the room is subject to monitored ventilation (redundant) with a minimum air exchange rate specified according to BS EN 50272.

Battery room – Classified ATEX zone 2
Should the redundant ventilation system fail, charging of the batteries for e.g. the DCS will change to emergency charging. However, charging of the batteries for the emergency lube oil pump must be maintained.

Consequently, the fire detection and lighting are rated and installed as ATEX zone 2 equipment.

5.4 Fire detectors

The following table provides an indication of the type of detection available to be used depending on perceived risk in the various areas:

Detector type:	Installation area:	Applicable for areas such as:	Not suitable for detection of:
Heat Detector, fixed temperature	Fog- and Misty Areas, Dusty areas, Smoky areas, Steamy areas. In areas/ zones where a rapid (hot) fire is capable to develop more heat than smoke. Process: Rapid oxidation of materials in the exothermic chemical process of combustion releasing heat (Hot Fire).	Outdoor substations. Generators. Solid fuel handling and storage areas.	Slow (shouldering) fires, Low heat fires
Heat Detector, rate-of-raise	Fog- and Misty Areas, Dusty areas, Smoky areas, Steamy areas. In areas/ zones where a rapid (hot) fire is capable to develop more heat than smoke. Process: Rapid oxidation of materials in the exothermic chemical process of combustion releasing heat (Hot Fire).	Outdoor substations. Generators. Solid fuel handling and storage areas.	Slow (shouldering) fires, Low heat fires
Line heat cable, fixed temperature	Small enclosed areas, cable-trays, tunnels etc. Fog- and Misty Areas, Dusty areas, Smoky areas, Steamy areas. In areas/ zones where a rapid (hot) fire is capable to develop more heat than smoke. Process: Rapid oxidation of materials in the exothermic chemical process of combustion releasing heat (Hot Fires).	Enclosed conveyors, Drag Conveyors, Conveyors, Detection in between electrical cables	Slow (shouldering) fires, Low heat fires
Smoke Detection, Ionisation element	Relative clean, steam and dust-free environments/ areas where a fire will develop a concentration of smoke from material emits as it burns.	Switchgear rooms, Offices, Server and computer rooms	Dusty areas with high air velocity, Steamy areas
Smoke Detection, Optical element	Relative clean, steam and dust-free environments/ areas where a fire will develop a concentration of smoke from material emits as it burns.	Electrical cables and machinery, Plastics, Air-conditioned areas, Computer rooms	Dusty areas, Steamy areas
Aspiration detection combined with CO detection	Aspiration detects smoke generated by flaming or smouldering fires. CO detectors detect and warn about dangerous CO-gas build-up	Very Dusty & Smoky Areas e.g. Open structures. Explosion risk areas. Gas accumulation areas.	
Flame	Flammable gases, Explosion risk areas, Smokeless areas, Areas with air movement, Chemical fires, Fuel handling, Hydrocarbon fires	In areas were an open flaming fire flame is a mixture of reacting gases and solids emitting visible, infrared, and sometimes ultraviolet light, the frequency spectrum of which depends on the chemical composition of the burning material and intermediate reaction products.	Smoky fires, Smouldering fires, Areas with obstructions to line of sight
Smoke optical beam	Ducts, Large open areas, Corridors	Warehouses, Computer room, Turbine halls	Dusty areas, Areas with obstructions to line of sight
Flammable & Explosion Gas Detection	Areas where explosion or flammable gases can occur.	Indoors or outdoors, Ventilation plenums	Areas containing Sulphur, Toxic gas detection

Table 6 - Fire Detector Types and Usage

The type of detectors mentioned in table 6 shall not be considered as mandatory to be installed in a specific risk area but listed for guidance only. There might be alternative type of detectors which provide equally monitoring and protection of a specific area. Additional to the detector types mentioned above thermal imaging cameras will be accepted to be installed in areas to assist e.g. identifying a hot area/spot in the storage building.

The level of automatic fire detection and alarm provided exceeds the minimum requirements of the Building Regulations.

The fire control panels (sub-panels) and the mimic panel are connected to the main fire alarm panel located in the Control Room.

The mimic panel will be located in the gate house to provide immediate indication of the system status to any personnel (including firefighting personnel) entering the site.

The fire control panels are located in strategic areas for local monitoring of fire detection and alarm devices. Status information from each of the fire control panels is relayed back to the main fire alarm panel in the Control Room.

6 Means of escape

6.1 Requirements

Ref. BS9999:16.1
Escape routes from each storey (or level) should be so sited that a person confronted by fire can turn away and make a safe escape through an alternative exit. Routes of travel should be free from any serious obstacle that could cause undue delay, especially to disabled people, e.g. raised thresholds or steps, or doors that are difficult to open.

6.2 Horizontal travel distances

6.2.1 Horizontal escape

Ref. BS9999
Maximum permissible travel distance for general buildings according to Table 11:

Risk Profile	Travel Distance, in metres (m)	
	Two-way travel	One-way travel
A1	65	26
A2	55	22
A3	45	18

Table 7 - Travel Distances - General Buildings

Maximum permissible travel distance for weather house plant (UHA, UEA, UEB) according to Table F.1:

Risk Profile	Travel Distance, in metres (m)	
	Two-way travel	One-way travel
A1	100	20
A2	100	18
A3	60	13

Table 8 - Travel Distances - Weather Housed Plant (UHA, UEA and UEB

For a means of escape to be deemed to have two-way travel, each route is required to be either:

- Separated from one another by an angle of not less than 45^{o}, or
- Separated from one another by fire resisting construction, or
- Spatially separated from one another by a distance sufficient to ensure that both routes are not affected by a fire simultaneously

The width of escape routes is according to BS9999: 16.6.2
- Corridors accessible for wheelchair users will be 1,200 mm wide.
- Corridors not accessible for wheelchair users will be not less than the minimum exit widths described in Section 6.2.3 of this report.

For Industrial Equipment Access a minimum horizontal width of 560 mm of any walkway, landing or platform, is required based on the provisions of NFPA101 (2018) Table 40.2.5.3.1. This reduced width can be used in the Process areas with no public access, and all obstructions are fixed obstructions.

The 560 mm width walkway is restricted to areas adjacent equipment and is limited locations.

Platforms, handrails and stairs shall be designed according to BS EN ISO 14122 and BS5395.

The means of escape drawings for each main area are listed in section 18 and included in the attachment to this report ref. 1017.M0.J01.002 (to be added)

6.2.1.1 *Waste Fuel Unloading Area and Waste Fuel Storage Area*

The waste fuel unloading area and the fuel storage area are located within the same building and as such in open connection. The building is a two-storey building holding the bunker for the received fuel, the transfer bunker, and the infeed hoppers for the boilers. Building is built together with the Boiler Building separated by internal concrete structure and/or cladding (min. 120 minutes fire rated).

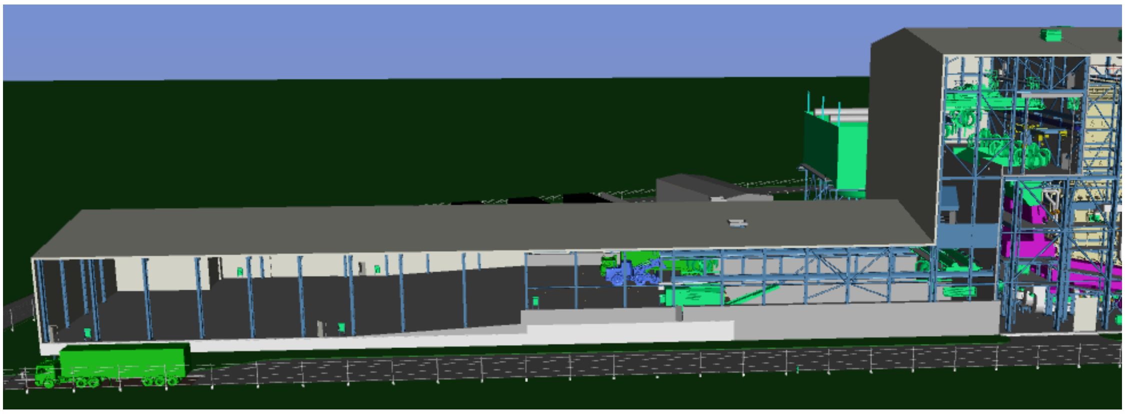


Figure 4 - Waste Fuel Handling (UEA, UEB)

6.2.2 Vertical escape – buildings

6.2.2.1 *Electrical Room - UBB*

The Electrical room is constructed as a three-storey internal structure inside the Boiler Building. The structure and each individual floor are considered separate fire zones and separated from the Boiler Hall (and each other) by 2hr fire separation.

The Electrical Rooms are installed with raised floors (void space height 2.0 m) covering the complete footprint of the room. Any access beneath the raised floor for maintenance will be provided by means of movable ladders from above. Access shall be supervised and carried out according to Confined Space Regulations 1997.

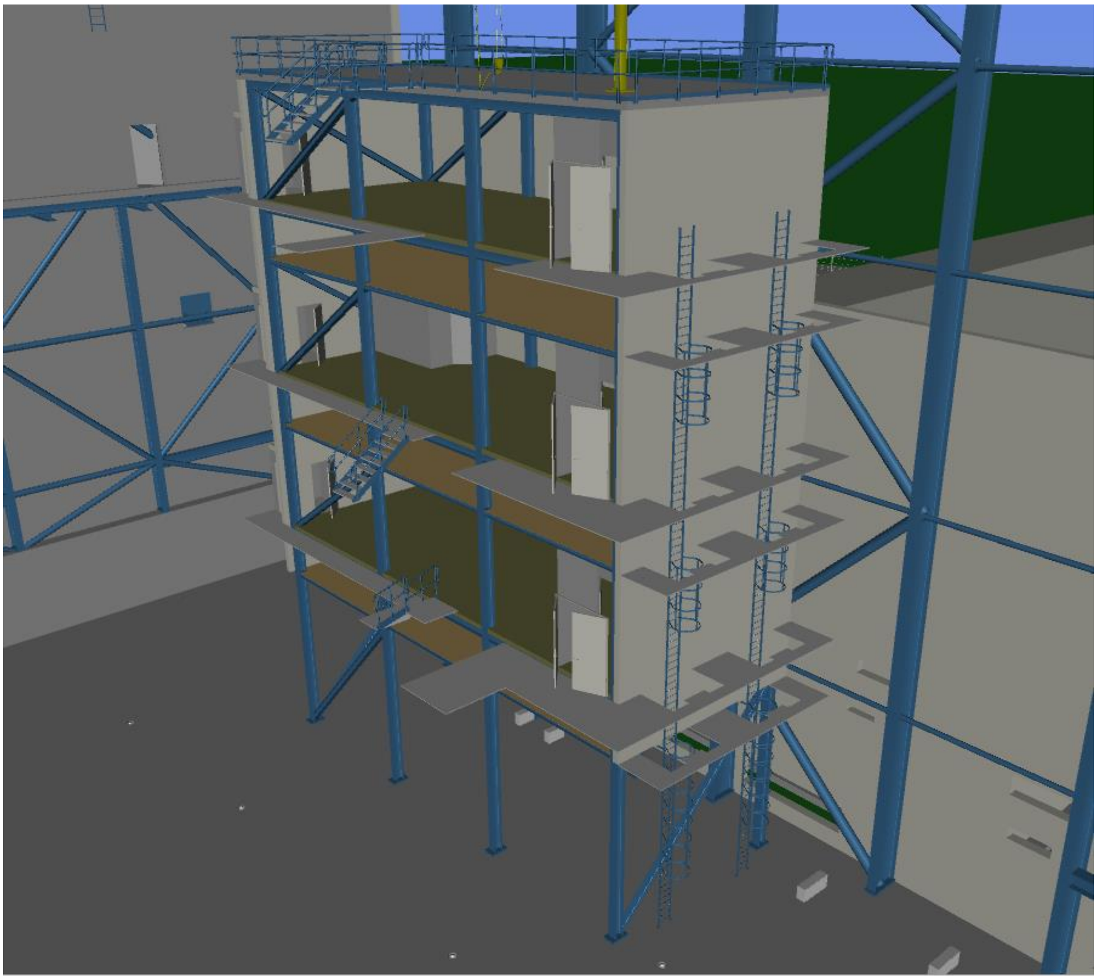


Figure 5 - Electrical Room (UEA)

Main access to the 3 floors is provided via stair links to the internal access galleries rf. below. Additionally, emergency exits are provided for each room directly to the outside and via platforms and marine ladders to the ground.

6.2.2.2 Boiler building - UHA

The Boiler building is a single storey building with a number of internal access galleries - the highest of which is some 32.6 m above ground level.

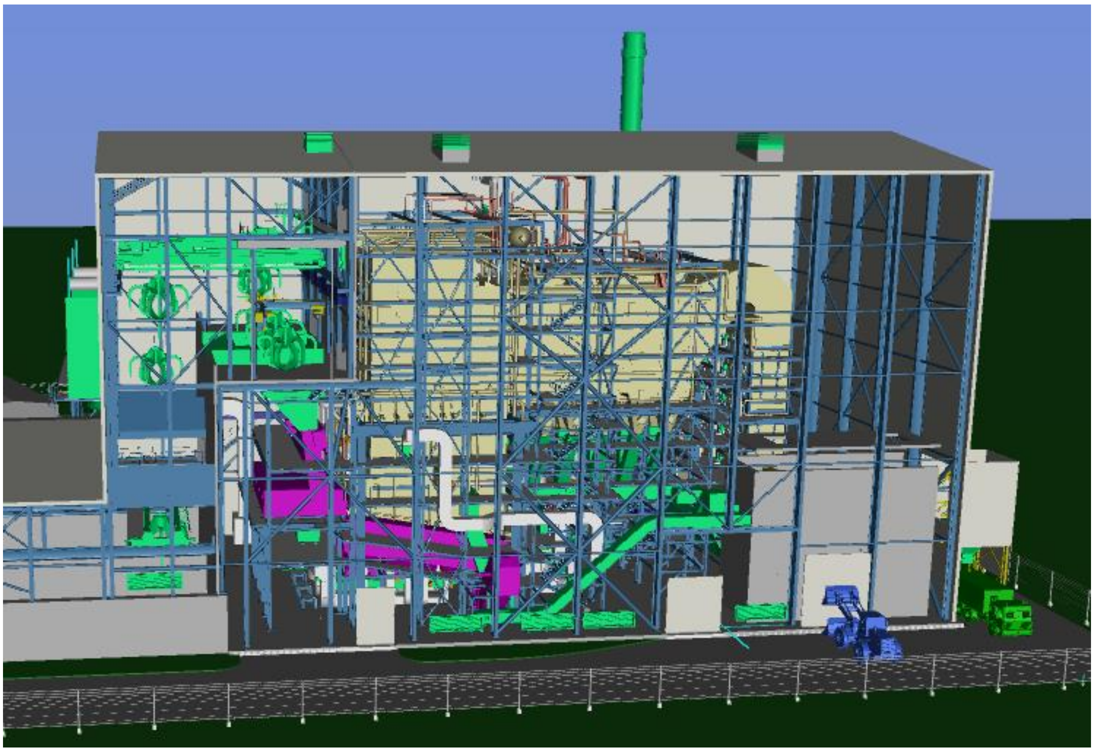


Figure 6 - Boiler Building (UHA)

All main galleries from level +32.600 to ground level +0.000 are vertically linked by means of two internal main access and egress stairs (open staircase) positioned on either side of the boilers (north and south) sized not less than 800mm mm in width.

Additional stair links are provided between vertically adjacent galleries.

The internal stairs discharge within the boiler building at ground level and alternative directions of escape are provided from the base of each stair. These alternative directions of escape could either be directly leading to outside building or leading into a separate 120-minute fire rated compartment which further lead to the outdoor. Discounting one of the stairs (spatial separation of the stairs and the sheer volume of the building mean that one will always be available for use in the event of a fire) there will always be more than adequate capacity for vertical means of escape within the building.

A small number of dead-end conditions exist on the boiler galleries but these are of very short distance and the open nature of the galleries ensures rapid detection of any fire event by personnel in the vicinity; the short single direction travel distances are therefore deemed acceptable.

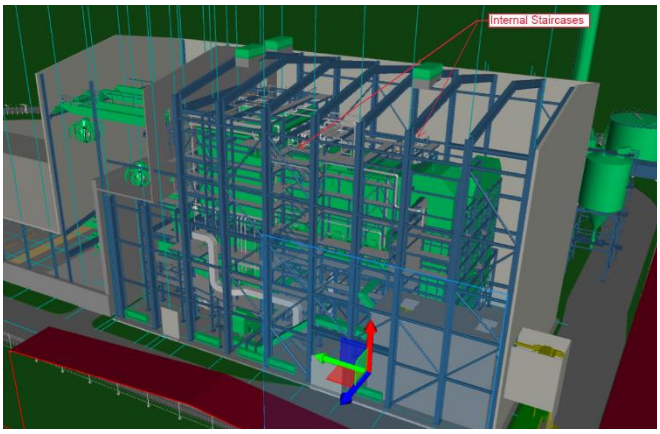


Figure 7 - Escape Stairs in Boiler Building (UHA)

6.2.2.3 *Turbine building – UMA*

The turbine building is provided with internal open-grate stairs, spatially separated to maintain the use of at least one in the event of fire.

6.2.2.4 *Fuel storage area (boiler infeed hopper area) –UEB*

Escape from the boiler infeed hopper area is provided through the boiler building. The boiler building is a separate 120-minute fire rated compartment.

6.2.3 Storey exits

Ref. BS9999: 16.6

The absolute minimum exit width for the purposes of means of escape is stated as being not less than 800mm.

According to table 12 of BS9999 the minimum door width per person should be:

- Risk profile A1 – minimum 3.3mm. 800mm door can serve 242 occupants
- Risk profile A2 – minimum 3.6mm. 800mm door can serve 222 occupants
- Risk profile A3 – minimum 4.6mm. 800mm door can serve 173 occupants

Welfare (and Administration) building:

Minimum required exit clearance width is 850 mm: This is an increase from the absolute minimum width and provided to accommodate wheelchair users.

Fuel storage area and process areas:
All exits from the fuel storage and process areas will be inherently larger than required for the occupancy of the areas due to the requirement for transportation of equipment to and from the areas.

All doors used as exits, whether they are storey or final exits shall be openable by a single simple operation without requiring the use of tools or keys. Doors held closed for security purposes shall freely open in the event of a fire.

6.2.4 Final exits

All final exits shall be designed to lead to a place of ultimate safety away from the building concerned and provide clear widths of not less than the minimum requirements in Section 6.2.1 of this report. Final exits shall lead to the place of safety via hard landscaping and the route provided with emergency lighting.

6.2.5 Means of escape for disabled persons

It is not envisaged that there will be disabled operatives in any service buildings, fuel storage or process areas. The welfare building may well have disable occupants or visitors on occasion and the following measures are recommended.

The evacuation of disabled persons is the responsibility of the building operator; no reliance can be placed on or assumed from the fire authority. The critical issue in terms of structural provisions is designing for the means of escape of mobility-impaired persons, in particular wheelchair users. The strategy for this should be rigorously developed in collaboration with the Building Management. It is also necessary to consider all disabilities, and the general principles for designing effective escape for other types of disability are summarised below.

Hearing and visual impairment: Audible alarms will as well as flashing beacons be installed throughout the plant to notify occupants to evacuate the building. Hearing and visual impaired persons should generally be assisted during evacuation of the building. Successful escape for other impaired persons is helped by ensuring legibility of the building – as recommended in BS 8300.

Disabled staff will be encouraged to produce PEEPS (Personal Emergency Egress Plans) in collaboration with the building operator; this will ensure an appropriate resource and response tailored to the individual needs of the disabled person and the specific features of the building itself (the “Building Capability”). PEEPS can also be prepared for the "generic" types of disability, to ensure the best management response for evacuation of non-staff occupants.

As a two-storey building, the Welfare (and Administration) building will be provided with refuge points.

6.2.6 Inner rooms

The Welfare Building and the process areas holds rooms that would be classed as 'inner rooms'; these specific areas are mitigated by limited occupancy (i.e. less than 60 occupants and infrequent use). These rooms (and the rooms from which they are accessed) are fitted with automatic fire detection and audible alarm.

6.2.7 Protection of stairways

6.2.7.1 *Welfare Building - ZWA*

Stairways (staircase or ladders) adjoining the external wall of the building and forming part of an escape route will be protected for 30 minutes within 1.8 m of the façade.

6.2.7.2 *Plant areas: Boiler building - UHA, Turbine building - UMA etc.*

Stairways (staircases or ladders) adjoining the external wall of the building and forming part of an escape route are not considered to be protected. Areas for plant and equipment have been assessed in regard to fire risks and suppression systems installed.

7 Emergency lighting

Escape lighting to BS 5266: Part 1 is to be provided following standard guidance in BS 9999 and Emergency light will be provided for critical plant operation areas according to NFPA850; 6.6.2

The lighting and small power drawings for each main area are listed in section 18 of this report and included in the attachment to this report ref. 1017.M0.J01.002 (to be added)

8 Fire spread

8.1 Internal fire spread

8.1.1 Requirements – Linings

Ref. BR2010
B2,-

1) To inhibit the spread of fire within the building, the internal linings shall:
   a) Adequately resist the spread of flame over their surfaces; and
   b) Have, if ignited, a rate of heat release or a rate of fire growth, which is reasonable in the circumstances.

2) In this paragraph 'internal linings' mean the materials or products used in lining any partition, wall, ceiling or other internal structure.

The classification of the surfaces of the internal walls and ceilings will comply with the requirements of the BS 9999.

These requirements reduce the likelihood of fire spreading in a building due to the combustibility of the internal linings.

The surface linings of the internal walls and ceilings shall comply with the classifications listed below in the following tables (ref. BS 9999, table 33)

Table 33 **Classification of linings**[A)]

Location	National class [B)]	European class[C), D)]
Small room of area not exceeding 4 m² in a residential building and 30 m² in a non-residential building and domestic garages not exceeding 40 m²	3	D-s3, d2
Other rooms (including garages)	1	C-s3, d2
Circulation spaces within dwellings	1	C-s3, d2
Other circulation spaces [D)] including the common areas of flats	0	B-s3, d2

NOTE Linings which can be effectively tested for "surface spread of flame" are rated for performance by reference to the method specified in BS 476-7:1987, under which materials or products are classified 1, 2, 3 or 4, with Class 1 being the highest. Class 0 is better than Class 1. It is not identified in any BS test standard. A Class 0 product is either:

a) *composed throughout of materials of limited combustibility; or*

b) *a material having a Class 1 surface spread of flame and which has a fire propagation index (I) of not more than 12 and a sub-index (i_1) of not more than 6.*

The fire propagation index is established by reference to the method specified in BS 476-6.

European classifications are described in BS EN 13501-1:2007+A1.

A) Recommendations are given in Clause **33** for linings of concealed voids.

B) The national classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class, unless they have been tested accordingly.

C) When a classification includes "s3, d2" this means that there is no limit set for smoke production and/or flaming droplets/particles.

D) Large rooms such as open plan offices, shops display areas and factories need not be regarded as circulation spaces even though there are circulation routes in them.

Table 9 - Classification of Linings

8.1.2 Requirements – Structure

Ref. BR2010
B3,-

1. The building shall be designed and constructed so that, in the event of fire, its stability will be maintained for a reasonable period.
2. A wall common to two or more buildings shall be designed and constructed so that it adequately resists the spread of fire between those buildings.
3. Where reasonably necessary to inhibit the spread of fire within the building, measures shall be taken to an extent appropriate to the size and intended use of the building, comprising either or both of the following:
    a. Sub-division of the building with fire resisting construction;
    b. Installation of suitable automatic fire suppression systems
4. The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited

8.1.2.1 Structure – BS 9999

There are separate requirements for the structural fire performance of the Power Plant in accordance with BS9999, table 25:

- Welfare (and Administration) Building (ground floor level and 1st floor) - height of top occupied storey 8.6 m, unsprinklered: 60 minutes fire resistance for elements of structure
- Workshop building (single storey): No requirement according to BS 9999 30.2.3
- Boiler Building and Turbine Building (single storey): No requirement according to BS 9999 30.2.3
- Fuel storage building (single storey): No requirement according to BS9999: 30.2.3

Note: Equipment located on roofs is considered maintenance free during normal operation of the plant. Access to maintenance free equipment is provided but does not form part of escape routes and will not be fire rated.

8.1.2.2 Structure – Insurers requirement

The boiler building, the turbine building, and the fuel storage buildings are single storey buildings and in general not required to be fire rated as risks inside buildings has been identified and addressed. Identified risks have been installed with fire suppression systems.

Specific for Fuel Storage Building Fuel unloading crane rails and roof building structure to be protected by water spray system.

Steel columns exposed vertical steel structures protected by an automatic water-based system.

Steel columns located at front of the fuel pits to be protected against structural damage caused by heat (2hr rating).

8.1.3 Compartmentation – BS 9999 requirements, Table 28

There is no limit on the compartment size for the Welfare Building as the highest occupied storey is less than 30 m above ground.

The remainder of the Power Plant:
Single storey buildings within Risk Profile A1, A2 and A3 are not restricted in regard to maximum floor area (no limit).

8.2 External fire spread

Functional Requirement

1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.
2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.

8.2.1 Construction of external walls

BS 9999 fig. 47 recommends that the external cladding of the building to be provided with Class 1 (national class) or Class C-s3, d2 or better (European class) or better up to a height of 18m above ground for buildings with a height of 18m or more. Above this height, BS9999 fig. 47 recommends that the external cladding of the building to be provided with Class 0 (National) / B-s3,d2 (European) or better.

8.2.2 Space separation – Building Regulation requirement

A requirement of the Building Regulations is that the external wall of a building shall adequately resist the spread of fire from one building to another. This is achieved by ensuring that the building under consideration has sufficient spatial separation from adjacent buildings.

For the purposes of life safety, the separation between buildings on the same site and subject to the same management regime can usually be ignored (BS 9999 35.1.2). It is therefore not proposed to analyse the potential for fire spread between the buildings on site for the purposes of the Building Regulations.

For business continuity and consequential loss, limitation in the event of a fire, each major element of the plant is provided with fire separation/isolation. Refer to Section 8.9 of this report for further details.

Boundary separation distances and permissible % unprotected openings in facades.

A fire within a building must not cause the ignition of another adjacent building, especially if that building is outside of the site boundary.

Approved Document B and BR187 both provide methods of calculating the permissible percentage of unprotected area for a façade, given the distance to a boundary line. That boundary line is usually taken as the site boundary where there are no existing adjacent buildings. The simple calculation methodology in BR187 can be in this instance and the site boundary becomes the relevant boundary.

Where there are existing adjacent buildings, the boundary is not necessarily the site boundary, and it will be necessary to calculate the consequences of a fire involving both the existing building and the proposed building separately. BR187 provides a methodology to calculate the thermal radiation (heat flux) received by an object or building when exposed to a fire condition in an adjacent building.

Current guidance proposes that an acceptably low level of risk of fire spread exists where the target building (existing or proposed) is subject to not more than 12.6kW/m2, based on the assumption that a building on fire will radiate heat from the affected compartment façade at an intensity of 84kW/m2 for a reduced fire load (e.g., office, residential, assembly buildings) or 168kW/m2 for a standard fuel load (e.g. retail, commercial, industrial buildings). Where a proposed building is too close to an adjacent existing building, the separation may be mitigated by a number or combination of factors:

- Passive fire protection to the building façade
- Active fire suppression within the building

The provision of passive fire protection to a building façade effectively a) reduces the surface area from which a fire may radiate heat from the building and b) provides a level of protection to the building façade from heat radiated from a fire in the adjacent building.

The provision of active fire suppression within a building is considered to reduce the effective thermal radiation from a building by 50% (resulting in a minimum separation distance reduction of 50%).

The two methods employed are described in further detail in the following section, with the site-specific analyses included thereafter.

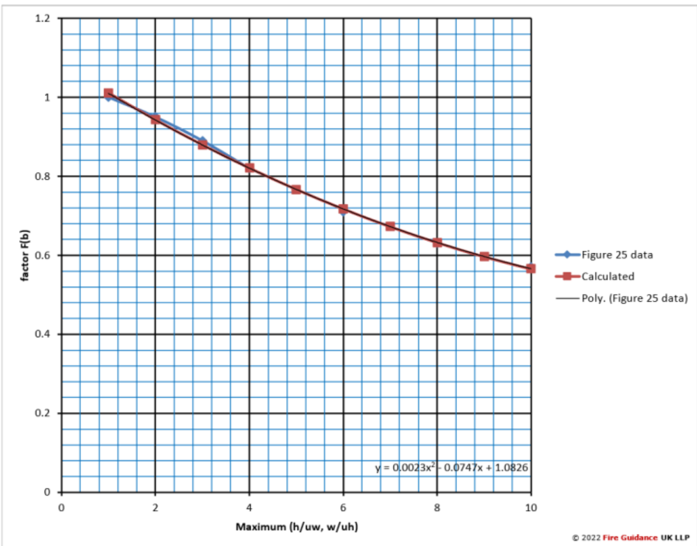
Method 1:
Using graphs from BR187 it is possible to determine the maximum permitted unprotected area for a set relevant boundary distance given the emitter façade dimensions and assumed fire load; in this instance the fire load is taken as the BR187 'standard fire load'.

References: **BR187 Section 2.2.4**

Standard fire load
Unprotected area calculation

$$u = 100\frac{(d/f)^2}{wh}\%$$

f(b) factor from 2nd order poly fit of data from Figure 25:



or, where:

$$\frac{h}{d} or \frac{w}{d} \geq 10$$

The maximum unprotected area is the greater of:

$$0.3\left(\frac{d}{w}\right)$$

and

$$0.3\left(\frac{d}{h}\right)$$

or, where:

$$\frac{h}{d} or \frac{w}{d} \leq 1$$

The maximum unprotected area ia 100%.

By applying a polynomial function to match the curves it is relatively simple to include the entire calculation into a Microsoft Excel worksheet.
Note: This method has only been used where the site boundary is a relevant boundary

Method 2:
Using equation A3 from BR187 it is possible to determine the thermal radiation received by an object at a given distance from the fire source, given the fire source dimensions and thermal radiation emitted from the source.
To determine the thermal radiation received it is first necessary to calculate the view factor from the emitter to the receiver, assuming both bodies are parallel, the following applies:

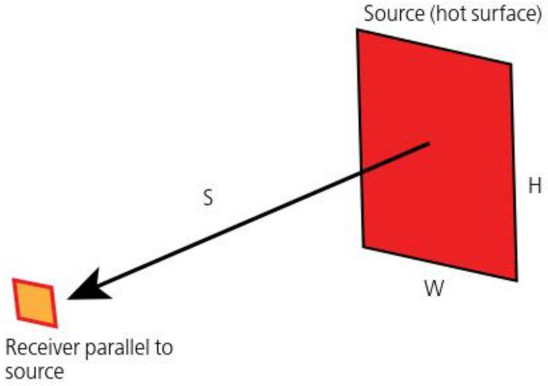


Figure 8 - Radiation view factor

And the view factor may be calculated from the following equation:

$$\phi=\frac{2}{\pi}\left(\frac{X}{\sqrt{1+X^2}}\tan^{-1}\left(\frac{Y}{\sqrt{1+X^2}}\right)+\frac{Y}{\sqrt{1+Y^2}}\tan^{-1}\left(\frac{X}{\sqrt{1+Y^2}}\right)\right)$$

Where:

$$X=\frac{W}{2s} \quad \text{and} \quad Y=\frac{H}{2s}$$

As with the previous method, it is relatively simple to include the entire calculation into a Microsoft Excel worksheet.

Note: This method has been used to determine thermal radiation exposure where Method 1 is not appropriate.

Each method will be used as appropriate when analysing the potential for fire spread across the site boundaries.

There are numerous buildings on the Newport EfW site that have elevations facing the site boundaries, some of which face directly adjacent existing buildings.

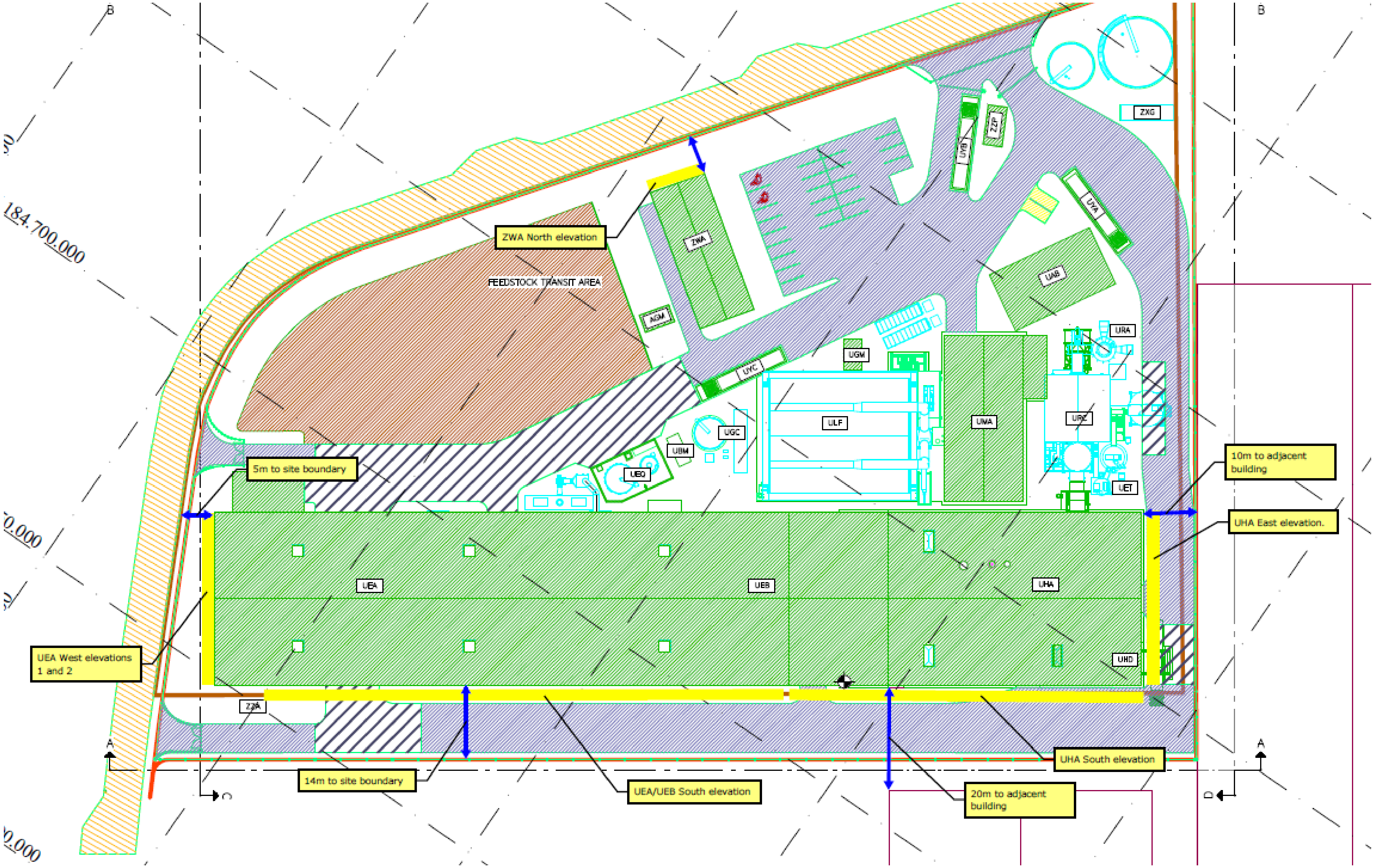


Figure 9 - Boundary Considerations

UHA (Boiler Building East elevation:

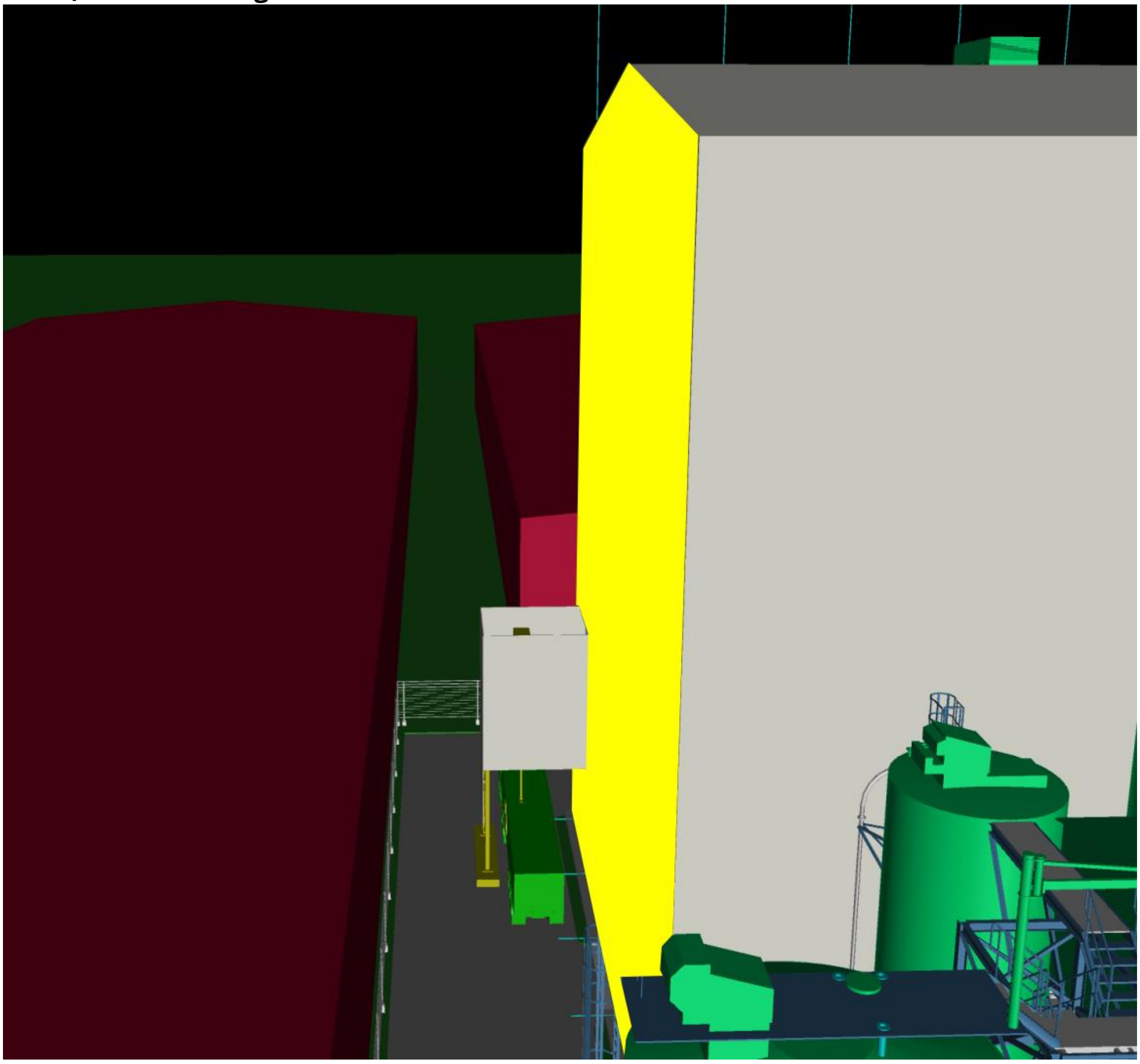


Figure 10 - Boiler Building (UHA) East Elevation

There is an existing building in close proximity to the site boundary adjacent to this elevation therefore the UHA building must not pose a fire spread risk to the existing building. In this instance the site boundary cannot be used as the relevant boundary for fire spread and separation analysis; an assessment of the thermal radiation between the buildings must be undertaken (Method 2).

In the first instance, from the UHA building to the existing building:

- Height of UHA elevation = 35m
- Width of UHA elevation = 32m

- Active fire suppression – Yes
- Distance to adjacent building = 10m

Assuming parallel emitter and receiver planes				
		Centre		
Eflux		168	*kW/m²*	
Fire suppression		Yes	*Yes/No*	
Modified Eflux		84	*kW/m²*	
height		35	*m*	
length		32	*m*	
dist		10	*m*	
X		**1.600000**		
Y		**1.750000**		
VF		**0.774571**		
VF tot		**0.774571**		
Rflux		**65.063953**	*kW/m²*	

Calculation 1 - Boiler Building (UHA) East Elevation - No Protection

Clearly the adjacent building would receive thermal radiation in excess of the 12.6kW/m2 recommended maximum.

Providing passive fire protection to the lower 32m of the façade effectively reduces the height of the radiating portion of the façade to 3m which reduces the incident heat flux on the adjacent building to an acceptable level:

Assuming parallel emitter and receiver planes				
		Centre		
Eflux		168	*kW/m²*	
Fire suppression		Yes	*Yes/No*	
Modified Eflux		84	*kW/m²*	
height		3	*m*	
length		32	*m*	
dist		10	*m*	
X		**1.600000**		
Y		**0.150000**		
VF		**0.137943**		
VF tot		**0.137943**		
Rflux		**11.587219**	*kW/m²*	

Calculation 2 - Boiler Building (UHA) East Elevation - With Protection

It is noted that there is an aperture within this façade for the removal of slag/ash from the building. Withing the building, the slag/ash room is enclosed within a 120-minute compartment therefore the aperture may be ignored for the purposes of external fire spread assessment.

