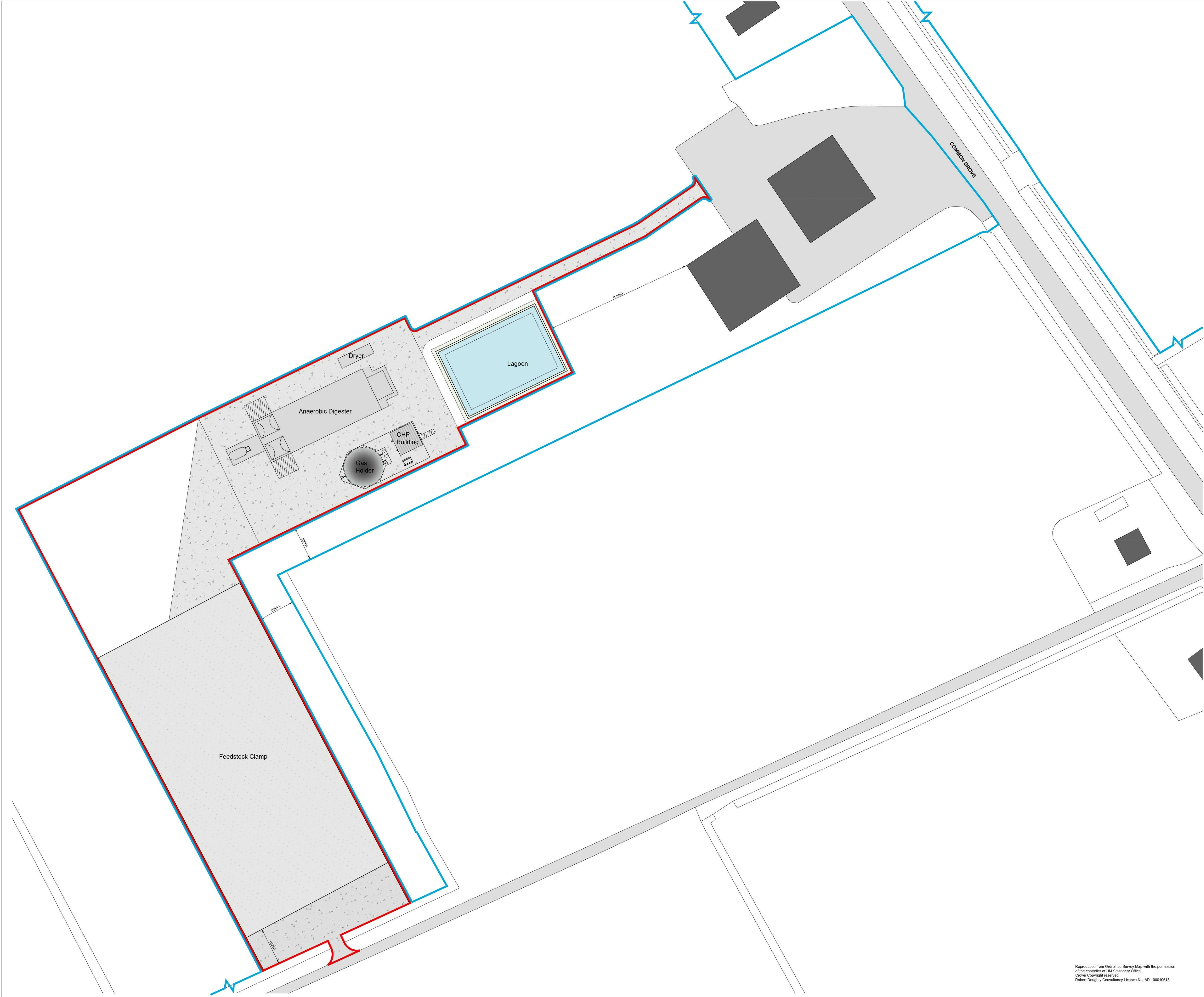
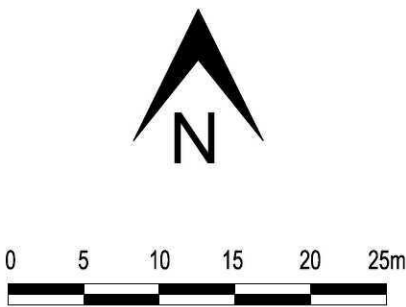




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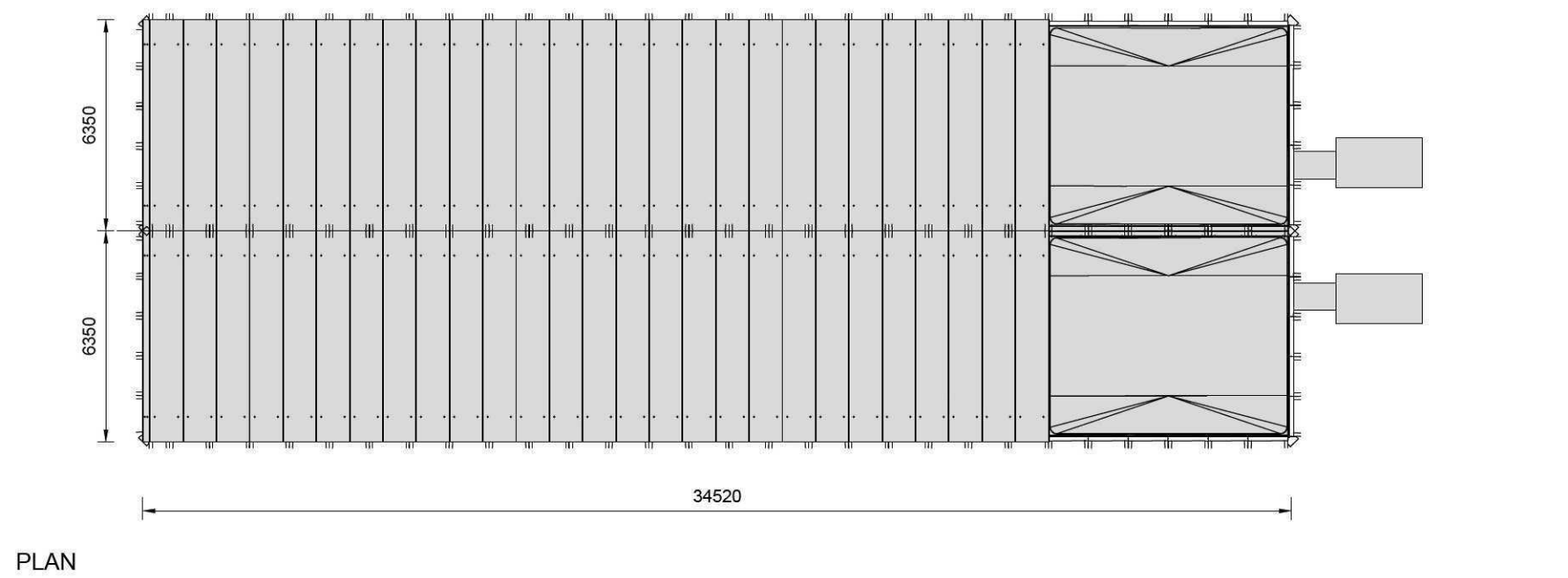
B	JB	Layout redesign, enlarge plan to A1	07-01-15
A	JB	Layout redesign, clamp & lagoon enlarged	07-01-15
Rev.	By	Notes	Date

rdc Robert Doughty Consultancy			32 High Street, Helpingsham Sleaford, Lincolnshire NG34 0RA Tel: 01529 421646 Fax: 01529 421356 Email: admin@rdc-landplan.co.uk Web: www.rdc-landplan.co.uk
Client: MR JAMES TANSLEY			
Project: Proposed A D Plant, Adams Farm, Common drove, Crowland			
Drawing title: Block Plan			
Drawing No. 1162-01-BP01	Rev. B	Drawn AB	
Scale 1:500 @ A1	Date 30/12/14	Checked LMS	

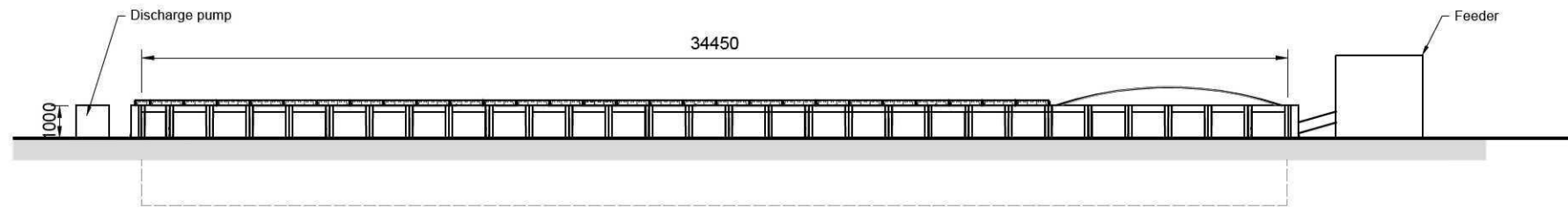
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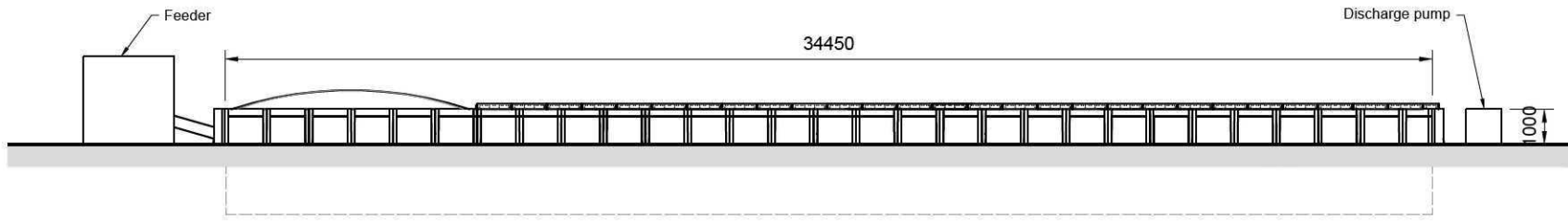