Secondly, from the existing building to the UHA building:
As the UHA elevation is to be provided with 120-minute fire protection to a height of 32m, there will be no significant impact from a fire in the existing adjacent building, whose height is approximately 12m.

UHA (Boiler Building) South elevation:

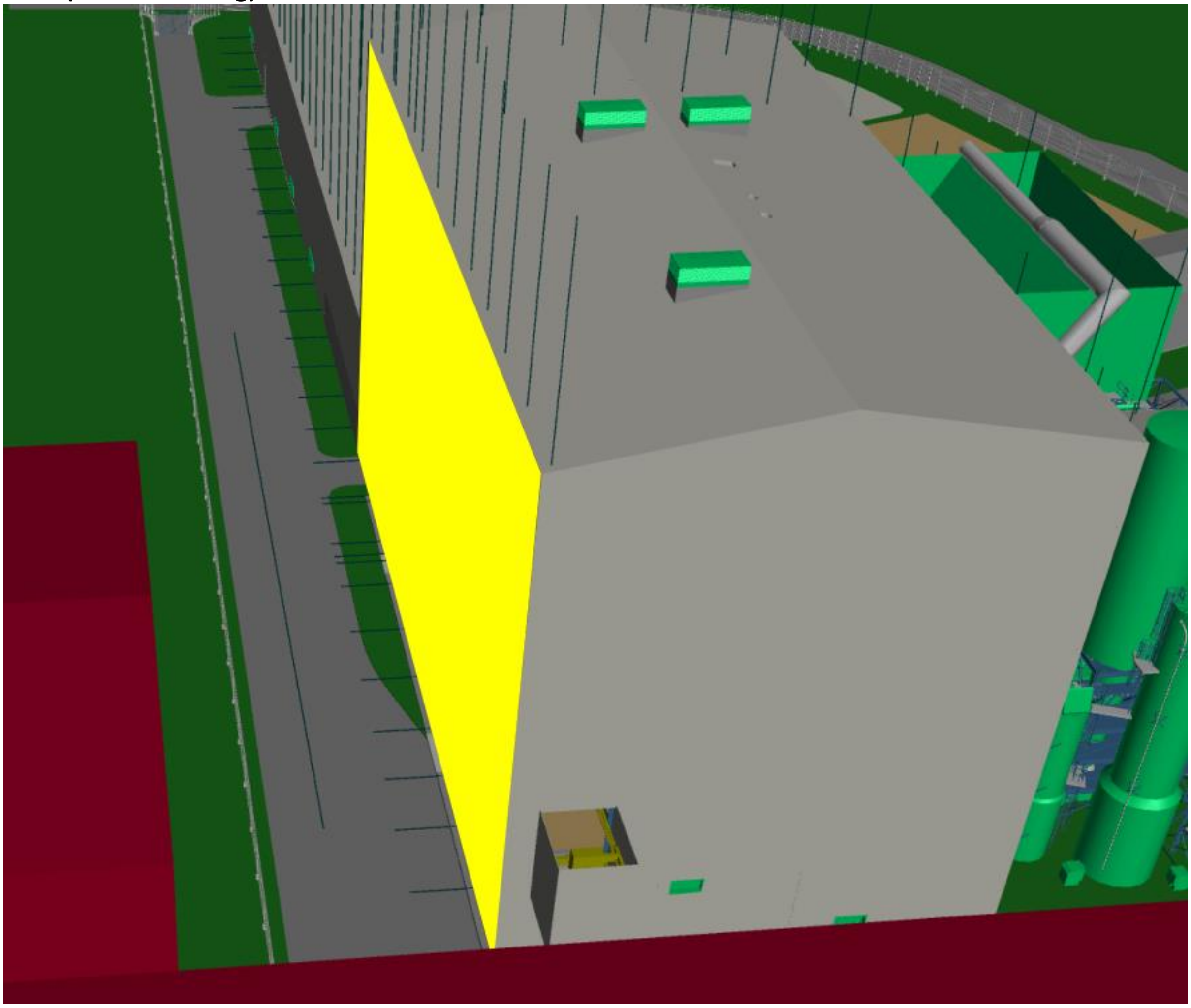


Figure 11 - Boiler Building (UHA) South Elevation

There is an existing building in close proximity to the site boundary adjacent to this elevation therefore the UHA building must not pose a fire spread risk to the existing building. In this instance the site boundary cannot be used as the relevant boundary for fire spread and separation analysis; an assessment of the thermal radiation between the buildings must be undertaken (Method 2).

In the first instance, from the UHA building to the existing building:

- Height of UHA elevation = 35m
- Width of UHA elevation = 59m
- Active fire suppression – Yes
- Distance to adjacent building = 20m

Assuming parallel emitter and receiver planes				
		Centre		
Eflux		168	*kW/m²*	
Fire suppression		Yes	*Yes/No*	
Modified Eflux		84	*kW/m²*	
height		35	*m*	
length		59	*m*	
dist		20	*m*	
X		**1.475000**		
Y		**0.875000**		
VF		**0.591608**		
VF tot		**0.591608**		
Rflux		**49.695034**	*kW/m²*	

Calculation 3 - Boiler Building (UHA) South Elevation - No Protection

Clearly the adjacent building would receive thermal radiation in excess of the 12.6kW/m^2 recommended maximum.

Providing passive fire protection to the lower 28.5m of the façade effectively reduces the height of the radiating portion of the façade to 6.5m which reduces the incident heat flux on the adjacent building to an acceptable level:

Assuming parallel emitter and receiver planes				
		Centre		
Eflux		168	*kW/m²*	
Fire suppression		Yes	*Yes/No*	
Modified Eflux		84	*kW/m²*	
height		6.5	*m*	
length		59	*m*	
dist		20	*m*	
X		**1.475000**		
Y		**0.162500**		
VF		**0.146858**		
VF tot		**0.146858**		
Rflux		**12.336070**	*kW/m²*	

Calculation 4 - Boiler Building (UHA) South Elevation - With Protection

Secondly, from the existing building to the UHA building:
As the UHA elevation is to be provided with 120-minute fire protection to a height of 28.5m, there will be no significant impact from a fire in the existing adjacent building, whose height is approximately 12m

UEA/UEB (Fuel Unloading and Bunker Building) South elevation:

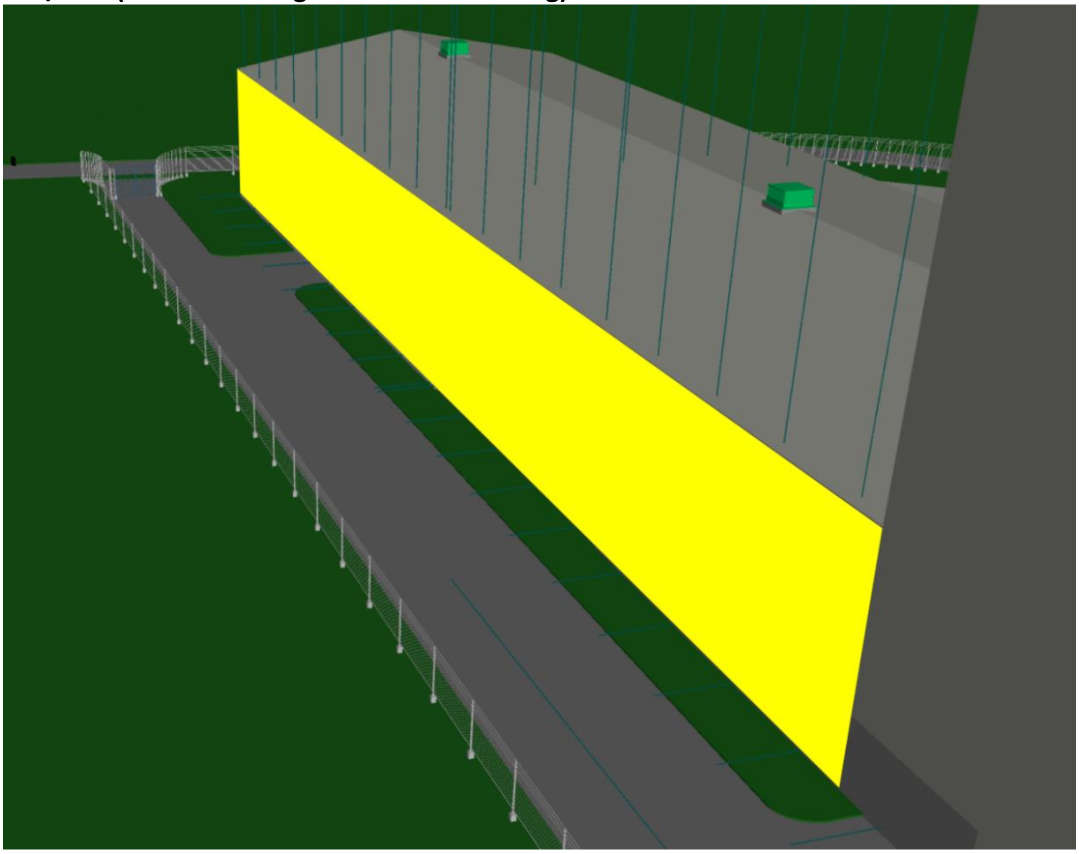


Figure 12 - Fuel Handling and Bunker Building (UEA, UEB) South Elevation

There are no existing buildings adjacent the UEA/UEB South elevation therefore the site boundary may be taken as the relevant boundary and Method 1 used.

- Height of UEA/UEB elevation = 12m
- Width of UEA/UEB 2elevation = 109m
- Active fire suppression – Yes
- Distance to site boundary = 14m

PERMISSIBLE UNPROTECTED OPENINGS (Standard fire load)		
Area:		
Height of elevation	12	h (m)
Width of elevlation	109	w (m)
Distance to relevant boundary	14	d (m)
Sprinklers	**Yes**	
Modified boundary distance	28	
w/d=	3.892857	
f(a)	0.826659	
Permissible unprotected area	**87.71**	%

Calculation 5 - Fuel Handling and Bunker Building (UEA, UEB) South Elevation - No Protection

Add passive fire protection to lower 2m of the elevation:
Modified height of elevation = 10m (12 – 2):

PERMISSIBLE UNPROTECTED OPENINGS (Standard fire load)		
Area:		
Height of elevation	10	h (m)
Width of elevlation	109	w (m)
Distance to relevant boundary	14	d (m)
Sprinklers	**Yes**	
Modified boundary distance	28	
w/d=	3.892857	
f(a)	0.826659	
Permissible unprotected area	**100.00**	%

Calculation 6 - Fuel Handling and Bunker Building (UEA, UEB) South Elevation - With Protection

With the lower 2m of the UEA/UEC South elevation provided with 120-minute fire protection there is no restriction on the amount of unprotected opening in the remainder of the façade.

UEA/UEB (Fuel Unloading and Bunker Building) South elevation (supplemental):

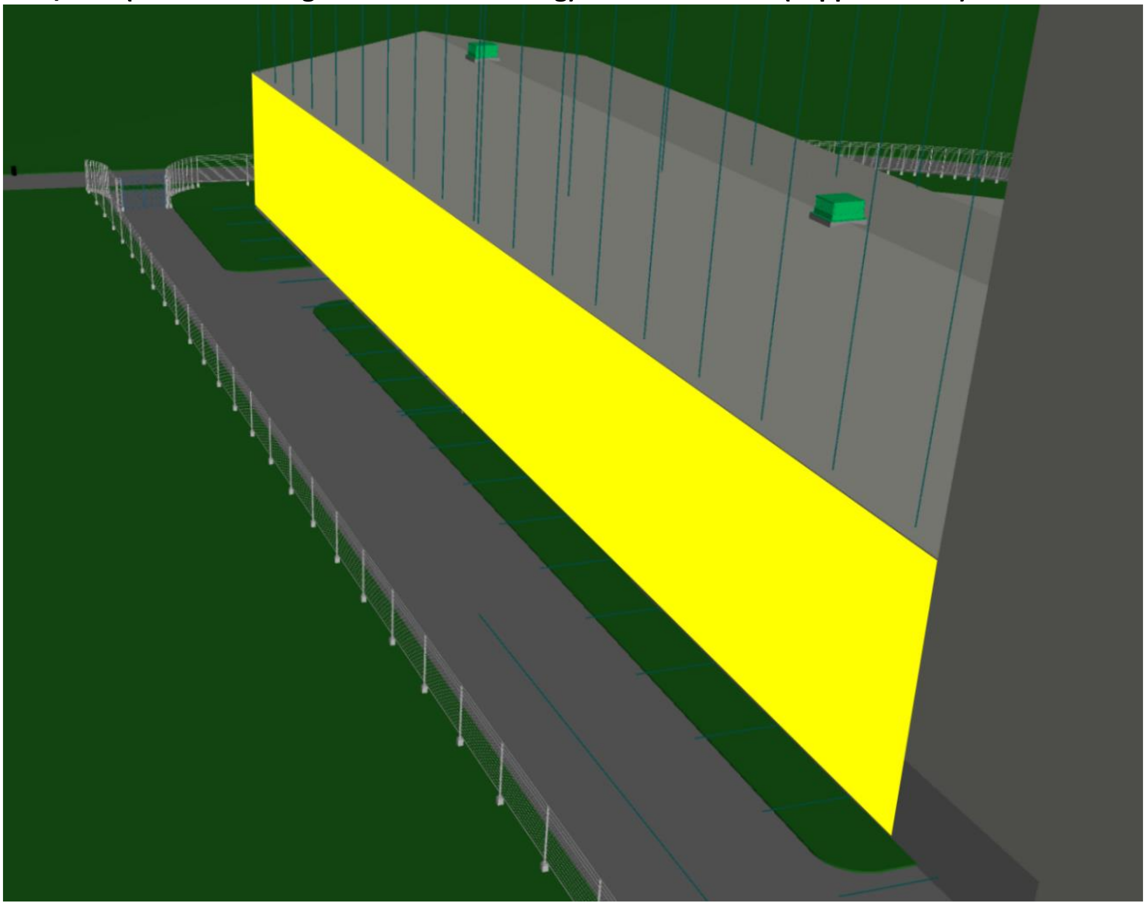


Figure 13 - Fuel Handling and Bunker Building (UEA, UEB) South Elevation

There is a proposed, 17m tall x 50m wide building proposed outside of the site boundary. The spatial separation of the proposed building from the boundary is not determined or fixed therefore the South elevation of UEA/UEB must also be assessed in terms of potential thermal radiation to the site boundary (rather than assuming mirrored separation distances. Method 2 has been used.

- Height of UEA/UEB elevation = 12m
- Width of UEA/UEB 2elevation = 109m
- Active fire suppression – Yes
- Distance to site boundary = 14m

Assuming parallel emitter and receiver planes				
		Centre		
Eflux		168	*kW/m²*	
Fire suppression		Yes	*Yes/No*	
Modified Eflux		84	*kW/m²*	
height		12	*m*	
length		109	*m*	
dist		14	*m*	
X		**3.892857**		
Y		**0.428571**		
VF		**0.391077**		
VF tot		**0.391077**		
Rflux		**32.850467**	*kW/m²*	

Calculation 7 - Fuel Handling and Bunker Building (UEA, UEB) South Elevation - No Protection

Clearly the adjacent building would receive thermal radiation in excess of the 12.6kW/m^2 recommended maximum.

Providing passive fire protection to the lower 8m of the façade effectively reduces the height of the radiating portion of the façade to 4m which reduces the incident heat flux on the adjacent building to an acceptable level:

Assuming parallel emitter and receiver planes				
		Centre		
Eflux		168	*kW/m²*	
Fire suppression		Yes	*Yes/No*	
Modified Eflux		84	*kW/m²*	
height		4	*m*	
length		109	*m*	
dist		14	*m*	
X		**3.892857**		
Y		**0.142857**		
VF		**0.140470**		
VF tot		**0.140470**		
Rflux		**11.799488**	*kW/m²*	

Calculation 8 - Fuel Handling and Bunker Building (UEA, UEB) South Elevation - With Protection

UEA (Fuel Handling Building) West elevation 1:

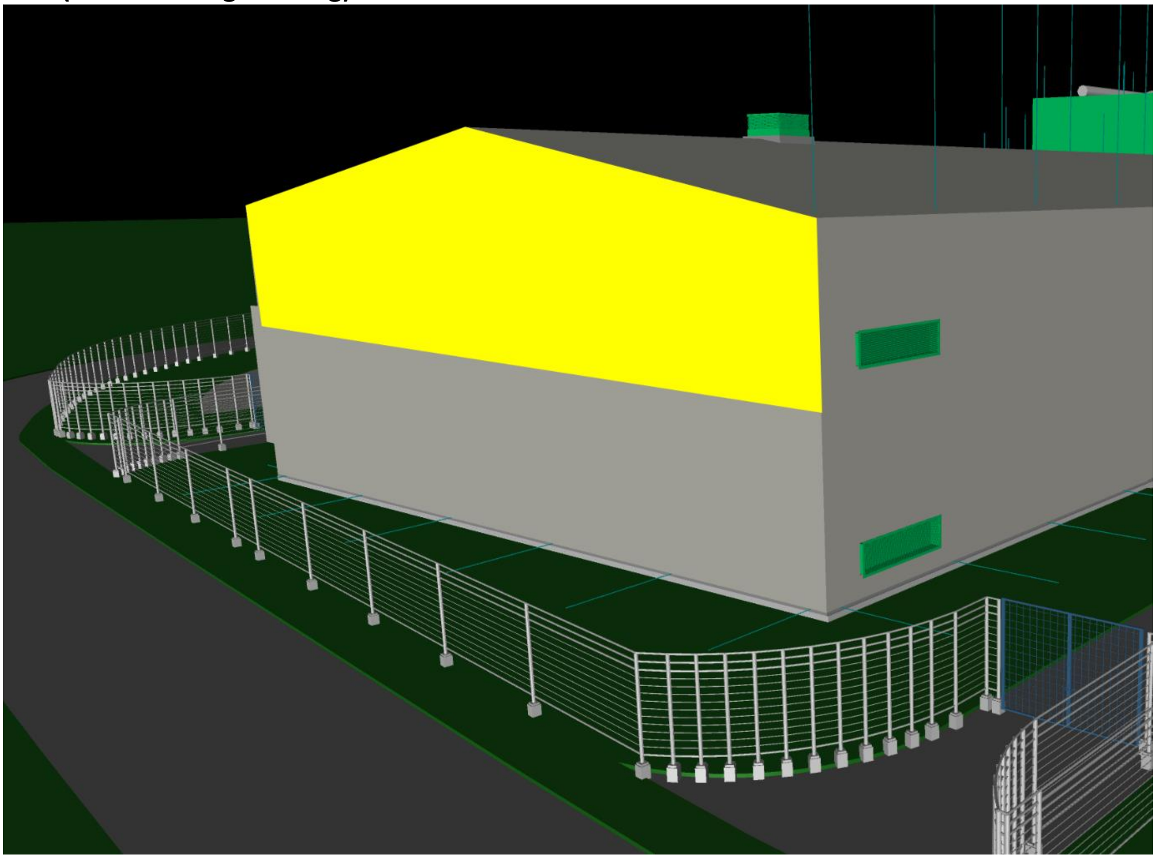


Figure 14 - Fuel Handling and Bunker Building (UEA, UEB) West Elevation 1

There are no existing buildings adjacent the UEA West elevation therefore the site boundary may be taken as the relevant boundary and Method 1 used.

There is internal compartmentation at the mid height level due to the electrical annexe location therefore the effective emitter height (6m) is half of the overall height of the building (12m).

- Height of UEA West elevation 1 = 6m
- Width of UEA West elevation 1 = 32m
- Active fire suppression – Yes
- Distance to site boundary = 5m
- (Whilst the site boundary ranges from 5m to 10m at this location, the worst case of 5m has been used in the assessment).

PERMISSIBLE UNPROTECTED OPENINGS (Standard fire load)		
Area:		
Height of elevation	6	h (m)
Width of elevlation	32	w (m)
Distance to relevant boundary	5	d (m)
Sprinklers	**Yes**	
Modified boundary distance	10	
w/d=	3.2	
f(a)	0.867112	
Permissible unprotected area	**69.27**	%

Calculation 9 - Fuel Handling Building (UEA) West Elevation 1 - No Protection

Add passive fire protection to lower 2m of the elevation:
Modified height of elevation = 4m (6 – 2):

PERMISSIBLE UNPROTECTED OPENINGS (Standard fire load)		
Area:		
Height of elevation	4	h (m)
Width of elevlation	32	w (m)
Distance to relevant boundary	5	d (m)
Sprinklers	**Yes**	
Modified boundary distance	10	
w/d=	3.2	
f(a)	0.867112	
Permissible unprotected area	**100.00**	%

Calculation 10 - Fuel Handling Building (UEA) West Elevation 1 - With Protection

Providing a horizontal 2m ‘strip’ of fire protection to the UEA West elevation 1 façade results in there being no restriction on unprotected openings in the remainder of this façade (the 2m horizontal strip may be located anywhere within the façade).

UEA (Fuel Handling Building) West elevation 2:

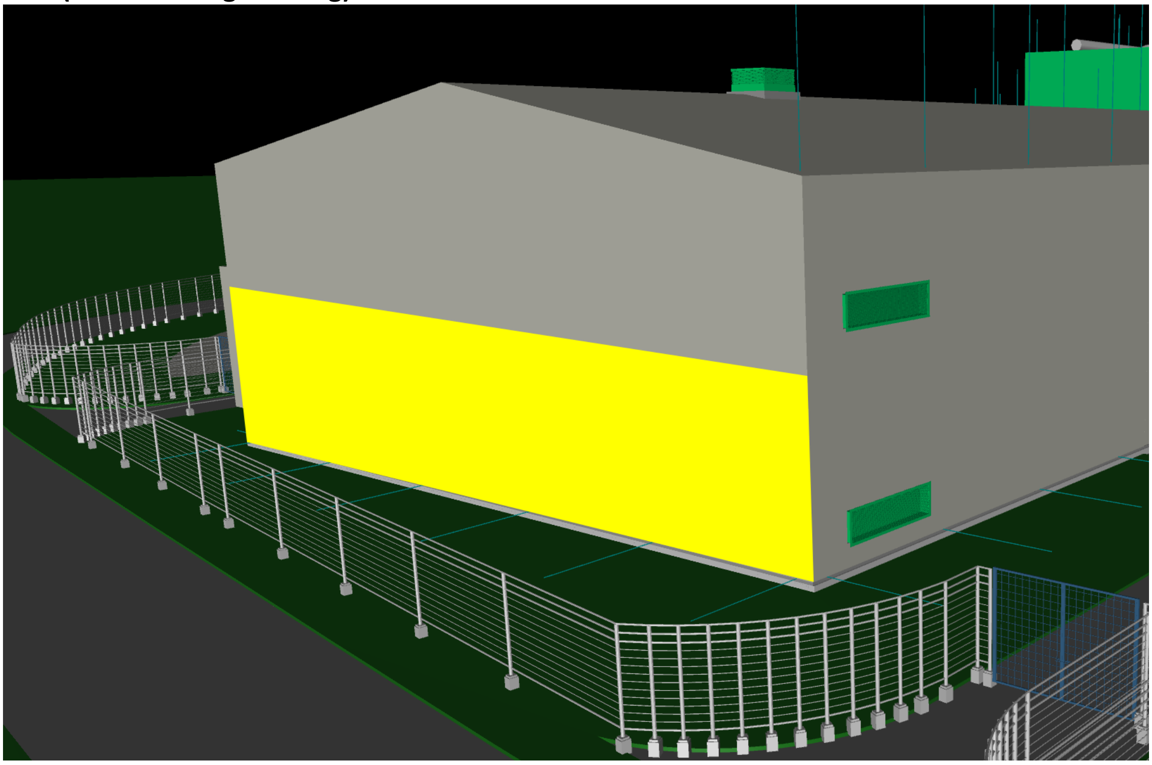


Figure 15 - Fuel Handling Building (UEA) West Elevation 2

There are no existing buildings adjacent the UEA West elevation therefore the site boundary may be taken as the relevant boundary and Method 1 used.

There is internal compartmentation at the mid height level due to the electrical annexe location therefore the effective emitter height (6m) is half of the overall height of the building (12m).

- Height of UEA West elevation 2 = 6m
- Width of UEA West elevation 2 = 32m
- Active fire suppression – Yes
- Distance to site boundary = 5m
- Whilst the site boundary ranges from 5m to 10m at this location, the worst case of 5m has been used in the assessment).

PERMISSIBLE UNPROTECTED OPENINGS (Standard fire load)		
Area:		
Height of elevation	6	h (m)
Width of elevlation	32	w (m)
Distance to relevant boundary	5	d (m)
Sprinklers	**Yes**	
Modified boundary distance	10	
w/d=	3.2	
f(a)	0.867112	
Permissible unprotected area	**69.27**	%

Calculation 11 - Fuel Handling Building (UEA) West Elevation 2 - No Protection

Add passive fire protection to lower 2m of the elevation:
Modified height of elevation = 4m (6 – 2):

PERMISSIBLE UNPROTECTED OPENINGS (Standard fire load)		
Area:		
Height of elevation	4	h (m)
Width of elevlation	32	w (m)
Distance to relevant boundary	5	d (m)
Sprinklers	**Yes**	
Modified boundary distance	10	
w/d=	3.2	
f(a)	0.867112	
Permissible unprotected area	**100.00**	%

Calculation 12 - Fuel Handling Building (UEA) West Elevation 2 - With Protection

Providing a horizontal 2m ‘strip’ of fire protection to the UEA West elevation 2 façade results in there being no restriction on unprotected openings in the remainder of this façade (the 2m horizontal strip may be located anywhere within the façade).

ZWA (Welfare building) North elevation:

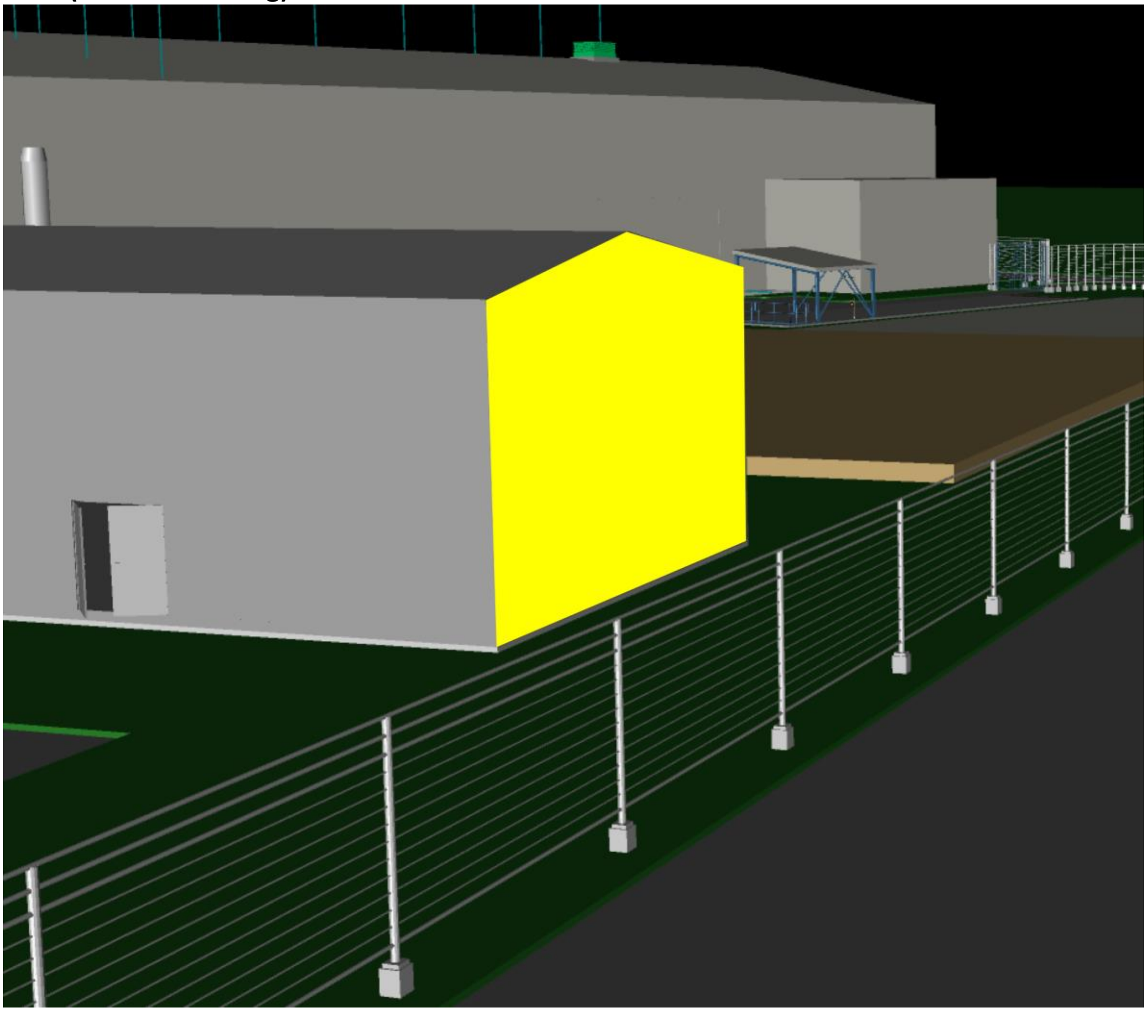


Figure 16 - Welfare Building (ZWA) North Elevation

There are no existing buildings adjacent the ZWA North elevation therefore the site boundary may be taken as the relevant boundary and Method 1 used.

There is internal compartmentation at the mid height level due to the electrical annexe location therefore the effective emitter height (6m) is half of the overall height of the building (12m).

- Height of ZWA North elevation = 6m
- Width of ZWA North elevation = 10m
- Active fire suppression – No
- Distance to site boundary = 8m

PERMISSIBLE UNPROTECTED OPENINGS (Standard fire load)		
Area:		
Height of elevation	6	h (m)
Width of elevlation	10	w (m)
Distance to relevant boundary	8	d (m)
Sprinklers	No	
Modified boundary distance	8	
w/d=	1.25	
f(a)	0.992819	
Permissible unprotected area	**100.00**	%

Calculation 13 - Welfare Building (ZWA) North Elevation - No Protection

There is no requirement to provide additional fire protection to the ZWA building North elevation in terms of potential for fire spread over the site boundary.

Feedstock transit area:
EA guidance recommends that feedstock piles, located close to the site boundary be either:

- Provided with a 120-minute fire wall between the feedstock pile and the boundary, or
- Provided with a 6m clearance between the feedstock pile and the boundary.

Using 6m as the distance to the relevant boundary (assuming no fire wall between feedstock pile and the site boundary) it is possible to assess the potential for fire spread across the boundary to existing or future buildings:

It is necessary to modify the Eflux value from the previous assessments in this instance due to the fire load presented by the fuel. From WISH data, a burn temperature of 950°C can be used to determine the thermal radiation emitted from the fire:

Calculate the thermal radiation emitted from a hot mass:			
$q_{\text{rad}} = \varepsilon\sigma T^4$			
Emissivity	ε	1	*(0 to 1)*
Temperature	t	950	*C*
Absolute Temperature	T	1223.15	*K*
Stephan Boltzmann Constar	σ	5.6703E-08	$W/m^2 K^4$
Thermal Radiation Emitted	q_{rad}	126918.496	W/m^2
		126.918496	kW/m^2

Calculation 14 - Feedstock Thermal Emission

From the above, the Eflux value to be used for this assessment should be 127kW/m^2 due to the fire load presented by the fuel.

- Width of emitter (feedstock pile) = 9.7m (from sketch plan)
- Height of emitter (feedstock pile) = 4m (assumed 2 bale high stack of 2.5m plus assumed flame height of 1.5m)
- Target distance = 12m (2 x boundary distance)
- Effective thermal radiation emission = 127kW/m^2

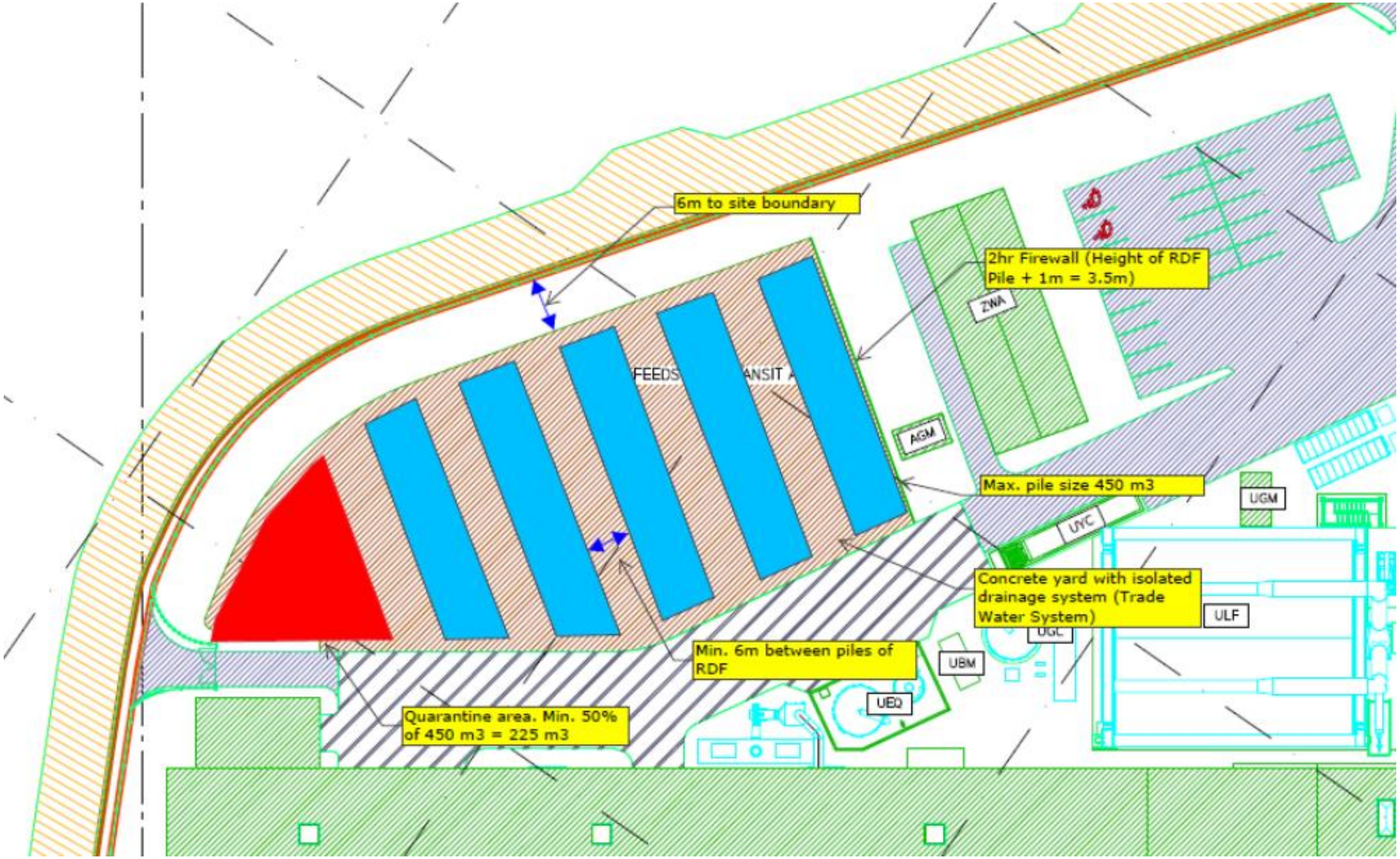


Figure 17 - External Feedstock Storage

Assuming parallel emitter and receiver planes				
		Centre		
Eflux		127	*kW/m²*	
Fire suppression		No	*Yes/No*	
Modified Eflux		127	*kW/m²*	
height		4	*m*	
length		9.7	*m*	
dist		12	*m*	
X		**0.404167**		
Y		**0.166667**		
VF		**0.076276**		
VF tot		**0.076276**		
Rflux		**9.687067**	*kW/m²*	

Calculation 15 - External Feedstock Storage Pile Thermal Radiation

With the orientation of the feedstock piles as proposed, with 6m separation in between the feedstock piles, the incident thermal radiation to a target 12m distant is sufficiently low as to not be of significance to any future building structures.

Note: feedstock storage may be subject to change during detailed design – the above assessment will be updated to reflect any changes proposed or implemented.

8.3 Separation and compartmentation – Insurer's Requirement

8.3.1 Buildings, Plant and Equipment

Fire areas should be separated from each other by 2-hour fire barriers, 15 m spatial separation or other approved means.

Fire separation of the various elements will be provided by a combination of one or more of the following measures:

- Blockwork or concrete construction.
- Fire rated cladding.
- Spatial separation.
- Active fire suppression.
- Fire rated cladding.

Ventilation ducts passing from one fire separated area to another will be provided with automatic fire dampers. Operation of dampers may either be from the fire detection system or inert gas panel. All dampers in the ventilation system are failsafe closed.

Fire areas to be defined as e.g.:

- Indoor biomass receiving / tipping floor and storage area.
- Indoor processed and unprocessed biomass storage (e.g., storage other than in the Bunker or the biomass receiving / tipping floor).
- External processed and unprocessed biomass storage.
- Processing area.
- Slag store areas.
- Dust collection equipment from any equipment.
- Cable spreading rooms and cable tunnels.
- Control Room, Computer Room, or combined Control / Computer Room.
- CEMS room.
- Rooms with major concentrations of electrical equipment, such as switchgear room and relay room.
- Battery rooms.
- Maintenance shop.
- Fire pumps.
- Warehouses.
- Emergency diesel generator.
- Office/Welfare buildings.
- Turbine-generator.

Note 1:
Buildings spaced less than 15 m will be fire rated. One of two opposite buildings spaced less than 15 m, shall be fire rated for two hours in regard to a fire from inside and outside or both buildings shall be fire rated for 2 hours in regard to a fire from outside.

Note 2:
For buildings where the exposing building is of lesser height than the exposed building and where the roof of the exposing building has no fire resistance, the height of the protection above the roof should be 7.5m (ref. NFPA 80A; 4.4.8.2).

Note 3:
Where an internal compartment fire wall terminates at a façade, the flanking elements of that façade are required to provide a fire resistance of either 60-minutes or 2 hours less than that of the compartment fore wall, whichever is the greater. In the case of the Newport EfW buildings, the requirement is for 60-minutes as the fire compartment walls are 120-minutes.

The extent of the flanking fire protection is based on the height of the compartmentation and the construction interface (i.e., the structural arrangement) of the fire compartment wall.

Reference is made to Figures 5.16.2.1(a) and 5.16.2.1(b) from NFPA 221 (2021):

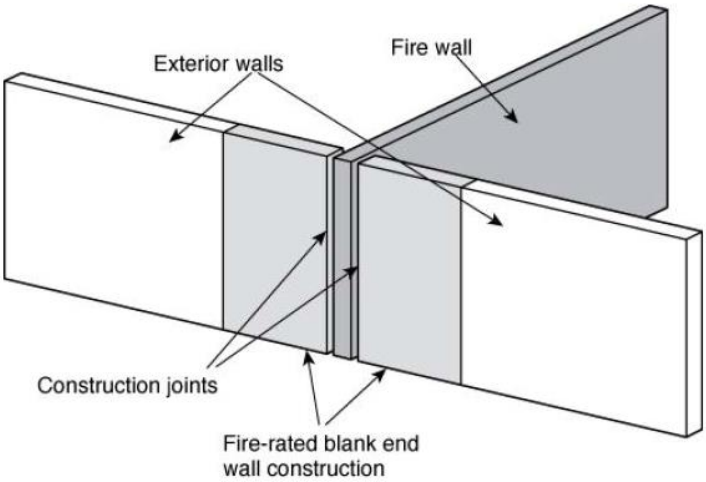


Figure 5.16.2.1(a) End Wall Exposure Protection — End Walls Tied to Structural Framing.

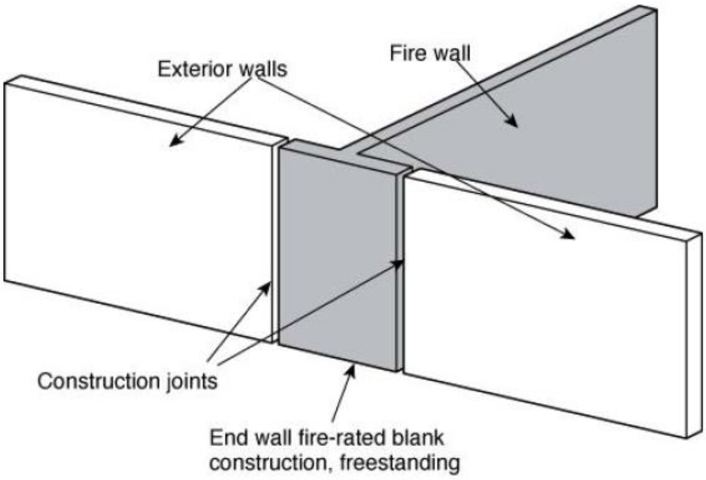


Figure 5.16.2.1(b) End Wall Exposure Protection — End Walls Not Tied to Structural Framing.

Figure 18 - Fire Wall Ends (From NFPA 221)

Flanking protection dimensions can be obtained from Table 5.16.2.1 (Wall protection) of NFPA 221 (2021):

Height of exposing area		Length of end wall protection	
m	**ft**	**m**	**ft**
<=12.2	<=40	1.830	6
12.5 – 21	41-70	3.050	10
>=21.6	>=71	4.265	14

Table 10 - Flanking Wall Protection Extents

8.4 Other measures

8.4.1 Cavity barriers

Where appropriate, suitable provisions will be made to prevent the unseen spread of fire and smoke through cavities or concealed spaces by use of cavity barriers. Cavity barriers will be designed and located to achieve the performance required for Building Regulations compliance e.g., by following the guidance contained in BS9999.

It should be noted that cavity barriers are not required within walls of 'traditional construction' i.e., two leaves of masonry minimum 75mm thickness separated by an internal cavity. In this instance, where cavity closers are required, they do not have to be provided with the same performance as a cavity barrier.

Concealed spaces within floor voids and ceiling voids as well as cable shafts will be installed with fire detection.

8.4.2 Fire doors

A Fire-resistant door in a compartment wall has the same fire resistance as the wall, e.g., the door in a 60-minute compartment wall has to be rated FD60S.

8.4.3 Corridors

Corridors exceeding 12m in length that provide access to more than one exit will be subdivided by cross corridor fire doors. The doors should be positioned approximately mid-way along the corridor and should be rated FD 20S (BS 9999 16.3.11.3; table 30). This does not mean that corridors are required to be broken down into 12 m segments.

8.4.4 Crane operator room viewing window

To achieve 2-hour fire resistance to the crane operator room viewing window will have a glazing system designed to provide at least 60 minutes integrity. The fire-resistant glazing will further be protected by a water drenching curtain system mounted on the Fuel/Bunker side of the glazing (see section 15.5.3 of this report)

8.5 Ductwork

Fire protection of ventilation ductwork is needed as an integral part of the building's compartmentation strategy to ensure not to compromise the integrity of the means of escape. As such, the recommendations contained BS 9999 Section 32.5.2 will be adopted.

- Where air handling ducts pass through fire-separating elements such as compartment walls or the enclosures to protected escape routes, then the integrity of those elements should be maintained, using one or a combination of the following four methods:
  - Method 1: thermally actuated fire dampers.
  - Method 2: fire-resisting enclosures.
  - Method 3: protection using fire-resisting ductwork.
  - Method 4: automatically actuated fire and smoke dampers triggered by automatic fire detection and alarm system.

Selection or combining the methods 1 to 4 will be evaluated based on the specific application in which they are to be used.

8.6 Fire stopping

All joints between fire separating elements will be adequately fire stopped and all openings for services passing through fire separating elements will be:

- As few in number as possible to serve the building.
- As small as possible to provide the service transit.
- Suitably fire stopped (allowing for thermal movement in the case of pipes and ducts).

8.7 Transformer cell

The step-up transformer (UAB) is spatially separated from all adjacent buildings and plant by a distance of not less than 1.5m. The transformer insulating/cooling oil is a type K Less Flammable Insulant with a capacity of 12,800L and the transformer is provided with “enhanced protection” in accordance with EC 61936-1.

The above provisions meet the requirements of Chubb Guidance (Table 5.1.15 – 1.5m) and exceed the requirements of EC 61936-1 (Table 3 – 0.9m vertically and 1.5m horizontally) therefore fire/blast wall enclosure and/or fixed fire suppression is not required.

8.8 Flue gas treatment

The filter bags installed in the filter are designed for high temperature operation and therefore do not require additional passive fire protection, however refer to Section 15.15 of this report for any active fire suppression requirements.

8.9 Fire separation (segregation) and compartmentation drawings

The fire segregation drawings for each main area are listed in section 18 and included in the attachment to this report ref. 1017.M0.J01.002 (to be added)

The following colour code indicates the fire resistance indicated on the drawings.

(blue)	120 minutes

Note: The 120-minute fire resistance is achieved either by concrete, block wall or cladding (cladding walls 120-minute fire resistance from a fire outside towards inside).

9 Access and facilities for the Fire Service

9.1 Functional requirement

1) The building shall be designed and constructed so as to provide reasonable facilities to assist fire-fighters in the protection of life.
2) Reasonable provision shall be made within the site of the building to enable fire appliances to gain access to the building.

9.2 Vehicle access

The typical design guidance for vehicle access routes is given below table (ref. BS9999 Table 20), although the route dimensions formally need to be confirmed with the Local Fire Authority.

Table 20 **Example of measurements for a typical vehicle access route**

Appliance type	**Min. width of road between kerbs**	**Min. width of gateways**	**Min. turning circle between kerbs**	**Min. turning circle between walls**	**Min. clearance height**	**Min. carrying capacity**
	m	m	m	m	m	t
Pump	3.7	3.1	16.8	19.2	3.7	12.5
High-reach [A)]	3.7	3.1	26.0	29.0	4.0	17.0

[A)] Because the weight of high-reach appliances is distributed over a number of axles, their infrequent use of a carriageway or route designed to 12.5 t is not likely to cause damage. It would therefore be reasonable to design the road base to 12.5 t, although structures such as bridges should have the full 17 t capacity.

Table 11 - Typical Fire Service Vehicle Data

A swept path analysis has been carried out for typical fire and rescue service vehicles on site and listed in section 18.

9.3 Access to buildings for firefighting personnel

The process areas do not have internal storeys that are normally occupied that would require firefighting stairs. Specific risks in the process areas are provided with dedicated fire extinguishing/control systems as described in Section 15 to this report.

With the exception for the Welfare Building the service areas that are normally occupied during operational times are all situated at ground floor level.

9.4 Firefighting in fuel unloading bunker and fuel storage bunker

Access into the fuel reception/unloading building (UEA) and fuel bunkers (UEB) is via the site vehicular roadway which provides access to entry point on the northern façade.

The areas are installed with fire water monitors (2 pc. covering each combined bunker) which can be operated from the main control room or during normal working hours be operated from the crane cabin.

10 Fire main and location of hydrants

The guidance contained in Appendix 5 of the National Guidance Document on The Provision of Water for Fire Fighting 2007) provides ideal requirements in terms of water flow availability for firefighting purposes based on the area of the site concerned. This however is based on the assumption that no additional firefighting measure have been provided. The provision of automatic fire suppression systems is based on NFPA 850 requirements as detailed in Section 15 therefore the hydrant demand will be based around a hose reel demand of 1890 litres per minute.

The Power Plant is to be provided with a looped fire hydrant ring main for use by the attending fire Service. Hydrants will be provided as indicated on the following diagram based on the provisions of NFPA 850 (2020) Clause 7.4.1

The hydrants will be in accordance with BS 750:2012 to ensure compatibility with the equipment carried by the Local Fire and Rescue Service.

Hose cabinets located in the vicinity of each hydrant will be supplied with one spray nozzle (jet and fog) and a total of 30m hose.

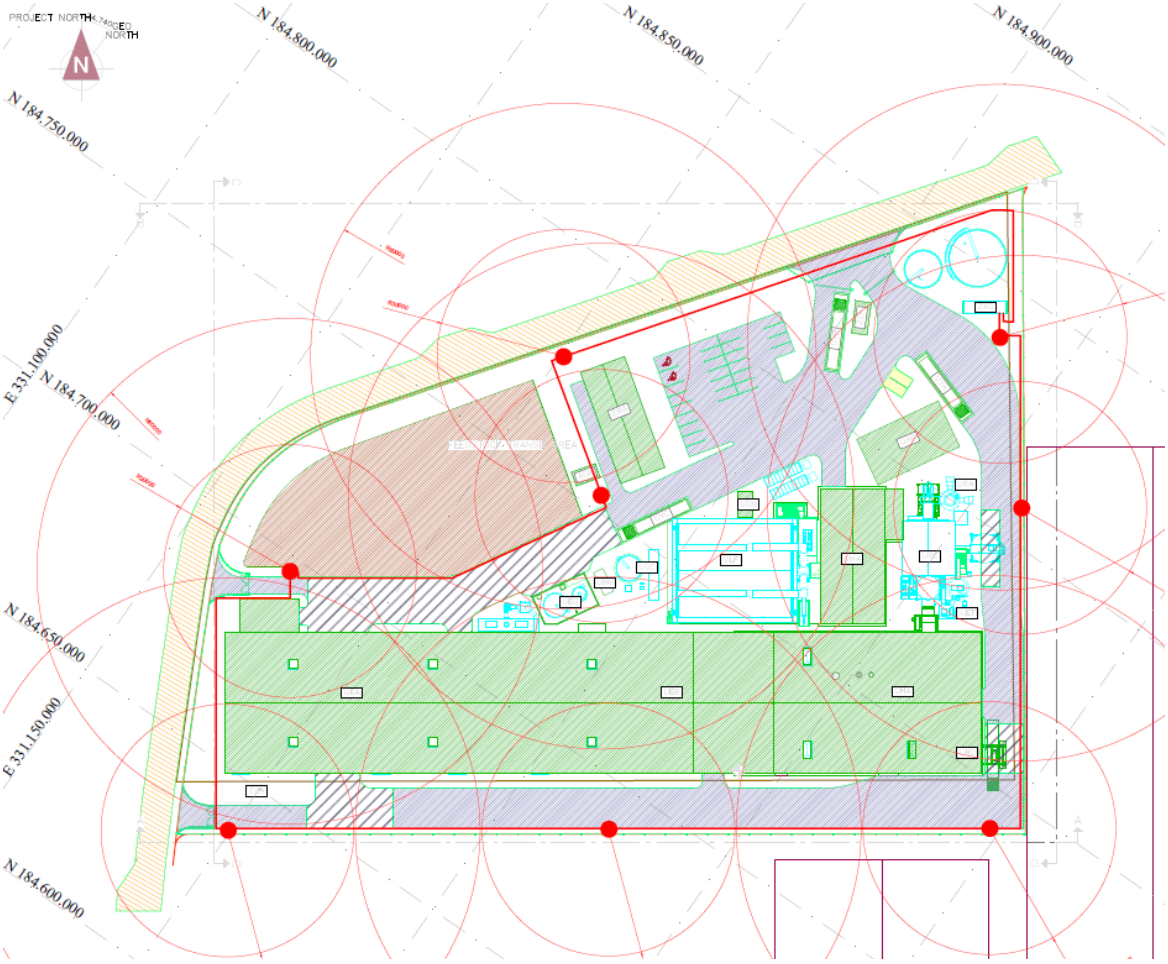


Figure 19 - Site Fire Main and Hydrant Layout

11 Portable fire extinguishers

Portable fire extinguishers will be provided throughout the entire facility, selected according to perceived risk.

Electrical rooms and the boiler building will be equipped with CO_2 extinguishers*. STG room will be equipped with both dry powder and CO_2 extinguishers.

* The boiler building will additional be installed with dry powder extinguishers where oil for the aux. burners is present.

The portable fire extinguisher layout drawings for each main area are listed in section 18.

12 Fire water run-off

In the event of a fire, water polluted by fire detritus and firefighting foam etc. will be retained on site by means of isolation valve (Penstock) and if required, thereafter pumped out and transported for appropriate disposal, reused in the process, or released in accordance with regulatory requirements.

CIRIA C736 gives guidance as to the control of pollution from firefighting events. This requires that

- firefighting water
- any rainfall retained from a 24-hour preceding the event
- rainfall during the period of the fire and
- rainfall for 8 days after the event (all based on a 1 in 10-year storm event)

...must be retained on the site.

Fire water retention capacity is maintained for the full plant area including volume included in the drainage system, the discharge attenuation tanks, the sedimentation basin, the trade water treatment tanks and main RDF bunkers.

Fire water retention is, as far as practible, designed separate for clean rainwater and other sources like firefighting and trade water etc. Initial volume planned for rainwater (clean) is 1750 m3 and some 5000 m3 will be available for overflow from rainwater, firefighting water, foul and trade (polluted).

In the event of a fire on site, a penstock linked to the building management system, will shut off water discharge to the Newport docks. Once the attenuation system is full, a pump station will begin to pump surface water to the waste unloading bunker (overflow). Any water drained to the attenuation system during a fire event shall initially be treated as polluted. The water is tested and removed for treatment if polluted or finally discharged to the Newport docks.

Any area inside buildings (except the fuel storage) is drained via the sedimentation basin and the trade water treatment tanks during a fire event. Overflow is pumped to the waste unloading bunker. In the fuel storage, the unloading area (reception) drains directly to the waste unloading bunker. Any water drained or pumped to the waste unloading bunker during a fire event shall be treated as polluted and removed for treatment as described above.
The site will therefore be able to accommodate the fire water retention requirements via retention of surface water and fire water and trade in the event of a fire, with no risk of pollution or flooding.

13 Smoke and heat venting system

13.1 Boiler building

The boiler building is installed with 3 pc. roof ventilation units which also serve as smoke extraction fans (rated for operation for 2 hours at 300 °C (F300)). In the event of a fire or after a fire, should smoke ventilation be required, the ventilation units can be started from the DCS. Fresh makeup air is provided either by the installed inlet louvres and/or by opening the gates at ground floor manually. The 3 pc. ventilation units are spaced as indicated below:

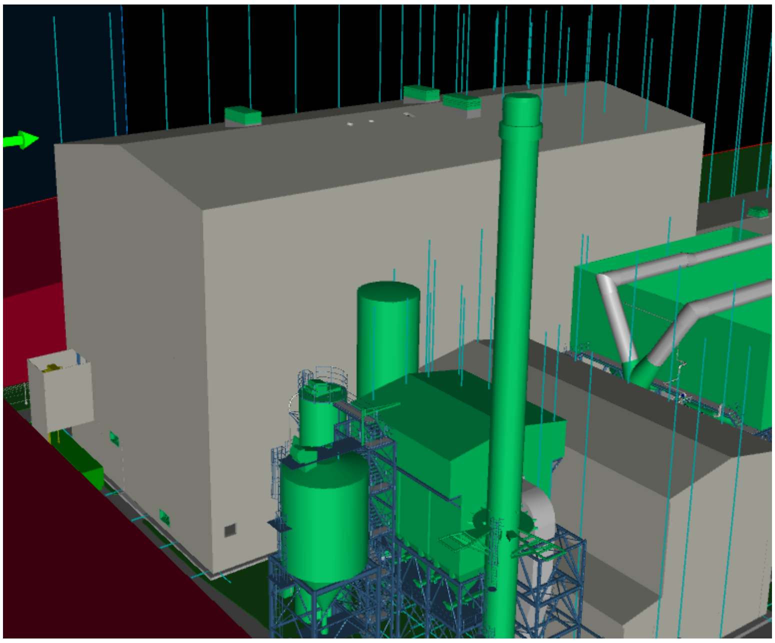


Figure 20 - Boiler Building (UHA) Smoke and Heat Ventilation

Capacity:

Ventilation unit 1:	~50,000	m3/h
Ventilation unit 2:	~100.000	m3/h
Ventilation unit 3:	~100.000	m3/h
Total flow through the building provided by having all ventilation units in operation:	~250.000	m3/h
Total flow through the building provided by having ventilation unit 1 and ventilation unit 2, 3, or 4 in operation:	~150,000	m3/h
Boiler building volume:	~68,000	m3

The roof ventilation units are designed as fail-safe open. In the event of loss of power supply to the units, these will be forced open and the gates at ground floor shall be opened manually to provide the required draft/replacement air through the building.

13.2 Steam turbine building

The building is installed with 3 pc. supply fan units located at the external walls of the building and 2 pc. passive outlet units at the roof. Each of the three supply fan units is sized to 31,000 m3/hour provided by two fans each sized to 50% of the total flow. Each of the two roof outlet units is sized to 61,000 m3/h.

Total flow into the building provided by having all three intake units in operation:	~93,000	m3/h
Total flow into the building provided by having one intake unit in operation:	~31,000	m3/h
Steam turbine building volume:	~8.650	m3

The gates at ground floor shall be opened manually to provide the required draft/replacement air through the building.

13.3 Feedstock building

The feedstock building is installed with 5 pc. smoke ventilation units (rated for operation for 2 hours at 300 °C (F300)). Each of the four smoke ventilation units is sized to 30,000 m3/hour

Total smoke extraction by having all four units in operation:	~150,000	m3/h
Feedstock building volume*:	~25,000	m3

*Not including occupied space for the boiler building and the fuel treatment structure and not including the tipping hall volume.

The tipping hall gate shall be opened manually to provide the required draft/replacement air through the building.

13.4 Control room

Fresh air is continuously supplied into the Control room (pressurized). In the event of fire all dampers leading to and from the rooms will be closed.

14 References

The following regulations and reference documents have been used in the preparation of this report:

- Guidance Document, Waste Processing Plant – Fire Systems, Issue 2.0, dated 19 May 2017(*1: see section 3.1)
- Guidance Document, Energy from Waste – Fire Systems, Issue 3.0, dated 19 May 2017(*1: see section 3.1)
- S.I. 2010 No. 2214 - The Building Regulations 2010
- S.I. 2005 No. 1541 - The Regulatory Reform (Fire Safety) Order 2005
- The Building Regulations 2010, Approved Document B Volume 2 - Fire Safety; (2006 edition incorporating 2007, 2010 and 2013 amendments)
- National Guidance Document on The Provision of Water for Fire Fighting (January 2007, 3rd edition)
- BS 9999: 2017; Code of Practice for Fire Safety in the Design, Management and Use of Buildings
- BS5839-1:2017; Fire detection and alarm systems for buildings Part 1 – Code of practice for system design, installation, commissioning and maintenance
- BS8300: 2018; Design of buildings and their approaches to meet the needs of disabled people. Code of Practice
- NFPA850: 2020; Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations
- NFPA13: 2022; Standard for the Installation of Sprinkler Systems
- NFPA14: 2019; Standard for the Installation of Standpipe and Hose Systems
- NFPA15: 2022; Standard for Water Spray Fixed systems for Fire Protection
- NFPA16: 2019; Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems
- NFPA20: 2022; Standard for the Installation of Stationary Pumps for Fire Fighting
- NFPA30: 2021; Flammable and Combustible Liquids Code
- NFPA101: 2018; Life Safety Code
- Research Establishment Report BRE187 (2014 – External fire spread: Building separation and boundary distances)
- CIBSE Guide E; Fire engineering
- WASTE 28 Reducing fire risk at waste management sites issue 2 – April 2017
- HSE Storage of flammable liquids in tanks (HSG176)

15 Fire safety provisions (Statutory requirement and Insurer's requirement)

The following describes each of the additionally fire safety measures to be incorporated in the design of the power plant for life safety and property protection (the figures mentioned for the water-based fire suppression systems would not necessarily be accurate however, they should provide sufficient information for the design and sizing of the fire water requirement i.e. fire water storage tank and fire pump capacity).

Fire suppression systems will be designed in accordance with the recommendations of NFPA except for the inert gas systems which will be designed in accordance with BS EN15004.

Note: Any water filled pipe, valve, deluge valve etc. serving fire suppression systems and dry risers with risk of being exposed to low temperature (frost) shall be properly heat traced.

15.1 Compartmentation – Fire segregation

Refer to section 8.9 of this report.

15.1.1 Steel Structure

Steel structure supporting 2-way fire rated compartment walls will be fire protected for a 2hr rating by passive fire protection system. Protection either by intumescent paint or by wrapping.

15.1.2 Fire rated walls

Fire walls with 2-way fire rating will in general be constructed using horizontally laid Rockwool cored composite panels (Eurobond Rainspan or similar) spanning between structural columns without horizontal sheeting rails.

Alternatively, pre-cast wall panels will be used where there is a risk for any mechanical load or wear on surfaces or need for continuous cleaning.

Fire walls with 1-way fire rating will in general be constructed using a twin skin, site assembled insulated profiled metal cladding built-up system with medium dense core rockwool (Tata Trinsul or similar) on traditional cold-rolled sheeting rails.

15.1.3 Fire rated roofs

Roofs with 1-way fire rating will in general be constructed using twin skin site assembled insulated profiled metal cladding built-up system with medium dense core rockwool (Tata Trinsul or similar) on traditional cold-rolled purlins.

15.2 Hydraulic systems

Listed Fire resistant hydraulic fluids will be used for hydraulic systems except where otherwise accepted by the codes.

15.3 Fixed fire protection – Sprinkler and Monitors

For life safety and in order to minimise losses to plant and production, certain areas and risks in a Power Plant of this type are recommended to be provided with fixed fire protection systems (manual or automatic in operation as appropriate).

15.4 External RDF storage

The external RDF storage is managed as stockpiles of baled fuel of not more than 450m3 with each stockpile separated from the adjacent pile by not less than 6m as per EA guidance.

EA guidance requires a water supply capable of providing 2,000L per minute, per 300m3 of fuel in the largest stockpile, for a period of 3 hours.

Fire water demand ((450/300) x 2000 x 180) ~540m3 total

15.5 Waste Fuel Handling (UEA/UEB)

15.5.1 <u>Tipping Hall</u>

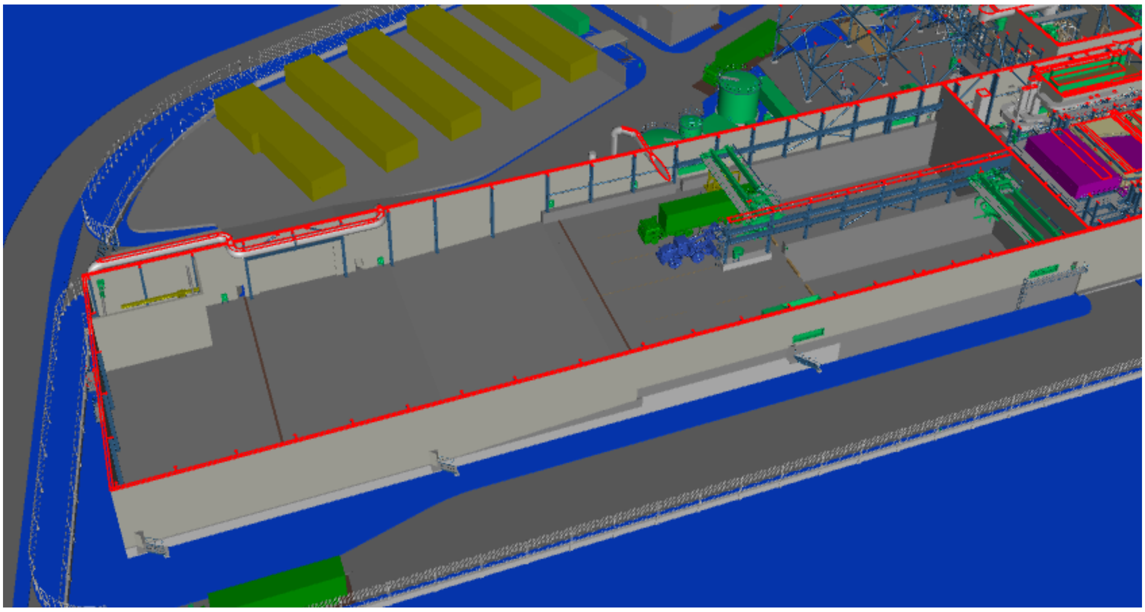


Figure 21 - Waste Fuel Handling (UEA/UEB)

The tipping hall will be provided with an automatic water sprinkler system. The system will be designed to provide complete coverage of the floor area. The system will be designed for a minimum of 10.2 mm/min over the most remote 279 m^2 of floor area.

Fire water demand (minimum requirement according to NFPA 850) ~171 m^3/h

15.5.2 Unloading and Fuel Storage Bunker

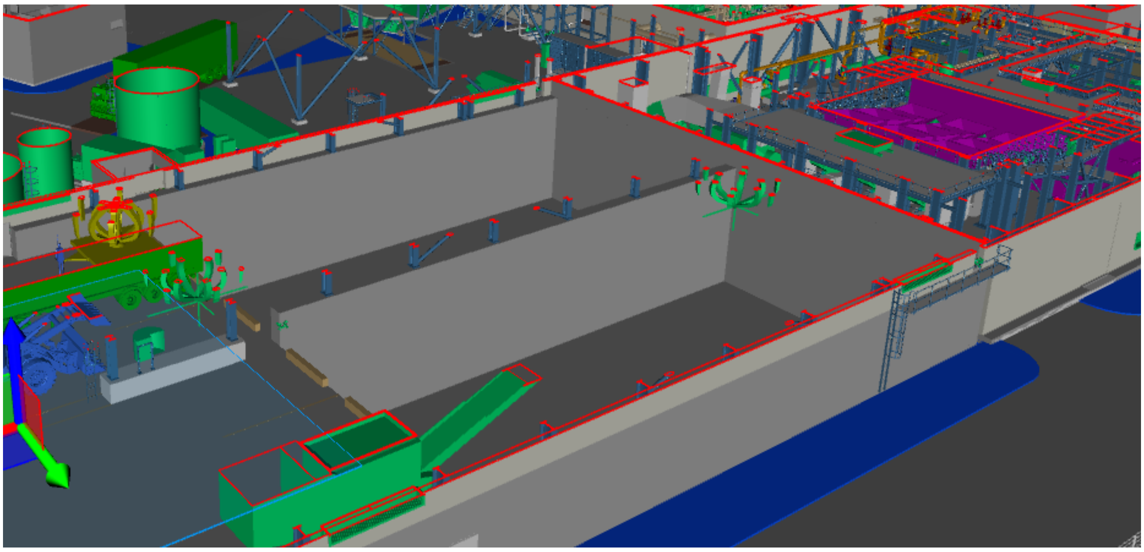


Figure 22 - Unloading Bunker (UEB)

The fuel bunker with centre separation wall will be installed with three monitors, so that each of the two sections is covered by two monitors. Each monitor with a capacity of minimum 946 l/min at 6.89 bar. The monitors will be located to allow for coverage of one section at a time with two monitors operating simultaneously.

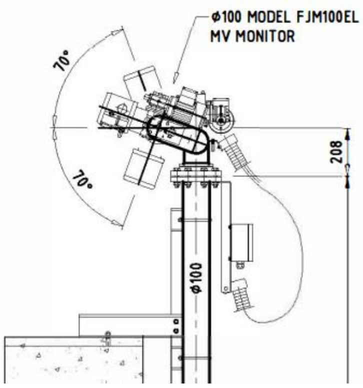


Figure 23 – Monitor, typical installation

Upon detection of fire and automatic start of the monitors, the monitor nozzles will automatic start oscillating. Manual override will be provided, and the monitors will be capable of remote operation from the crane operator room and the central control room.

Fire water demand ~114 m^3/h.

15.5.3 Crane operator room viewing window

Additional to the fire rated glazing for 60 minutes for the viewing windows towards the bunker/hopper area, a water drenching curtain system will be mounted on the bunker side of the glazing designed for a density of 10.2 mm/min over the window area. The water drenching system will be automatically activated via the bunker fire detection system linked to a deluge valve. In addition, a manual initiation system will be installed inside the crane operator rooms and the central control Room.

Fire water demand (2 No operating) ~11.6 m^3/h

15.5.4 Steel Structure

All steel columns in the fuel storage bunker area will be fire protected for a 2hr rating by passive fire protection system. Protection either by intumescent paint or by wrapping.

15.6 Waste Fuel Storage Area – UEB

15.6.1 Boiler Feed Area

The tipping hall will be provided with an automatic deluge protection. The system will be designed as two zones each covering 75% of the floor area. The centred area will at any time be sprayed in the event of release of either system. The systems will be designed for a minimum of 10.2 mm/min over the most remote 279 m2 of floor area. In the event of fire, the installed fire detection system covering the specific area will release the specific deluge valve (note: only one out of two area can be release at one time).

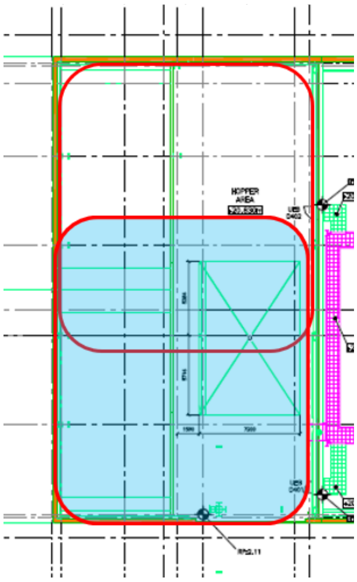


Figure 24 – Deluge zones

Fire water consumption (minimum requirement according to NFPA 850)	~171 m3/h
Actual fire water consumption per zone (before detailed design):	~275 m3/h

15.6.2 Boiler Feed Hopper

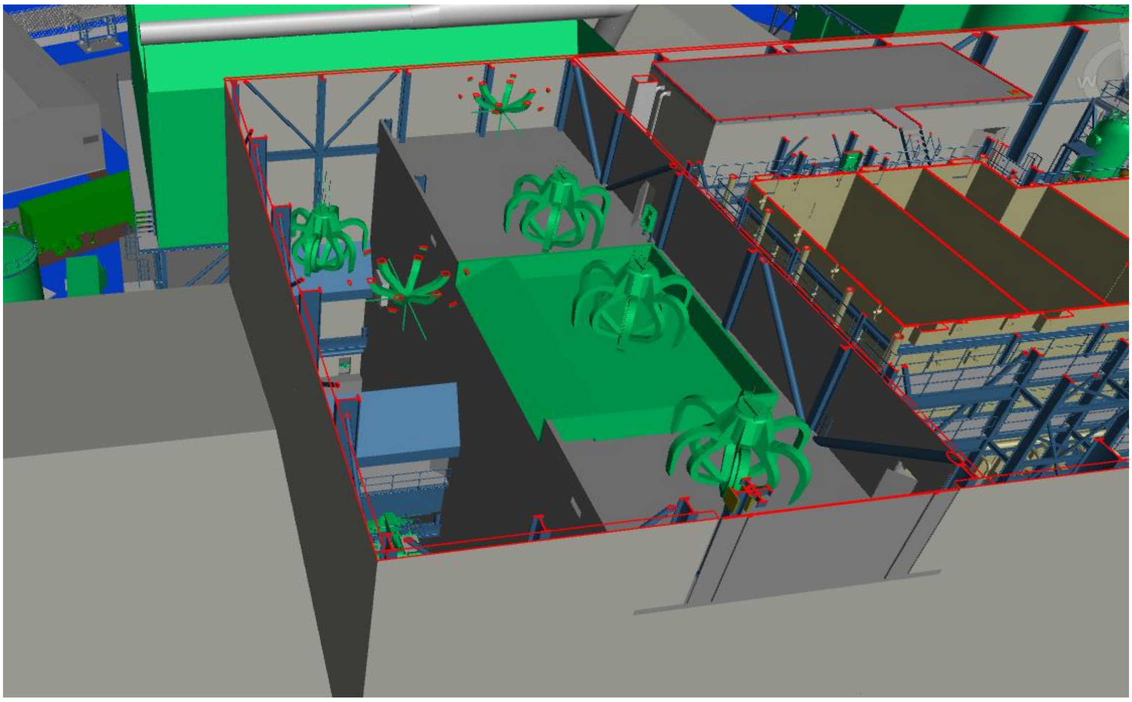


Figure 25 - Boiler Feed Hopper (UEB)

The feed hopper for the boiler will have automatic deluge protection designed for a minimum of 8.1 mm/min over the entire Hopper, with the protection area per deluge head not to exceed 12.0 m^2. Manual activation of the Hopper deluge system will be possible from the Control Room.

Fire water demand (11m x 7m hopper) ~37.5 m^3/h

The boiler feed hopper also has two integral water spray systems, one at high level, just below the chute gate, and the other at low level however these are process related and not for direct fire suppression.

15.7 Step-up transformer (UAB)

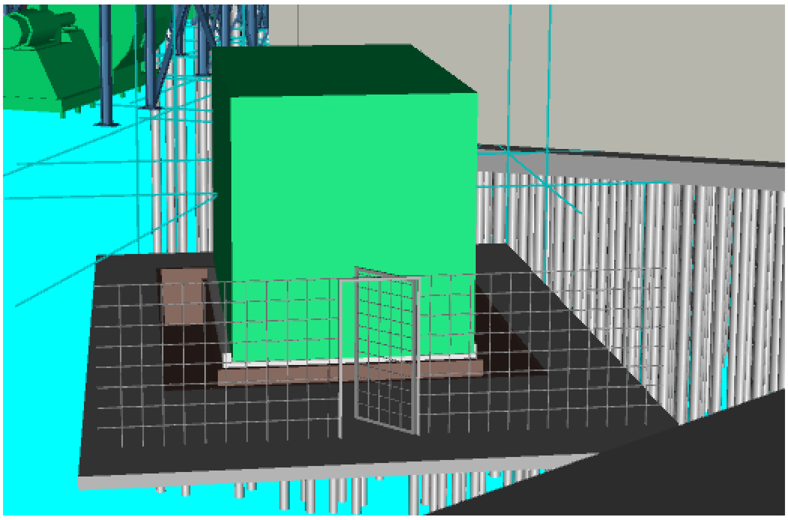


Figure 26 - Step Up Transformer (UAB)

The external step-up transformer (UAB) is filled with a type K Less Flammable Liquid insulant and has a capacity <38,000L (actual specification is 12,800L). Accordingly, Chubb guidance recommends that a minimum separation distance of 1.5m (Table 5.12.5) be maintained between all parts of the transformer and any adjacent buildings.

With a spatial separation of 1.5m the step-up transformer is not required to be enclosed by firewalls, nor provided with an automatic fire suppression system.

15.8 Diesel and Urea storage tanks (UEQ)

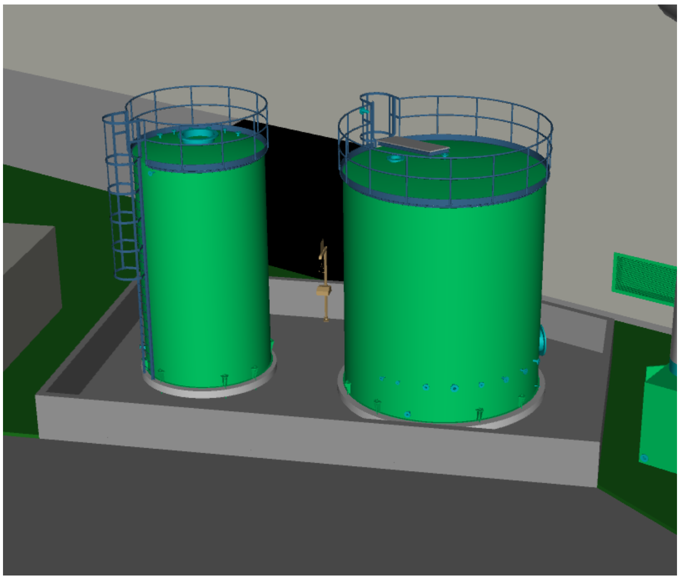


Figure 27 - Diesel and Urea Storage Tanks

The diesel and Urea storage tanks are located externally but near the Fuel Handling Building (UEA/UEB) and as such the affected façade of the building will be provided with fire protection. In this instance the fire protection offered is in the form of a local hydrant to enable wetting of the UEA/UEB façade in the event of a fire in the proximity.
This provision follows the guidance of NFPA30 Table 22.4.1.1(a) and requires a minimum spatial separation of the tanks from the building of:

- 1/3 the tank diameter for vertical tanks with a weak roof to shall seam, or
- The value from Table 22.4.1.1(b) for a vertical tank fitted with a pressure relief vent limiting the pressure to a gauge pressure of 17kPa.

Tank Capacity (L)	Minimum Distance (m) From Property Line that Is or Can Be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance (m) From Nearest Side of Any Important Building on the Same Property
1,045 or less	1.5	1.5
1,046 to 2,850	3	1.5
2,851 to 45,600	4.5	1.5
45,601 to 114,000	6	1.5
114,001 to 190,000	9	3
190,001 to 380,000	15	4.5
380,001 to 1,900,000	24	7.5
1,900,001 to 3,800,000	30	10.5
3,800,001 to 7,600,000	40.5	13.5
7,600,001 to 11,400,000	49.5	16.5
11,400,001 or more	52.5	18

Table 12 - SI version of Table 22.4.1.1(b) from NFPA30

15.9 Emergency diesel generator (UBM)

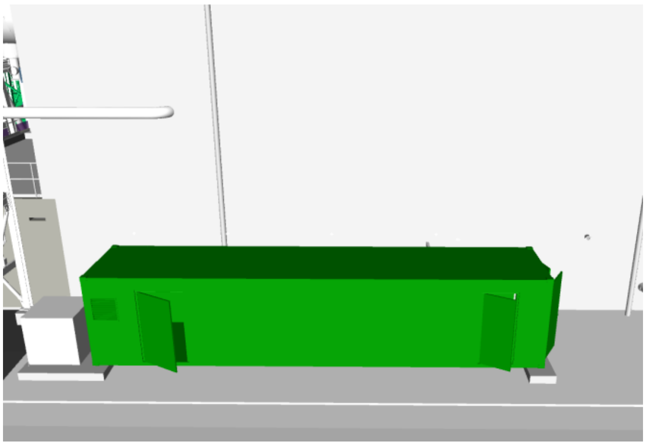


Figure 28 - Emergency Diesel Generator (UBM)

The emergency diesel generator is installed outdoor in a weatherproof and non-combustible enclosure and is a standard package unit. The unit will be equipped with smoke detectors for early warning and an internal sprinkler system. The sprinkler system will be release by means of heat detectors (glass bulbs, set point 30°C above ambient temperature.

Fire water demand (assuming a nominal 32m^2 coverage) ~20 m^3/h.

The above figure is subject to change as detailed design progresses.

15.10 Containerized fire pump unit (USG)

The containerised fire pump unit will be designed according to NFPA20. This includes fire protection of the interior of the containerized unit with automatic sprinklers to all areas including the fuel tank.

Fire water demand (assuming a nominal 32m^2 coverage) ~20 m^3/h.
The above figure is subject to change as detailed design progresses.

15.11 Steam turbine generator (UMA)

15.11.1 The area above the turbine table

Turbine bearings, generator bearings, gearbox, the purifier- and the lube oil unit, and main steam valve, will be protected by an automatic low-pressure pre-action closed head sprinkler system.

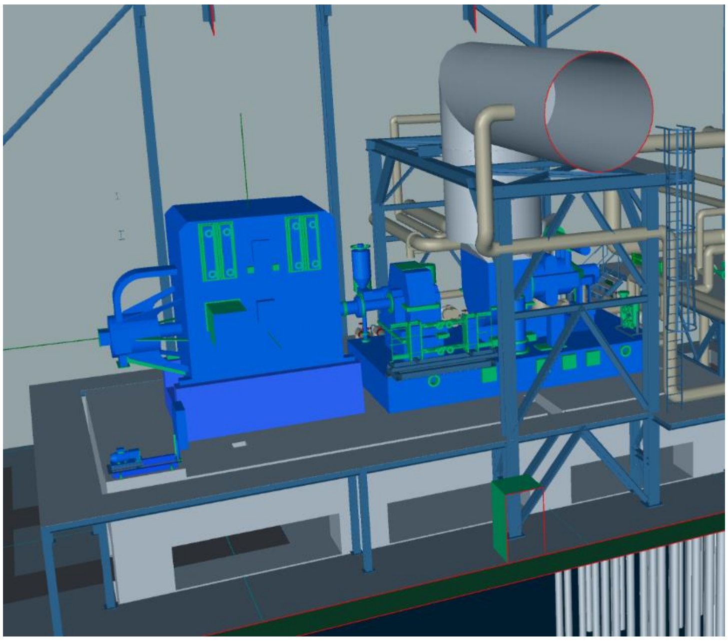


Figure 29 - Turbine Table

The fire protection system for the gearbox, the purifier- and the lube oil unit, and main steam valve, will be designed for a density of 12.2 mm/min in accordance with NFPA850 (2020); 10.3.1.

The fire protection system for the turbine generator bearings will be designed for a density 10.2 mm/min in accordance with NFPA850 (2020); 10.3.3.1.

Until detailed design of the systems is complete an assumed maximum area of coverage of 112m2 has been adopted.

Fire water demand ~82.0m3/h.

15.11.2 The area beneath the turbine table

The fire protection system will be designed for a density of minimum 6.5 mm/min in accordance with NFPA16 (2019); 7.2.2.1 and a duration of minimum 10 minutes in accordance with NFPA16 (2019); 7.2.3.1

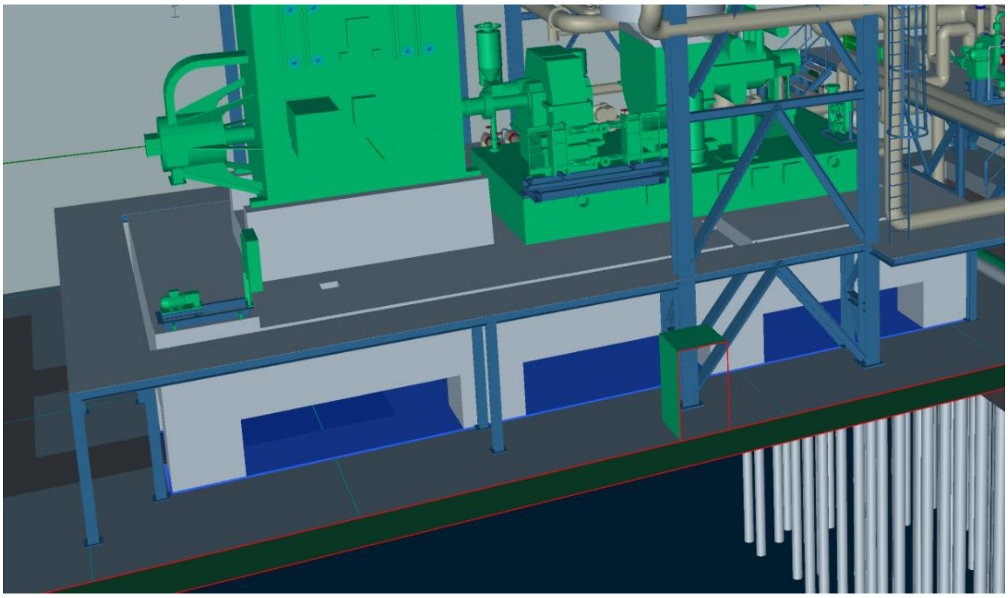


Figure 30 - Area Beneath Turbine Table

The foam system will be for automatic release be by means of heat and flame detectors through a deluge valve as well as manual release.