PLAN



SIDE ELEVATION

Anaerobic Digester 1:200

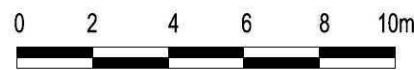


SIDE ELEVATION



FRONT ELEVATION

REAR ELEVATION

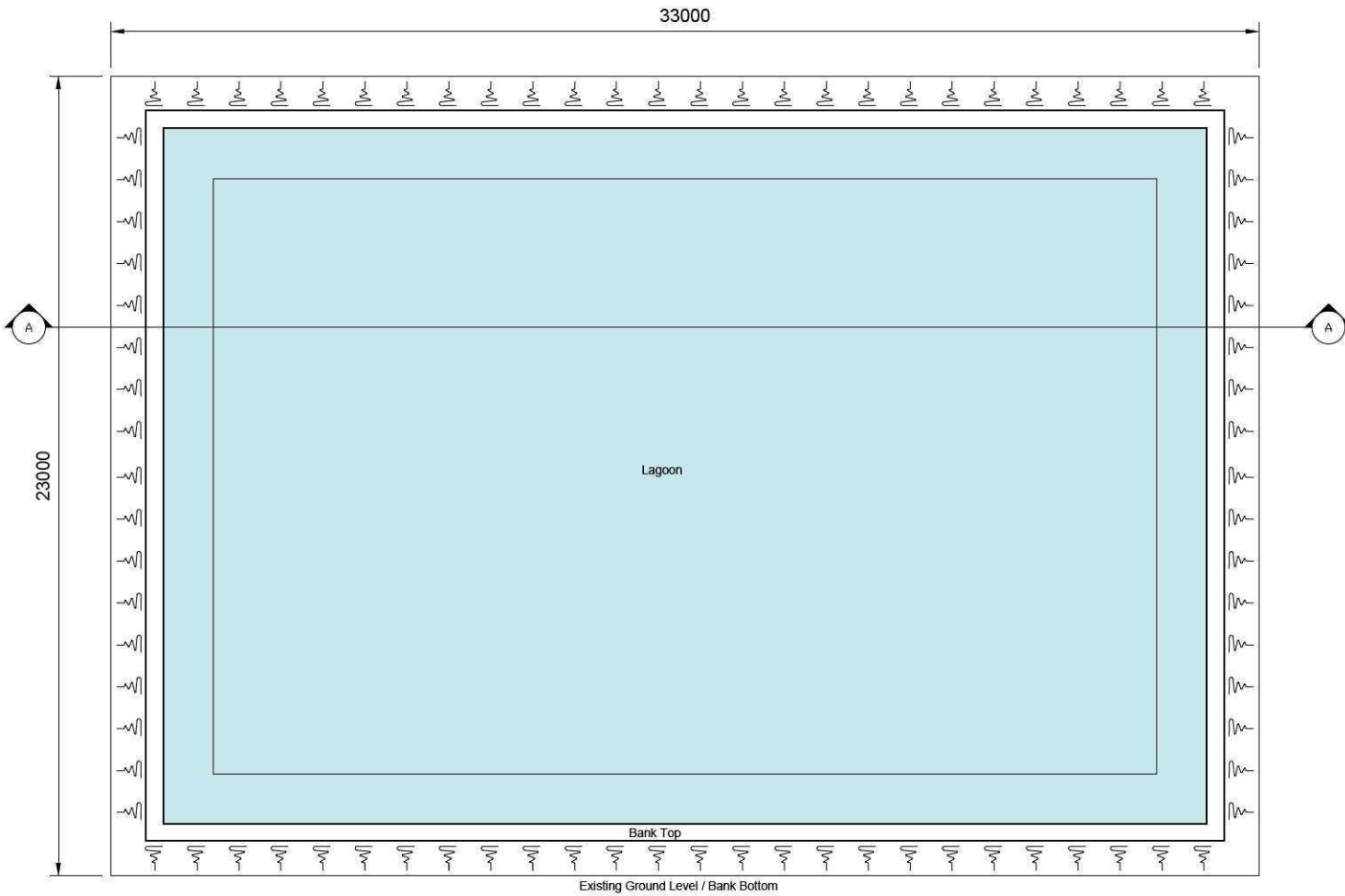


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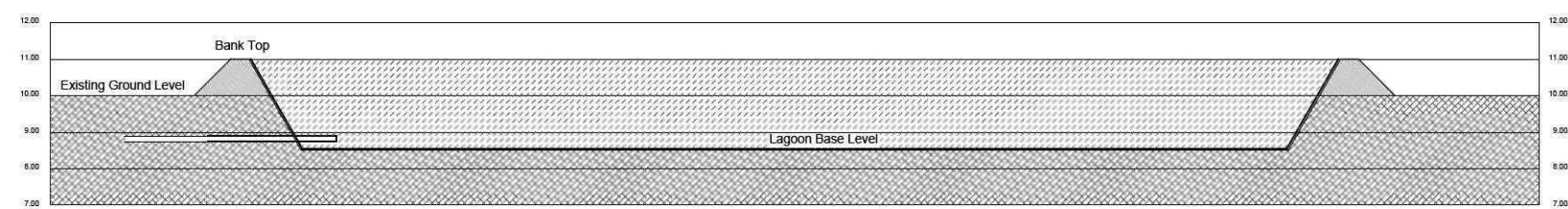
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PLAN

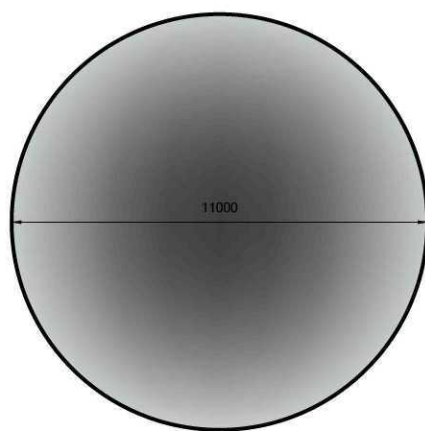
Lagoon

Lagoon 1:200



SECTION AA

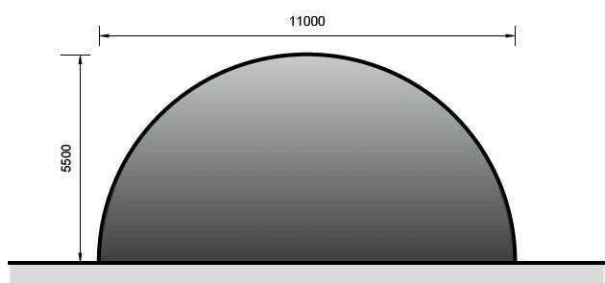
Lagoon



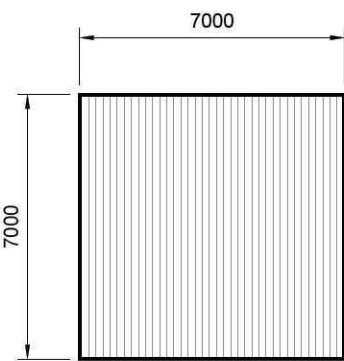
PLAN

Gas Holder

Gas Holder 1:200

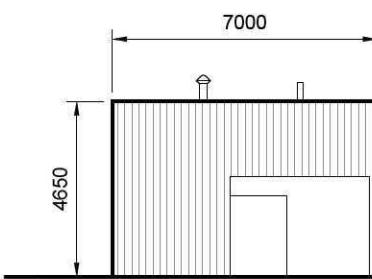


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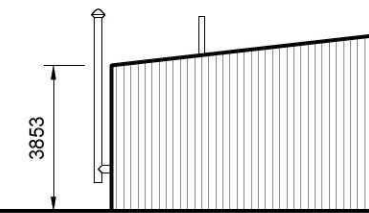


PLAN

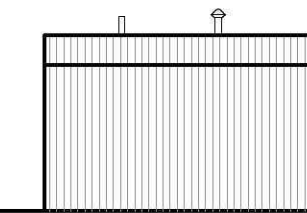
CHP Building 1:200



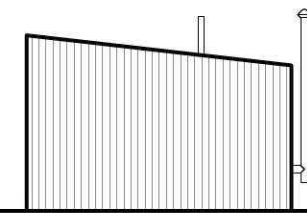
FRONT ELEVATION



SIDE ELEVATION



SIDE ELEVATION



REAR ELEVATION



A	JB	Various plant & lagoon amended	08-01-15
Rev.	By	Notes	Date

rdc
Robert Doughty
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Client:
MR JAMES TANSLEY