Unless detailed design dictates otherwise, it is assumed that the whole of the UMA floor area is to be covered by the foam system – area 14.8 x 31.7 = 470m2.

Fire water demand ~30.6m3.

A reservoir is constructed below turbine table to limit the spread of oil from any leakage in lube or hydraulic systems. The reservoir is established by constructing a concrete “bund” around circumference of the turbine table at terrain level covered with steel grating.

15.11.3 Spray guides

To reduce the risk of aerosols from oil originated from a leaking flange assembly in the turbine building, flange assemblies will be installed with spray guides.

15.12 Boiler auxiliary burners (UHA)

15.12.1 General

The auxiliary burners and valve skids serving the boiler shall be protected by a closed head pre-action single interlocked foam water sprinkler system (i.e., one valve set per boiler serving all areas). The fire protection system will be designed for a density of minimum 10.2 mm/min in accordance with NFPA 850 (2020); 12.3.1.1.2 and a duration of minimum 10 minutes in accordance with NFPA16 (2019); 7.2.3.1

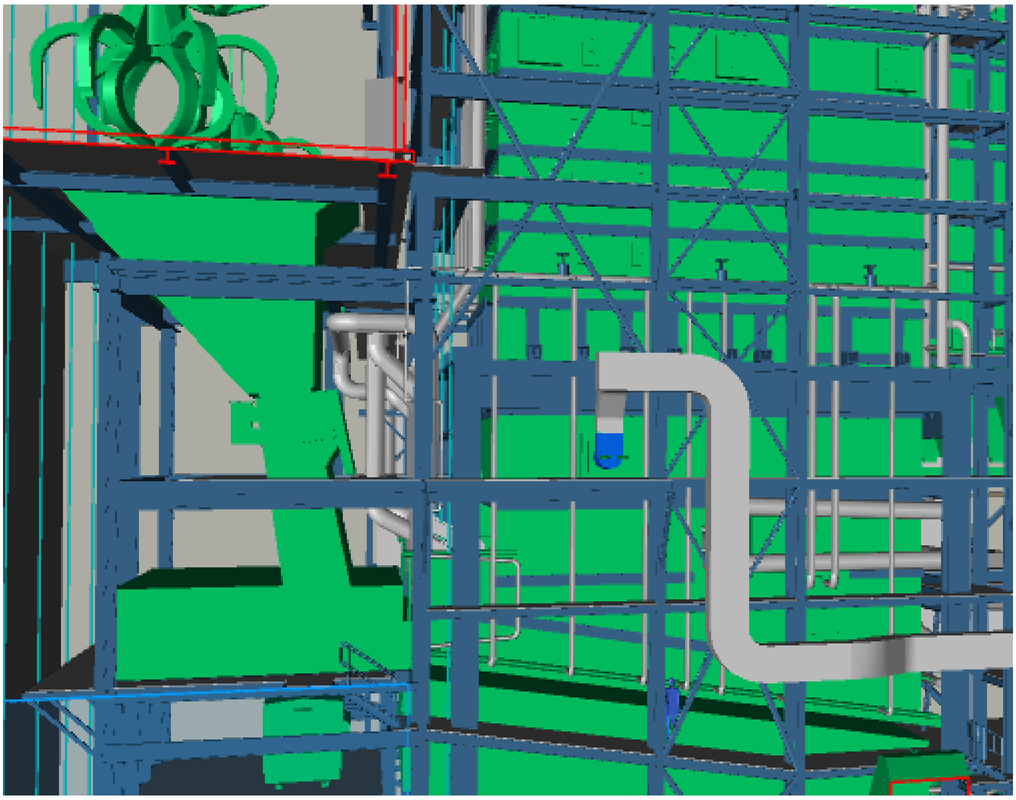


Figure 31 - Auxiliary Boiler Burners - View from South

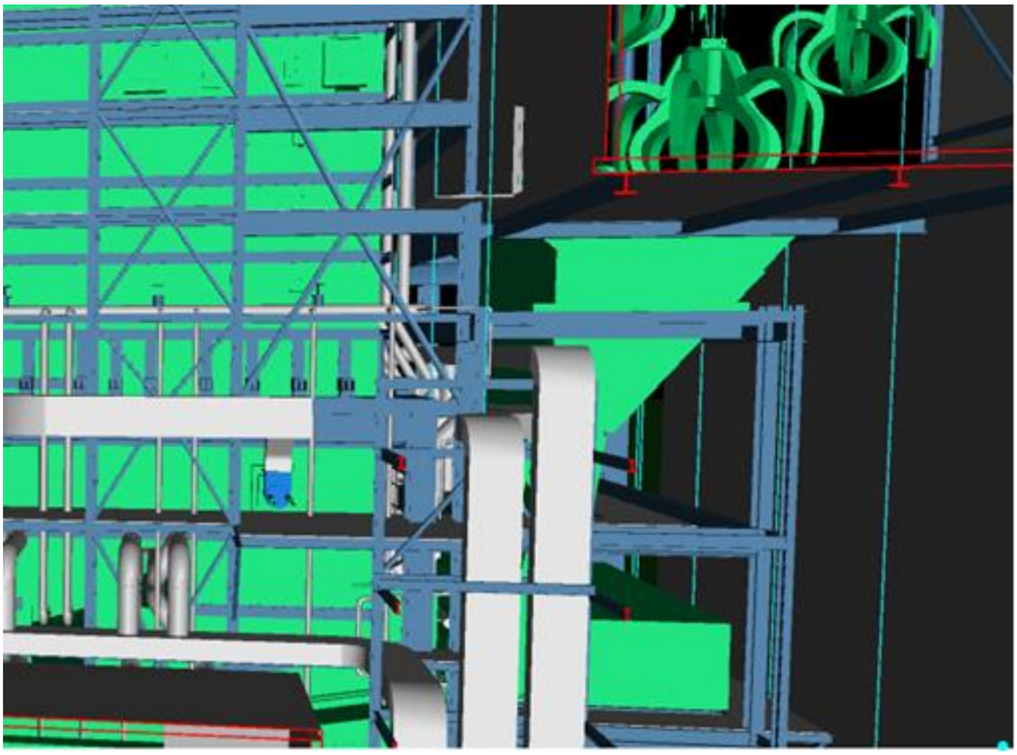


Figure 32 - Auxiliary Boiler Burners - View from North

The foam system design for burners and igniters and adjacent fuel oil piping shall be designed to cover 6.1 m distance from the burners and igniters including structural members and walkways according to NFPA 850.

The foam water sprinkler system shall be designed to a density of 10.2 mm/min over a total area of 465 m^2 (most remote area) for a minimum of 10 minutes according to NFPA 16. The total area to be covered is approximately 2 x 800 m^2.

Fire water demand ~284 m3/h.

The above figures are subject to confirmation of required protected area and subject to change as detailed design progresses.

15.12.2 Spray guides

To reduce the risk of aerosols from oil originated from a leaking flange assembly in the boiler building, flange assemblies will be installed with spray guides.

15.13 Boiler Grate Hydraulic Pack (UHA)

The Boiler Grate is driven by a hydraulic ram pack located at the bottom of the boiler fuel chute. The fuel is pushed by hydraulic rams onto the boiler grate where it moves through the various combustion zones (drying, ignition, main combustion, extinction).

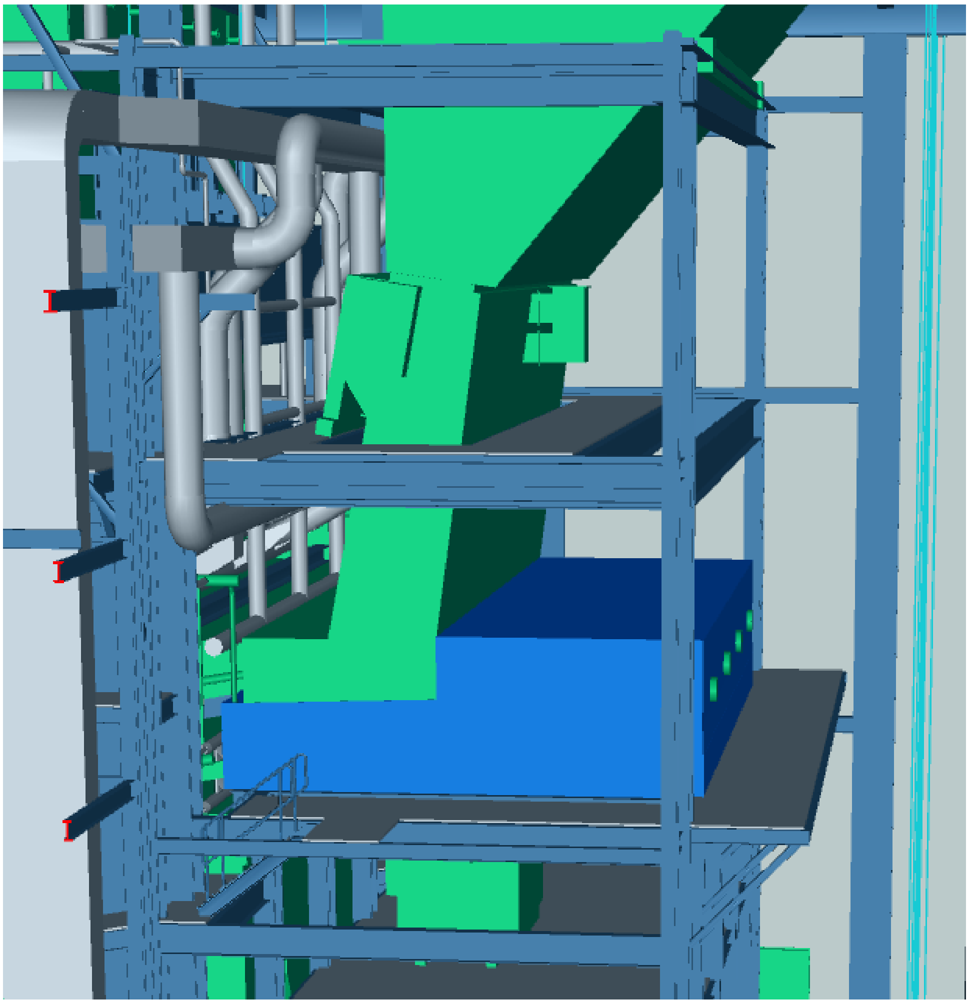


Figure 33 - Boiler Grate Drive

The Boiler Grate Hydraulic Ram system utilises a Fire Resistant Fluid (FRF) – estimated volume 800-1,000 litres and has an associated hydraulic pack (tank, pumps, instrumentation etc.).

As the system uses a FRF (example cited – "Quintolubric 888-68" or equivalent) there is no requirement to provide additional active fire suppression to the system.

15.14 Electrical rooms (various locations)

A total flooding inert gas system will be provided for the following rooms:

- MV room.
- LV room.
- DCS equipment room.
- Battery room.
- SAT room (building).
- Feedstock handling switchboard room.
- ACC / Steam Turbine switchboard room.
- FGT Area switchboard room.
- CEMS.

The above areas are typical descriptions only and the list of protected rooms will be rationalised during detailed design. Where multiple electrical rooms are in close proximity to one another they may be protected by a single extinguishing system, activated on a zonal basis.

The gaseous extinguishing systems will be designed according to EN15004-2009 and based on discharge of Inergen (IG541).

Coverage will include floor voids and ceiling voids where applicable.

Automatic systems must be interlocked such that when the room is occupied, extinguishant discharge cannot occur. The system may operate in fully automatic mode when such rooms are unoccupied.

Detailed design of any gaseous extinguishing systems will be the responsibility of the specialist system supplier.

15.15 FGT Bag filter

An Inergen extinguishing system will be installed for protection of the Bag filter. The system will be designed to flood one compartment out of six. The system will be released based on temperature switches monitoring each compartment.

Detailed design of any gaseous extinguishing systems will be the responsibility of the specialist system supplier.

15.16 Smoke and Heat Venting system

Refer to section 13 of this report.

15.17 Hose reels

Hose reels are provided for manual firefighting in the following areas:

- Boiler building
- Steam turbine building
- Fuel unloading area
- External baled fuel storage area

The hose reels inside the process buildings will be designed so that all areas are within the range of a fire hose.

Size of hoses will be 1" (DN25) semi ridged rubber hoses.

15.18 Dry riser

Dry risers with landing valves located at each level will be installed at the two internal staircases inside the boiler building (UHA).

15.19 Fire Service connection

Two 2-way inlet breeching valves will be available on site allowing for charging the fire main. One will be available at the gate to enter the power plant and one will be available next to the steam turbine building (UMA). The connections will be 2 1/2" and according to BS336.

15.20 Fire water tank

Secondary outlet for fire water supply to Fire Service and filling of tank.
The fire water storage tank will be equipped with a spare connection to allow the attending Fire Service to connect directly to the tank for replenishment water for the fire appliances should it be necessary. Type of coupling to be agreed.

The fire water storage tank will normally be filled and refilled through a fixed connection to the site water supply from the public water supplier. To allow for additional filling the fire water storage tank will equipped with a separate connection installed with a 2-way inlet breeching valve. The connection will be 2 1/2" and according to BS336.

15.21 Sprinkler system for crane grab workshop

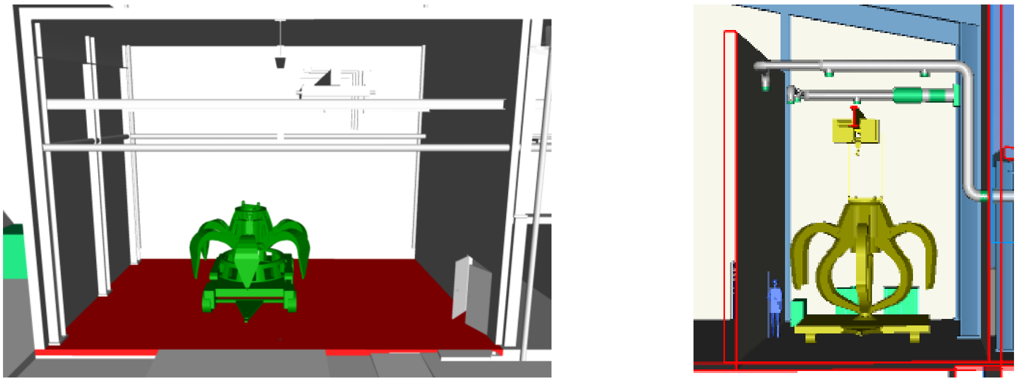


Figure 34 - Crane grab workshop (sprinkler floor area coverage)

The sprinkler system to be installed will be designed as a dry pipe system with a density of 8.1 mm/min.

The system shall be for automatic release through glass bulb with release temperature at 30 °C above ambient temperature.

Fire water demand (134.7 m^2 x 8.1 mm/min) ~ 65.5 m^3/h.
The above figure is subject to change as detail design progresses.

15.22 Powdered Activated Carbon (PAC) Silo

The PAC silo will be fitted with temperature sensors and a manual initiated gaseous fire protection system. To avoid danger to the operator, the manual release point will be located at a safe distance from the PAC silo.

15.23 Odour Control Unit

The Odour Control Unit will internally be provided with automatic sprinkler. The sprinkler system to be installed will be designed as a dry pipe system with a density of 10.2 mm/min.

The system shall be for automatic release through glass bulb with release temperature at 30 °C above ambient temperature.

15.24 Oil Storage room – Workshop

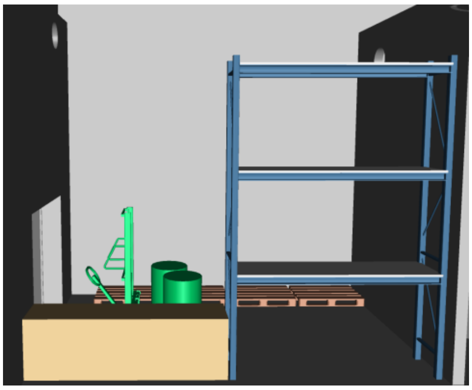


Figure 35 - Oil storage room

The oil storage room (area 3.655mm x 5.555mm) will be provided with automatic sprinkler. The sprinkler system to be installed will be designed as a dry pipe system with a density of 12.2 mm/min.

The system shall be for automatic release through glass bulb with release temperature at 30 °C above ambient temperature.

Fire water demand (20.3 m^2 x 12.2 mm/min) ~ 15 m^3/h.
The above figure is subject to change as detailed design progresses.

15.25 Water supplies for firefighting purposes

The firefighting water supply is to comprise a water storage facility for the fire main, duty and standby fire pumps (100% duty each, either 2 x diesel engine driven or 1 x diesel engine and 1 x electric motor driven), and a jockey pump to maintain quiescent static ring main pressure. The supply design for the Power Plant is based on the requirements of NFPA850:

The water supply for the permanent fire protection installation is be based on providing a 2-hour supply for:

- Either the largest fixed fire suppression system demand or any fixed fire suppression system demands that could reasonably be expected to operate simultaneously during a single event.

And

- The hose stream demand of not less than 1893 L/min (113.6 m^3/h)

The scenario considered as a potential worst case would be a large fire in Fuel Handling (UEA/UEB):

Fire Design basis:

Largest simultaneously operated fixed extinguisher system at power plant:

Deluge system, only one zone (75% of the area)	278	m^3/h
Waste feed hopper sprinklers	37	m^3/h

Fire water pump:

Fire hose stream + largest fixed extinguisher system (acc. NFPA 850)

Fire hose capacity (acc. NFPA 850):	113.4	m^3/h
Largest fixed extinguisher system (+30% gradient):	410	m^3/h
Fire pump min. capacity:	523	m^3/h

Fire and service water tank:

Required fire water tank capacity (acc. NFPA):	1100	m^3
Service water storage capacity (option):	0	m^3
Additional service water storage capacity (option):	0	m^3
Total fire and service water tank capacity:	1100	m^3

From BS9999; 22.2:

Water mains and hydrants should be capable of delivering a sufficient flow of water to enable effective firefighting to be undertaken. If the water supply takes the form of a static tank or dam, the capacity should be related to the size of the building and the risk involved.

The fire water storage tank combines provision for both automatic water-based fire suppression systems and hydrant/hose reel demand.

16 Impairment procedure

NFPA25 - Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, provides guidelines in regard to how to act in case of impairment. Based on these guidelines the O&M Contractor should prepare and issue procedures, so that these are in place before actually needed. Further, the O&M Contractor and his team should be familiar with these procedures and responsible members should be appointed before an actual event would occur.

The following from NFPA 25 – Definition:

Impairment. A condition where a fire protection system or unit or portion thereof is out of order, and the condition can result in the fire protection system or unit not functioning in a fire event.
Emergency Impairment. A condition where a water-based fire protection system or portion thereof is out of order due to an unplanned occurrence, or the impairment is found while performing inspection testing or maintenance activities.
Preplanned Impairment. A condition where a water-based fire protection system or a portion thereof is out of service due to work planned in advance, such as revisions to the water supply or sprinkler system piping.

As mentioned in NFPA25 section 15.4.2 impaired equipment shall include, but shall not be limited to:

(1) Sprinkler systems
(2) Standpipe systems
(3) Fire hose systems
(4) Underground fire service mains
(5) Fire pumps
(6) Water storage tanks
(7) Water spray fixed systems
(8) Foam-water systems
(9) Water mist systems
(10) Fire service control valves

NFPA 25, section 15.6 Emergency Impairments:

15.6.1 Emergency impairments shall include, but are not limited to, interruption of water supply, frozen or ruptured piping, and equipment failure, and includes impairments found during inspection, testing, or maintenance activities.

15.6.2 The coordinator shall implement the steps outlined in section 15.5

NFPA 25 section 15.5 Preplanned impairment program:

15.5.1 All preplanned impairments shall be authorized by the impairment coordinator.

15.5.2 Before authorization is given, the impairment coordinator shall be responsible for verifying that the following procedures have been implemented:

(1) The extend and expected duration of the impairment have been determined.
(2) The areas or buildings involved have been inspected and the increased risks determined.
(3) Recommendations to mitigate any increased risks have been submitted to management or the property owner or his designated representative.
(4) Where a fire protection system is out of service for more than 10 hours in a 24-hour period, the impairment coordinator (see NFPA25 (2014) section 15.2) shall arrange for one of the following:
    (a) Evacuation of the building or portion of the building affected by the system out of service
    (b) An approved fire watch
    (c) Establishment of a temporary water supply
    (d) Establishment and implementation of an approved program to eliminate potential ignition sources and limit the amount of fuel available to the fire.
(5) The fire department has been notified
(6) The insurance carrier, the alarm company, property owner or designated representative, and other authorities having jurisdiction have been notified.
(7) The supervisors in the areas to be affected have been notified.
(8) A tag impairment system has been implemented.
(9) All necessary tools and materials have been assembled on the impairment site.

NFPA 25 section 15.7 Restoring systems to service:

When all impaired equipment is restored to normal working order, the impairment coordinator shall verify that the following procedures have been implemented:

(1) Any necessary inspections and tests have been conducted to verify that affected systems are operational. The appropriate chapter of NFPA 25 shall be consulted for guidance on the type inspection and test required.
(2) Supervisors have been advised that protection is restored.
(3) The fire department has been advised that protection is restored.
(4) The property owner or designated representative, insurance carrier, alarm company, and other authorities having jurisdiction have been advised that protection is restored.
(5) The impairment tag has been removed

Definitions:
NFPA 25, 15.2 Impairment Coordinator.
15.2.1 The property owner or designated representative shall assign an impairment coordinator to comply with the requirements of this chapter.
15.2.2 In the absence of a specific designee, the property owner or designated representative shall be considered the impairment coordinator.

Note: This section should not be considered as fulfilling all requirements within NFPA25. NFPA 25 should be reviewed in its full length and be implemented in the impairment procedures where applicable.

17 Follow on design

The purpose of this report is to promote and support Building Regulations application and Local Fire and Rescue Service discussions.

The actual design and specification of the systems and fire safety provisions described herein are required to be carried out during the detailed design stage of the project and will form part of the M&E package, otherwise specialist fire alarm and protection design input will be sought.

Any fire safety designs will be required to be submitted to Building Control for areas that are subject to the Building Regulations, i.e. permanently occupied buildings and facilities such as Welfare Building (ZWA) etc. Where not covered by the Building Regulations, the designer is required to ensure that a suitable level of fire safety has been provided to safeguard any persons who may occasion the affected areas – this may be demonstrated by following established published guidance or performance-based design and should be the subject of discussion with the Local Fire and Rescue Service.

Where fire safety provisions have been made purely for the protection of property or business continuity the design should be in accordance with both the Client's requirements and those of the eventual insurer.

Prior to full operation of the plant and occupation of the Welfare Building a documented fire risk assessment is required under the Regulatory Reform (Fire Safety) Order 2005. The fire risk assessment should be carried out by a person or persons conversant with the fire safety provisions and operating procedures for the installation. The Local Fire and Rescue Service will not provide a fire risk assessment but will require its availability for inspection at any reasonable time during the occupation and operation of the installation.

18 Attachments

Refer 1017.M0.J01.002 - Fire safety strategy report, Attachments

Contents

1 3D - Plant Layout
2 Mechanical - Fire Fighting - P&ID
3 Mechanical – Fire Fighting - Process
4 Mechanical - Fire Fighting - Hose Reel Layout
5 Electrical – Site Lighting
6 Civil - Cladding
7 Civil – Drainage – Surface water, foul and trade

The following represents an indication of the related document types that are/will be used to support the Fire Strategy for the development and will be compiled together as a complete package during detailed design and prior to occupation and full operation of the plant.

Drawing Type
Fire Main layout
Escape and egress – All areas
Portable extinguisher locations – All areas
Hose reel layout – All areas
Fire segregation / Fire separation - All areas
Equipment layout of Fire Detection System (all plant areas)
Light & Small Power - All areas
Swept Path Analysis
Firefighting Containment Volume Design
ATEX area locations

TECHNICAL SPECIFICATION

Rev.	Date	Description	Issuer	Reviewer	Approver
00	2021.06.17	First issue	MUKH	HSW	PEJO

Table of Content

1. Introduction

This document contains a Fire Risk Assessment for the Newport waste to energy plant.

Its purpose is to summarize the regulatory basis, give an overall summary of plant characteristics and activities as well as an assessment of potential risk factors by area/process and the general designs and precautions applied to minimise the risk and potential consequences of fire.

The risk assessment and design precautions for specific areas/processes are given in a tabular form for easy reference.

In addition to this Fire Risk Assessment document a Fire Safety Strategy Report (see 1017.M0.J01.001) is prepared for the project detailing the various Fire-fighting systems with reference to relevant norm basis, i.e., BS and NFPA, as well as contractually specified requirements. The fire safety strategy document also contains drawings showing the fire main layout, hose reel locations, escape routes etc. Emergency plans, test of fire equipment and periodically inspections of plant as well as signage will be covered in the Operation and Maintenance Manual.

2. Acronyms

ALARP	As low as reasonably practicable
BS	British Standard
DSEAR	The Dangerous Substances and Explosive Atmospheres Regulations (UK)
HAZOP	Hazard and operability study
LCV	Lower calorific value
MSW	Municipal solid waste
NFPA	National Fire Protection Association (US)
NO_x	NO and NO_2 (oxides of Nitrogen)
PAC	Pulverized activated carbon
RDF	Refuse derived fuel
SIL	Safety integrity level
SNCR	Selective non catalytic reaction

3. Background

General fire safety requirements in the workplace in England and Wales are applied through the Regulatory Reform (Fire Safety) Order 2005 (SI 2005/1541) in the following called the “Order” see [1].

The current legislation requires the employer to carry out a risk assessment to determine the general fire safety requirements for their workplace and implement those requirements.

This document describes the fire risk assessment which is carried out on the Newport waste to energy plant as well as a description of the legislative background and the applied method.
The risk assessment is limited to risks of a reasonable probability which includes (but is not limited to) fire from electrical malfunctions, self-heating in heaps of waste, malfunctions of mechanical equipment etc. Very unlikely events are excluded from the analysis (e.g., meteors and the like).

A number of other risk assessments relating to safe operation of the plant have been/will be undertaken, including HAZOP, SIL and design risk assessments. For these subjects, please refer to the specific documents.

4. Brief plant description and key numbers

The Newport waste to energy plant is a single line waste to energy power plant, which at full load generates approximately 20 MW electrical power to the grid. The fuel for the power plant will be RDF as per Schedule 33 EPC. The power plant infeed fuel requirement at design load is approx. 27 tonnes per hour (at design LCV 11 MJ/kg).

The power plant is designed to provide an enclosed process, from delivery, pre-treatment and storage of the feedstock, steam production in the boiler to the steam turbine generator set and finally electrical distribution. Fuel is delivered to the waste fuel unloading area (feedstock receiving area) and unloaded into the reception bunker from lorries. From here it will be transferred by crane into the shredder which ensures that the received fuel conforms to the maximum acceptable size for use in the combustion feed systems. From the shredder the fuel is screened for magnetic materials followed by conveying it to the waste fuel storage area (feedstock storage area). In the waste fuel storage area, the fuel is mixed and finally transferred to the in-feed hoppers for combustion in the boilers. Combustion gas provides the heat to the boiler which produces steam for the steam-turbine generator set producing electricity. The cooled combustion gas is de-acidified with the addition of lime and filtered in a bag-filter before being released through a stack.

Main characteristics of the plant from a fire risk perspective can be summarized as follows:

<u>Main fuel</u>

Main fuel type	:	Refuse-derived-fuel (RDF)
Fuel moisture content	:	40 % wt/wt (per tonne)
Fuel calorific value (LCV)	:	Design 11 MJ/kg (Min: 8, Max.: 16 MJ/kg)
Norm. firing capacity	:	83 MW_{th} (LCV basis)
Norm. fuel consumption	:	27 t/h (~ 650 t/day)
Annual operating time	:	Approx. Xx h/y
Annual fuel throughput	:	Approx. Xx GWh_{th}
		~ Xx ton/y@Nom. LCV or equiv. on energy basis

Fuel storage capacity	:	Xx m^3 (approx. Xx ton)

Production

Nom. generating capacity	:	xx MWe (gross generator output)
Nom. export capacity	:	20 MWe (after deduction of own consumption / losses)

Other

The plant utilizes/consumes various auxiliary products which are also dealt with from a fire and safety risk perspective.

These are:

Light fuel oil for start-up

Maximum consumption rate	:	2285 kg/hr at 100% MCR (per burner)
Maximum on site storage	:	70 m^3 (~ 59 ton)

Miscellaneous lubricants (oil & grease) for machinery
Aqueous ammonia (25%) for SNCR NOx reduction
Hydrated lime for flue gas treatment
Activated carbon (PAC) for flue gas treatment
Various water treatment chemicals, a.o. ammonia
Bottled technical gasses (H_2 etc.) for analysers
Oxygen gas bottles for tapping hole channel burner
Miscellaneous (ordinary) workshop substances such as grease, oil, solvents, paint etc. in limited amounts.

5. Applied standards and Regulations

A fire risk assessment is required as stated in [1] under Part 2: “Fire Safety Duties”.

Risk assessment

(1) The responsible person must make a suitable and sufficient assessment of the risks to which relevant persons are exposed for the purpose of identifying the general fire precautions he needs to take to comply with the requirements and prohibitions imposed on him by or under this Order.

(2) Where a dangerous substance is or is liable to be present in or on the premises, the risk assessment must include consideration of the matters set out in Part 1 of Schedule 1.

(3) Any such assessment must be reviewed by the responsible person regularly so as to keep it up to date and particularly if—
(a) there is reason to suspect that it is no longer valid; or

(b) there has been a significant change in the matters to which it relates including when the premises, special, technical and organisational measures, or organisation of the work undergo significant changes, extensions, or conversions, and where changes to an assessment are required as a result of any such review, the responsible person must make them.

(4) The responsible person must not employ a young person unless he has, in relation to risks to young persons, made or reviewed an assessment in accordance with paragraphs (1) and (5).

(5) In making or reviewing the assessment, the responsible person who employs or is to employ a young person must take particular account of the matters set out in Part 2 of Schedule 1.

(6) As soon as practicable after the assessment is made or reviewed, the responsible person must record the information prescribed by paragraph (7) where—
(a) he employs five or more employees;
(b) a licence under an enactment is in force in relation to the premises; or
(c) an alterations notice requiring this is in force in relation to the premises.

(7) The prescribed information is—
(a) the significant findings of the assessment, including the measures which have been or will
be taken by the responsible person pursuant to this Order; and
(b) any group of persons identified by the assessment as being especially at risk.

(8) No new work activity involving a dangerous substance may commence unless—
(a) the risk assessment has been made; and
(b) the measures required by or under this Order have been implemented.

The general fire safety requirements are applied through the Regulatory Reform (Fire Safety) Order 2005 [1]. Guideline for the enforcement of [1] is given in [2].

The methods for preparing this fire risk assessment follows the general principles described in: "Fire Safety Risk Assessment" see [3].

The Dangerous Substances and Explosive Atmospheres Regulations 2002 [4] set minimum requirements for the protection of workers from fire and explosion risks related to dangerous substances and potentially explosive atmospheres. Guidelines for compliance with the DSEAR regulations are found in [5]. SEC has carried out a separate risk assessment for risks related to explosion (see DSEAR Risk Assessment 1017.S0.X02.001).

The regulatory background for the design of the various buildings and equipment on site is described in the Fire Safety Strategy Report 1017.M0.J01.001.

6. The aims of the fire risk assessment

The aims of the fire risk assessment are:

1. Identify fire hazards and mitigating measures
2. Evaluate the risks (likelihood and consequences)
3. Assess if risks are as low as reasonably practicable

The plant is segregated into separate fire zones in order to optimize detection, isolation and firefighting as well as limitation of consequences in the event of a fire

Fire zones are defined based on a number of considerations, involving e.g.,

- Type and level of risk within various areas
- Material flows and process steps within the plant
- Practical fire detection options
- Practical separation/isolation possibilities considering site & plant layout
- Human risk and value/consequences for each zone
- Type of fire and fire-fighting options as well as access

General ignition control measures and fire safety measures which are valid for the entire plant are listed below and generally not included in the fire risk assessment in Appendix B unless considered particular relevant for a given fire risk.

7. Fire zones

With a few exceptions, the fire zones follow the general plant area division shown in Appendix A (Plan A) and consists of the following fire zones:

1. Substation (UAB)
2. Electrical annex building (UBB)
3. Step-up transformer area (UBD)
4. Emergency generator area (UBM)
5. Unloading solid fuel building (UEA)
6. Fuel bunker building (UEB)
7. Solid fuel handling area (UEC)
8. Fuel and Urea tank area (UEQ)
9. Ash & residues storage area (UET)
10. Water treatment area (UGC)
11. Effluent area (UGM)
12. Boiler building (UHA)
13. Slag storage building (UHD)

14. Air cooled condenser area (ULF)
15. Turbine building (UMA)
16. Stack area (URA)
17. Flue gas treatment area (URC)
18. Weighbridge areas (UYA, UYCB, UYC)
19. Welfare building (ZWA)
20. Raw water and Fire equipment area (ZXG)
21. Pond area (ZXH)
22. Remaining site (ZZA)
23. Gate house (ZZP)

Each fire zone is separated from others to prevent a fire from spreading uncontrolled before firefighting can be employed in accordance with relevant norms.
Additionally process related detection and precautions are taken to avoid a fire spreading via material flow within the plant.

Area related fire-fighting capability is designed in accordance with relevant norms (ref. Fire-fighting Strategy plan) to cope with fires within each area and the plant-based fire-fighting capacity is designed to cope with the most demanding fire scenario within one area.

8. General ignition control measures

Smoking
Smoking is not allowed anywhere on the plant except in designated smoking areas. Staff and visitors are informed through site induction (signage where relevant)

Housekeeping
A cleaning maintenance program/procedures shall be in place to ensure good housekeeping. This includes procedures for clean-up when maintenance work has been carried out as well as regular housekeeping for removing dust and waste material.

Inspection and maintenance
An inspection and maintenance program/procedures shall be in place to ensure the plant and equipment is kept in good condition reducing risk of mechanical or electrical equipment failures.

9. General fire safety measures

Compartmentation
Passages through compartment walls including fire doors as well as pipes, ducts and cables shall be constructed to adequately prevent the spread fire. This includes sealing around cables and pipework run through walls, elimination of gaps around fire doors and installation of fire dampers.

Compartment walls are shown in the Compartment drawings forming part of the Fire Safety Strategy attachments, ref. doc. No 1017.M0.J01.001.

Means of escape
Escape routes are provided in accordance with the fire safety strategy.
Escape routes are shown in the Escape and Egress Routes Drawings forming part of the Fire Safety Strategy Attachments, ref. doc. No 1017.M0.J01.001.

Emergency lighting
Emergency lighting is provided in accordance with the fire safety strategy and shown in the light and small power drawings forming part of the Fire Safety Strategy attachments, ref. doc. No 1017.M0.J01.001.

Signage
Signage will be in place to show escape routes, fire exits, EX areas, fire suppression equipment etc., as according to the Signs drawings for the different plant areas.
Fire detection and alarm system
A fire detection and alarm system are installed. The system includes fire detectors, manual call points and audible/visible fire alarms as described in the fire safety strategy

Fire-fighting equipment
Automatic fire-fighting equipment is provided where found relevant according to the fire risk assessment. In addition, manual fire-fighting equipment is provided throughout the plant as according to the fire safety strategy. The manual fire-fighting equipment comprise outdoor fire hydrants, hose-reels and portable fire extinguishers (CO2 or dry powder)

10. Fire Risk assessment method

The methodology used to evaluate the risk of fire within the plant is described in the following.

The risk matrix
The risk is a product of the likelihood of a fire and its consequences. The risk level can be estimated from the matrix given in Figure 1. The input to the matrix is the likelihood (ranging from 1 to 5) of a fire and the estimated consequences (ranging from 1 to 5). The resulting risks are divided into 3 levels; Low, Medium and High. The definitions of likelihood and consequences are given in Table 1 and Table 2.

Figure 1: Risk matrix

Risk matrix			**Consequence**				
			1	**2**	**3**	**4**	**5**
			Negligible	Slight	Moderate	High	Very High
Likelihood	Very Likely	**5**	M	M	H	H	H
	Likely	**4**	M	M	M	H	H
	Possible	**3**	L	M	M	M	H
	Unlikely	**2**	L	L	M	M	M
	Very Unlikely	**1**	L	L	L	M	M

Table 1: Definition of likelihood intervals

Range		Definition
5	Very Likely	Very likely to occur one or more times within plant life span
4	Likely	Likely to occur one time within plant life span
3	Possible	Could possibly occur within plant life span
2	Unlikely	Unlikely to occur within plant life span
1	Very Unlikely	Very unlikely to occur within plant life span

Table 2: Definition of consequence levels

Range		Description	Definition
1	Negligible	Personnel	No injury
		Equipment	Marginal damage to process units. Process shut down
		Production loss	< 2 days
2	Slight	Personnel	Limited injury
		Equipment	Damage to process unit
		Production loss	2 - 7 days
3	Moderate	Personnel	Personnel injury
		Equipment	Process unit collapse and possible damage to corresponding units
		Production loss	7 - 30 days
4	High	Personnel	Serious personnel injury, possibly loss of life
		Equipment	Significant damage to several process units
		Production loss	30 – 90 days
5	Very High	Personnel	Loss of one or several lives
		Equipment	Plant extensively damaged
		Production loss	> 90 days

If the risk level is low (green area of risk matrix), the risk is acceptable and no further risk reducing measures are required. If a fire incident is identified which is evaluated to have a high risk level (red area of risk matrix), risk reducing measures shall be implemented to lower the risk. For the fire incidents evaluated to have a medium risk level it shall be evaluated if further risk reducing measures are required or if the risk is as low as is reasonably practicable.

Table 3: Risk levels and acceptance criteria

	Risk level	Acceptance criteria	Recommended action
H	High	Unacceptable	Risk reducing measures must be implemented
M	Medium	Medium	Risk reducing measures shall be considered (ALARP)
L	Low	Acceptable	Further risk reducing measures are not required

This fire risk assessment report is the product of a design process where consideration of fire risks has been an ongoing process. Therefore, the risk evaluation contained in the risk assessment tables in Appendix B does not contain any hazards with a high-risk level.

<u>Risk assessment tables</u>
The risk of fire is evaluated in each fire zone of the plant. The risk analysis is given in a tabular form in Appendix B.

The first four columns of the risk analysis table contain the identified fire hazards.

No.: The first figure in the number refers to the number of the fire zone as given in section 7. The second figure is a consecutive numbering of the fire incidents identified.

Fire incident: The fire incidents identified

Caused by: The cause of the fire incident

Consequence: The Consequence of the fire incident

The columns five to eight concerns the mitigation of risk.

Detection: List of fire detection equipment within the area

Comments: If any additional information of relevance

Fire Fighting: How firefighting is anticipated

Building design: Structural fire design

The remaining columns of the risk analysis table concern the risk evaluation. The risk is the product of likelihood and consequence. ”L” is the likelihood, ”C” is the consequence and ”R” is the risk. The risk level is evaluated according to the risk matrix see Figure 1.

11. Main findings of the fire risk assessment

The main part of the identified fire hazards has been evaluated to have a low risk level.

No fire hazards are identified which have a high-risk level (after mitigation).

A number of fire hazards have been identified which could lead to extensive fire if not detected and mitigated. The likelihood of an extensive fire is very low as automatic fire detection/ extinguishing systems are installed at all relevant places. The consequence of an extensive fire is, however, very high due to high economic consequences of plant down-time and material damage. These fire hazards are therefore evaluated to have a medium risk level.

For each of the medium risk level fire hazards it has been evaluated whether the risk is acceptable or if further risk reducing measures should be implemented.

The result of this evaluation is that the risk level is acceptable and that the risk reducing measures implemented are in line with relevant standards and good engineering practice.

12. Bibliography

[1] Statutory Instruments, The Regulatory Reform (Fire Safety) No. 1541, 2005.

[2] Government, Department for Communities and Local, Regulatory Reform (Fire Safety) Order 2005 Guidance Note No. 1: Enforcement, London: Communities and Local Government Publications, 2007.

[3] HM Government, Fire Risk Assessment, Crown Copyright, 2006.

[4] Statutory Instruments, “The Dangerous Substances and Explosive Atmospheres Regulations,” Health and Safety, 2002.

[5] HSE, Dangerous Substances and Explosive Atmospheres - Approved Code of Practice and guidance L138, 2013.