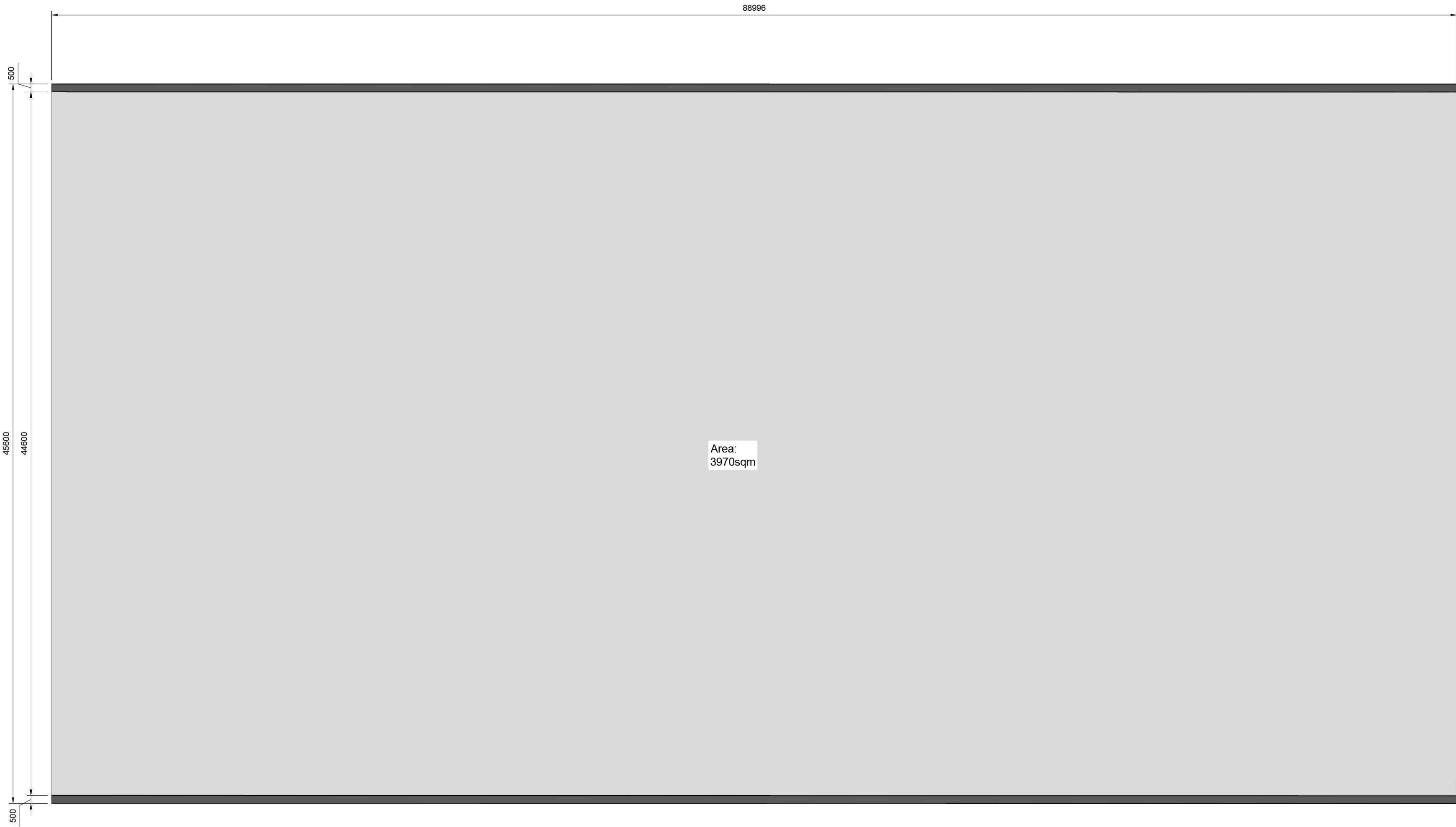
Project:
Proposed A D Plant, Adams Farm, Common drove, Crowland

Drawing title:
Design Sheet 01: Plans & Elevations

Drawing No. 1162-01-DS01	Rev. A	Drawn AB
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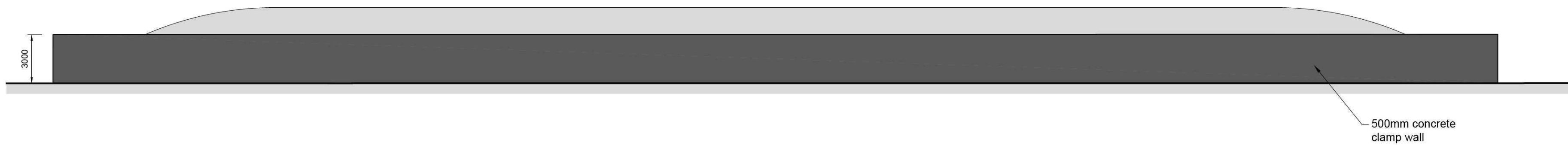
Scale 1:200 @ A1	Date 30/12/14	Checked LMS
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PLAN

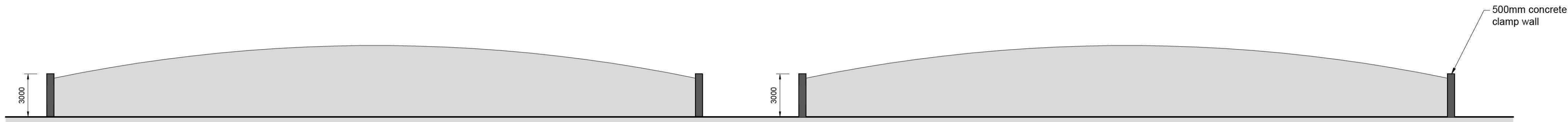
Feedstock Clamp



SIDE ELEVATION



SIDE ELEVATION



FRONT ELEVATION

REAR ELEVATION

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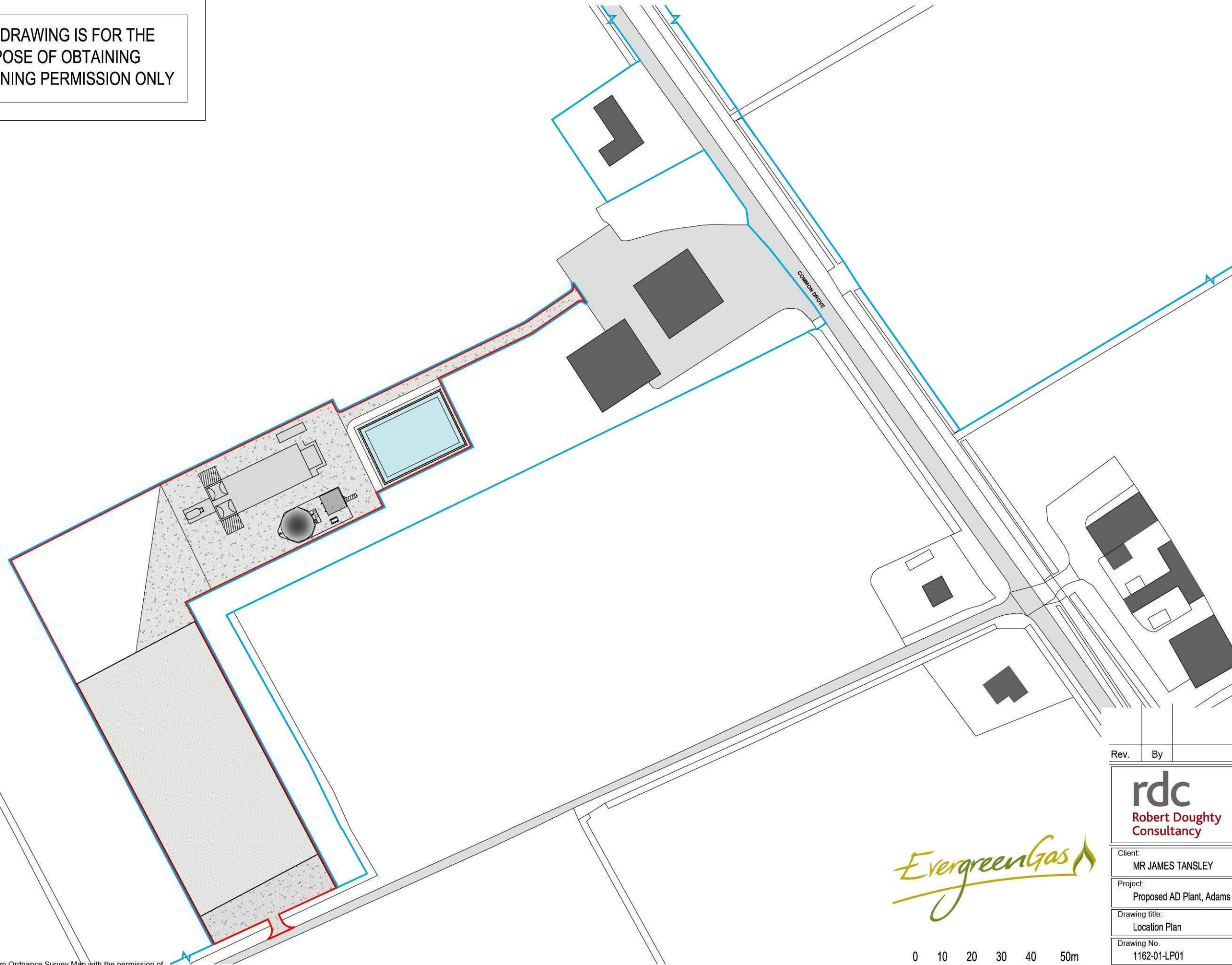


A	JB	Clamp increased in size	08-01-15
Rev.	By	Notes	Date

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Client: MR JAMES TANSLEY			
Project: Proposed AD Plant, Adams Farm, Common drove, Crowland			
Drawing title: Design Sheet 02: Feedstock Clamp Plans & Elevations			
Drawing No. 1162-01-DS02	Rev. A	Drawn AB	
Scale 1:200 @ A1	Date 30/12/14	Checked LMS	

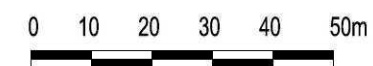
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Evergreen Gas



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Client:			
MR JAMES TANSLEY			
Project:			
Proposed AD Plant, Adams Farm, Common drove, Crowland			
Drawing title:			
Location Plan			
Drawing No.		Rev.	Drawn
1162-01-LP01			AB
Scale		Date	Checked
1:1250 @ A3		30/12/14	LMS

All measurements should be checked against on site conditions and any discrepancies should be brought to the attention of the Robert Doughty Consultancy.

Porter, Karen

From: Simmonds, Mark
Sent: 20 February 2015 06:57
To: _planningadvice
Cc: Fidler, Richard; Norman, Phil
Subject: FW: H02-0019-15 Adams Farm.Common Drove, Cowland.
Attachments: Tansley DAS fv 9-1-15.pdf; FLOOD RISK ASSESSMENT AD PLANT 9-1-15.pdf; 1162-01-LP01.pdf; 1162-01-BP01.pdf; 1162-01-DS01.pdf; 1162-01-DS02.pdf; EIA Letter.PDF

Please scan this request for a screening opinion to H02-0019-15 – 3EIA

Thank you

Mark

From: Lewis Smith [<mailto:l.smith@rdc-landplan.co.uk>]
Sent: 19 February 2015 11:10
To: Simmonds, Mark
Cc: Mercedes Golding
Subject: RE: H02-0019-15 Adams Farm.Common Drove, Cowland.

Mark

By way of assistance I attach a Screening Opinion request.

regards

Lewis

Lewis M Smith MRTPI
Town Planning Director

Robert Doughty Consultancy Limited

32 High Street, Helpringham, Sleaford, Lincolnshire NG34 0RA

Telephone: 01529 421646, Fax: 01529 421358

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From: Simmonds, Mark [<mailto:marksimmonds@sholland.gov.uk>]
Sent: 18 February 2015 17:07

To: Lewis Smith
Subject: H02-0019-15

Lewis,

A couple of points;

Has the proposed development been screened under the EIA regulations? If not I will need to carry out a screening exercise.

Do the traffic movements of 340 per annum include for return trips – ie is the figure 680?

Regards,

Mark

Mark Simmonds | Planning Officer | South Holland District Council
DDI: 01775 764502 | www.sholland.gov.uk

FLOOD RISK ASSESSMENT

**PROPOSED ANAEROBIC DIGESTION PLANT
ADAM'S FARM
COMMON DROVE
CROWLAND
PETERBOROUGH
PE6 0HL**

FLOOD RISK ASSESSMENT FOR PROPOSED AD PLANT ADAM'S FARM, CROWLAND, PETERBOROUGH. PE6 0HL

INTRODUCTION

The Government has placed increasing priority on the need to take full account of the risks associated with flooding at all stages of the planning and development process. This seeks to reduce the future damage to property and the risk to life from incidents of flooding. Their expectations relating to flooding are contained in the National Planning Policy Framework March 2012, (NPPF), which identifies how the issue of flooding is dealt with in the drafting of planning policy and the consideration of planning applications by avoiding inappropriate development in areas at risk from flooding and to direct development away from areas at highest risk.

Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. Local plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change.

The Environment Agency's flood maps show areas that are at risk, from fluvial and tidal flooding. These maps show the limits of the flood plain of the area which could be affected by flood events, over topping or breaching of flood defences. They are based on the approximate extent of floods with a 1% annual probability of exceedance (1 in 100 year flood) for rivers and 0.5% annual probability of exceedance (1 in 200 years flood) for coastal areas under present expectations or the highest known flood. However they do not take into account of the presence of defences or the likelihood that flood return intervals will be reduced by climate change.

This Flood Risk Assessment has been prepared in support of the planning application and considers the risk of flooding from fluvial and tidal sources in accordance with National Planning Policy Framework (NPPF). It also considers the risks of localised flooding due to inadequate foul and surface water sewers, failure of reservoirs, water main pipe bursts, sewer blockages, pump failures or high ground water table etc.

APPLICATION SITE

The site is located at Adam's Farm, Common Drove, Crowland, Peterborough, PE6 0HL within the South Holland District Council's administrative area and is shown on **Plan1**

The National Grid Reference is TF 22437 11238

This flood risk assessment has been prepared for a full planning application covering an area of 1,100m² comprising a feedstock clamp, covered lagoon, and the AD Plant. **Plan 2**

The National Planning Policy Framework Planning Practice Guidance (PPG) defines three levels of flood risk depending upon the annual probability of fluvial flooding occurring.

Zone 1 – Low Probability (<0.1%)

Zone 2 – Medium Probability (0.1 – 1.0%)

Zone 3 – High Probability (>1.0%)

The proposed development site is shown to be within Flood Zone 3a 'High Probability' as detailed on the Environment Agency's Flood Zone Maps without defences, and as defined in Table 1 of PPG.**Map1**

Table 1: Flood Zones Definition

Zone 3a - high probability

Definition

This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Appropriate uses

The water-compatible and less vulnerable uses of land (table 2) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone.

The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.

Flood risk assessment requirements

All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims

In this zone, developers and local authorities should seek opportunities to:

- reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems;

Applying the Flood Risk Vulnerability Classification in Table 2 of the PPG, the proposed industrial use for the site is classified as "Less Vulnerable," Table 3 of the PPG states that such uses are permitted in Flood Zone 3a.

Table 2: Flood Risk Vulnerability Classification

Less vulnerable • Police, ambulance and fire stations which are <i>not</i> required to be operational during flooding. • Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do <i>not</i> need to remain operational during times of flood. • Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).

From the topographic survey the road level on Common Drive at the site entrance is at 2.70mODN with the proposed area for the proposal at a level averaging 2.50mODN. **Plan 3**

DRAINAGE AUTHORITIES

Environment Agency

The Environment Agency is responsible for reducing the risk of flooding from designated main rivers and from the sea.

The following potential sources of flooding affecting the development site have been identified as:

- From the River Welland
- Welland & Deepings Internal Drainage Board system

The Flood Zone Maps identify river catchments over 3 sq. km. These maps are a theoretical estimate of areas that could be inundated should no defence exist. In practice current standards of protection would result in flood envelopes substantially less than shown by these maps. The maps make no allowance for local, site specific features.

The flood zone maps show that the site of the proposed development is considered at risk from flooding. These maps indicate that the area would be flooded without flood defences, which are in place, (with an annual probability of more than 1% or a 1 in 200 or greater annual probability of flooding from the sea) (**Map 1**).

RIVER WELLAND

The Left bank of the River Welland is formed by an earth bank which is provided with a soak dyke on the landward toe. The right bank to the river is at a slightly lower level and of less proportions and this forms the embankment to the Crowland Washlands which allows water to overtop to control the levels in the river from overtopping the left

bank which consequently controls the river levels downstream during a high flow event. The standard of protection provided by these defences is for the 1 in 100 year flood event.

The following is an abstract from Table 6R & 7R SHSFRA

	Chainage (km)	Peak 1 in 100 year fluvial Flood level (mODN)		Peak 1 in 1000year fluvial Flood Level (mODN)		Left Bank Defence Crest Level (mODN)
		2007	2115	2007	2115	
Little London Bridge	0.0	4.42	4.67	4.43	4.68	5.22
A16 Road Bridge	2.4	4.50	4.67	4.51	4.67	5.98
Welland Farm	5.0	4.57	4.69	4.59	4.69	6.08

Taking the precautionary approach the Hazard Rating following a breach which in Flood Risk Assessment (FD 2320) Guidance for New Development Phase 2 R & D Technical Report these are classified as low <0.75, moderate 0.75 - 1.25, significant 1.25 - 2.50 and extreme >2.50 based upon an empirical measure of velocity and depth.

Flood Hazard value	Degree of flood hazard	Description	Indicative depth range
< 0.75	Low	Caution 'Flood zone with shallow flowing water or deep standing water'	Up to 0.25 m
0.75 – 1.25	Moderate	Danger for some (i.e. children) 'Danger: flood zone with deep or fast flowing water'	Up to 0.5 m
1.25 – 2.0	Severe	Danger for most 'Danger: flood zone with deep fast flowing water'	0.5 m to 3 m
> 2.0	Extreme	Danger for all 'Extreme danger: flood zone with deep fast flowing water'	0.5 m to over 3 m

$$HR = d \times (v + 0.5) + DF$$

Where V = Flood flow velocity (m/sec)

D = Flood depth (m)

DF = A debris factor included to represent the greater damage, or risk of injury to people, that can occur if debris is swept along with the water. = 0.5 for depths <0.25 or 1.0 for depths

For the degree of Flood Hazard to be classified as low HR has to be <0.75

The updated South Holland SFRA carried out Mapping following a breach to the flood defences. With climate change up to year 2115 the maps show that the site is not within a Hazard Rating area, therefore the site is not subject to flooding following a breach to the flood defences.

Welland & Deepings Internal Drainage Board

The proposed development site is located within Catchment area of Welland & Deepings Internal Drainage Board. The Board is responsible to operate and maintain the arterial fluvial system.

The Board's Drain which serves the site is:-

South Drove Drain

This watercourse is one of the Boards main drains which flows north-westwards to Pode Hole pumping station which discharges into Vernatts Drain which flows by gravity to Surfleet Seas End where it discharges through pointing doors into the tidal River Welland. The design flood level in South Drove Drain at Pode Hole pumping Station is 1.20mODN.

South Holland District Council

In order to inform the process of risk assessment and site selection the District Council commissioned Haskoning UK Ltd Consultants to prepare a Strategic Flood Risk Assessment in December 2002. They have carried out an update of this report and this report was published in January 2010

This Flood Risk Assessment has taken the results of the updated South Holland Strategic Flood Risk Assessment (SHSFRA) into account in its findings.

It was found that the actual risk from primary sources of flooding (taken as being rivers and the sea) was assessed as being the product of:

- Medium probability (assigned because the standards of the primary defences are variable) and
- Low consequence (assigned because of the District's generally rural nature and because any urban flooding is likely to be shallow with minimal impact).

The findings reflect the considerable protection afforded to the area by coastal and tidal & fluvial flood defences and by the extensive well organised system of lowland IDB fluvial drainage.

The computer modelling used in the SFRA to produce the Hazard, depth and velocity maps simulated the spread of flood waters over the land and allowed for the presence of locally raised features such as road embankments etc. The maps produced by the Environment Agency took a more precautionary approach.

The potential flooding consequences shown on this map relate to flooding from the sea, main rivers and Internal Drainage Board systems taking into account the presence of current flood risk management measures such as flood defences.

The consequences designated as being an Actual Risk arise from direct overtopping of defences, where this would occur, together with assumed breach failure of some defences. Breach failure has been assumed to occur in places where the freeboard between Peak Sea or river water level and the defence crest level is less than the minimum desirable for structural security of the defence.

From the Actual Risk Extent District - Year 2115 1% Fluvial / 0.5% Tidal Event Probability, the Actual Peak Depth District - Year 2115 1% Fluvial / 0.5% Tidal Event Probability and Actual Flood Hazard District - Year 2115 1% Fluvial / 0.5% Tidal Event Probability maps from the update of strategic flood risk assessment for South Holland District Council, the site is not affected from any breach to the flood defences. **Map 4, Map 5 & Map 6.**

SEQUENTIAL APPROACH

When considering the sequential approach for flood risk from fluvial flooding in accordance with NPPF the site would fall into Zone 3a (High Probability) as defined in Table 1: Flood Zones, and illustrated on the Environment Agency's Flood Maps, if defences were not present.