Annex A: Fire Risk Assessment Tables

Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	Comment	Fire fighting	Building design	L	C	R
SUBSTATION (UAB)	F1.1	Fire in 33 kV substation building	Equipment failure	Automatic fire detection (smoke detectors)	Dry-type transformer	Total flooding inert gas system installed in room.2) The system is for automatic release by smoke detectors. Portable fire extinguisher (CO_2) in room for manual firefighting.	Substation is a separate fire zone (120 minutes) towards adjacent buildings.	**2**	**4**	**M**
	F2.1	Fire in 11 kV substation building	Equipment failure	Automatic fire detection (smoke detectors)	Dry-type transformer	Total flooding inert gas system installed in room.2) The system is for automatic release by smoke detectors. Portable fire extinguisher (CO_2) in room for manual firefighting.	Substation is a separate fire zone (120 minutes) towards adjacent buildings.	**2**	**4**	**M**
STEP-UP TRANSFORMER AREA (UBD)	F3.1	Oil fire in transformer cell	Equipment failure	Automatic fire detection (glass bulbs)		The transformer cell is provided with automatic deluge sprinkler system released by glass bulbs.	Transformer cell is a separate fire zone (120 minutes) towards adjacent buildings. Separation is acc. to distance requirement.	**2**	**4**	**M**
EL ANNEX BUILDING (UBB)	F4.1	Fire in MV room	Electrical equipment failure	Automatic fire detection (smoke detectors)		Total flooding inert gas system installed in room.2) The system is for automatic release by smoke detectors. Room equipped with portable fire extinguisher (CO_2) for manual firefighting.	MV room is a separate fire zone (120 minutes) towards adjacent rooms.	**2**	**4**	**M**
	F4.2	Fire in Battery room	Electrical equipment failure 'E.g., Overheating or damaged insulation	Automatic fire detection (smoke detectors)		Total flooding inert gas system installed in room.2) The system is for automatic release by smoke detectors. Room equipped with portable fire extinguisher (CO_2) for manual firefighting.	The battery room is a separate fire zone (120 minutes) towards adjacent rooms.	**2**	**2**	**L**

Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	**Comment**	**Fire fighting**	**Building design**	**L**	**C**	**R**
	F4.3	Fire in compressor room	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)	None or limited combustible material present	Portable fire extinguisher (CO_2) for manual firefighting.		**1**	**1**	**L**
	F4.4		Hot work [1]		Work permission required for any work to be carried out			**2**	**1**	**L**
	F4.5	Fire in electrical store	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Store equipped with portable fire extinguisher (CO_2) for manual firefighting.	The store is a separate fire zone (120 minutes) towards adjacent rooms.	**1**	**1**	**L**
	F4.6	Fire in cable shaft	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Portable fire extinguisher (CO_2) for manual firefighting located in the corridor and adjacent rooms.	The cable shaft is a separate fire zone (120 minutes) towards adjacent rooms.	**1**	**2**	**L**
	F4.7	Fire in water treatment room	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Water treatment room equipped with portable fire extinguisher (CO_2) for manual firefighting.	The water treatment room is a separate fire zone (120 minutes) towards adjacent rooms.	**1**	**2**	**L**
	F4.8		Hot work [1]		Work permission required for any work to be carried out			**3**	**1**	**L**
	F4.9	Fire in control room	Electrical equipment failure	Automatic fire detection(heat and/or smoke detectors)	Control room is permanently manned	Room equipped with portable fire extinguishers (CO_2) for manual firefighting.	The control room (include work permit room) is a separate fire zone (120 minutes) towards adjacent rooms.	**1**	**3**	**L**
	F4.10	Fire in work permit room	Electrical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Portable fire extinguisher (CO_2) for manual firefighting located in adjacent control room.		**1**	**1**	**L**
	F4.11	Fire in DCS room	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Total flooding inert gas system installed in room.[2] The system is for automatic release by smoke detectors. Room equipped with portable fire extinguisher (CO_2) for manual firefighting.	The DCS room is a separate fire zone (120 minutes) towards adjacent rooms.	**1**	**3**	**L**

Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	Comment	Fire fighting	Building design	L	C	R
	F4.12	Fire in LV room	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Total flooding inert gas system installed in room.2) The system is for automatic release by smoke detectors. Room equipped with portable fire extinguisher (CO_2) for manual firefighting.	The LV room is a separate fire zone (120 minutes) towards adjacent rooms.	1	3	L
	F4.13	Fire in kitchen	Cooking (toaster, microwave etc.) or electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Room equipped with portable fire extinguisher (CO_2) for manual firefighting.		3	1	L
	F4.14	Fire in sample store	Ignition of stored sample e.g., due to self-heating.	Automatic fire detection (heat and/or smoke detectors)		Room equipped with portable fire extinguisher (CO_2) for manual firefighting.		2	1	L
	F4.15	Fire in corridor, staircases, cleaning room or toilet	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Portable fire extinguisher (CO_2) for manual firefighting located in the corridor.		1	1	L
ACC & TURBINE BUILDING EL ROOM ()	F5.1	Fire in ACC & turbine building electrical room	Electrical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Total flooding inert gas system installed in room. 2) The system is for automatic release by smoke detectors. Room equipped with portable fire extinguisher (CO_2) for manual firefighting.	ACC & turbine building electrical room is a separate fire zone (120 minutes)	2	4	M
UNLOADING SOLID FUEL BUILDING (UEA)	F6.1	Fire in tipping hall	Lorry engine fire due to malfunction causing ignition of fuel oil or lube oil	Automatic fire detection (CO monitoring and thermal camera)		Automatic sprinkler system installed in tipping hall.Fuel unloading building equipped with hose reels for manual firefighting.	Compartment walls between the unloading/storage area and the adjacent buildings are 120 minutes fire resisting construction.(No separation between unloading and storage area) To achieve 120 minutes fire resistance	1	2	L

<table>
<tr><th rowspan="2">Area (PLAN A/B/B+)</th><th rowspan="2">No.</th><th rowspan="2">Fire Incident</th><th rowspan="2">Caused by</th><th colspan="4">Mitigation</th><th colspan="3">Risk Evaluation</th></tr>
<tr><th>Detection</th><th>Comment</th><th>Fire fighting</th><th>Building design</th><th>L</th><th>C</th><th>R</th></tr>
<tr><td rowspan="6"></td><td>F6.2</td><td rowspan="2"></td><td>Load with hot or hazardous material (e.g., hot ashes, flammable liquids etc.)</td><td rowspan="2"></td><td></td><td rowspan="2"></td><td rowspan="5">the crane operator room is protected by a water drenching curtain system which will be activated automatically by bunker fire detection system or manually from crane operator room or control room.</td><td>2</td><td>2</td><td>L</td></tr>
<tr><td>F6.3</td><td>Ignition of waste fuel material due to hot surface on lorry (e.g., hot brakes, engine or exhaust pipe)</td><td>Procedure for regular cleaning of waste from lorry unloading area.</td><td>2</td><td>2</td><td>L</td></tr>
<tr><td>F6.4</td><td rowspan="2">Fire in unloading bunker</td><td>Self-ignition of waste fuel material caused by temperature increase within the pile due to microbial activity if moist waste is stored in large piles</td><td rowspan="2">Automatic fire detection (CO monitoring and thermal camera)</td><td>Normally, the unloading bunker will be emptied on a daily basis into the main bunker. Maximum storage time for waste is according to guidance documents</td><td rowspan="2">Fire water monitors installed covering the whole fuel bunker area with both streams operating simultaneously</td><td>3</td><td>3</td><td>M</td></tr>
<tr><td>F6.5</td><td>Load with hot or hazardous material (e.g., hot ashes, flammable liquids etc.)</td><td>Inspection of load during unloading. If signs of fire or hazardous material the lorry will be diverted into a quarantine area</td><td>3</td><td>3</td><td>M</td></tr>
<tr><td>F6.6</td><td>Fire in crane operation cabin</td><td>Electrical equipment failure</td><td>Automatic fire detection</td><td>Crane operation cabinet is manned during waste unloading</td><td></td><td>1</td><td>2</td><td>L</td></tr>
<tr><td>F6.7</td><td>Fire in shredder hopper 1 or 2</td><td>Waste fuel fire</td><td>Automatic fire detection</td><td></td><td>Automatic deluge sprinkler system installed in each shredder hopper
Shredder area equipped with hose reels for manual firefighting</td><td>The two shredder system rooms are separate fire zones (120 minutes)</td><td>2</td><td>2</td><td>L</td></tr>
</table>

Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	Comment	Fire fighting	Building design	L	C	R
	F6.8	Fire inside shredder or shredder belt conveyor	Spark produced during shredding process (e.g., due to friction or hazardous material in fuel)	Automatic fire detection		Automatic deluge sprinkler system installed in shredder and shredder belt conveyor Shredder area equipped with hose reels for manual firefighting		2	2	L
	F6.9	Fire in shredder system room area	Mechanical or electrical equipment failure	Automatic fire detection		Automatic deluge sprinkler system installed in each shredder room area Shredder area equipped with hose reels for manual firefighting		2	2	L
	F6.10	Hydraulic oil fire	Oil leakage ignited by spark generated by electrical or mechanical equipment failure		FM Listed fire resistant hydraulic oil will be used.			2	2	L
	F6.11		Oil leakage ignited by hot work [1)]		Work permission required for any hot work to be carried out			2	2	L
	F6.12		Overheating of oil due to low level in tank		Hydraulic oil tank equipped with level alarms and temperature alarms.			2	2	L
	F6.13	Fire in cooling unit and shredders area	Mechanical or electrical equipment failure	Automatic fire detection				2	2	L
	F6.14	Fire in metal reject room	Ignition of waste material e.g. during change of magnetic	Automatic fire detection				2	2	L

Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	Comment	Fire fighting	Building design	L	C	R
			material container							
	F6.15	Fire in feedstock handling electrical annex	Electrical equipment failure	Automatic fire detection (smoke detectors)		Total flooding inert gas system installed in room.[2)] The system is for automatic release by smoke detectors. Room equipped with portable fire extinguisher (CO_2) for manual firefighting.	Electrical annex is a separate fire zone (120 minutes)	**2**	**4**	**M**
FUEL BUNKER BUILDING (UEB/UEB/AEB)	F7.1	Fire in main waste bunker	Self-ignition caused by temperature increase within the pile due to microbial activity if moist waste is stored in large piles	Automatic fire detection (CO monitoring and thermal camera)	Maximum storage time for waste according to guidance documents. However, typical storage time is < 72 hours	Fire water monitors installed covering the whole fuel bunker area with both streams operating simultaneously The sprinkler system will reduce risk of fire growth. A smouldering fire in the lower part of the wood chip pile can be very difficult to extinguish as the water sprayed on will not penetrate deep enough into the stack. In case of fire, fuel will need to be removed from the fuel storage. Depending on location and extent of the fire and the operation of the plant this may be done in different ways. The fuel storage building is provided with two access gates for entering.	Compartment walls between the unloading/storage area and the adjacent areas are 120 minutes fire resisting construction. (No separation between unloading and storage area)	**2**	**4**	**M**
	F7.2		Load with hot or hazardous material (e.g., hot ashes, flammable liquids etc.)					**2**	**4**	**M**
	F7.3		Fire introduced from fuel unloading area		Spark detection and extinguishing system installed in conveyor drop chutes to wood chip storage			**2**	**4**	**M**
	F7.4		Hot work [1)]		Work permission required for any work to be carried out			**3**	**1**	**L**
	F7.5		During unloading of fuel into the storage building some dust will be generated which may accumulate on		Dust generation and migration in the fuel storage building is expected to be low concentration of fines and high fuel moisture content. A water mist dust suppression system is installed which can be activated to reduce spreading of dust formed during			**2**	**4**	**M**

Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	Comment	Fire fighting	Building design	L	C	R
			electrical equipment leading to overheating and ignition.		unloading and drop of fuel in the hopper. Electrical equipment and installations in the fuel storage building will be located and shielded to avoid direct contact with the wood chip fuel. Dust exposed electrical equipment will be selected with minimum IP55 level and fitted with thermal sensors for automatic overheating protection.					
FUEL & UREA TANK AREA (UEQ)	F8.1	Diesel oil fire in tank farm	Diesel oil leakage	Automatic fire detection in storage tank (temperature switch)	Diesel oil is stored and handled below its flash point temperature (> 56°C). An ignitable mixture in air is therefore not foreseen under any normal conditions.	Firefighting in the area is done manually by means of the installed outdoor hydrants or portable fire extinguisher (CO_2 and dry chemical).In case of plant shut down activated or in case of fire alarm in the boiler house, the diesel oil supply pump will be stopped automatically, and fuel shutoff valves closed. In case of fire at the storage tank or one of the systems supplied from the diesel oil storage tank, the storage tank will be isolated and the diesel oil supply cut-off via on/off valves placed at the tank.	Diesel oil storage tank is located in a bunded area with a capacity of 110% of the storage tank volume	**1**	**4**	**M**
	F8.2		Diesel oil leakage ignited by electrical or mechanical equipment failure					**1**	**4**	**M**
	F8.3		Hot work igniting diesel oil leakage [1)]		Work permission required for any work to be carried out			**2**	**2**	**L**
	F8.4	Diesel oil fire at outdoor diesel oil transfer system	Diesel oil leakage ignited by hot surface or spark generated by electrical or mechanical equipment failure		To reduce the risk of ignition in case of a leakage, the diesel oil piping will not be routed near hot surfaces.			**1**	**2**	**L**

Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	**Comment**	**Fire fighting**	**Building design**	**L**	**C**	**R**
FUEL & UREA TANK AREA (UEQ)	F9.1	Diesel oil fire at unloading area	Hot work igniting diesel oil leakage [1)]		Work permission required for any work to be carried out	Firefighting in the area is done manually by means of the installed outdoor hydrants or portable fire extinguisher (CO_2 and dry chemical).		**2**	**2**	**L**
	F9.2		Smoking igniting diesel oil leakage		Diesel oil is supplied and delivered to site by a registered supply company. Driver is required to receive site induction Fire safety warning signs are clearly displayed around the unloading area			**2**	**2**	**L**
	F9.3	Lorry engine fire	Malfunction causing ignition of fuel oil or lube oil					**1**	**2**	**L**
SLAG STORAGE AREA (UHD)	F10.1	Fire in slag storage area		No automatic detection		Firefighting in the area is done manually by means of the installed outdoor hydrants.		**1**	**2**	**L**
EFFLUENT AREA (UGM)	F11.1	Fire in effluent area		No automatic detection		Firefighting in the area is done manually by means of the installed outdoor hydrants.		**1**	**2**	**L**
BOILER BUILDING (UHA)	F12.1	Fire in boiler building	Electrical or mechanical equipment failure	Automatic fire detection (smoke, heat and flame detectors)		Boiler building equipped with hose reels and portable fire extinguisher (CO_2) for manual firefighting	Compartment walls between the boiler building and the adjacent buildings are 120 minutes fire resisting construction.	**2**	**4**	**M**
	F12.2		Hot work [1)]		Work permission required for any hot work to be carried out			**3**	**1**	**L**

Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	Comment	Fire fighting	Building design	L	C	R
	F12.3	Diesel oil fire inside boiler building	Oil leakage ignited by hot surface	Automatic fire detection (combination of flame detectors and smoke detectors placed above diesel oil burner)	To reduce the risk of ignition in case of a leakage, the diesel oil piping will, to the extent possible, not be routed near hot surfaces and joints/flanges will not be put in risk areas. In case joints/flanges cannot be avoided in a risk area flange guards will be used. In case of plant shut down activated or in case of fire alarm in the boiler house, the diesel oil supply pump will be stopped automatically, and fuel shutoff valves closed.	Auxiliary burners and start up burners are provided with foam based automatic fire suppression system. Boiler building equipped with hose reels and portable fire extinguisher (CO_2) for manual firefighting		2	4	M
	F12.4		Oil leakage ignited by spark generated by electrical or mechanical equipment failure					1	4	M
	F12.5		Oil leakage ignited by hot work [1)]		Work permission required for any hot work to be carried out			2	1	L
	F12.6	Fire in feed hopper 1 or 2	Waste fuel fire in feed hopper	Automatic fire detection in hopper	Fuel feeding is interlocked in case a fire is detected in the system	Automatic deluge sprinkler system installed in each feed hopper		2	2	L
	F12.7	Fire in waste fuel feeding conveyor	Sparks/glows igniting the waste fuel e.g., backfire	Automatic fire detection in conveyor		Automatic sprinkler system installed in conveyor.		2	2	L
	F12.8	Fire in feeding hoppers lower area	Mechanical or electrical equipment failure	Automatic fire detection		Boiler building equipped with hose reels and portable fire extinguisher (CO_2) for manual firefighting		2	2	L

Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	Comment	Fire fighting	Building design	L	C	R
TURBINE BUILDING (UMA)	F13.1	Fire in turbine building	Electrical or mechanical equipment failure	Automatic fire detection (smoke, heat and flame detectors)		Turbine building equipped with hose reels and portable fire extinguishers (CO_2 and dry powder) for manual firefighting	Compartment walls between the turbine building and the adjacent buildings are 120 minutes fire resisting construction.	**2**	**4**	**M**
	F13.2		Hot work [1)]		Work permission required for any hot work to be carried out			**3**	**1**	**L**
	F13.3	Turbine lubricating oil fire inside turbine building	Oil leakage ignited by hot surface	Automatic fire detection (smoke and flame detectors)	To reduce the risk of ignition in case of a leakage, lubrication oil piping is not routed near hot surfaces. In case joints/flanges cannot be avoided in a risk area flange guards will be used.	The lube oil units and area beneath the turbine table are provided with foam-based fire suppression systems. The foam system will be for automatic as well as manual release. The release boxes will be located inside the STG building at the exits. Turbine building equipped with hose reels and portable fire extinguishers (CO_2 and dry powder) for manual firefighting.		**2**	**4**	**M**
	F13.4		Oil leakage ignited by spark generated by electrical or mechanical equipment failure		Oil is handled below flash point temperature.			**1**	**4**	**M**
	F13.5		Oil leakage ignited by hot work [1)]		Work permission required for any hot work to be carried out			**2**	**2**	**L**
	F13.6		Overheating of oil due to low level in tank		Lubricating oil tank equipped with level alarms and temperature alarms. Alarm and turbine trip due to low oil pressure.			**1**	**4**	**M**
	F13.7	Turbine hydraulic oil fire inside	Oil leakage ignited by hot surface	Automatic fire detection (smoke and flame detectors)	FM Listed fire resistant hydraulic oil will be used	The turbine generator bearings, gearbox and main steam valve hydraulic actuator are provided with an automatic sprinkler		**2**	**4**	**M**

Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	Comment	Fire fighting	Building design	L	C	R
	F13.8	turbine building	Oil leakage ignited by spark generated by electrical or mechanical equipment failure		Oil is handled below flash point temperature.	system. Turbine building equipped with hose reels and portable fire extinguishers (CO_2 and dry powder) for manual firefighting.		1	4	M
	F13.9		Oil leakage ignited by hot work [1)]		Work permission required for any hot work to be carried out			2	2	L
	F13.10		Overheating of oil due to low level in tank		Hydraulic oil tank equipped with level alarms and temperature alarms. Alarm and turbine trip due to low oil pressure.			1	4	M
	F13.11	Turbine generator fire	Generator cooling failure or electrical failure	Automatic fire detection (smoke, heat and flame detectors)	Alarms and trip of turbine			1	4	M
AIR COOLED CONDENSER AREA (ULF)	F14.1	Fire in air cooled condenser area	Electrical or mechanical equipment failure	No automatic detection		Firefighting in the area is done by means of the installed outdoor hydrants.		1	3	L
RAW WATER & FIRE EQUIPMENT AREA (ZXG)	F15.1	Diesel oil fire in the fire pump container	Oil system leakage ignited by hot surface	Automatic fire detection (glass bulbs)	Shielding of hot surfaces	The container is equipped with an automatic sprinkler system. System released by glass bulbs.		2	3	M
	F15.2		Oil system leakage ignited by e.g. spark generated by electrical or mechanical equipment failure					1	3	L

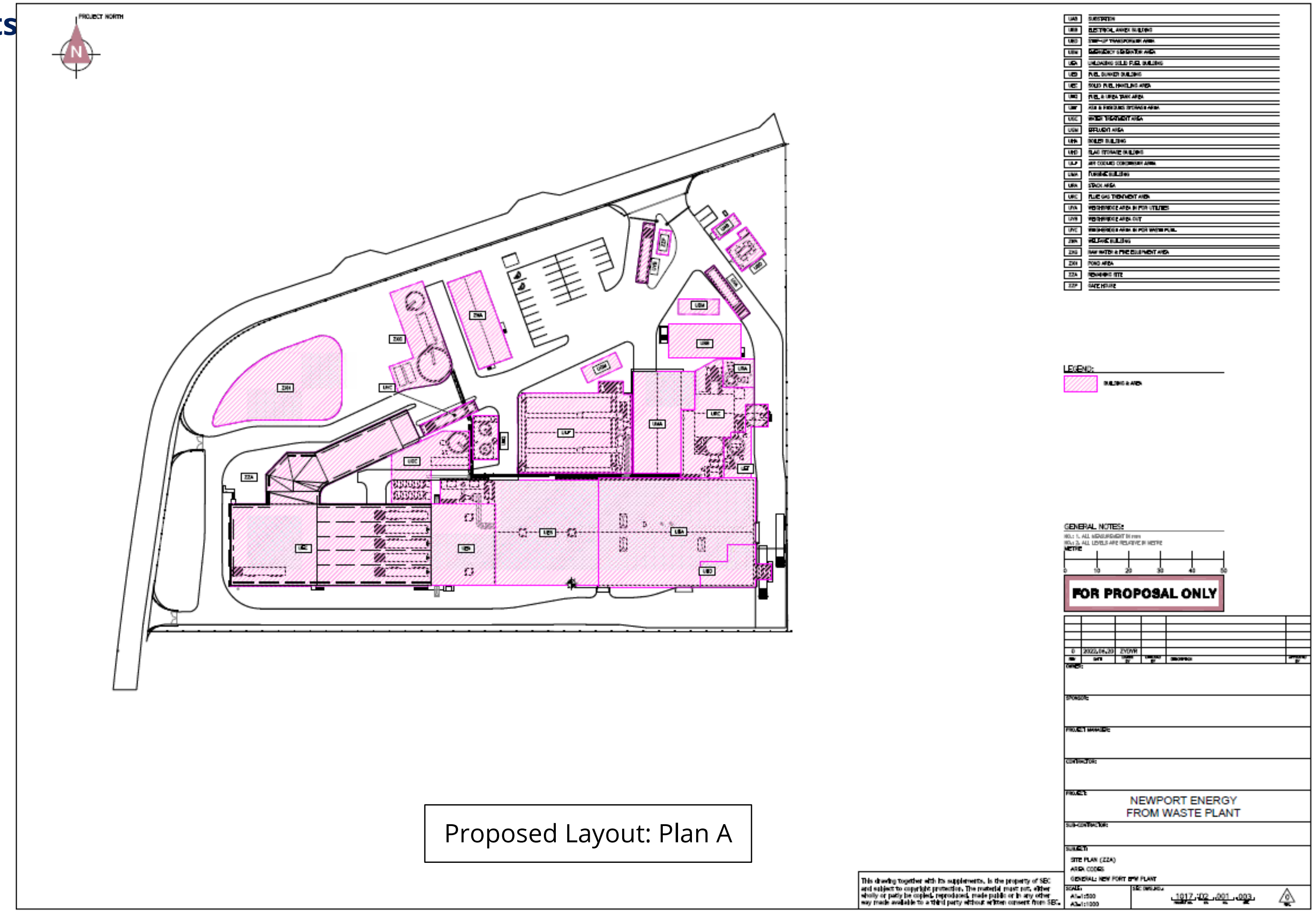
Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	Comment	Fire fighting	Building design	L	C	R
	F15.3		Hot work [1]		Work permission required for any hot work to be carried out			2	3	M
	F15.4	Electrical fire in the fire pump container	Electrical equipment failure					1	3	L
WORKSHOP BUILDING	F16.1	Fire in mechanical workshop	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Workshop equipped with portable fire extinguishers (CO_2) for manual firefighting.	The mechanical workshop is a separate fire zone (120 minutes) towards adjacent rooms.	1	2	L
	F16.2		Hot work [1]		Work permission required for any hot work to be carried out			2	2	L
	F16.3	Fire in crane grab workshop	Mechanical or electrical equipment failure	Automatic fire detection (glass bulbs)		Sprinkler system installed. Released by means of glass bulbs. (Deluge system) Portable fire extinguisher (dry powder) for manual firefighting	The crane grab workshop is a separate fire zone (120 minutes) towards adjacent rooms.	2	2	L
	F16.4	Fire in oil & grease storage	Oil leakage ignited by spark generated by electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)	FM Listed fire resistant hydraulic oil will be used					L
EMERGENCY GENERATOR AREA (UBM)	F17.1	Diesel oil fire in the emergency diesel generator unit	Oil system leakage ignited by hot surface	Automatic fire detection (glass bulbs) Emergency diesel generator unit also equipped with smoke detectors for early warning.	Shielding of hot surfaces	Emergency diesel generator unit equipped with sprinkler system released by glass bulbs.		2	2	L
	F17.2		Oil system leakage ignited by e.g., spark generated by electrical or mechanical equipment failure					1	2	L

Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	Comment	Fire fighting	Building design	L	C	R
	F17.3		Hot work [1]		Work permission required for any hot work to be carried out			2	2	L
	F17.4	Electrical fire in the emergency diesel generator unit area	Electrical equipment failure					1	2	L
FLUE GAS TREATMENT AREA (URC)	F18.1	Fire in flue gas treatment filter	Local concentrations of carbon or combustible material in the bag filter may lead to "hot spots" which might ignite the filter media.	Temperature sensors installed in each hopper for fire detection	Lime coating of filter bags prior to operation	Fixed N2 based extinguishing system installed. System designed to flood one compartment out of eight. The system will be for automatic release based on temperature switches monitoring each compartment		1	3	L
	F18.2	Fire in PAC silo	Ignition of PAC dust cloud	Temperature transmitter installed in PAC silo	Internals of the PAC storage and injection system is classified as zone 22 to reduce risk of ignition	Firefighting in the area is done by means of the installed outdoor hydrants.		1	3	L
	F18.3	Fire in flue gas treatment area	Ignition of PAC spillage		Procedure for regular inspection and cleaning of area around the PAC big bag and dosing equipment.	Firefighting in the area is done by means of the installed outdoor hydrants.		1	3	L
	F18.4		Electrical or mechanical equipment failure					1	3	L
	F18.5	Fire in FGT area switchboard room	Electrical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Total flooding inert gas system installed in room. [2)] The system is for automatic release by smoke detectors.	Electrical room is a separate fire zone (120 minutes)	1	4	M
	F18.6	Fire in CEMS container	Electrical equipment failure	Automatic fire detection (smoke detectors)		Total flooding inert gas system installed in room. [2)] The system is for automatic release by smoke detectors.	CEMS container is a separate fire zone (120 minutes)	1	4	M

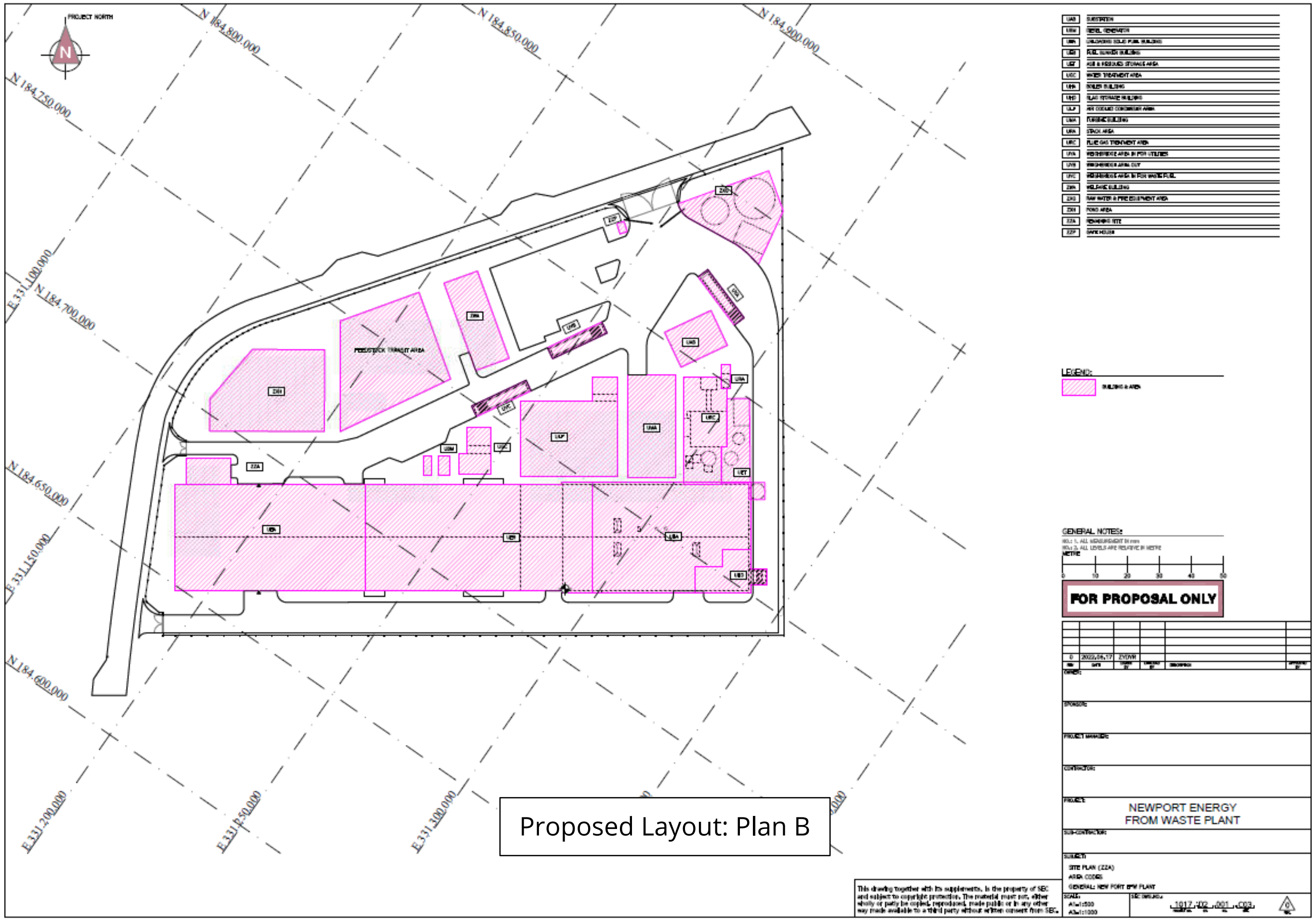
Area (PLAN A/B/B+)	**No.**	**Fire Incident**	**Caused by**	**Mitigation**				**Risk Evaluation**		
				Detection	**Comment**	**Fire fighting**	**Building design**	**L**	**C**	**R**
WELFARE BUILDING (ZWA)	F19.1	Fire in one of the office rooms or meeting room	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Portable fire extinguisher (CO_2) for manual firefighting located in the corridor.	The administration building is a combined fire zone separated from adjacent buildings/equipment by min 15 m distance.	**2**	**2**	**L**
	F19.2	Fire in kitchen	Cooking (toaster, microwave etc.) or electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)				**2**	**2**	**L**
	F19.3	Fire in changing room, shower room or toilet	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)				**1**	**2**	**L**
	F19.4	Fire in corridor	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)				**1**	**1**	**L**
	F19.5	Fire in technical room or cleaners' room	Electrical or mechanical equipment failure	Automatic fire detection (heat and/or smoke detectors)				**2**	**1**	**L**
WEIGHBRIDGE AREA IN FOR WASTE FUEL (UYC)	F20.1	Fire at weighbridge area in	Lorry engine fire due to malfunction causing ignition of fuel oil or lube oil	No automatic detection	Fire only likely when lorry at weighbridge. Fire detected and extinguished quickly.	Firefighting in the area is done by means of the installed outdoor hydrants.		1	1	**L**

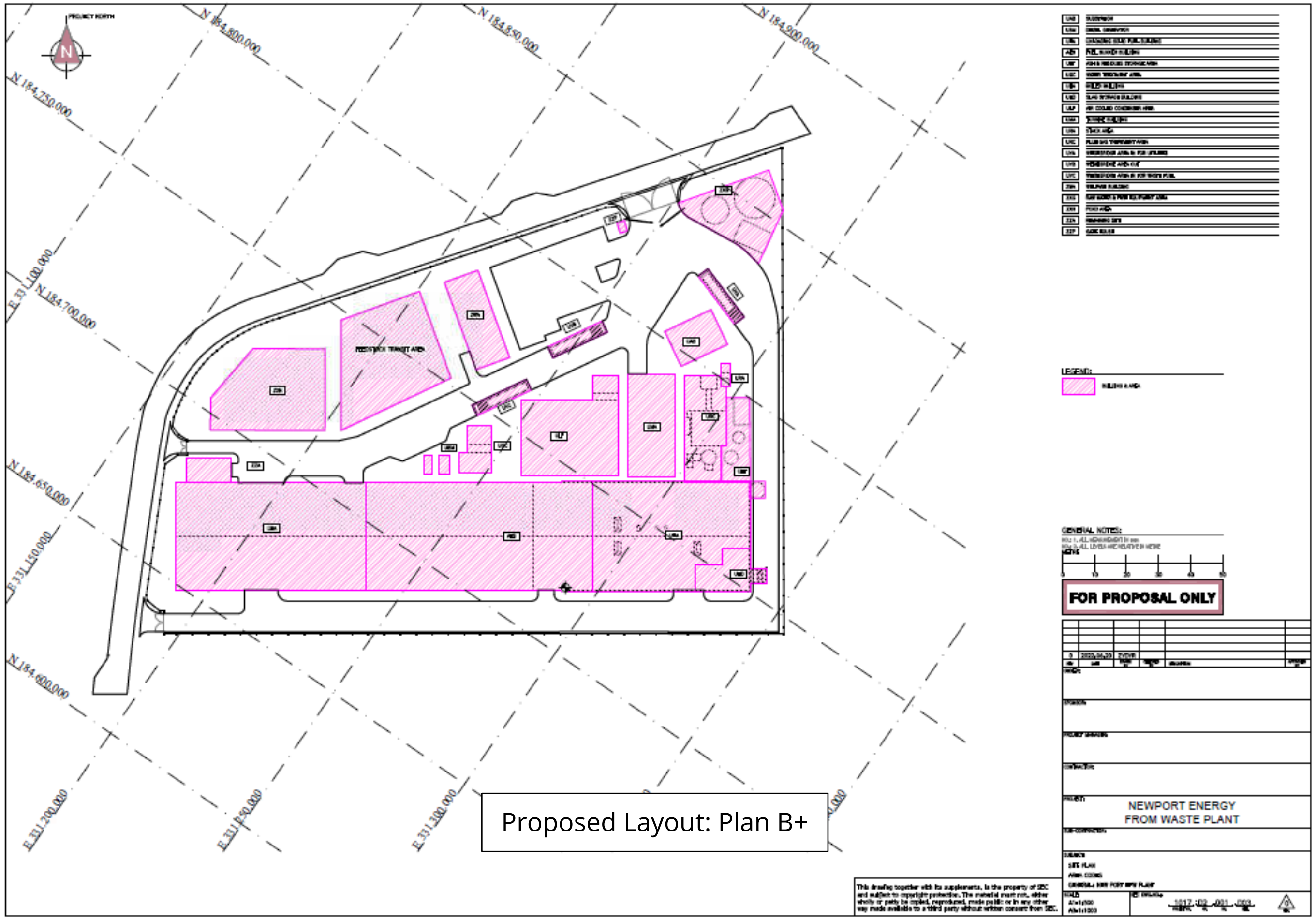
Area (PLAN A/B/B+)	No.	Fire Incident	Caused by	Mitigation				Risk Evaluation		
				Detection	Comment	Fire fighting	Building design	L	C	R
	F20.2		Load with hot or hazardous material (e.g., hot ashes, flammable liquids etc.)					1	1	L
GATE HOUSE (ZZF)	F21.1	Fire in security gate house (office or toilet)	Electrical equipment failure	Automatic fire detection (heat and/or smoke detectors)		Portable fire extinguisher (CO_2) for manual firefighting located in gate house.		1	1	L
WEIGHBRIDGE AREA OUT (UYB)	F22. 1	Fire at weighbridge area out	Lorry engine fire due to malfunction causing ignition of fuel oil or lube oil	No automatic detection		Firefighting in the area is done by means of the installed outdoor hydrants.		1	1	L
	F22.2		Load with hot or hazardous material (e.g., hot ashes, flammable liquids etc.)					1	1	L
POND AREA (ZXH)	F23.1	Fire in attenuation pond area	No likely causes for fire	No automatic detection		Firefighting in the area is done by means of the installed outdoor hydrants.		1	1	L
PARKING AREA	F24.1	Fire in parking area	Car engine fire due to malfunction causing ignition of fuel oil or lube oil	No automatic detection		Firefighting in the area is done by means of the installed outdoor hydrants.	The parking area is separated from adjacent buildings/equipment by min 15 m distance.	1	1	L

Annex B: Layouts



Proposed Layout: Plan A


FOR PROPOSAL ONLY
NEWPORT ENERGY FROM WASTE PLANT
Proposed Layout: Plan B


FOR PROPOSAL ONLY
NEWPORT ENERGY
FROM WASTE PLANT
Proposed Layout: Plan B+

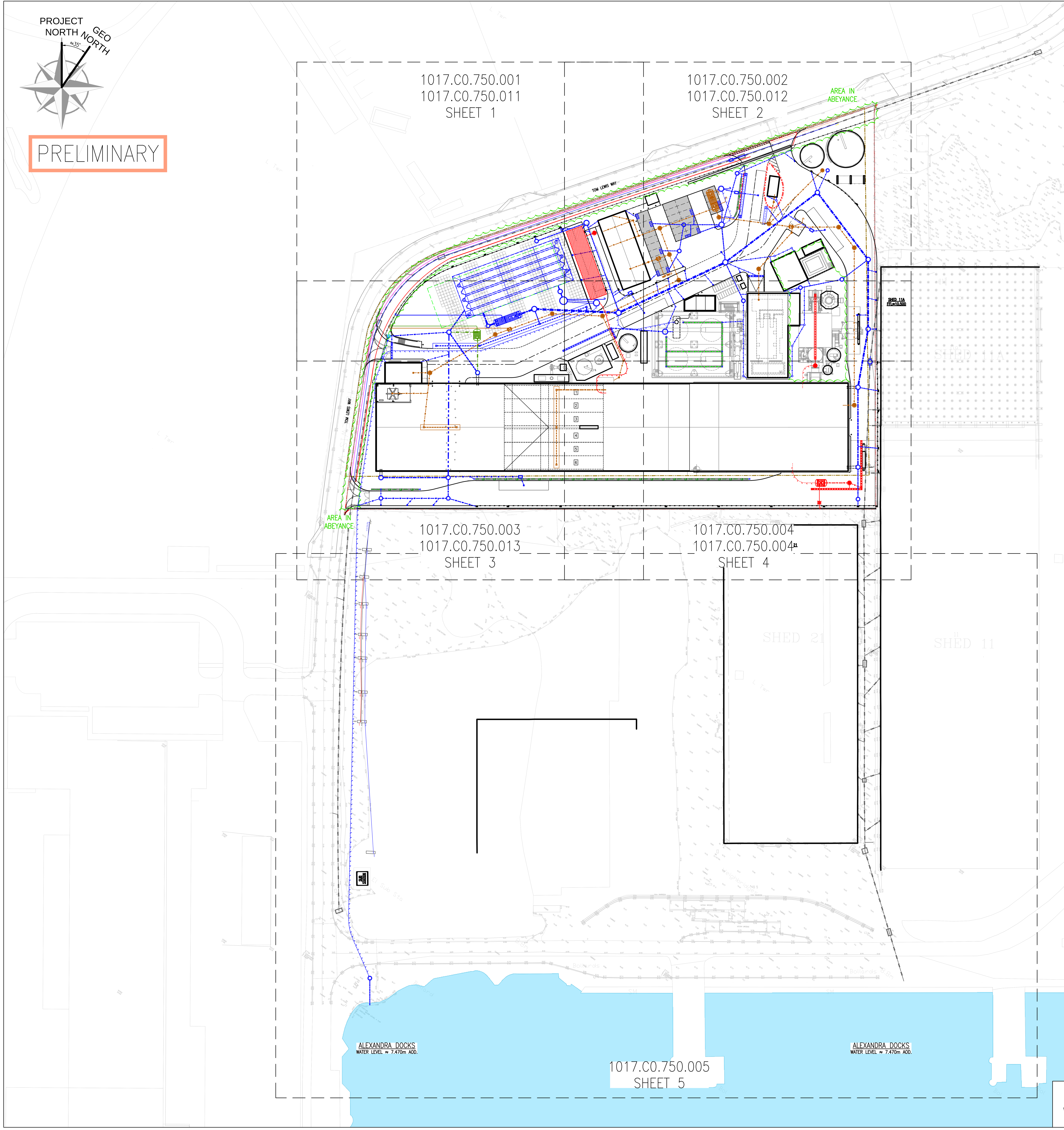
Annex C: Fire zone study

Will be updated once 3D model for Newport is finalized.

Design requirement for oil burners:

The foam water spray system shall cover the oil burners from the nozzles located immediately above as indicated in below. Further, it must be assumed that a number of nozzles located to cover the adjacent burner will be triggered due to heat exposure from a fire at the burners for boiler. Atotal of XX nozzles at this level would be assumed activated.

An area beneath the platform at level XX shall be included in the design. A number of nozzles (assuming X nozzles) placed in a distance of X m from the casing and along the boiler wall shall be included.