The flood zones as detailed on the flood map show the area of land which theoretically would be inundated by floodwater during a flooding event from either tidal or fluvial sources without flood defences.

The Environment Agency categorise land into one of three Flood Zones.

- Flood Zone 1 is land outside the 0.1% floodplain (with a chance of flooding of less than 0.1 % chance in any given year);
- Flood Zone 2 is land that falls between the 1 in 100 year extent and the 1 in 1000 year extent (a chance of flooding between 1% and 0.1% in any given year);
- Flood Zone 3a is land which falls within the 1 in 100 year flood extent (has a 1 %chance of a flood occurring in any given year).

The Sequential Test is defined in PPG with the principal aim of steering new development to areas of the lowest probability of flooding (Flood Zone 1). Where there are no reasonably available sites in Flood Zone 1 then decision makers should first consider Zone 2 and then Zone 3a taking into account the flood risk vulnerability of land uses as categorised in Table 2 of the PPG.

The proposed commercial use development for the site falls within "Less Vulnerable" uses of land in Table 3 Flood Risk Vulnerability Classification and Table 1 shows that developments of this nature are appropriate in this zone. All development is permitted in Zone 1. Development in Zones 2 and 3 is restricted based on Table 3 of the PPG replicated below

TABLE 3: Flood risk vulnerability and flood zones 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	✗	✗	✗

The proposed site is shown on the flood maps to be within Flood Zone 3a and less vulnerable uses are permitted.

CLIMATE CHANGE

Global warming is now recognised that it is likely to affect the frequency and severity of extreme events as both tidal and fluvial flooding.

The annual sea rise due to climate change is given in the PPG and the recommended contingency allowances are stated in Table 4.

TABLE 4: Recommended contingency allowances for net sea level rises

	Net sea level rise (mm per year) relative to 1990			
	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
East of England, east midlands, London, south-east England (south of Flamborough Head)	4.0	8.5	12.0	15.0
South-west England	3.5	8.0	11.5	14.5
North-west England, north-east England (north of Flamborough Head)	2.5	7.0	10.0	13.0

The effect of global warming on fluvial flood peaks is given in Table 5. It is expected that the overall effect up to 2025 will result in an increase of rainfall of 5%, 2025-2055 10%, 2055-2085 20% and 2085-2115 of 30% with Peak River flows increasing by 20%.

Table 5: Recommended National Precautionary Sensitivity Ranges for Peak Rainfall Intensities.

Peak River Flows, Offshore Wind Speeds and Wave Heights.

Parameter	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	+5%	+10%	+20%	+30%
Peak river flow	+10%	+20%		
Offshore wind speed	+5%		+10%	
Extreme wave height	+5%		+10%	

INFRASTRUCTURE

Surface Water Drainage

The rainwater falling onto the proposed impermeable feedstock clamps and the plant area will all be collected for re-use within the anaerobic digesters. In addition it is proposed to construct a lagoon within which the rainwater and small amount of leachate from the clamp will be stored. There will be no direct discharge from the site.

Foul Water

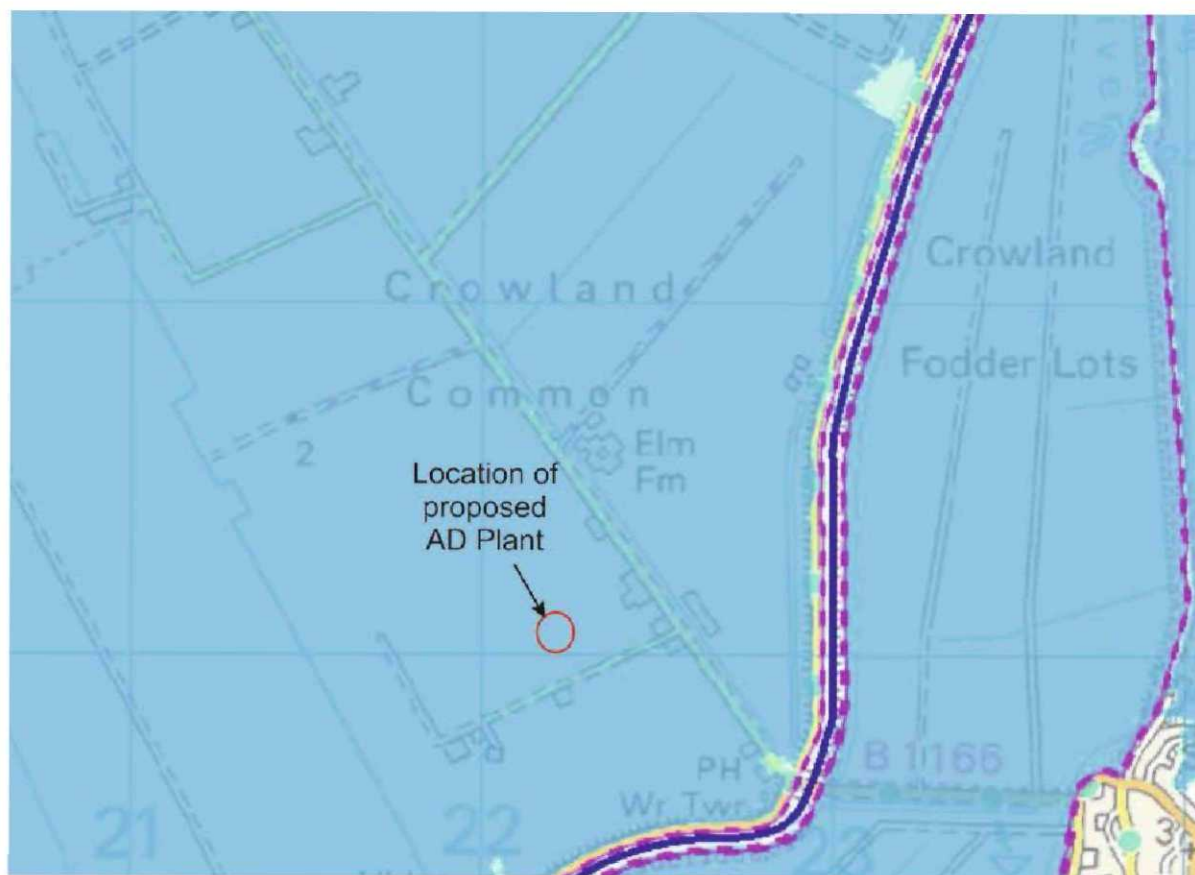
There is no requirement to provide foul water facilities as part of the proposal.

CONCLUSIONS

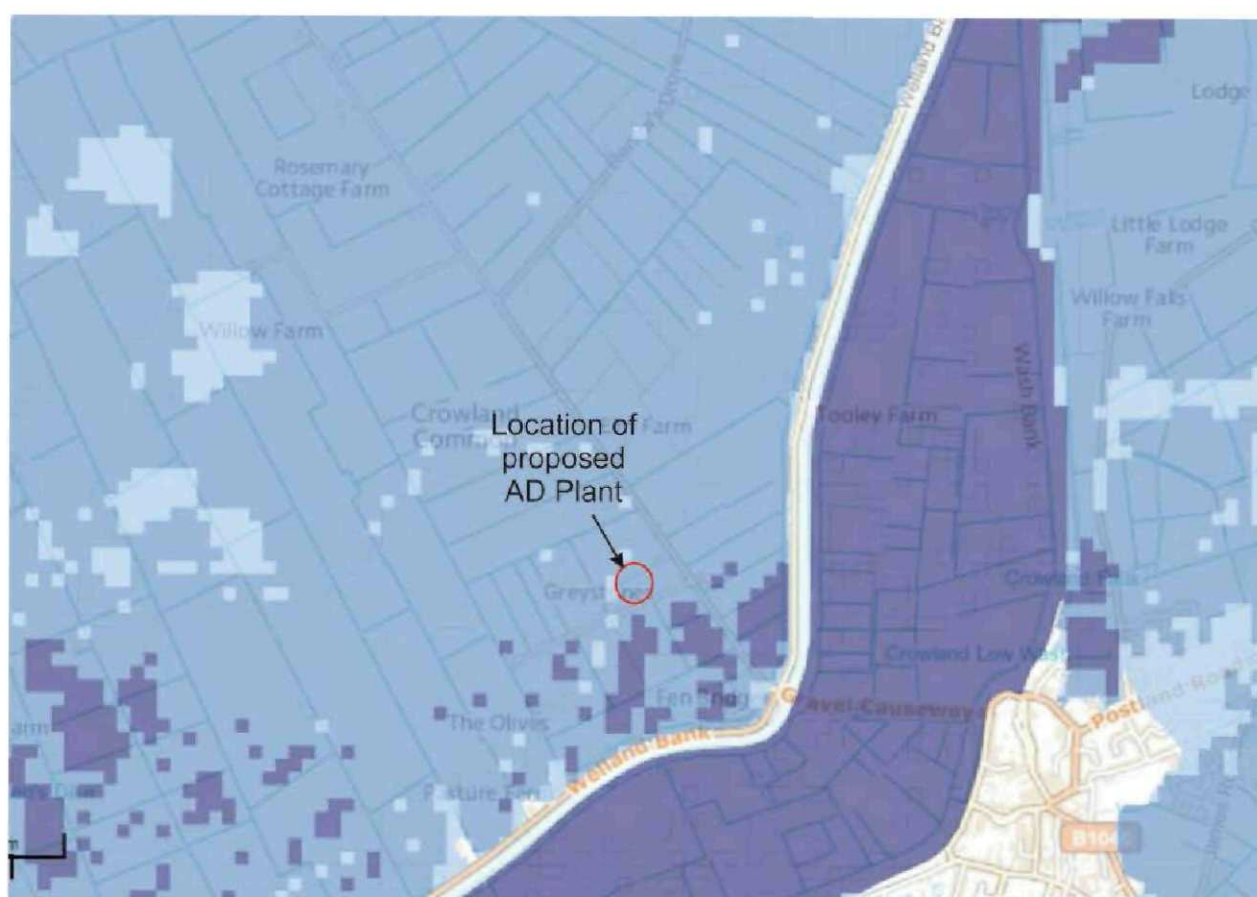
- The site does have the benefit of protection from tidal/fluvial flooding by existing defences which are properly maintained to a 1 in 200 /100year standard of protection from tidal/fluvial flooding.
- The proposal is for planning permission to construct an anaerobic digestion plant located adjacent to the proposed feedstock, which complies with prevailing local plan policies. The Sequential Test therefore passed.
- The maps indicating the actual risk of flooding contained in South Holland's Strategic Flood Risk Assessment 2010 show that the site could have a depth 0.0m to 0.5m from flooding from a breach to the defences.
- The industrial use falls within the "Less Vulnerable" uses of land as defined in Table 2 NPPF for Flood Risk Vulnerability Classification and the proposed development use is appropriate in Flood Zone 3a.
- Flooding from other sources is unlikely to affect the site.

APPENDICES

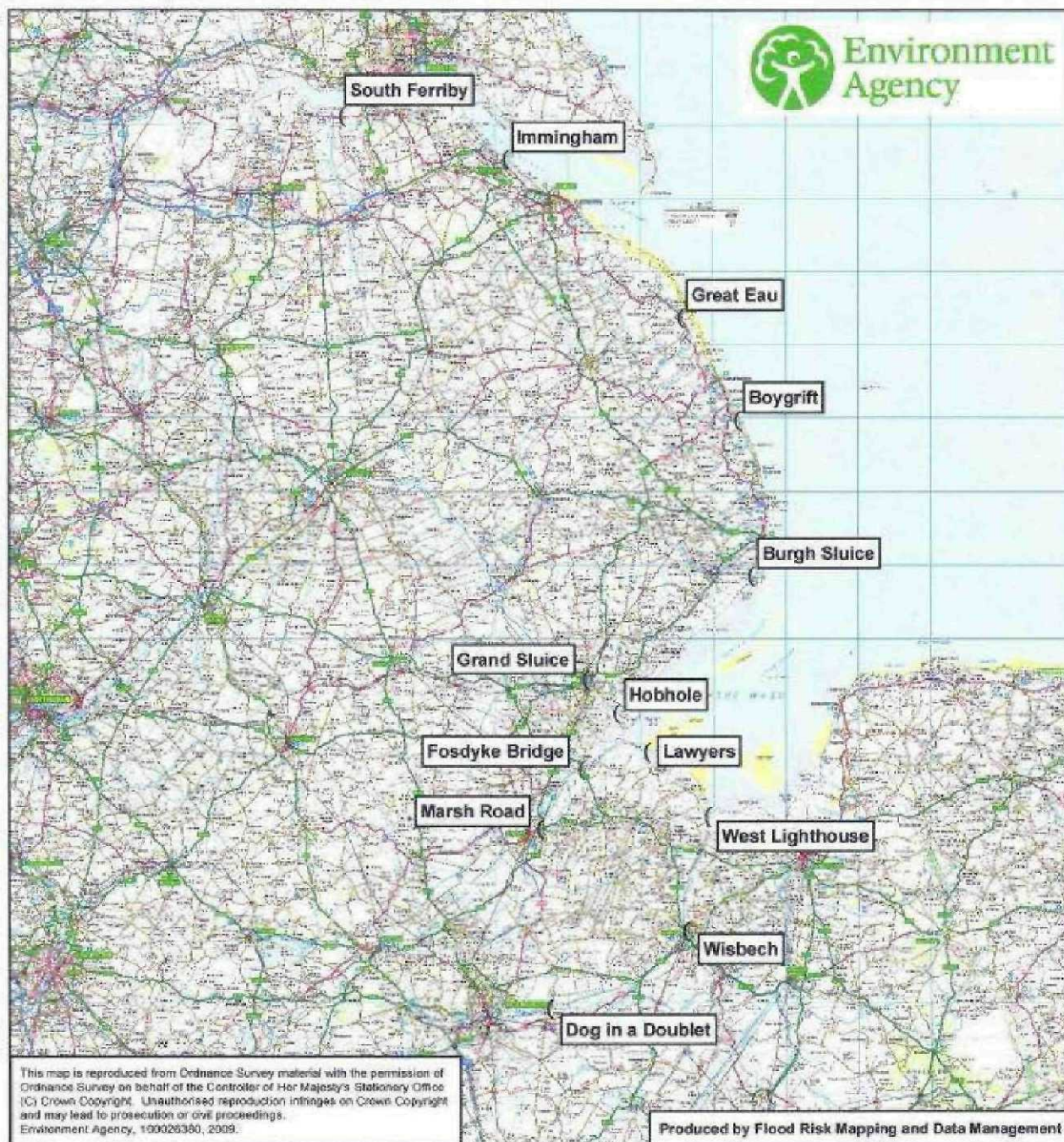
Map 1	Environment Agency Flood Plain Map.
Map 2	Environment Agency Risk of Flooding from Rivers and Sea Map.
Map 3	Northern Area Tidal Model Analysis 2006 Map
Map 4	Actual Risk Extent District - Year 2115 1% Fluvial / 0.5% Tidal Event Probability
Map 5	Actual Peak Depth District- Year 2115 1% Fluvial / 0.5% Tidal Event Probability
Map 6	Actual Flood Velocity District - Year 2115 1% Fluvial / 0.5% Tidal Event Probability
Plan 1	Site Location Plan
Plan 2	Site Layout Plan



MAP 1

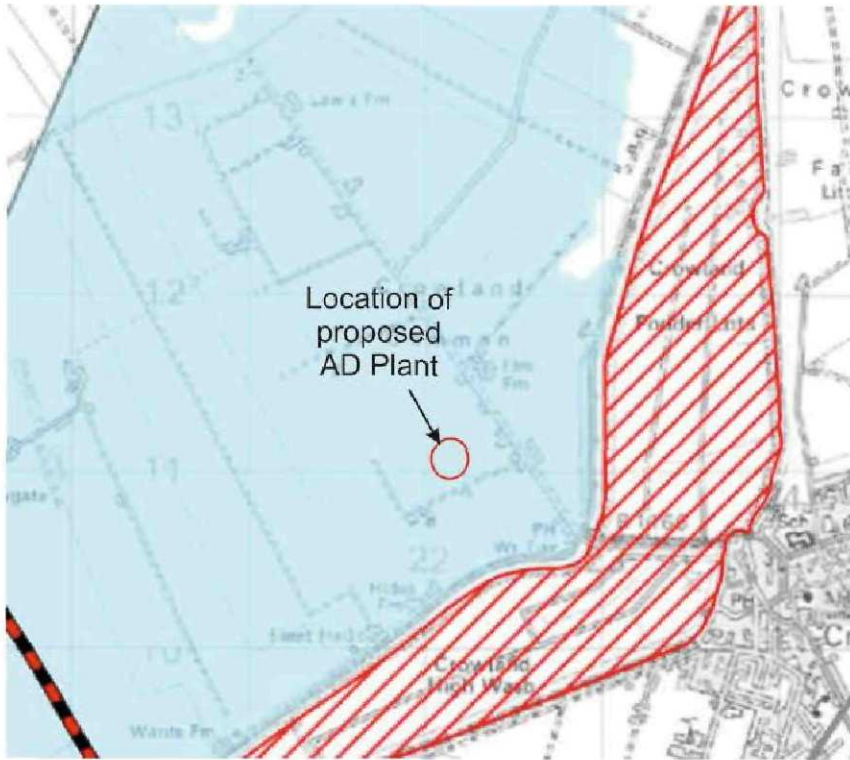


MAP 2



Tidal Levels mODN - based Northern Area Tidal Model Analysis 2006

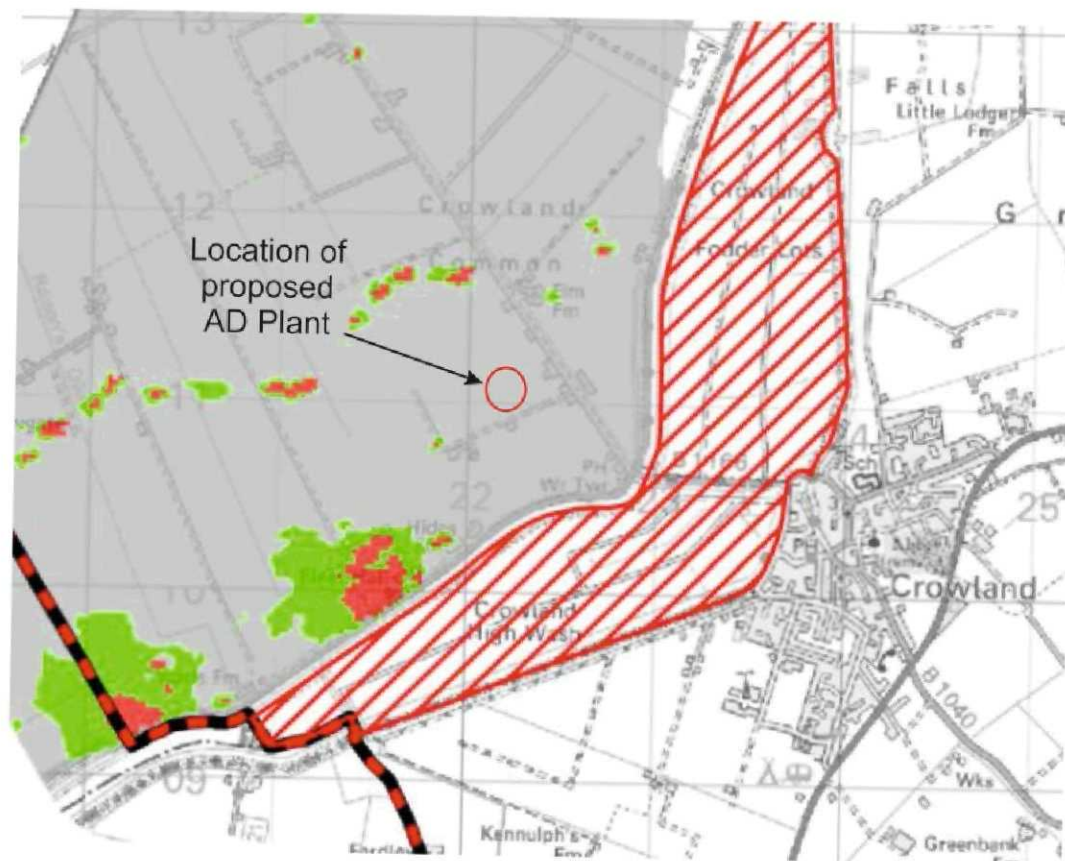
Location	Easting	Northing	100% (1 in 1)	10% (1 in 10)	4% (1 in 25)	2% (1 in 50)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)
South Ferriby	498772	421418	4.90	5.29	5.45	~	~	5.55	5.63
Immingham	521381	415464	4.08	4.49	4.65	4.76	4.88	5.05	5.34
Great Eau	545500	393800	3.60	4.19	4.34	4.46	4.57	4.69	4.96
Boygriff	553300	379800	3.84	4.24	4.41	4.53	4.65	4.77	5.05
Burgh Sluice	555190	358620	4.26	4.45	4.63	4.76	4.90	5.03	5.34
Hobhole	536810	339940	4.82	5.30	5.49	5.64	5.78	5.93	6.27
Lawyers	540750	334550	4.84	5.32	5.51	5.66	5.80	5.95	6.29
West Lighthouse	549150	325750	4.88	5.37	5.57	5.71	5.86	6.01	6.35
Grand Sluice	532400	344500	4.68	5.33	5.51	5.65	5.78	5.93	~
Fosdyke Bridge	531700	332200	4.91	5.38	5.56	5.71	5.85	5.99	~
Marsh Road	526000	324000	5.04	5.44	5.60	5.73	5.85	5.98	~
Wisbech	546100	310000	4.83	5.25	5.41	5.53	5.66	5.78	~
Dog in a Doublet	527300	299300	3.67	4.00	4.13	4.22	4.32	4.42	~