LEGEND:

- PROPERTY BOUNDARY
- PLANNING BOUNDARY
- SURFACE WATER MANHOLE
- RAINWATER HARVESTING WATER MANHOLE
- SURFACE PUMP STATION
- SEPARATOR
- PRIVATE SURFACE WATER SEWER
- PRIVATE RAINWATER HARVESTING SEWER
- SURFACE WATER SEWER RISING MAIN
- ROAD GULLY
- SURFACE WATER DRAINAGE CHANNEL
- SURFACE WATER TRASH BOX
- SYPHONIC DOWNPIPES & LATERALS BY SPECIALIST
- RAINWATER HARVESTING TANK
- LINED LAND DRAIN
- POROUS PAVING DRAINAGE CONNECTION UNITS. PERMAVOID – LENGTH & WIDTH TBC
- LINED BLOCK POROUS PAVING
- KERBDRAIN (ACO OR SIMILAR)
- KERB DRAIN ACCESS BOX
- CAST IRON OR PCC CONCRETE SEWER
- SURFACE WATER INSPECTION CHAMBER (PIC)
- EXISTING SURFACE WATER DRAINAGE
- ATTENUATION TANK (WEHOLITE)
- SURFACE WATER RAIN WATER DOWN PIPE
- FOUL WATER MANHOLE
- TRADE EFFLUENT WATER MANHOLE
- PRIVATE FOUL WATER SEWER
- FOUL WATER RISING MAIN
- TRADE EFFLUENT RISING MAIN
- SEPARATOR
- FOUL GULLY (INTERNAL)
- FOUL GULLY (EXTERNAL)
- SOIL VENT PIPE (SVP)
- STUB STACK (SS)
- FOUL INSPECTION CHAMBER (PIC)
- TRADE EFFLUENT DRAINAGE CHANNEL
- TRADE EFFLUENT TRASH BOX
- TG TRADE EFFLUENT GULLY (EXTERNAL)
- G TRADE EFFLUENT GULLY (INTERNAL)
- FOUL LINEAR DRAINAGE CHANNEL
- TRADE EFFLUENT STORAGE TANK
- FOUL TREATMENT PLANT
- TRADE EFFLUENT STORAGE TANK (DETAILS TO BE DEVELOPED WITH SEC)

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

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CONSTRUCTION

DEMOLITION

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   CITY SURVEY LTD: CSGP007435–SU–DRG–004 – 006 WITH TRIAL HOLE INFORMATION

ITEMS REVISED

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PHONE :+45 3226 6401
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PROJECT:
NEWPORT ENERGY FROM WASTE PLANT

SUB–CONTRACTOR:
FAIRHURST

SUBJECT:
SITE DRAINAGE
OVERALL LAYOUT

SCALE:
A1 = 1:750
A3 = 1:1500

SEC DWG.NO.:
1017.C0.750.000
PROJECT NO. GR. NO. SHT.
REV. 01

1017.C0.750.000

LEGEND:

	PROPERTY BOUNDARY		SURFACE WATER SEWER RISING MAIN		KERBDRAIN (ACO OR SIMILAR)
	PLANNING BOUNDARY	RG	ROAD GULLY		KERB DRAIN ACCESS BOX
	SURFACE WATER MANHOLE		SURFACE WATER DRAINAGE CHANNEL		CAST IRON OR PCC CONCRETE SEWER
R	RAINWATER HARVESTING WATER MANHOLE		SURFACE WATER TRASH BOX		SURFACE WATER INSPECTION CHAMBER (PIC)
			SYPHONIC DOWNPIPES & LATERALS BY SPECIALIST	ExSWS	EXISTING SURFACE WATER DRAINAGE
PS	SURFACE PUMP STATION		RAINWATER HARVESTING TANK		ATTENUATION TANK (WEHOLITE)
	SEPARATOR	LD	LINED LAND DRAIN	RWP	SURFACE WATER RAIN WATER DOWN PIPE
SW	PRIVATE SURFACE WATER SEWER		POROUS PAVING DRAINAGE CONNECTION UNITS. PERMAVOID – LENGTH & WIDTH TBC		
RH	PRIVATE RAINWATER HARVESTING SEWER		LINED BLOCK POROUS PAVING		

- V=VENTED PIPE
- PEN=PENSTOCK
- PS=PUMP STATION
- VC=VALVE CHAMBER
- C=CATCHPIT MANHOLE

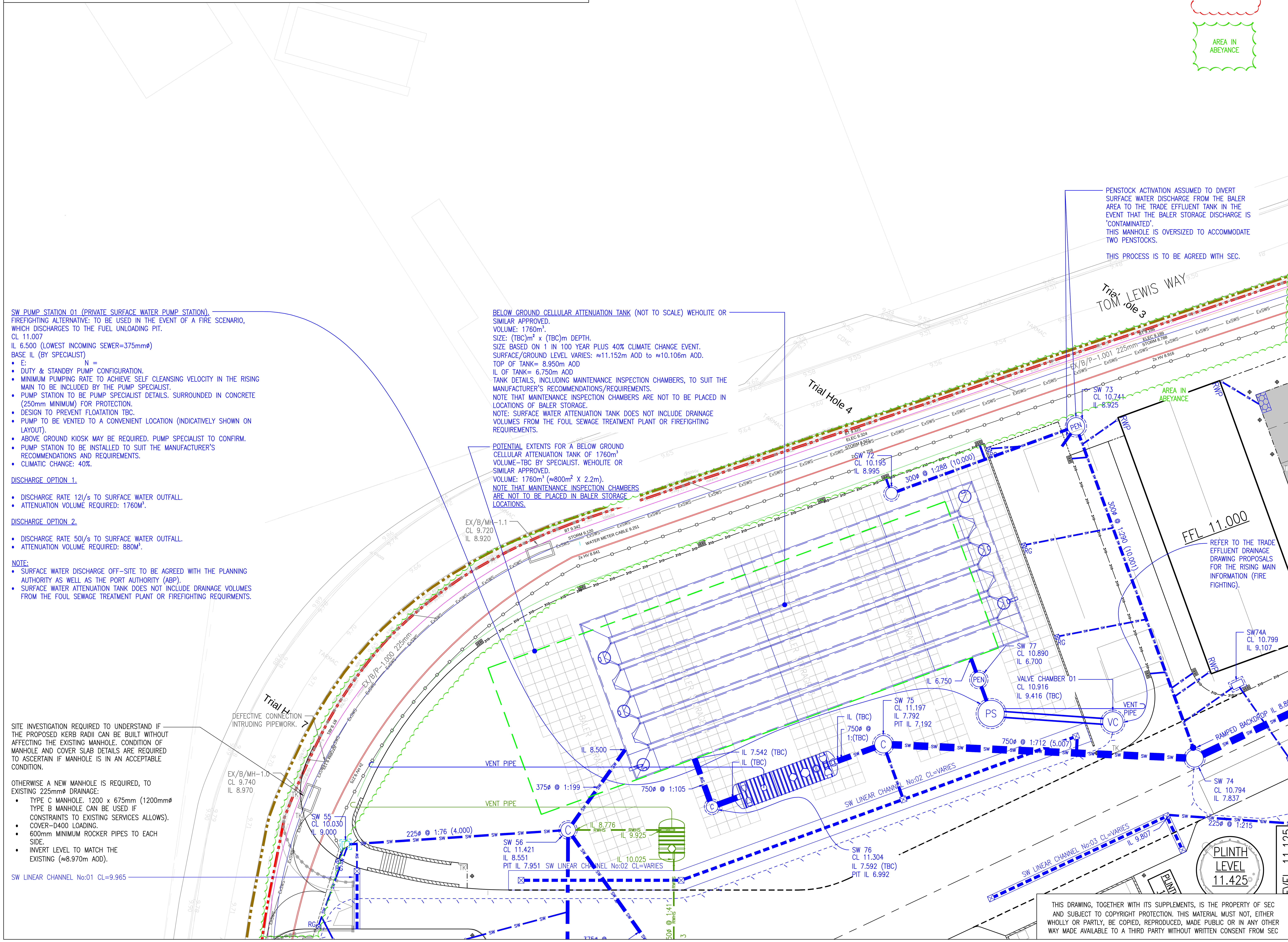
PRELIMINARY

PROJECT NORTH

GEO NORTH

ITEMS REVISED

AREA IN ABEYANCE



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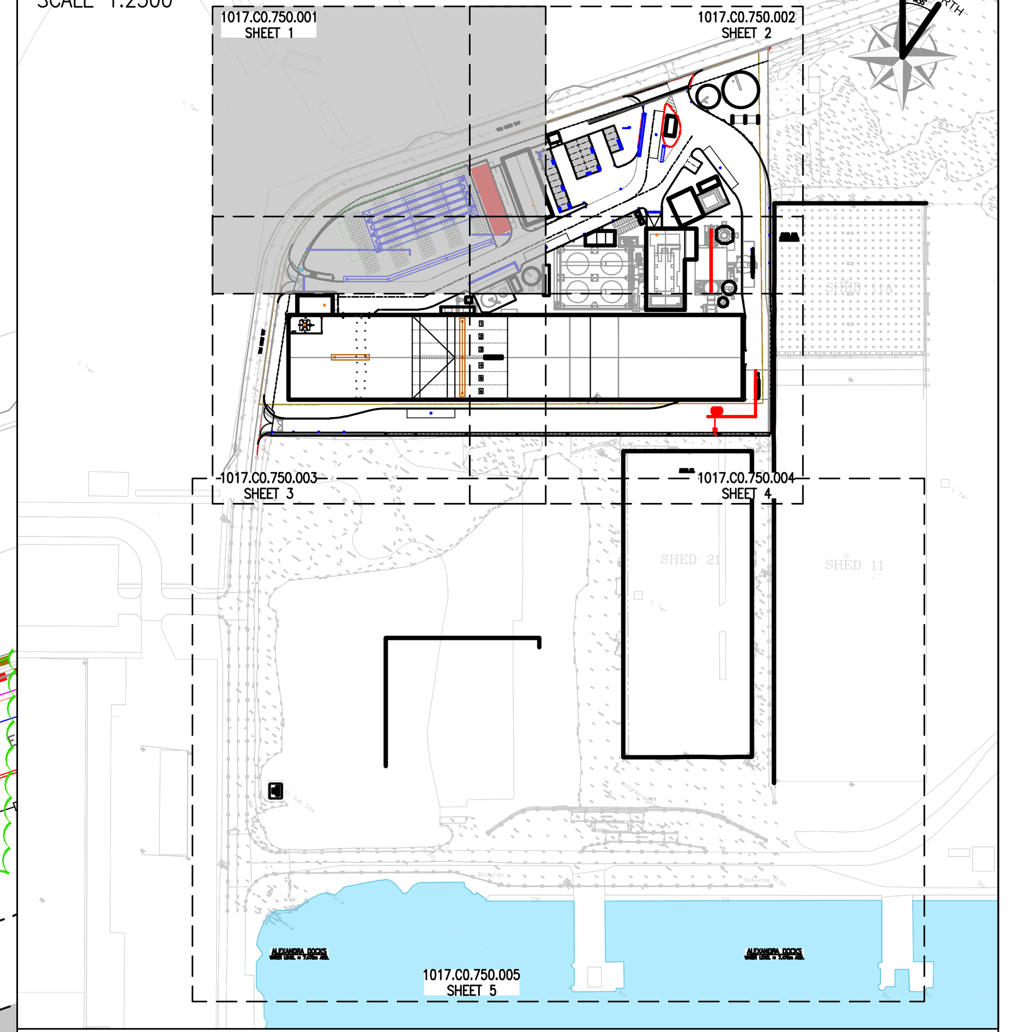
LOCATION PLAN
SCALE 1:2500



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CITY SURVEY LTD: CSGP007435–SU–DRG–004 – 006 WITH TRIAL HOLE INFORMATION

1017.C0.750.001

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CONTRACTOR:
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PROJECT:
NEWPORT ENERGY FROM WASTE PLANT

SUB–CONTRACTOR:
FAIRHURST

SUBJECT:
SITE DRAINAGE SURFACE WATER
SHEET 1

SCALE:
A1 = 1:200
A3 = 1:400

SEC DWG.NO.:
1017.C0.750.001
REV. 01

LEGEND:

	PROPERTY BOUNDARY		SURFACE WATER SEWER RISING MAIN		KERBDRAIN (ACO OR SIMILAR)
	PLANNING BOUNDARY	RG	ROAD GULLY		KERB DRAIN ACCESS BOX
	SURFACE WATER MANHOLE		SURFACE WATER DRAINAGE CHANNEL		CAST IRON OR PCC CONCRETE SEWER
R	RAINWATER HARVESTING WATER MANHOLE		SURFACE WATER TRASH BOX		SURFACE WATER INSPECTION CHAMBER (PIC)
			SYPHONIC DOWNPIPES & LATERALS BY SPECIALIST	ExSWS	EXISTING SURFACE WATER DRAINAGE
PS	SURFACE PUMP STATION		RAINWATER HARVESTING TANK		ATTENUATION TANK (WEHOLITE)
	SEPARATOR	LD	LINED LAND DRAIN	RWP	SURFACE WATER RAIN WATER DOWN PIPE
SW	PRIVATE SURFACE WATER SEWER		POROUS PAVING DRAINAGE CONNECTION UNITS. PERMAVOID – LENGTH & WIDTH TBC		
RH	PRIVATE RAINWATER HARVESTING SEWER		LINED BLOCK POROUS PAVING		

- V=VENTED PIPE
- PEN=PENSTOCK
- PS=PUMP STATION
- VC=VALVE CHAMBER
- C=CATCHPIT MANHOLE

PROJECT NORTH

GEO NORTH

PRELIMINARY

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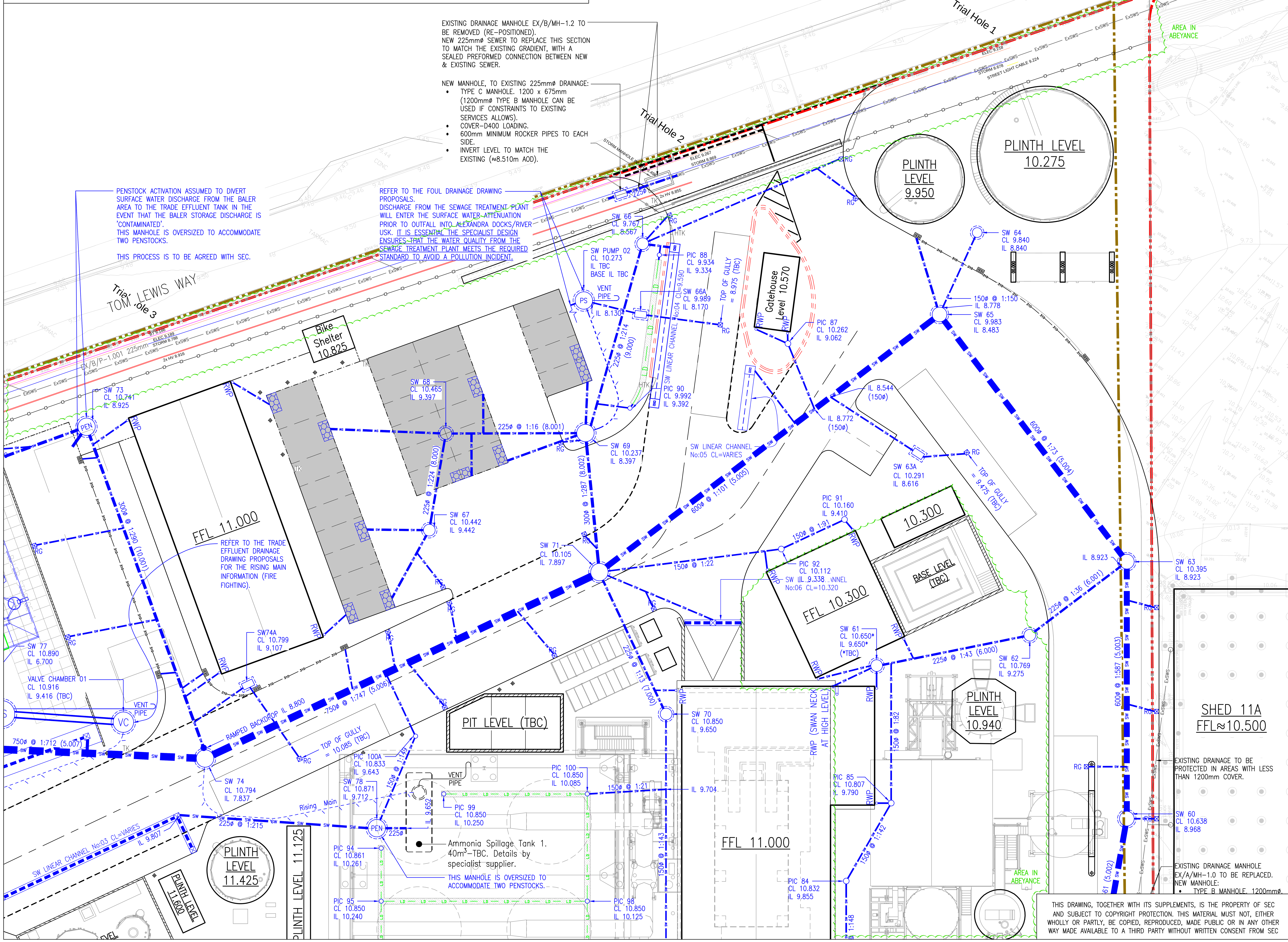

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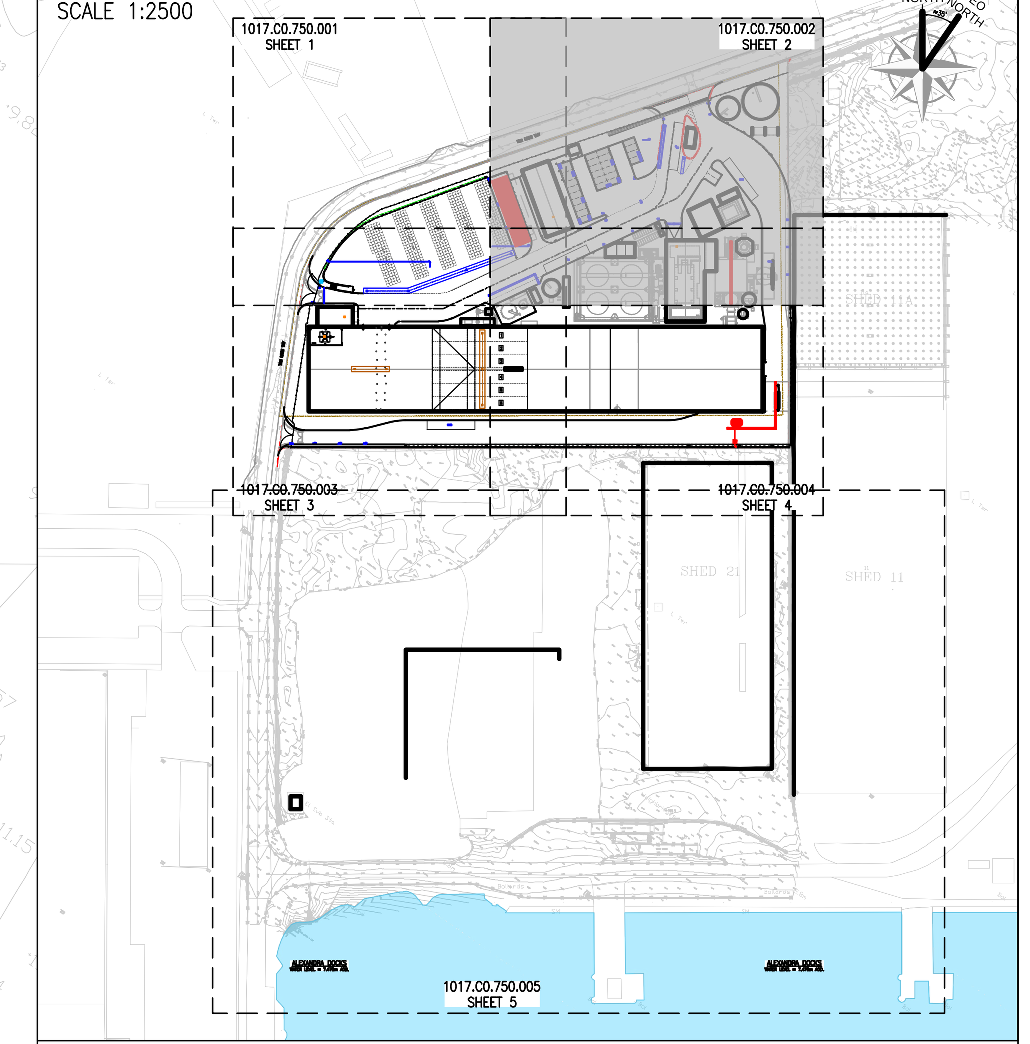
LOCATION PLAN
SCALE 1:2500



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CONTRACTOR:
SCANDINAVIAN ENERGY CONTRACTOR
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PROJECT:
NEWPORT ENERGY FROM WASTE PLANT

SUB-CONTRACTOR:
FAIRHURST

SUBJECT:
SITE DRAINAGE SURFACE WATER
SHEET 2

SCALE:
A1 = 1:200
A3 = 1:400

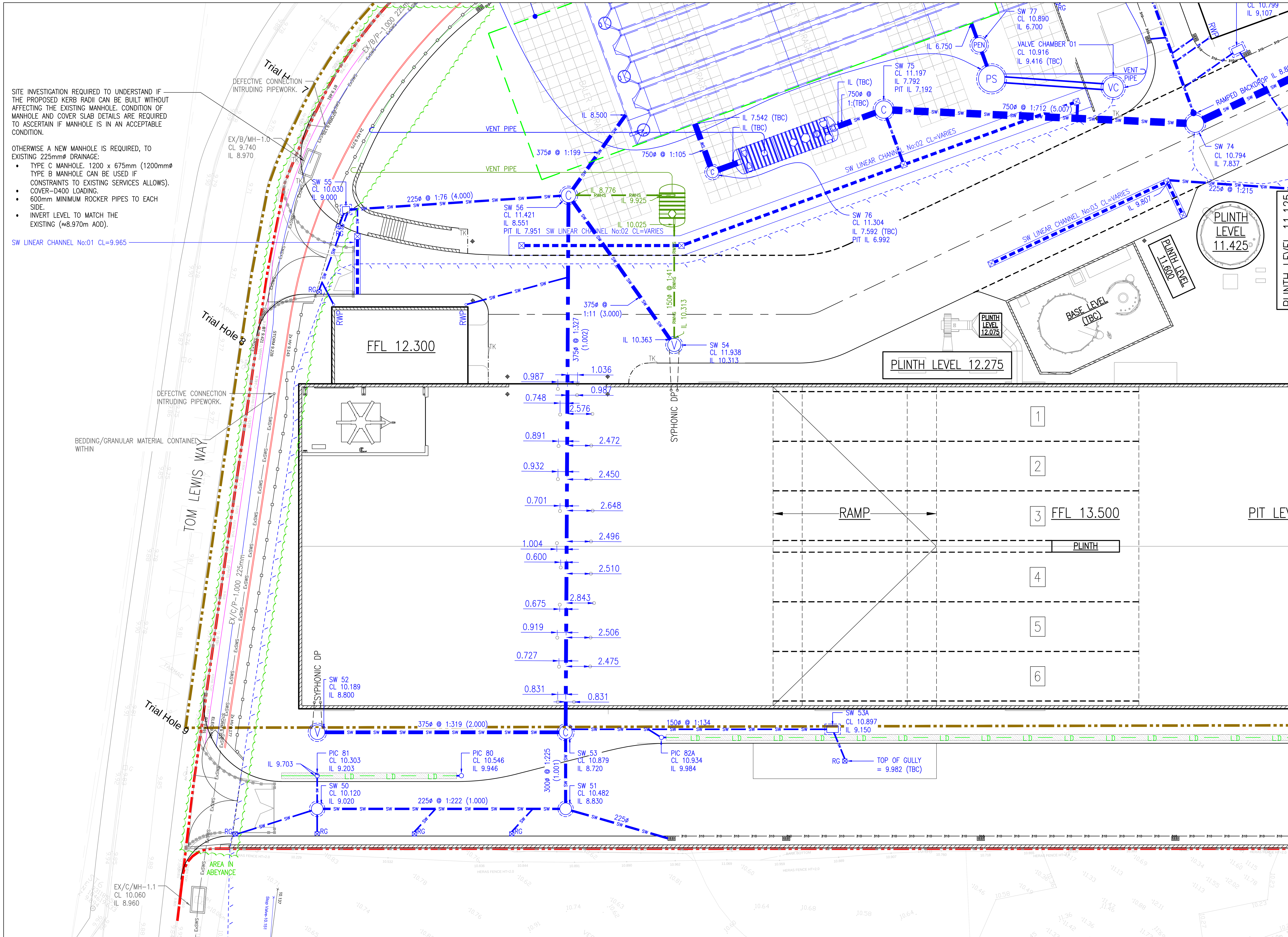
SEC DWG.NO.:
1017.C0.750.002
REV. 01

1017.C0.750.002

SITE INVESTIGATION REQUIRED TO UNDERSTAND IF THE PROPOSED KERB RADII CAN BE BUILT WITHOUT AFFECTING THE EXISTING MANHOLE. CONDITION OF MANHOLE AND COVER SLAB DETAILS ARE REQUIRED TO ASCERTAIN IF MANHOLE IS IN AN ACCEPTABLE CONDITION.

OTHERWISE A NEW MANHOLE IS REQUIRED, TO EXISTING 225mmø DRAINAGE:
- TYPE C MANHOLE. 1200 x 675mm (1200mmø TYPE B MANHOLE CAN BE USED IF CONSTRAINTS TO EXISTING SERVICES ALLOWS).
- COVER–D400 LOADING.
- 600mm MINIMUM ROCKER PIPES TO EACH SIDE.
- INVERT LEVEL TO MATCH THE EXISTING (≈8.970m AOD).

SW LINEAR CHANNEL No:01 CL=9.965



LEGEND:

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	PLANNING BOUNDARY	RG	ROAD GULLY		KERB DRAIN ACCESS BOX
	SURFACE WATER MANHOLE		SURFACE WATER DRAINAGE CHANNEL		CAST IRON OR PCC CONCRETE SEWER
R	RAINWATER HARVESTING WATER MANHOLE		SURFACE WATER TRASH BOX		SURFACE WATER INSPECTION CHAMBER (PIC)
			SYPHONIC DOWNPIPES & LATERALS BY SPECIALIST	ExSWS	EXISTING SURFACE WATER DRAINAGE
PS	SURFACE PUMP STATION		RAINWATER HARVESTING TANK		ATTENUATION TANK (WEHOLITE)
	SEPARATOR		LINED LAND DRAIN	RWP	SURFACE WATER RAIN WATER DOWN PIPE
SW	PRIVATE SURFACE WATER SEWER		POROUS PAVING DRAINAGE CONNECTION UNITS. PERMAVOID – LENGTH & WIDTH TBC		
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- V=VENTED PIPE
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ITEMS REVISED

AREA IN ABEYANCE

PRELIMINARY

PROJECT NORTH GEO NORTH

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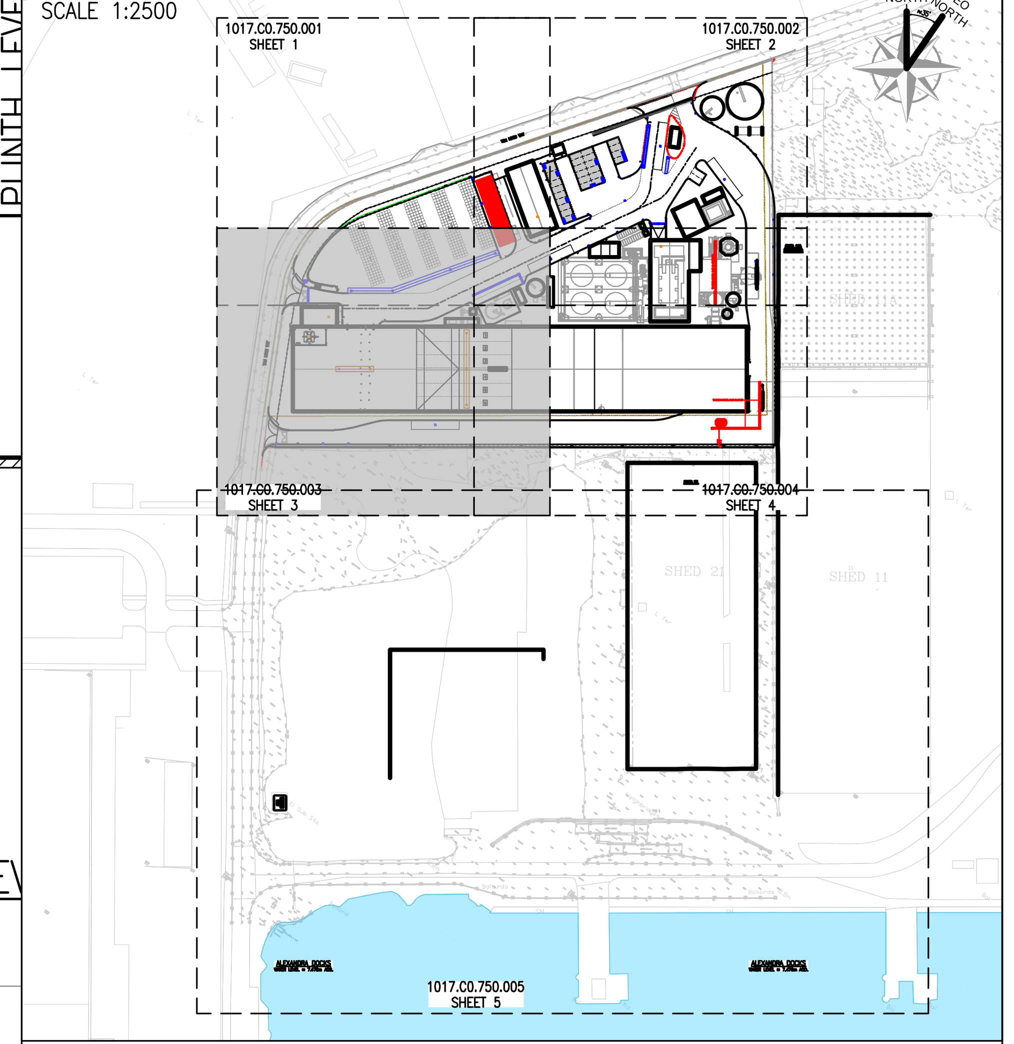
LOCATION PLAN
SCALE 1:2500



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1017.C0.750.003

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CONTRACTOR:
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PROJECT:
NEWPORT ENERGY FROM WASTE PLANT

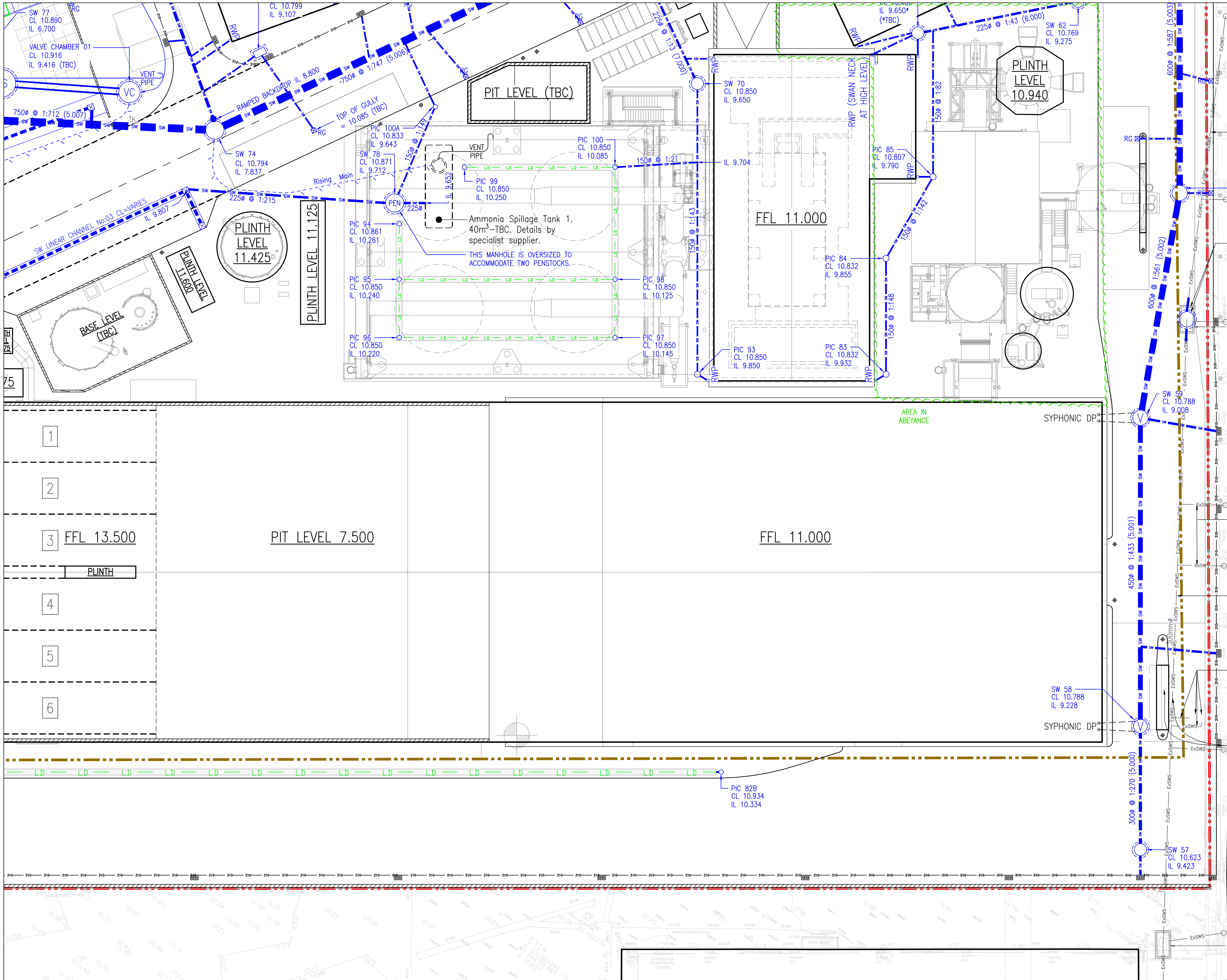
SUB–CONTRACTOR:
FAIRHURST

SUBJECT:
SITE DRAINAGE SURFACE WATER
SHEET 3

SCALE:
A1 = 1:200
A3 = 1:400

SEC DWG.NO.:
1017 . C0 . 750 . 003
PROJECT NO. GR. NO. SHT.

REV. 01



EXISTING DRAINAGE TO BE PROTECTED IN AREAS WITH LESS THAN 1200mm COVER.

EXISTING DRAINAGE MANHOLE EX/A/MH-1.0 TO BE REPLACED. NEW MANHOLE:
- TYPE B MANHOLE. 1200mmø.
- COVER–D400 LOADING.
- 600mm MINIMUM ROCKER PIPES TO EACH SIDE TO SUIT EXISTING SEWER DIAMETERS. SEALED PREFORMED CONNECTIONS BETWEEN NEW & EXISTING SEWERS REQUIRED.
- INVERT LEVEL TO MATCH THE EXISTING (≈9.140m AOD).

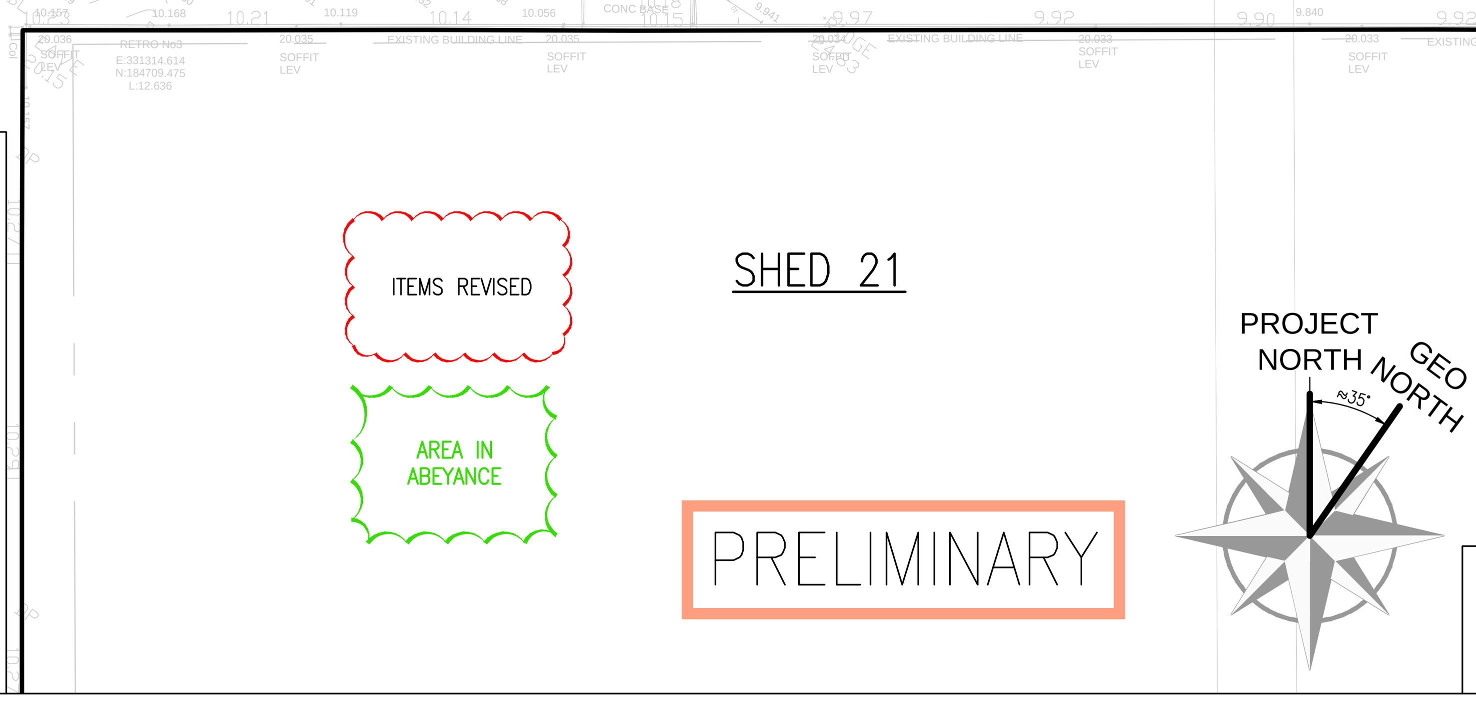
ALL EXISTING RWP DRAINAGE TO SHED 11A MAY NEED PROTECTION AND OR RELAYING (LOWERING) IF CLASHING WITH THE PROPOSED KERBS OCCURS.

EXISTING 300mmø DRAINAGE TO BE PROTECTED IN AREAS WITH LESS THAN 1200mm COVER.

BOTH THESE TWO EXISTING GULLIES AND LATERALS CAN BE REMOVED. A SMALL LENGTH OF LATERAL TO REMAIN (SAY 150mm) AND CAPPED TO ENSURE A SEAL OCCURS.

FOUNDATION DETAILS REQUIRED. PROTECTION TO EXISITING SEWER REQUIRED AT MINIMUM, OR POSSIBLY A LOCAL DIVERSION WILL NEED TO BE ACCOMMODATED.