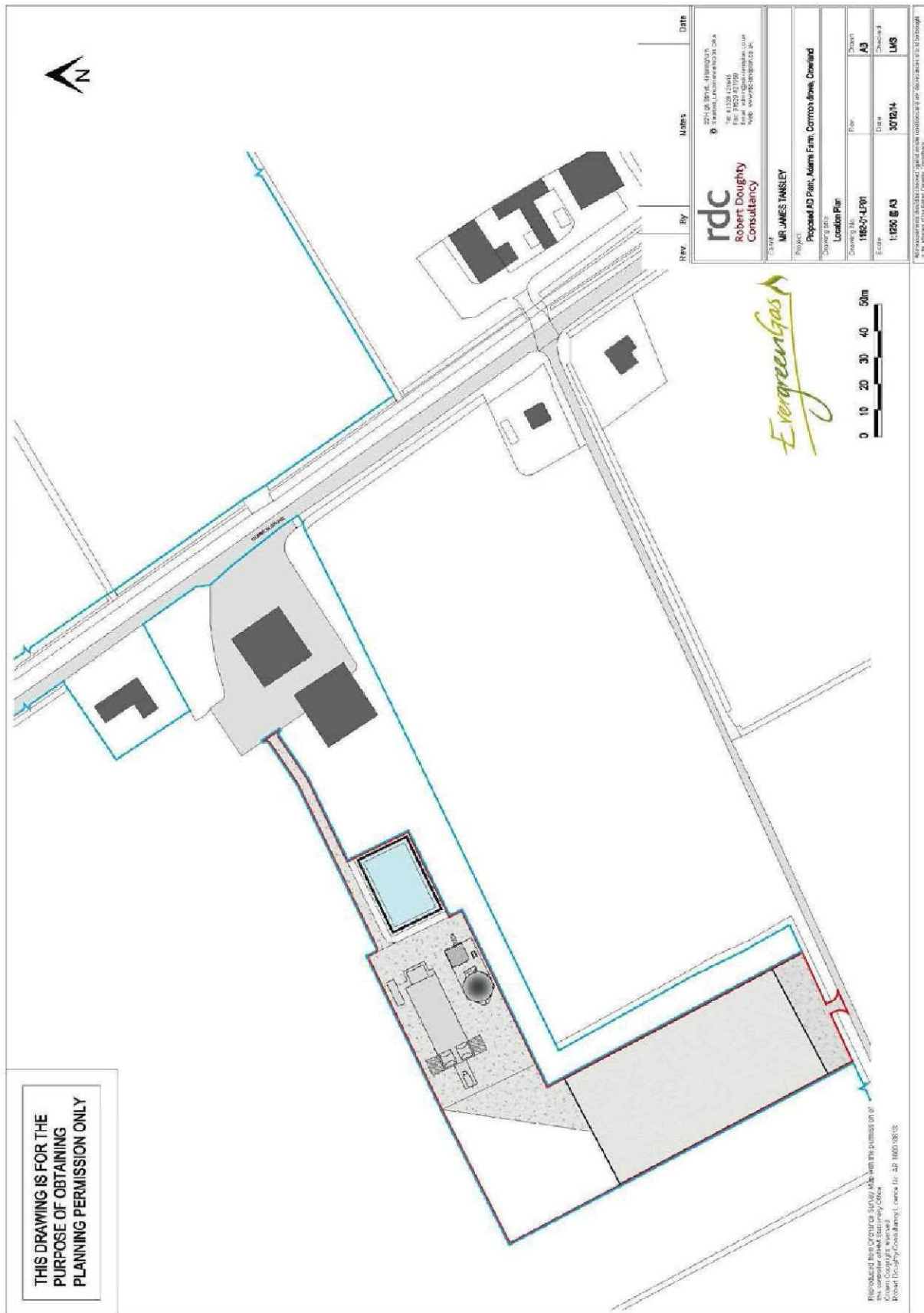
MAP 4



MAP 5



MAP 6



PLAN 1



MR J TANSLEY

rdc
Robert Doughty
Consultancy

Design and Access Statement

Proposed Small Scale, On-Farm Anaerobic
Digestion Plant (combined heat and power
production)

Adam's Farm, Common Drove, Crowland,
Peterborough. PE6 0HL

1162 /DAS/LMS

January 2015

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Appendix

Appendix A Odour Management Proposals

1. EXECUTIVE SUMMARY

- 1.1. Mr J Tansley farms approximately 526ha of land with the majority located to the north of the Crowland in the vicinity of the application site. The existing farmstead at Adam's Farm consists of two grain dryers and an area of concrete hardstanding with access onto Common Drove.
- 1.2. It is proposed to construct a small scale anaerobic digestion plant at Adam's Farm, Common Drove, Crowland which will produce 250kW of electricity and 281kW of heat throughout the year. The electricity will be exported to the national grid and used to dry the grain in the adjacent grain stores. The waste heat will be used to heat the digestion process and dry the resultant digestate.
- 1.3. In addition to the production of green electricity and heat, the digestion process produces an organic digestate that will be used as a fertilizer and soil improver on the applicant's farmland, which reduces the need for fossil fuel reliant inorganic fertilizer such as nitrogen.
- 1.4. The annual feedstock for the process will consist of approximately 2,550 tonnes of rye grass and 2,550 tonnes of maize per annum grown on 62ha of adjoining farmland in the applicant's control. The process will also produce approximately 3,900 tonnes of digestate per annum, of which approximately 13% or 507 tonnes is dry matter. Once underway, no additional water is needed for the digestion process. All the surface water from the feedstock clamp and site in general and any leachate from the feedstock clamp will also be stored in the proposed covered lagoon.
- 1.5. In effect one energy crop will be exchanged for others; the rye and maize will be grown on land traditionally used to grow oilseed rape, which is harvested and turned into bio-ethanol.
- 1.6. The process of anaerobic digestion is largely silent and the gas engine is located within a purpose made building. There will be no odour from the process, as the system is 'closed' because of the need to keep oxygen out.

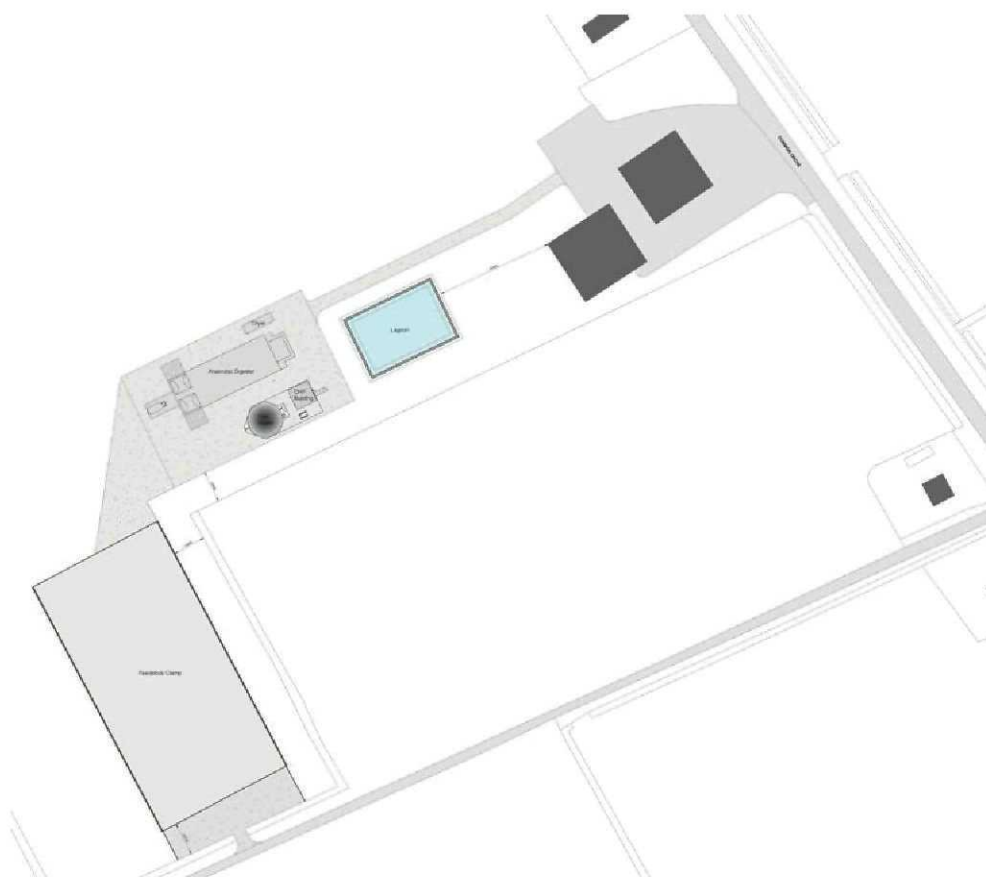
- 1.7. There will be no detrimental impact on the amenity for occupiers of the neighbouring dwellings to the north east and south east. In addition, having regard to the relatively small scale of the plant, there will be no visual harm arising from the proposal.
- 1.8. A Flood Risk Assessment accompanies the application which demonstrates that the proposal will be safe from the risk of flood and will not cause flooding beyond the site to other land uses or users.
- 1.9. The proposal complies with Development Plan policies and national planning guidance contained in the National Planning Policy Framework (NPPF) and represents a sustainable form of development.
- 1.10. In the event that the process (other than the clamp and lagoon) was to be put within a building, it is most likely that planning permission would not be required as the operation would be permitted development under Class A, Part 6 of The Town and Country Planning (General Permitted Development) Order 1995.