EX/A/MH-1.1
CL 9.840
IL 8.910



LEGEND:

	PROPERTY BOUNDARY		SURFACE WATER SEWER RISING MAIN		KERBDRAIN (ACO OR SIMILAR)
	PLANNING BOUNDARY	RG	ROAD GULLY		KERB DRAIN ACCESS BOX
	SURFACE WATER MANHOLE		SURFACE WATER DRAINAGE CHANNEL		CAST IRON OR PCC CONCRETE SEWER
R	RAINWATER HARVESTING WATER MANHOLE		SURFACE WATER TRASH BOX		SURFACE WATER INSPECTION CHAMBER (PIC)
			SYPHONIC DOWNPIPES & LATERALS BY SPECIALIST	ExSWS	EXISTING SURFACE WATER DRAINAGE
PS	SURFACE PUMP STATION		RAINWATER HARVESTING TANK		ATTENUATION TANK (WEHOLITE)
	SEPARATOR	LD	LINED LAND DRAIN	RWP	SURFACE WATER RAIN WATER DOWN PIPE
SW	PRIVATE SURFACE WATER SEWER		POROUS PAVING DRAINAGE CONNECTION UNITS. PERMAVOID – LENGTH & WIDTH TBC		
	PRIVATE RAINWATER HARVESTING SEWER		LINED BLOCK POROUS PAVING		

- V=VENTED PIPE
- PEN=PENSTOCK
- PS=PUMP STATION
- VC=VALVE CHAMBER
- C=CATCHPIT MANHOLE

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

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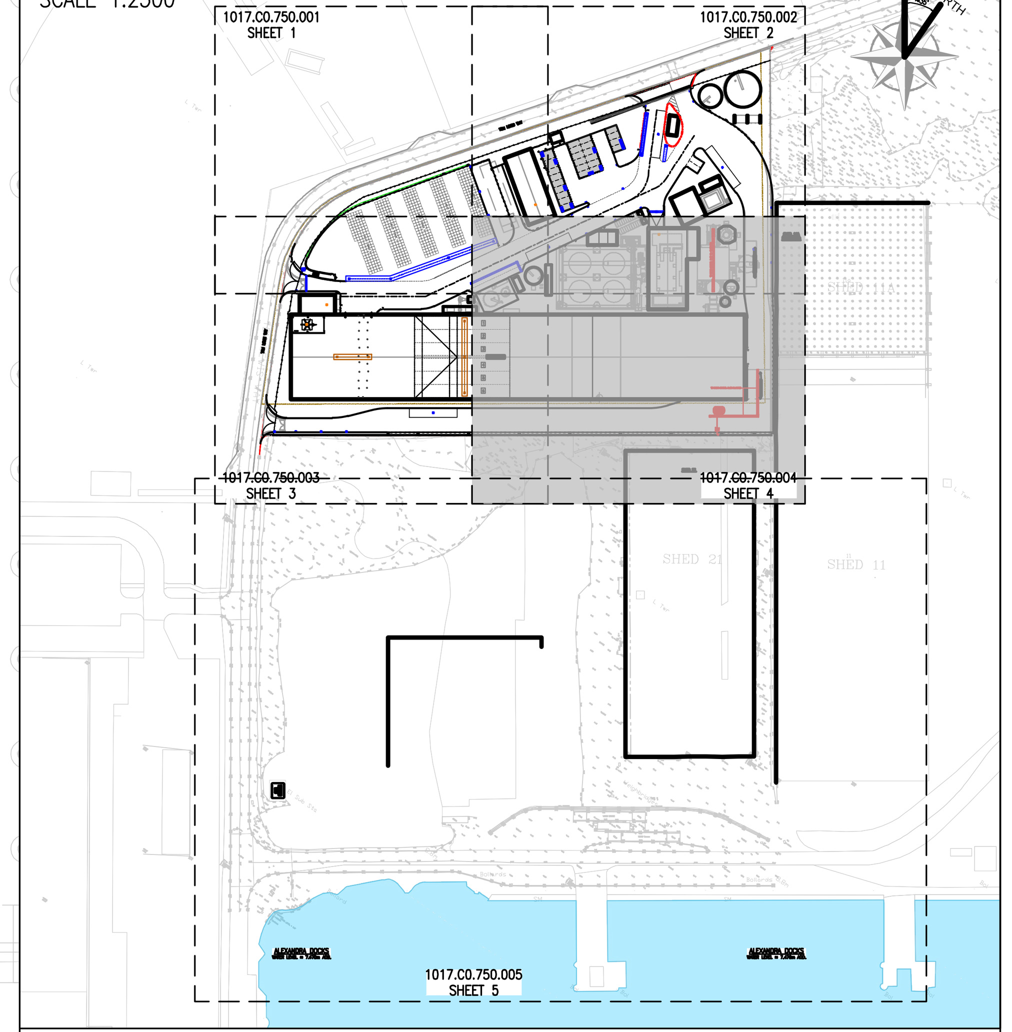
CONSTRUCTION

DEMOLITION

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

LOCATION PLAN
SCALE 1:2500



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146083–NWE–HP1537–BUR–05–ULF–STR–DRW–116000–A1–C3
CITY SURVEY LTD: CSGP007435–SU–DRG–004 – 006 WITH TRIAL HOLE INFORMATION

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
01	14.12.2022	TD	JDF	BASE LAYOUT INFORMATION & DRAINAGE UPDATED. NOT CLOUDED FOR CLARITY.	MJT
00	18.01.22	TD	JDF	FIRST ISSUE.	MJT

OWNER:
RDF ENERGY NO. 1 LTD
TOM LEWIS WAY, ALEXANDRA DOCK
NEWPORT, WALES
UK NP20 2WF
TELEPHONE :+44 01782 384898

SPONSOR:
AVIVA
ST HELEN'S, 1 UNDERSHAFT
LONDON, EC3P 3DQ
UK, VAT REG NO. 220227168
TELEPHONE :+44 (0)207 809 6000

PROJECT MANAGER:
CoGen
BLYTHE HOUSE, BLYTHE PARK,
CRESSWELL, STOKE ON TRENT,
STAFFORDSHIRE ST11–9RD, UK
TELEPHONE :+44 01782 384898

CONTRACTOR:
SCANDINAVIAN ENERGY CONTRACTOR
GYDEVANG 39–41
DK 3450 ALLEROED, DENMARK
PHONE :+45 3226 6401
EMAIL :WWW.SECONTRACTOR.DK

PROJECT:
NEWPORT ENERGY
FROM WASTE PLANT

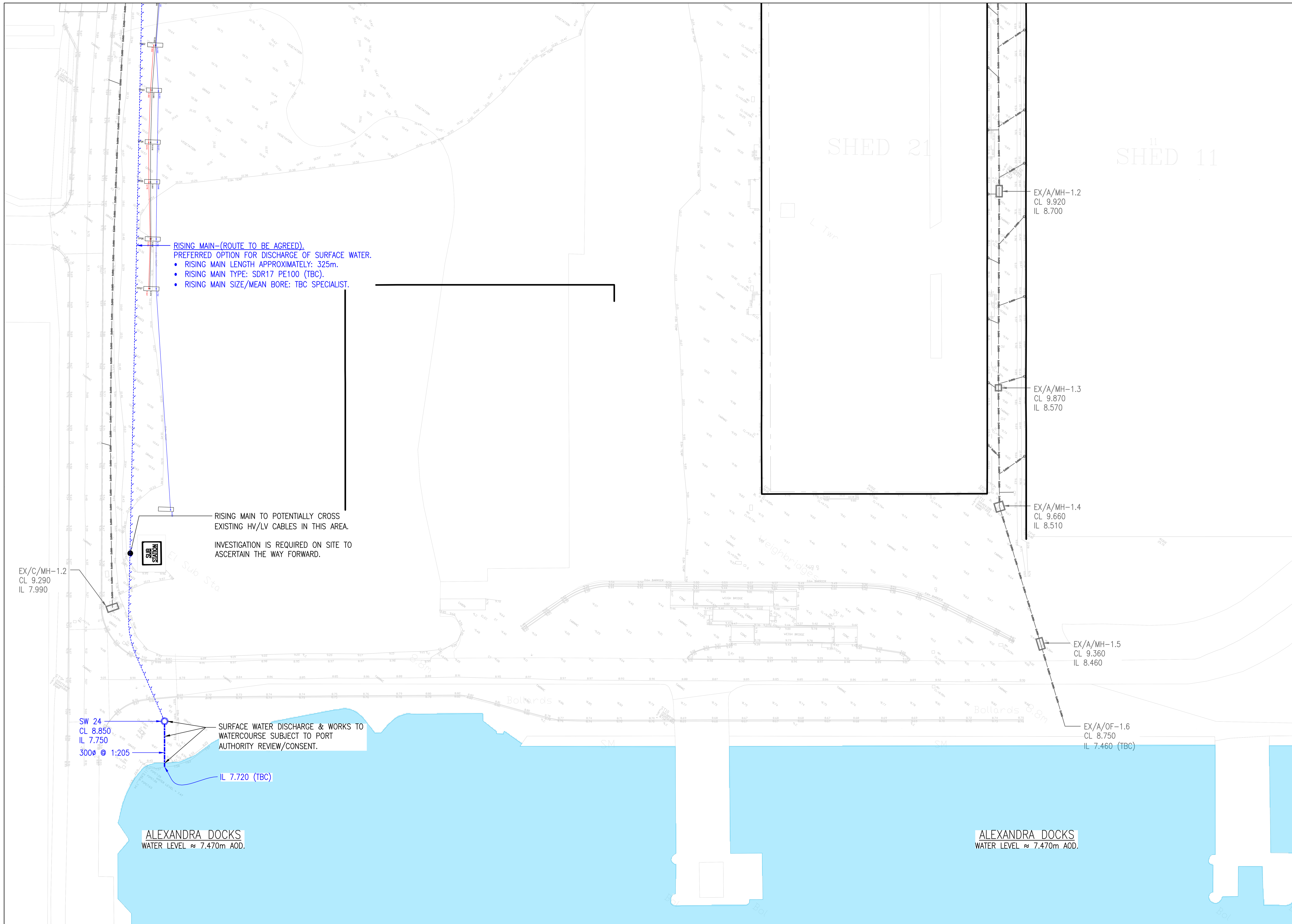
SUB-CONTRACTOR:
FAIRHURST

SUBJECT:
SITE DRAINAGE SURFACE WATER
SHEET 4

SCALE:
A1 = 1:200
A3 = 1:400

SEC DWG.NO.:
1017.C0.750.004
REV. 01

1017.C0.750.004



LEGEND:

PROPERTY BOUNDARY	SURFACE WATER SEWER RISING MAIN
PLANNING BOUNDARY	RG ROAD GULLY
SURFACE WATER MANHOLE	SURFACE WATER DRAINAGE CHANNEL
RAINWATER HARVESTING WATER MANHOLE	SURFACE WATER TRASH BOX
SURFACE PUMP STATION	SYPHONIC DOWNPIPES & LATERALS BY SPECIALIST
SEPARATOR	RAINWATER HARVESTING TANK
PRIVATE SURFACE WATER SEWER	LINED LAND DRAIN
PRIVATE RAINWATER HARVESTING SEWER	POROUS PAVING DRAINAGE CONNECTION UNITS. PERMAVOID – LENGTH & WIDTH TBC
	LINED BLOCK POROUS PAVING
KERBDRAIN (ACO OR SIMILAR)	KERB DRAIN ACCESS BOX
CAST IRON OR PCC CONCRETE SEWER	SURFACE WATER INSPECTION CHAMBER (PIC)
EXISTING SURFACE WATER DRAINAGE	ATTENUATION TANK (WEHOLITE)
RWP SURFACE WATER RAIN WATER DOWN PIPE	

- V=VENTED PIPE
- PEN=PENSTOCK
- PS=PUMP STATION
- VC=VALVE CHAMBER
- C=CATCHPIT MANHOLE

PRELIMINARY

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

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CONSTRUCTION

DEMOLITION

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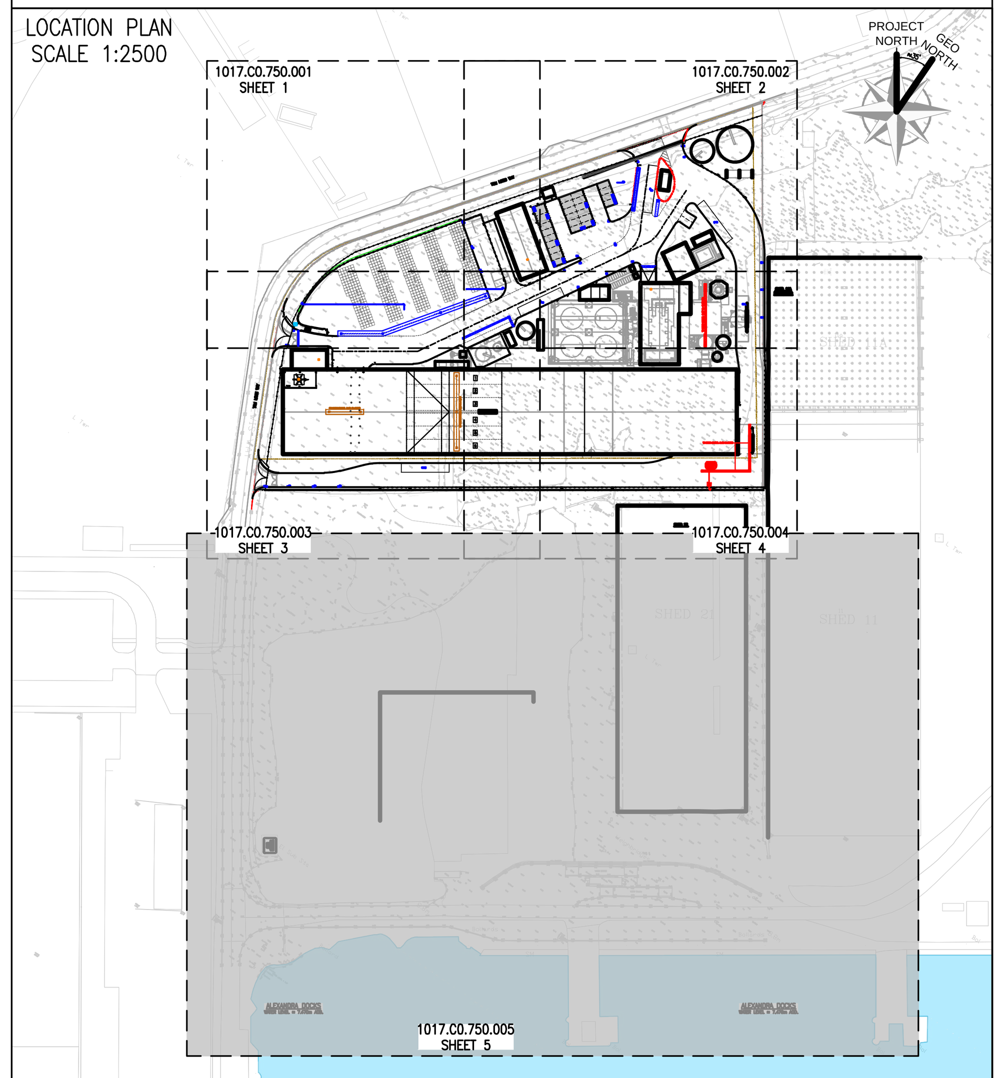
LOCATION PLAN
SCALE 1:2500



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146083-NWE-HP1537-BUR-05-ULF-STR-DRW-116000-A1-C3
CITY SURVEY LTD: CSGP007435-SU-DRG-004 – 006 WITH TRIAL HOLE INFORMATION

1017.C0.750.005

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
01	14.12.2022	TD	JDF	BASE LAYOUT INFORMATION & DRAINAGE UPDATED. NOT CLOUDED FOR CLARITY.	MJT
00	18.01.22	TD	JDF	FIRST ISSUE.	MJT

OWNER:
RDF ENERGY NO. 1 LTD
TOM LEWIS WAY, ALEXANDRA DOCK
NEWPORT, WALES
UK NP20 2WF
TELEPHONE :+44 01782 384898

SPONSOR:
AVIVA
ST HELEN'S, 1 UNDERSHAFT
LONDON, EC3P 3DQ
UK, VAT REG NO. 220227168
TELEPHONE :+44 (0)207 809 6000

PROJECT MANAGER:
CoGen
BLYTHE HOUSE, BLYTHE PARK,
CRESSWELL, STOKE ON TRENT,
STAFFORDSHIRE ST11-9RD, UK
TELEPHONE :+44 01782 384898

CONTRACTOR:
SCANDINAVIAN ENERGY CONTRACTOR
GYDEVANG 39-41
DK 3450 ALLEROED, DENMARK
PHONE :+45 3226 6401
EMAIL :WWW.SECONTRACTOR.DK

PROJECT:
NEWPORT ENERGY FROM WASTE PLANT

SUB-CONTRACTOR:
FAIRHURST
OAK HOUSE
REEDS CRESCENT
WATFORD
WD24 4QP
TELEPHONE :+44 (0)1923 210 460
EMAIL :watford@fairhurst.co.uk

SUBJECT:
SITE DRAINAGE SURFACE WATER
SHEET 5

SCALE:
A1 = 1:500
A3 = 1:1000

SEC DWG.NO.:
1017 : C0 . 750 . 005
PROJECT NO. GR. NO. SHT.
01 REV.

LEGEND:

- PROPERTY BOUNDARY
- PLANNING BOUNDARY
- FOUL WATER MANHOLE
- TRADE EFFLUENT WATER MANHOLE
- PRIVATE FOUL WATER SEWER
- PRIVATE TRADE EFFLUENT SEWER
- FOUL WATER RISING MAIN
- TRADE EFFLUENT RISING MAIN
- SEPARATOR
- FOUL GULLY (INTERNAL)
- FOUL GULLY (EXTERNAL)
- SOIL VENT PIPE (SVP)
- STUB STACK (SS)
- FOUL INSPECTION CHAMBER (PIC)
- TRADE EFFLUENT DRAINAGE CHANNEL
- TRADE EFFLUENT TRASH BOX
- TRADE EFFLUENT GULLY (EXTERNAL)
- TRADE EFFLUENT GULLY (INTERNAL)
- FOUL LINEAR DRAINAGE CHANNEL
- TRADE EFFLUENT STORAGE TANK
- FOUL TREATMENT PLANT
- TRADE EFFLUENT STORAGE TANK (DETAILS TO BE DEVELOPED WITH SEC)

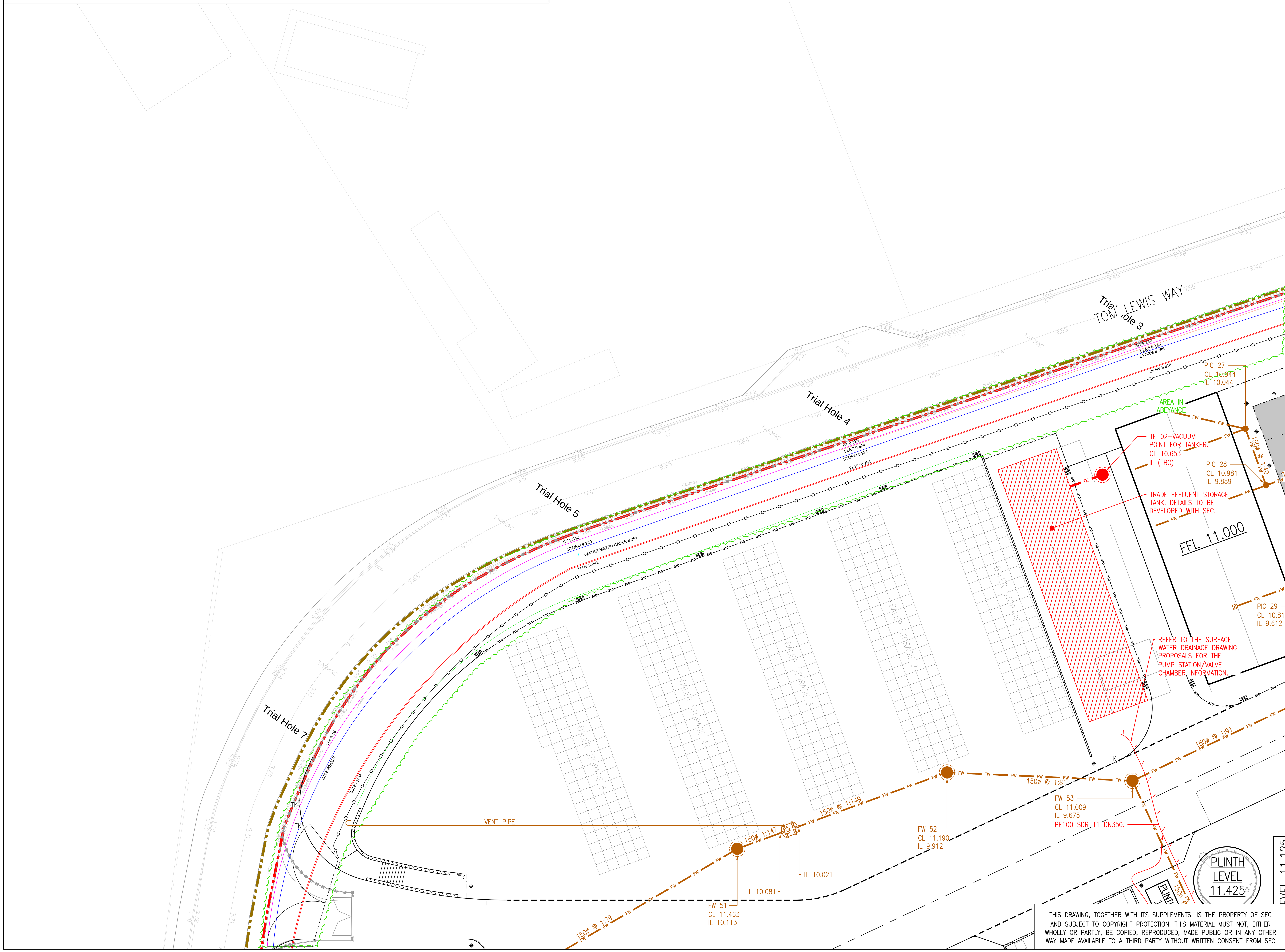
ITEMS REVISED

AREA IN ABEYANCE

PRELIMINARY

PROJECT NORTH

GEO NORTH



1017.C0.750.011

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

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CONSTRUCTION

DEMOLITION

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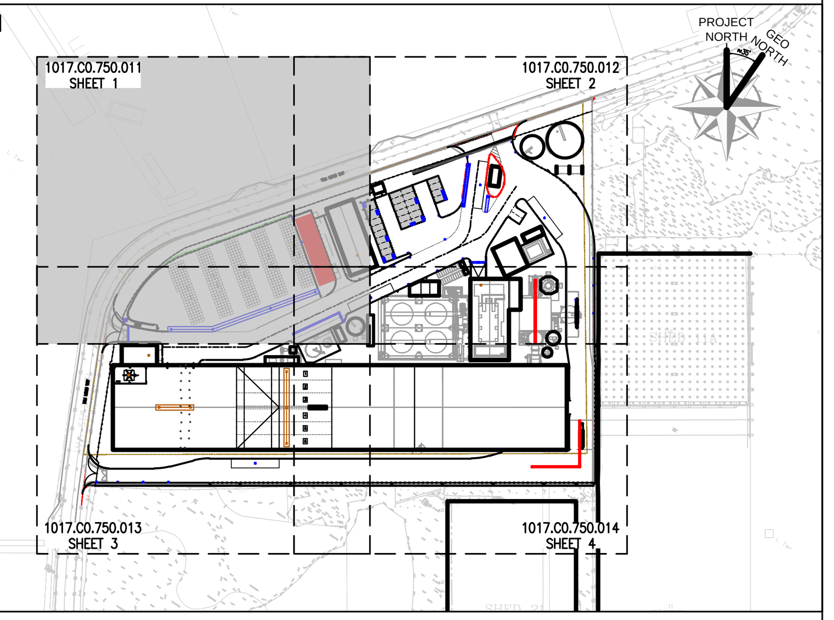
LOCATION PLAN
SCALE 1:2500



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00	07.12.2021	TD	JDF	FIRST ISSUE.	MJT

OWNER:
RDF ENERGY NO. 1 LTD
TOM LEWIS WAY, ALEXANDRA DOCK
NEWPORT, WALES
UK NP20 2WF
TELEPHONE :+44 01782 384898

SPONSOR:
AVIVA
ST HELEN'S, 1 UNDERSHAFT
LONDON, EC3P 3DQ
UK, VAT REG NO. 220227168
TELEPHONE :+44 (0)207 809 6000

PROJECT MANAGER:
CoGen
BLYTHE HOUSE, BLYTHE PARK,
CRESSWELL, STOKE ON TRENT,
STAFFORDSHIRE ST11–9RD, UK
TELEPHONE :+44 01782 384898

CONTRACTOR:
SCANDINAVIAN ENERGY CONTRACTOR
GYDEVANG 39–41
DK 3450 ALLEROED, DENMARK
PHONE :+45 3226 6401
EMAIL :WWW.SECONTRACTOR.DK

PROJECT:
NEWPORT ENERGY FROM WASTE PLANT

SUB–CONTRACTOR:
FAIRHURST
OAK HOUSE
REEDS CRESCENT
WATFORD
WD24 4QP
TELEPHONE :+44 (0)1923 210 460
EMAIL :watford@fairhurst.co.uk

SUBJECT:
SITE DRAINAGE FOUL & TRADE EFFLUENT
SHEET 1

SCALE:
A1 = 1:200
A3 = 1:400

SEC DWG.NO.: 1017.C0.750.011 (PROJECT NO. / GR. / NO. / SHT.)

REV. 02

LEGEND:

PROPERTY BOUNDARY	FOUL GULLY (INTERNAL)
PLANNING BOUNDARY	FOUL GULLY (EXTERNAL)
FOUL WATER MANHOLE	SOIL VENT PIPE (SVP)
TRADE EFFLUENT WATER MANHOLE	STUB STACK (SS)
PRIVATE FOUL WATER SEWER	FOUL INSPECTION CHAMBER (PIC)
PRIVATE TRADE EFFLUENT SEWER	TRADE EFFLUENT DRAINAGE CHANNEL
FOUL WATER RISING MAIN	TRADE EFFLUENT TRASH BOX
TRADE EFFLUENT RISING MAIN	TRADE EFFLUENT GULLY (EXTERNAL)
SEPARATOR	TRADE EFFLUENT GULLY (INTERNAL)

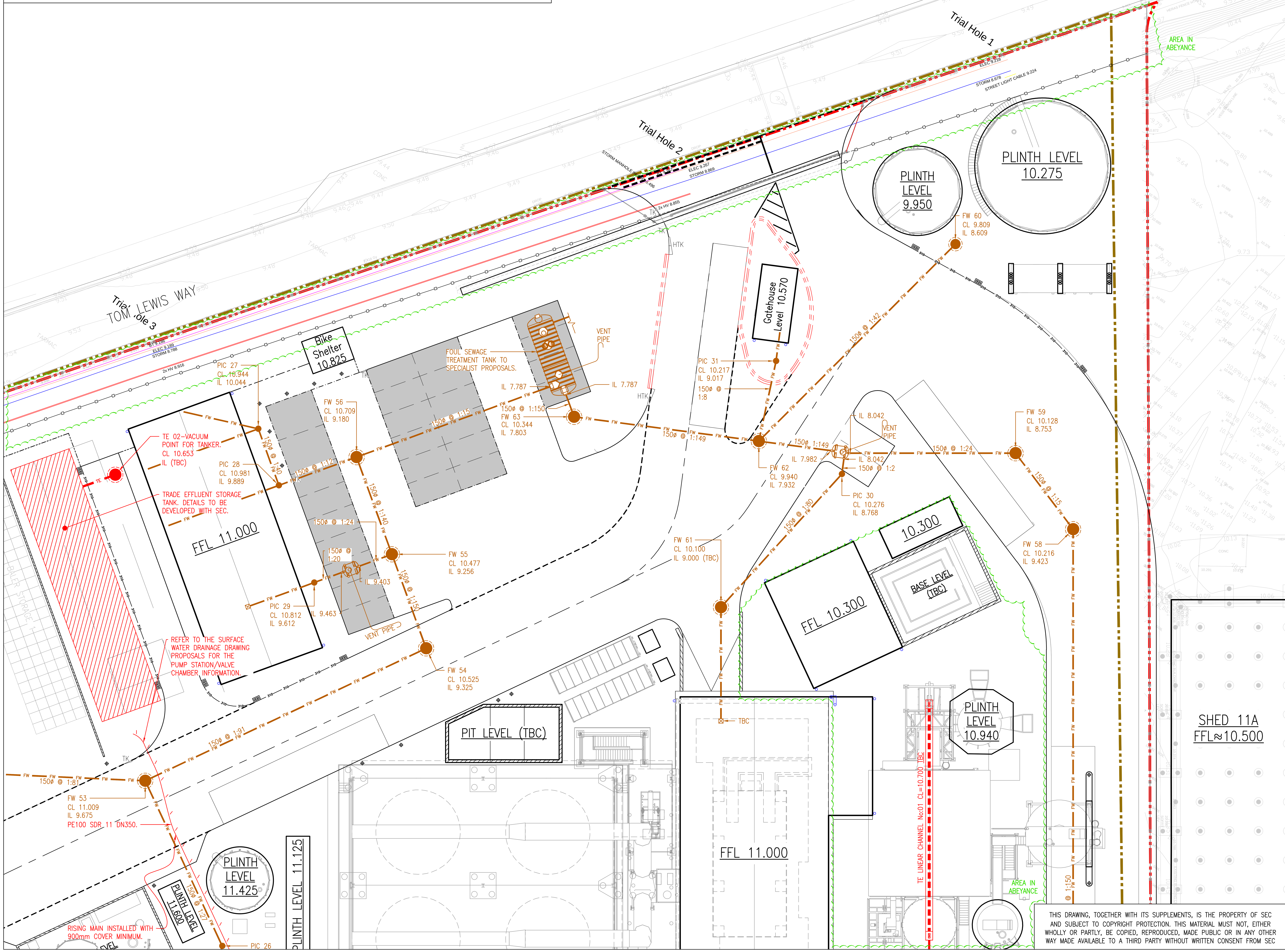
FOUL LINEAR DRAINAGE CHANNEL
TRADE EFFLUENT STORAGE TANK
FOUL TREATMENT PLANT
TRADE EFFLUENT STORAGE TANK (DETAILS TO BE DEVELOPED WITH SEC)

PROJECT NORTH
GEO NORTH

PRELIMINARY

ITEMS REVISED

AREA IN ABEYANCE



SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

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CONSTRUCTION

DEMOLITION

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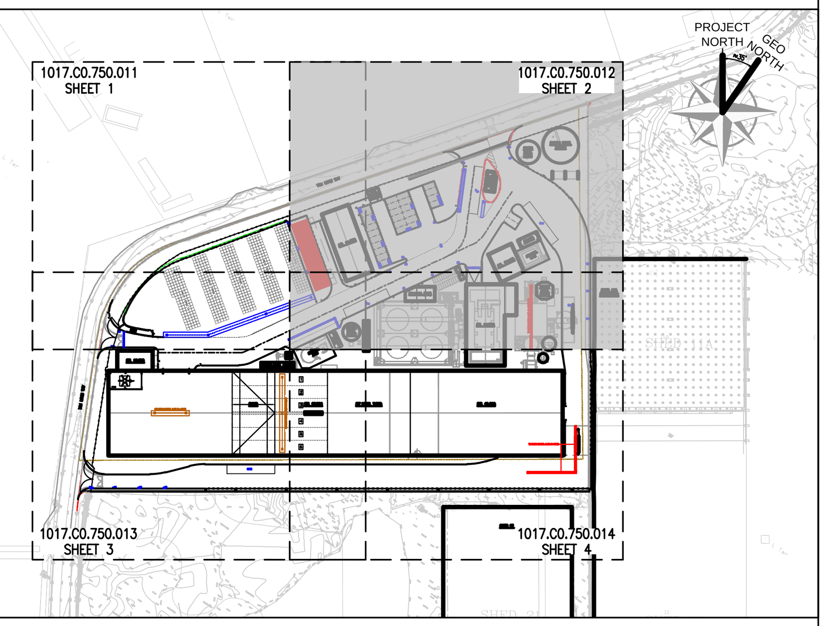
LOCATION PLAN
SCALE 1:2500



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1017.C0.750.012

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OWNER:
RDF ENERGY NO. 1 LTD
TOM LEWIS WAY, ALEXANDRA DOCK NEWPORT, WALES UK NP20 2WF TELEPHONE :+44 01782 384898

SPONSOR:
AVIVA
ST HELEN'S, 1 UNDERSHAFT LONDON, EC3P 3DQ UK, VAT REG NO. 220227168 TELEPHONE :+44 (0)207 809 6000

PROJECT MANAGER:
CoGen
BLYTHE HOUSE, BLYTHE PARK, CRESSWELL, STOKE ON TRENT, STAFFORDSHIRE ST11-9RD, UK TELEPHONE :+44 01782 384898

CONTRACTOR:
SCANDINAVIAN ENERGY CONTRACTOR
GYDEVANG 39-41 DK 3450 ALLEROED, DENMARK PHONE :+45 3226 6401 EMAIL :WWW.SECONTRACTOR.DK

PROJECT:
NEWPORT ENERGY FROM WASTE PLANT

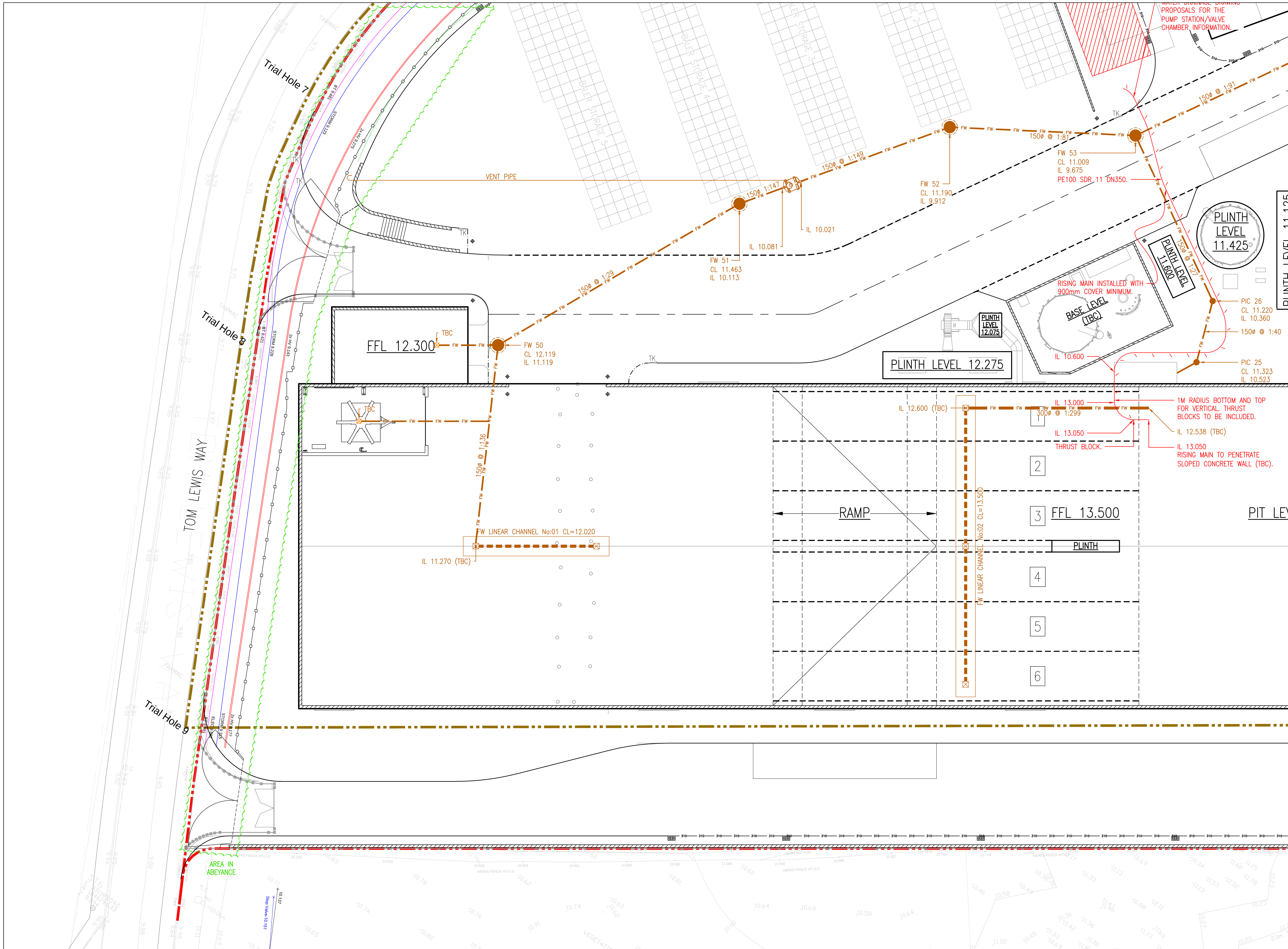
SUB-CONTRACTOR:
FAIRHURST

SUBJECT:
SITE DRAINAGE FOUL & TRADE EFFLUENT
SHEET 2

SCALE:
A1 = 1:200
A3 = 1:400

SEC DWG.NO.:
1017.C0.750.012
PROJECT NO. GR. NO. SHT.

02 REV.



LEGEND:

PROPERTY BOUNDARY		FOUL GULLY (INTERNAL)		FOUL LINEAR DRAINAGE CHANNEL	
PLANNING BOUNDARY		FOUL GULLY (EXTERNAL)		TRADE EFFLUENT STORAGE TANK	
FOUL WATER MANHOLE		SOIL VENT PIPE (SVP)		FOUL TREATMENT PLANT	
TRADE EFFLUENT WATER MANHOLE		STUB STACK (SS)		TRADE EFFLUENT STORAGE TANK (DETAILS TO BE DEVELOPED WITH SEC)	
PRIVATE FOUL WATER SEWER		FOUL INSPECTION CHAMBER (PIC)			
PRIVATE TRADE EFFLUENT SEWER		TRADE EFFLUENT DRAINAGE CHANNEL			
FOUL WATER RISING MAIN		TRADE EFFLUENT TRASH BOX			
TRADE EFFLUENT RISING MAIN		TRADE EFFLUENT GULLY (EXTERNAL)			
SEPARATOR		TRADE EFFLUENT GULLY (INTERNAL)			

ITEMS REVISED

AREA IN ABEYANCE

PRELIMINARY

PROJECT NORTH

GEO NORTH

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

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CONSTRUCTION

DEMOLITION

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LOCATION PLAN
SCALE 1:2500

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146083-NWE-HP1537-BUR-05-ULF-STR-DRW-116000-A1-C3
CITY SURVEY LTD: CSGP007435-SU-DRG-004 - 006 WITH TRIAL HOLE INFORMATION

NOT YET ISSUED AS REVISION 01

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CONTRACTOR:
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GYDEVANG 39-41
DK 3450 ALLEROED, DENMARK
PHONE :+45 3226 6401
EMAIL :WWW.SECONTRACTOR.DK

PROJECT:
NEWPORT ENERGY FROM WASTE PLANT

SUB-CONTRACTOR:
FAIRHURST

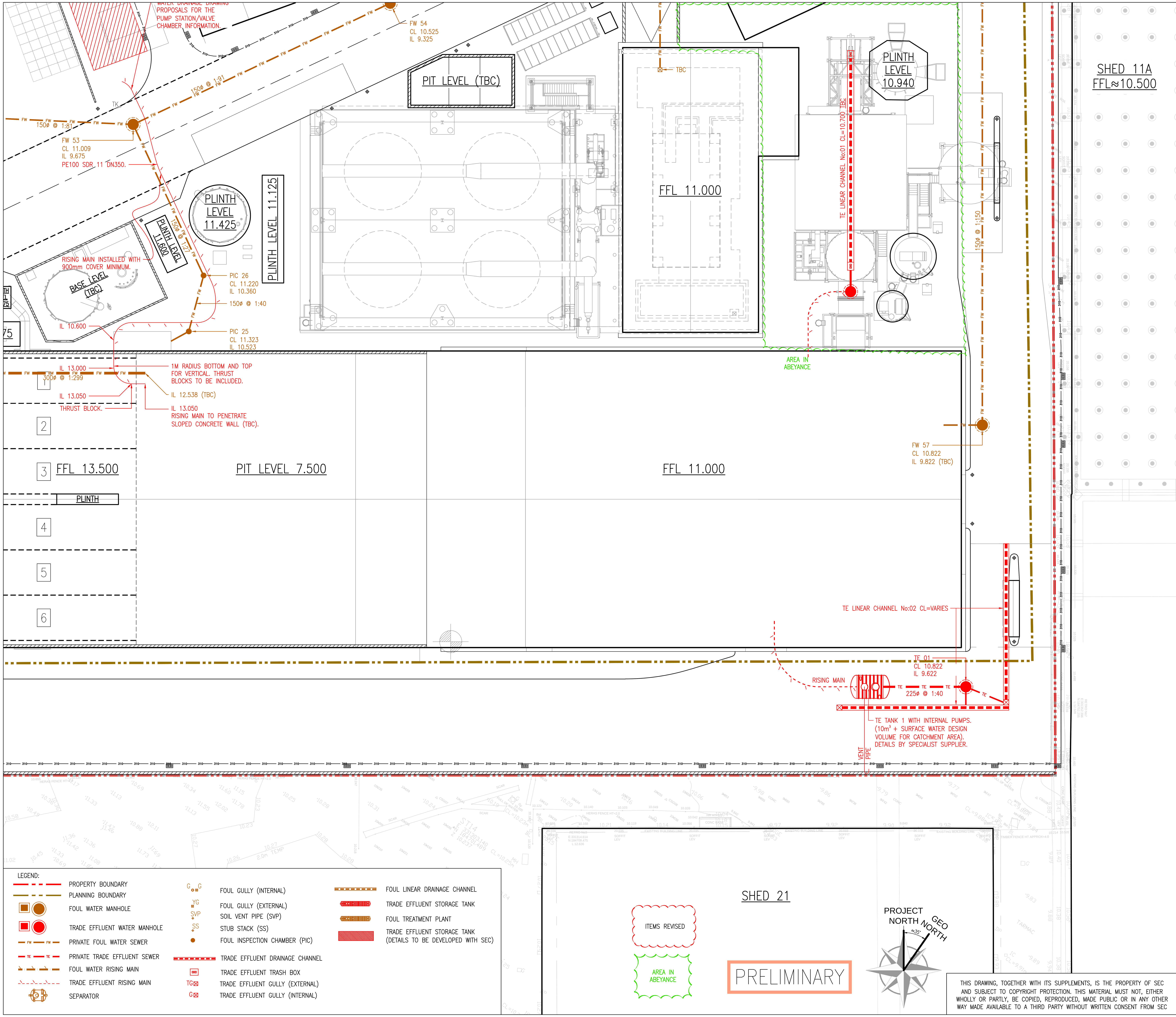
SUBJECT:
SITE DRAINAGE FOUL & TRADE EFFLUENT
SHEET 3

SCALE:
A1 = 1:200
A3 = 1:400

SEC DWG.NO.:
1017 . C0 . 750 . 013

REV. 02

1017.C0.750.013



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1017.C0.750.014

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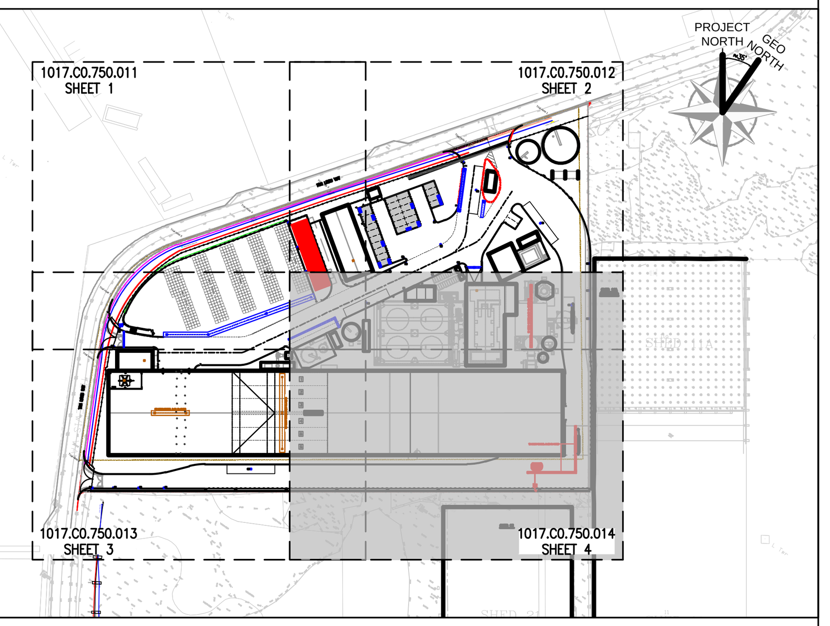
LOCATION PLAN
SCALE 1:2500



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NEWPORT, WALES
UK NP20 2WF
TELEPHONE :+44 01782 384898

SPONSOR:
AVIVA
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TELEPHONE :+44 (0)207 809 6000

PROJECT MANAGER:
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CONTRACTOR:
SCANDINAVIAN ENERGY CONTRACTOR
GYDEVANG 39-41
DK 3450 ALLEROED, DENMARK
PHONE :+45 3226 6401
EMAIL :WWW.SECONTRACTOR.DK

PROJECT:
NEWPORT ENERGY FROM WASTE PLANT

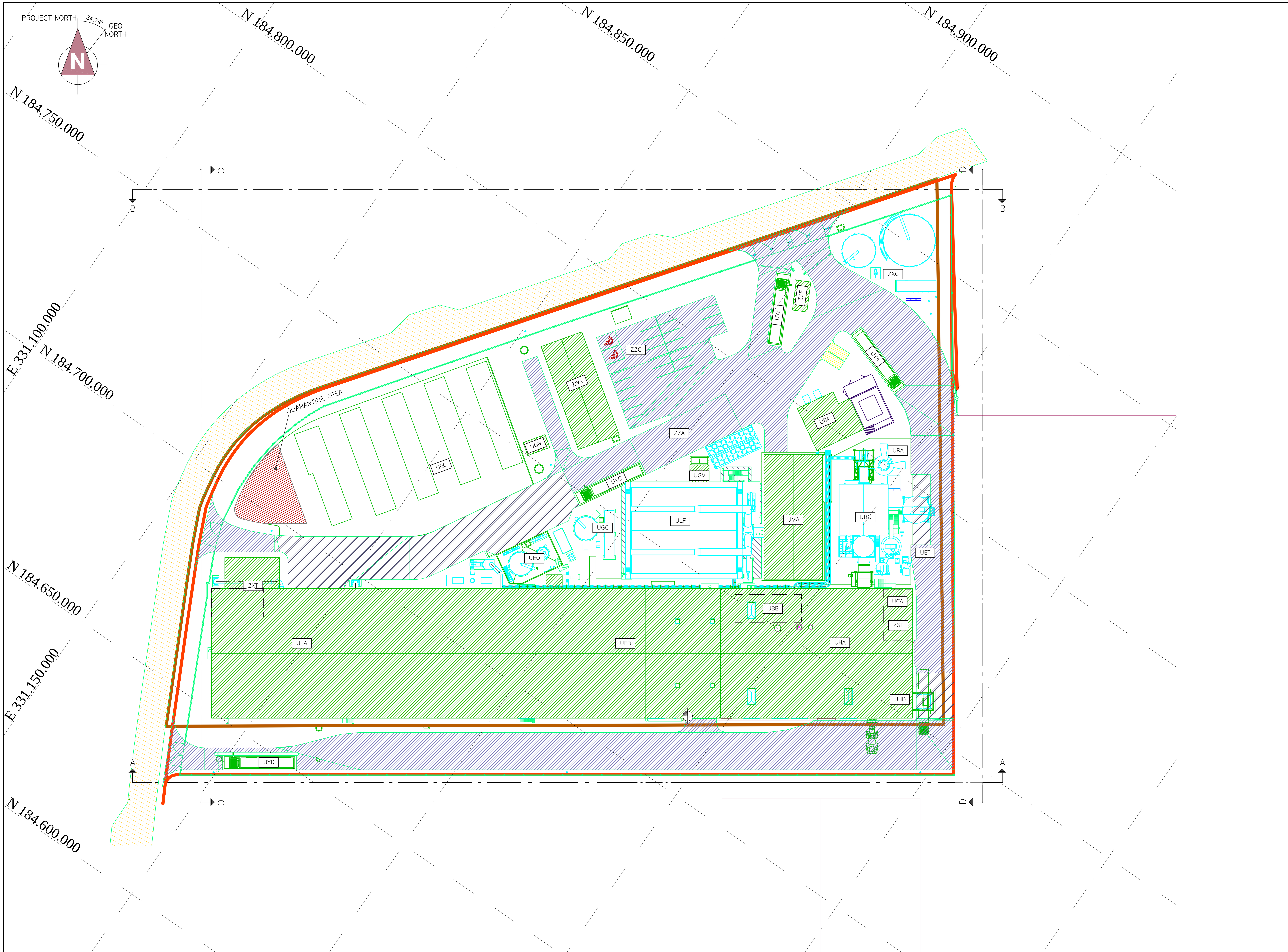
SUB-CONTRACTOR:
FAIRHURST
OAK HOUSE
REEDS CRESCENT
WATFORD
WD24 4QP
TELEPHONE :+44 (0)1923 210 460
EMAIL :watford@fairhurst.co.uk

SUBJECT:
SITE DRAINAGE FOUL & TRADE EFFLUENT
SHEET 4

SCALE:
A1 = 1:200
A3 = 1:400

SEC DWG.NO.: 1017.C0.750.014 (PROJECT NO. / GR. / NO. / SHT.)

REV. 02



UBA	SWITCHGEAR BUILDING
UBB	ELECTRICAL ANNEX (WITHIN UHA)
UCA	CONTROL ROOM BUILDING (WITHIN UHA)
UEA	UNLOADING SOLID FUEL BLDG.
UEB	FUEL BUNKER BUILDING
UEC	SOLID FUEL HANDLING AREA
UEQ	FUEL & UREA TANK AREA
UET	ASH & RESIDUES STORAGE AREA
UGC	WATER TREATMENT AREA
UGM	SEDIMENTATION BASIN
UGN	TRADE EFFLUENT TREATMENT AREA
UHA	BOILER BUILDING
UHD	SLAG STORAGE BUILDING
ULF	AIR COOLED CONDENSER AREA
UMA	TURBINE BUILDING
URA	STACK AREA
URC	FLUE GAS TREATMENT AREA
UYA	WEIGHBRIDGE IN FOR UTILITIES
UYB	WEIGHBRIDGE OUT
UYC	WEIGHBRIDGE IN
UYD	WEIGHBRIDGE OUT FOR UTILITIES
ZST	MECHANICAL WORKSHOP (WITHIN UHA)
ZWA	WELFARE BUILDING
ZXG	RAW WATER & FIRE EQUIPMENT AREA
ZXT	WORKSHOP & SHREDDER PARKING BLDG.
ZZC	PARKING AREA
ZZA	REMAINING SITE
ZZP	GATE HOUSE

LEGEND:

- MECHANICAL EQUIPMENT
- ELECTRICAL EQUIPMENT
- OTHER SUPPLIER
- BUILDINGS
- ASPHALT ROAD
- CONCRETE ROAD
- PAVEMENT
- GRAVEL
- OUTSIDE ROAD
- DNO PARKING
- QUARANTINE AREA
- FENCE
- PLANNING BOUNDARY
- PROPERTY BOUNDARY
- ACCESSIBLE PARKING

REFERENCE:

1017:D2.005.101 SECTION A-A & B-B
1017:D2.007.101 SECTION C-C & D-D

GENERAL NOTES:

NO.: 1. ALL MEASUREMENT IN mm
NO.: 2. ALL LEVELS ARE RELATIVE IN METRE

METRE

0 10 20 30 40 50

ESTIMATE

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
1	2023.01.27	MARVA	STAA		RKNP
0	2022.11.04	MARVA	STAA		RKNP

OWNER:

RDF ENERGY NO. 1 LTD

TOM LEWIS WAY, ALEXANDRA DOCK
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UK NP20 2WF
TELEPHONE :+44 01782 384898

SPONSOR:

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PROJECT MANAGER:

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CONTRACTOR:

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PHONE :+45 3226 6401
EMAIL :WWW.SECONTRACTOR.DK

PROJECT:

NEWPORT ENERGY FROM WASTE PLANT

SUB-CONTRACTOR:

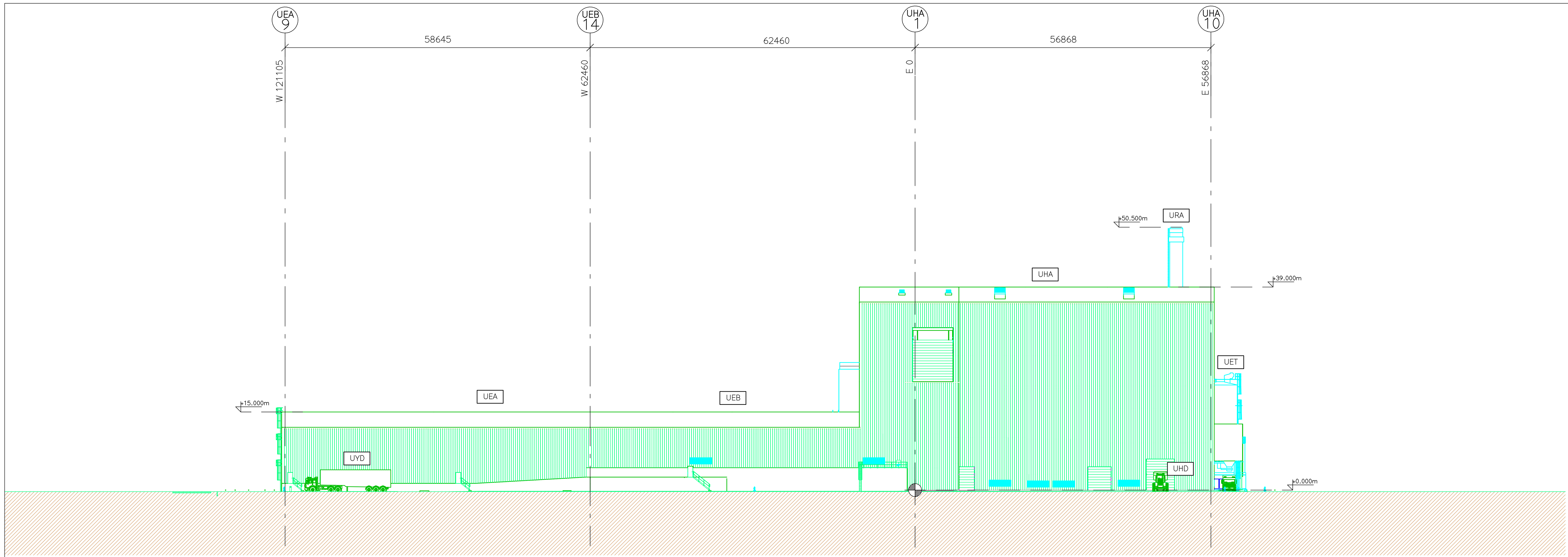
SUBJECT:

SITE PLAN (ZZA)
LAYOUT
GENERAL NEW EFW PLANT

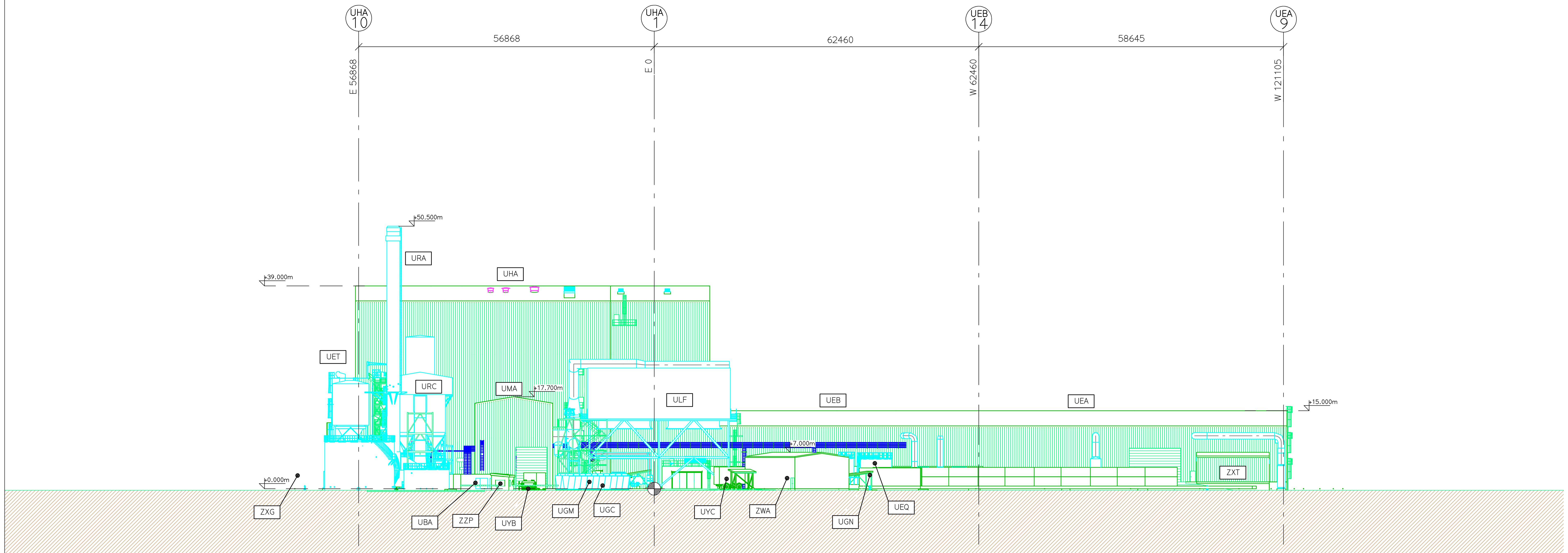
SCALE:
A1=1:500
A3=1:1000

SEC DWG.NO.: 1017 (PROJECT NO.) : D2 (GR.) . 001 (NO.) . 101 (SHT.)

REV. 1



SECTION A–A: LOOK NORTH (PROJECT DIRECTION)



SECTION B–B: LOOK SOUTH (PROJECT DIRECTION)

UBA	SWITCHGEAR BUILDING
UEA	UNLOADING SOLID FUEL BLDG.
UEB	FUEL BUNKER BUILDING
UEQ	FUEL & UREA TANK AREA
UET	ASH & RESIDUES STORAGE AREA
UGC	WATER TREATMENT AREA
UGM	SEDIMENTATION BASIN
UGN	TRADE EFFLUENT TREATMENT AREA
UHA	BOILER BUILDING
UHD	SLAG STORAGE BUILDING
ULF	AIR COOLED CONDENSER AREA
UMA	TURBINE BUILDING
URA	STACK AREA
URC	FLUE GAS TREATMENT AREA
UYB	WEIGHBRIDGE OUT
UYC	WEIGHBRIDGE IN
UYD	WEIGHBRIDGE OUT FOR UTILITIES
ZWA	WELFARE BUILDING
ZXG	RAW WATER & FIRE EQUIPMENT AREA
ZXT	WORKSHOP & SHREDDER PARKING BLDG.
ZZP	GATE HOUSE

LEGEND:

ELECTRICAL EQUIPMENT
MECHANICAL EQUIPMENT
EARTH

GENERAL NOTES:

NO.: 1. ALL MEASUREMENT IN mm
NO.: 2. ALL LEVELS ARE RELATIVE IN METRE

METRE
0 10 20 30 40 50

ESTIMATE

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
1	2023.01.27	MARVA	STAA		RKNP
0	2022.11.04	MARVA	STAA		RKNP

OWNER:
RDF ENERGY NO. 1 LTD
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SPONSOR:
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PROJECT MANAGER:
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PHONE :+45 3226 6401
EMAIL :WWW.SECONTRACTOR.DK

PROJECT:
NEWPORT ENERGY FROM WASTE PLANT

SUB-CONTRACTOR:

SUBJECT:
SITE PLAN (ZZA)
LAYOUT
SECTION A-A & B-B

SCALE:
A1=1:500
A3=1:1000

SEC DWG.NO.:
1017 D2 005 101
PROJECT NO. GR. NO. SHT.

REV. 1

UBA	SWITCHGEAR BUILDING
UCA	CONTROL ROOM BUILDING (WITHIN UHA)
UEA	UNLOADING SOLID FUEL BLDG.
UEQ	FUEL & UREA TANK AREA
UET	ASH & RESIDUES STORAGE AREA
UGC	WATER TREATMENT AREA
UHA	BOILER BUILDING
UHD	SLAG STORAGE BUILDING
ULF	AIR COOLED CONDENSER AREA
UMA	TURBINE BUILDING
URA	STACK AREA
URC	FLUE GAS TREATMENT AREA
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UYB	WEIGHBRIDGE OUT
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UYD	WEIGHBRIDGE OUT FOR UTILITIES
ZST	MECHANICAL WORKSHOP (WITHIN UHA)
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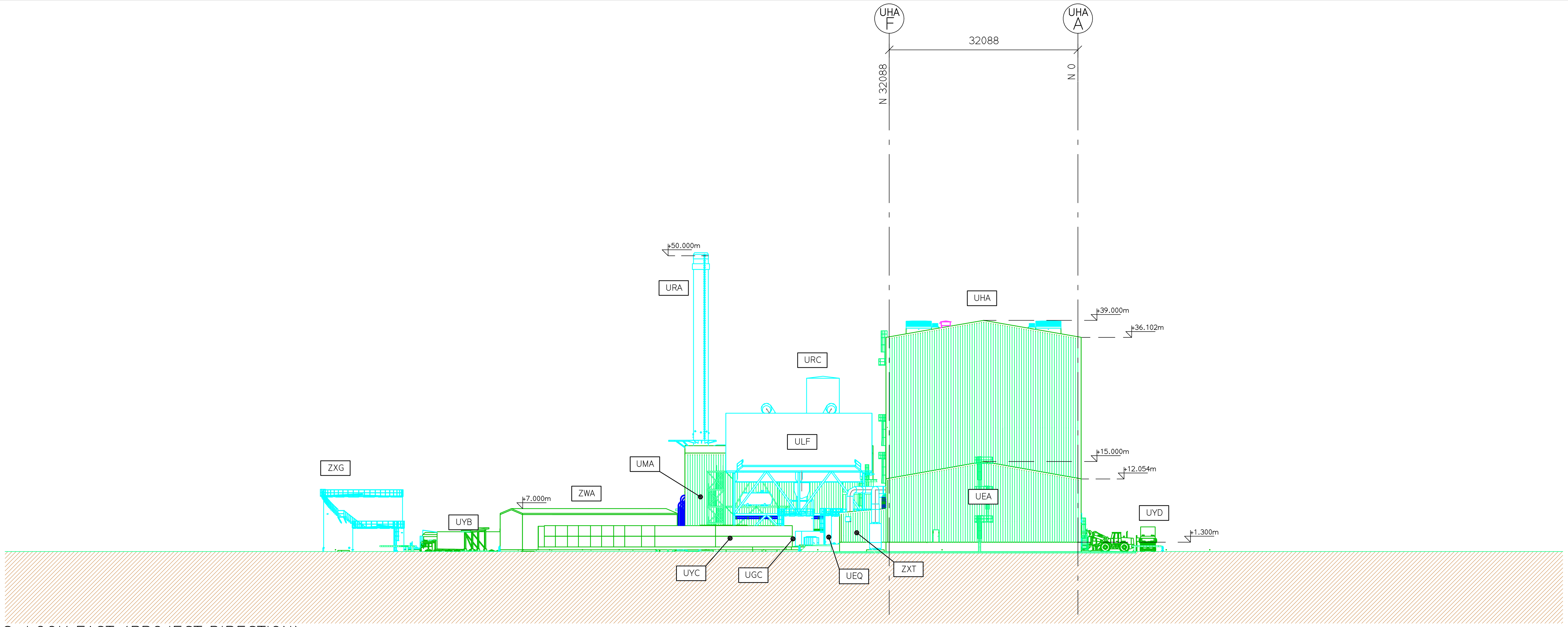
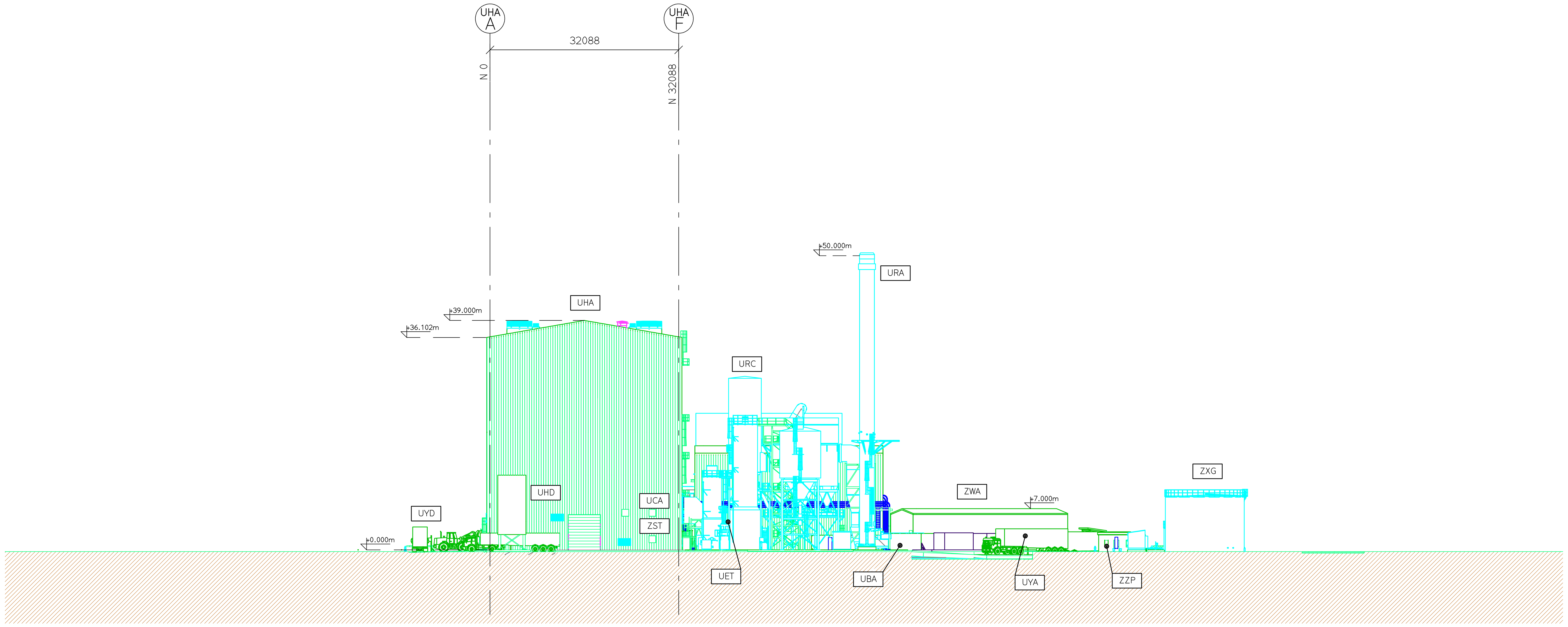
ZXG	RAW WATER & FIRE EQUIPMENT AREA
ZXT	WORKSHOP & SHREDDER PARKING BLDG.
ZZP	GATE HOUSE



SECTION C-C: LOOK EAST (PROJECT DIRECTION)



SECTION D-D: LOOK WEST (PROJECT DIRECTION)

LEGEND:

MECHANICAL EQUIPMENT
ELECTRICAL EQUIPMENT
OTHER SUPPLIER
EARTH

GENERAL NOTES:

NO.: 1. ALL MEASUREMENT IN mm
NO.: 2. ALL LEVELS ARE RELATIVE IN METRE

METRE
0 10 20 30 40 50

ESTIMATE

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
1	2023.01.27	MARVA	STAA		RKNP
0	2022.11.04	MARVA	STAA		RKNP

OWNER:
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PROJECT MANAGER:
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CONTRACTOR:
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PROJECT:
NEWPORT ENERGY FROM WASTE PLANT

SUB-CONTRACTOR:

SUBJECT:
SITE PLAN (ZZA)
LAYOUT
SECTION C-C & D-D

SCALE:
A1=1:500
A3=1:1000

SEC DWG.NO.: 1017 D2 007 101
PROJECT NO. GR. NO. SHT.
REV. 1

UBA	SWITCHGEAR BUILDING
UBB	ELECTRICAL ANNEX (WITHIN UHA)
UCA	CONTROL ROOM BUILDING (WITHIN UHA)
UEA	UNLOADING SOLID FUEL BLDG.
UEB	FUEL BUNKER BUILDING
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ZZC	PARKING AREA
ZZP	GATE HOUSE

LEGEND:

- MECHANICAL EQUIPMENT
- ELECTRICAL EQUIPMENT
- EXISTING BUILDINGS & EQUIPMENT
- OTHER SUPPLIER

ESTIMATE

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
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0	2022.11.04	MARVA	STAA		RKNP

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PROJECT MANAGER:

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PHONE :+45 3226 6401
EMAIL :WWW.SECONTRACTOR.DK

PROJECT:

NEWPORT ENERGY
FROM WASTE PLANT

SUB-CONTRACTOR:

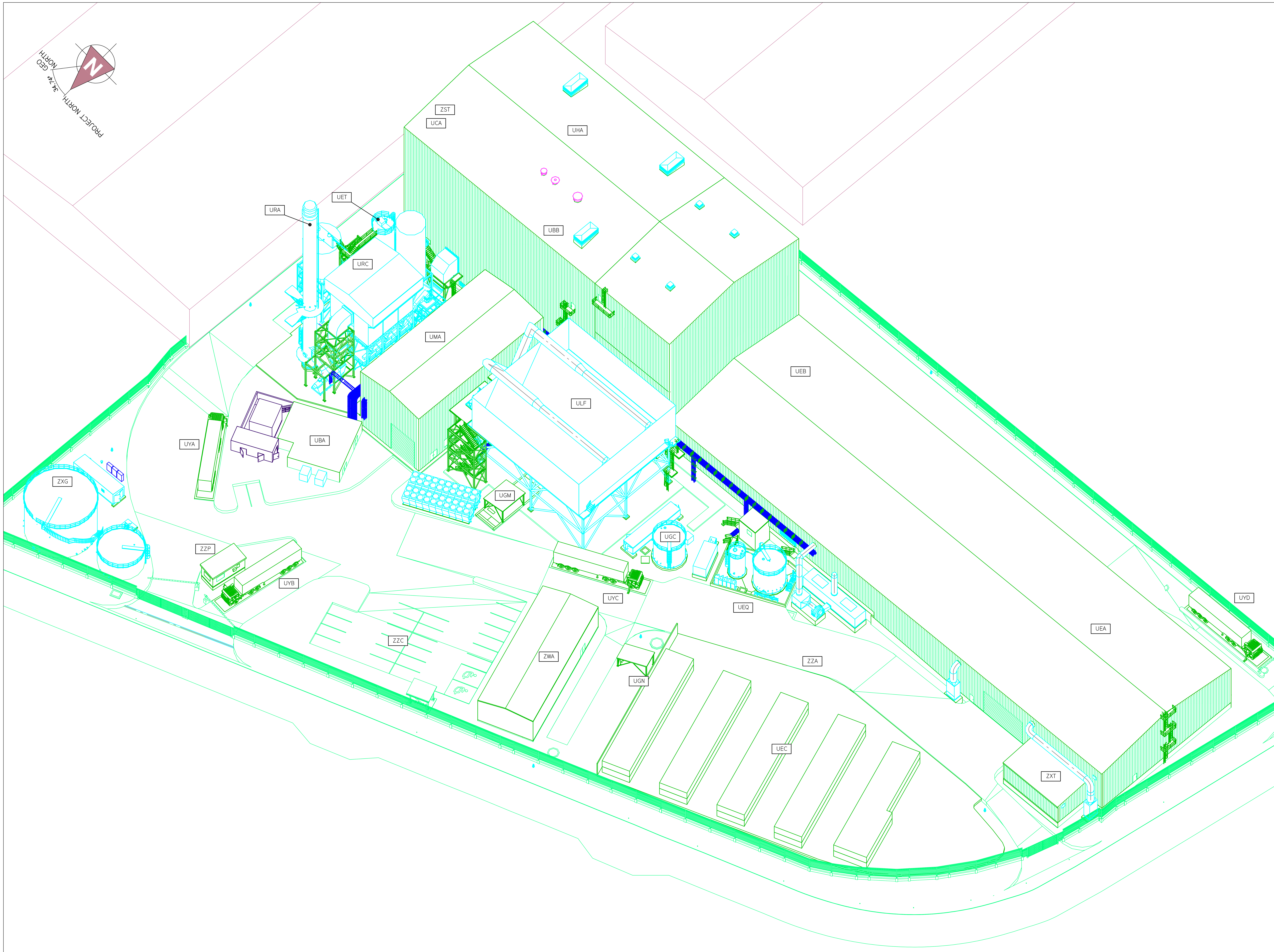
SUBJECT:

SITE PLAN (ZZA)
LAYOUT
3D VIEW: LOOK EAST 45° NORTH 55° DOWN (PROJECT DIRECTION)

SCALE:
A1=NO SCALE
A3=NO SCALE

SEC DWG.NO.: 1017 (PROJECT NO.) : D2 (GR.) . 091 (NO.) . 101 (SHT.)

REV. 1



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UEC	SOLID FUEL HANDLING AREA
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UGM	SEDIMENTATION BASIN
UGN	TRADE EFFLUENT TREATMENT AREA
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UMA	TURBINE BUILDING
URA	STACK AREA
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UYA	WEIGHBRIDGE IN FOR UTILITIES
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ZXG	RAW WATER & FIRE EQUIPMENT AREA
ZZA	REMAINING SITE
ZXT	WORKSHOP & SHREDDER PARKING BLDG.
ZZC	PARKING AREA
ZZP	GATE HOUSE

LEGEND:

- ELECTRICAL EQUIPMENT
- MECHANICAL EQUIPMENT
- EXISTING BUILDINGS & EQUIPMENT
- OTHER SUPPLIER

ESTIMATE

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1	2023.01.27	MARVA	STAA		RKNP
0	2022.11.04	MARVA	STAA		RKNP

OWNER:
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PROJECT MANAGER:
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TELEPHONE :+44 01782 384898

CONTRACTOR:
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DK 3450 ALLEROED, DENMARK
PHONE :+45 3226 6401
EMAIL :WWW.SECONTRACTOR.DK

PROJECT:

NEWPORT ENERGY FROM WASTE PLANT

SUB-CONTRACTOR:

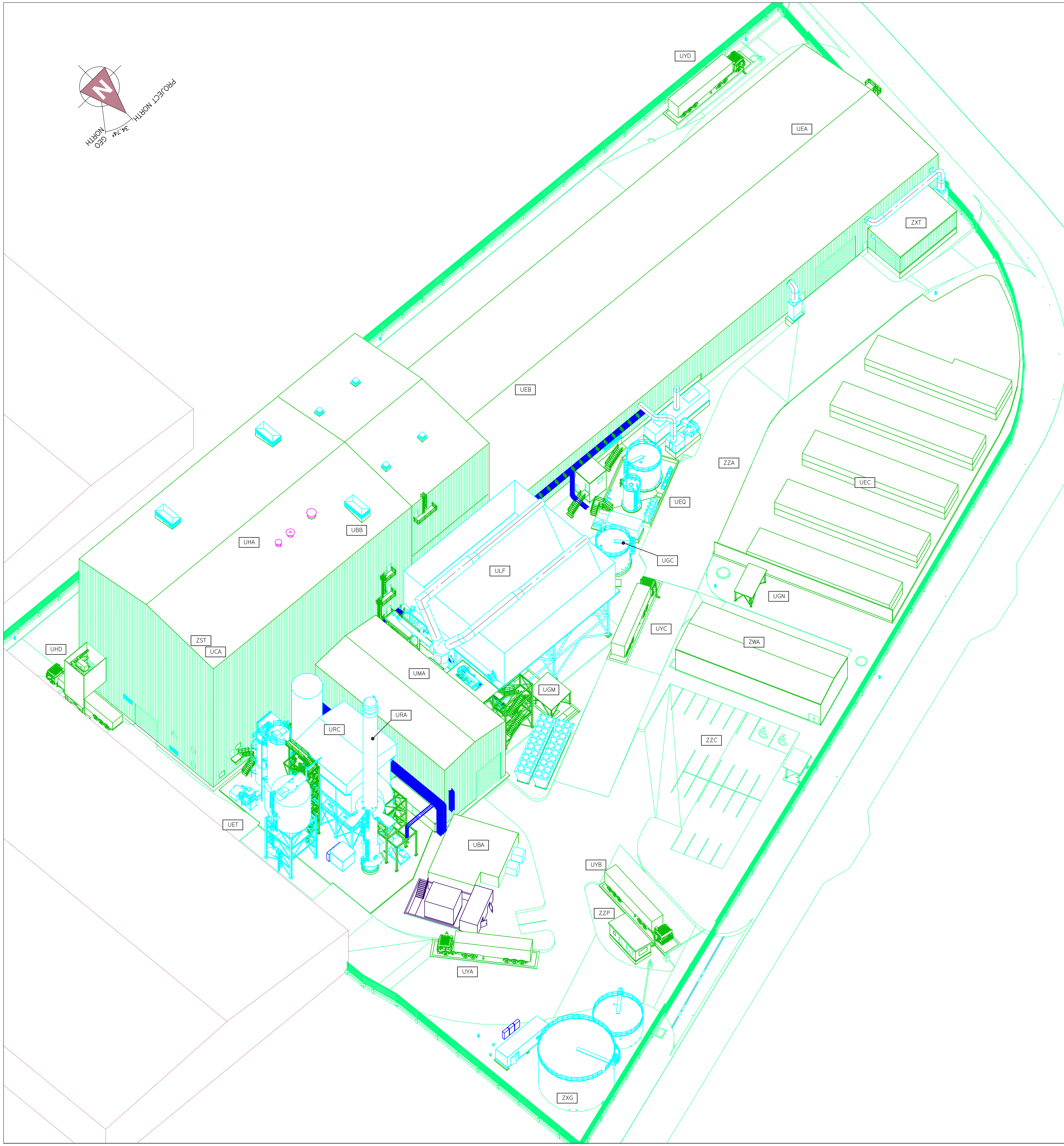
SUBJECT:

SITE PLAN (ZZA)
LAYOUT
3D VIEW: LOOK EAST 45° SOUTH 55° DOWN (PROJECT DIRECTION)

SCALE:
A1=NO SCALE
A3=NO SCALE

SEC DWG.NO.: 1017 (PROJECT NO.) : D2 (GR.) . 092 (NO.) . 101 (SHT.)

REV. 1



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UBB	ELECTRICAL ANNEX (WITHIN UHA)
UCA	CONTROL ROOM BUILDING (WITHIN UHA)
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ZZC	PARKING AREA
ZZP	GATE HOUSE

LEGEND:

- ELECTRICAL EQUIPMENT
- MECHANICAL EQUIPMENT
- EXISTING BUILDINGS & EQUIPMENT
- OTHER SUPPLIER

ESTIMATE

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
1	2023.01.27	MARVA	STAA		RKNP
0	2022.11.04	MARVA	STAA		RKNP

OWNER:

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PROJECT MANAGER:

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EMAIL :WWW.SECONTRACTOR.DK

PROJECT:

NEWPORT ENERGY FROM WASTE PLANT

SUB-CONTRACTOR:

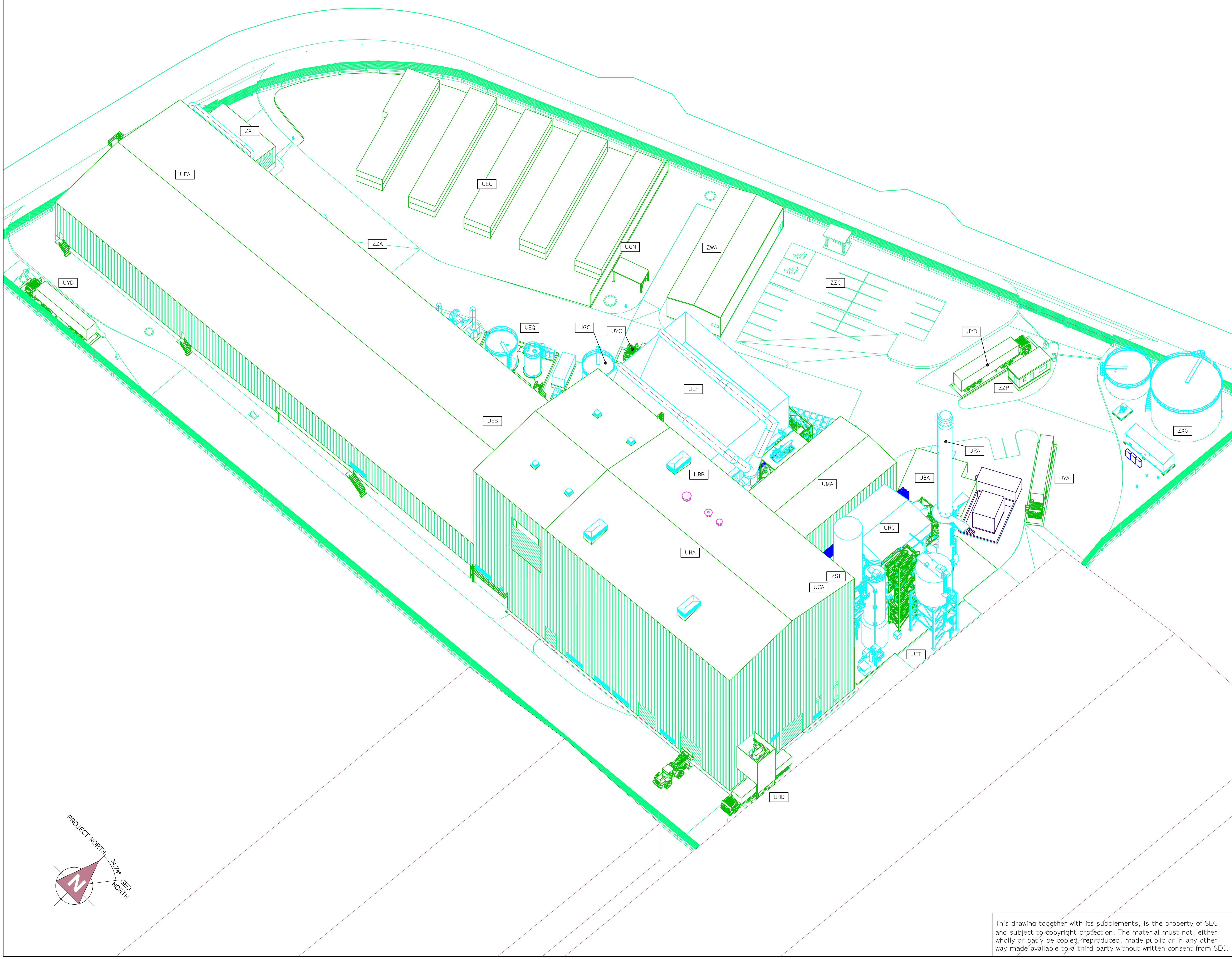
SUBJECT:

SITE PLAN (ZZA)
LAYOUT
3D VIEW: LOOK WEST 45° SOUTH 55° DOWN (PROJECT DIRECTION)

SCALE:
A1=NO SCALE
A3=NO SCALE

SEC DWG.NO.: 1017 : D2 . 093 . 101 (PROJECT NO. : GR. . NO. . SHT.)

REV. 1



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ZXT	WORKSHOP & SHREDDER PARKING BLDG.
ZZC	PARKING AREA
ZZP	GATE HOUSE

LEGEND:

- ELECTRICAL EQUIPMENT
- MECHANICAL EQUIPMENT
- EXISTING BUILDINGS & EQUIPMENT
- OTHER SUPPLIER

ESTIMATE

REV	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	APPROVED BY
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PROJECT MANAGER:

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PHONE :+45 3226 6401
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PROJECT:

NEWPORT ENERGY
FROM WASTE PLANT

SUB-CONTRACTOR:

SUBJECT:

SITE PLAN (ZZA)
LAYOUT
3D VIEW: LOOK WEST 45° NORTH 55° DOWN (PROJECT DIRECTION)

SCALE:
A1=NO SCALE
A3=NO SCALE

SEC DWG.NO.: 1017 (PROJECT NO.) : D2 (GR.) . 094 (NO.) . 101 (SHT.) — REV. 1