2. THE PROPOSAL

- 2.1. It is proposed to construct an anaerobic digestion plant that will create 250kW of electricity and 281kW of heat from the combustion of methane produced from the biological breakdown of rye and maize in the absence of oxygen.
- 2.2. A typical layout of the main elements of the plant can be seen below. There will be a second flat digester parallel to the one shown and the light coloured gas holder will be dark green. There will only be a relatively small section at one end of the digester where the gas will initially collect, rather than the series of 'bubbles' shown below.



- 2.3. The plan below shows the proposed layout of the site which includes the rye and maize feedstock clamp.



- 2.4. The residence time for the digestion process is approximately 46 days, which allows for the feedstock to be fully broken down thereby releasing the maximum amount of methane for capture and subsequent combustion. The bio-gas is fed into a purpose made engine where it is burnt to generate electricity.
- 2.5. Following the completion of the anaerobic digestion process, the resultant digestate is stable and benign as the anaerobic breakdown process has effectively ceased. Accordingly, very little odour is produced and, once the liquid has been driven off, the remaining solid fraction is ready to be applied to the land as an organic fertilizer and soil improver. The technology provider, Evergreen Gas Ltd, is a specialist provider of small scale modular AD plants and has 30 years experience of building such facilities. An odour management sheet has been provided in support of the proposal and this can be found at Appendix A.
- 2.6. Some of the resultant electricity will be used in the adjacent grain stores also owned by the applicant.

- 2.7. The process of digestion is thermophillic and anaerobic in that heat, but no oxygen, is used to speed the breakdown of the feedstock. The gas will produce 2,015,000 kWh (gross) per year of electricity and 2,267,000 kWh (gross) per year of heat.
- 2.8. Maize and rye will be grown on approximately 137ha of farmland owned by the applicant. The rye is harvested in late June/early July and the maize is forage harvested in early October. Both crops are stored in a purpose made clamp for subsequent use throughout the year. The clamp has to be sheeted over and the maximum amount of oxygen expelled in order to prevent the silage from oxidising, which would reduce the energy value of the feedstock.
- 2.9. The rye and maize will replace an existing energy crop namely oilseed rape which is used to produce bioethanol.
- 2.10. The feedstock is macerated, treated, heated and fed into the two digestion tanks, which are long concrete chambers sunk 2m into the ground, where the breakdown of the feedstock produces biogas (methane). The methane is then stored on site in a sealed double-skinned hemisphere, from where it is fed into the process building that houses the CHP Unit (combined heat and power) which is in effect an engine.
- 2.11. The plant produces a slightly moist bio-gas which is piped to the proposed gas holder at 38 degrees. It is condensed and cooled in the gas holder where it remains for up to 5 hours. Thereafter it is piped to the CHP spark engine to generate electricity. In the event the CHP engine is shut down for maintenance preventing the normal operation of the engine, the gas is redirected to a water boiler and burned to heat water. The resultant hot water is pumped through the digester tank to maintain digester tank temperature (38-40 degrees). This system obviates the need to flare surplus gas and is, therefore, more efficient and sustainable.
- 2.12. The entire process is monitored via telemetry and there are numerous alarms built into the various stages of the process that ensures the process continues to operate efficiently.

- 2.13. Once the digestion process is complete, the resultant liquid digestate will be put through a dryer (which uses waste heat from the CHP engine). The resultant dry fibrous material will be spread straight onto the land as fertilizer and soil improver.
- 2.14. Both the liquid and fibrous elements of the digestate have the majority of methane extracted from them and, as a consequence, there is little odour produced. The semi-dry digestate has the odour similar to that of leaf litter or domestic compost.

3. PLANNING JUSTIFICATION FOR THE PROPOSAL SET AGAINST PREVAILING POLICIES IN THE DEVELOPMENT PLAN AND NATIONAL GUIDANCE AND LEGISLATION

- 3.1. Section 38(6) of the Planning and Compulsory Purchase Act 2004 states that, "If regard is to be had to the development plan for the purpose of any determination to be made under the planning Acts the determination must be made in accordance with the plan unless material considerations indicate otherwise."
- 3.2. The Development Plan consists of the South Holland Local Plan (saved policies 2009) (Local Plan). There are no saved policies in the Local Plan that deal specifically with renewable energy proposals.
- 3.3. Section 19 (1A) of the Planning and Compulsory Purchase Act 2004 requires that local planning authorities include within their local plans "policies designed to secure that the development and use of land in the local planning authority's area contribute to the mitigation of, and adaption to, climate change".
- 3.4. The Climate Change Act 2008 establishes a legally binding target to reduce the UK's greenhouse gas emissions by at least 80% in 2050 from 1990 levels.
- 3.5. The National Planning Policy Framework (NPPF) at paragraph 97 states that local planning authorities should help increase the use and supply of renewable and low carbon energy and when determining applications (paragraph 98), local planning authorities should approve the application if the impacts are (or can be made) acceptable.

The Principle of Development

- 3.6. Local Plan Policy SG4 deals with development in the open countryside and states that permission will only be granted for development which is essential in the proposed location and cannot reasonably be accommodated within settlement limits.
- 3.7. The proposal is located in close proximity to the feedstock source namely the production of a purpose grown energy crop on the applicant's surrounding farmland.

- 3.8. The feedstock will be brought to the farm via local minor roads and farm tracks in the same way as any other crop and the resultant digestate will be returned to the same farmland from where the maize and rye will be grown.
- 3.9. The location of the proposal is, therefore, sustainable in that it is close to the grown feedstock and the connection to the grid is also located on the farm. Were the proposal to be located inside the nearest settlement, this would result in the need to transport the feedstock away from the land where it is grown and then bring back the resultant digestate to put back on the land. This would be contrary to the principles of sustainable development as enshrined in the NPPF.
- 3.10. The proposal is therefore in accordance with Local Plan Policy SG4.

Odour

- 3.11. Local Plan policy SG17 states that planning permission will be granted for development that will not cause material harm to residential amenity including smell, emissions and pollutants.
- 3.12. The process of anaerobic digestion takes place in the absence of oxygen and, accordingly, the process is carried out in airtight conditions which also prevent any odours from leaving the plant.
- 3.13. The rye and maize feedstock is ensiled under heavy weatherproof sheeting to prevent degradation from oxidation. When the face of the clamp is opened to enable an agricultural teleporter or similar to load the digester, there is very little odour given off and any that is detectable is quite sweet in nature and not offensive.
- 3.14. Many thousands of anaerobic digestion plants have operated quite satisfactorily on the continent for many years, with many located in settlements as district heating suppliers.
- 3.15. Any small amount of leachate from the feedstock clamp will be fed into a covered lagoon and so there will be no odour arising from either the start or end of the process.

Noise

- 3.16. Anaerobic digestion is largely silent, as it is a biological rather than a mechanical process. There is, however, machinery used at either end of the process and this includes the mechanical loading of

approximately 15 tonnes (one trailer load per day) of maize and rye into the digester and the removal of dry digestate from the facility. Both of these operations use agricultural machinery such as teleporters, and tractor and trailers. The loading is carried out during normal working hours.

- 3.17. Having regard to the distance between the site and the nearest dwelling, there is unlikely to be any impact on reasonable residential amenity from proposed operations on the application site.
- 3.18. The feedstocks will be harvested over a couple of days in June (rye) and a similar period in October (maize). The crops will be brought to the farm like any other from the minor road to the south of the farm and not through the existing farmstead and will be stored on the clamp. Based on an average agricultural trailer having a capacity of 15 tonnes, this will equate to 340 trailer loads, with half these movements in June and the other half in October.
- 3.19. The CHP engine that will use the methane to produce electricity is situated within a purpose-made container inside a building that has the necessary sound attenuation to ensure that sound breakout from the building is minimal. Having regard to the proximity of the nearest dwellings, there will be no detrimental impact on local residents.
- 3.20. Accordingly, the proposal complies with Local Plan Policy SG17.
- 3.21. The process is controlled under a Standard Rules Permit issued by the Environment Agency.

Siting

- 3.22. The various elements of the plant are shown on the supporting plans accompanying the application and all are lower than typical agricultural buildings.
- 3.23. The proposed plant has been located as close to the existing agricultural buildings as possible, having regard to the potential need for the farmstead to expand in the future and to provide some distance between the proposal and the nearby dwellings.
- 3.24. The siting also makes use of an existing single track road to the south where the feedstock clamp will be loaded.

Landscape Impact

- 3.25. The landscape character is flat and open and is punctuated by farmsteads, isolated building groups and individual dwellings. Views of the site are generally distant ones and are likely to be in the main from moving vehicles along the B1166 (Welland Bank), some 660m to the east and south. There is a light amount of traffic using the Welland Bank.
- 3.26. The visual impact arising from the proposal will be limited and will generally be 'lost' within the wider landscape. The fenland landscape has a well known ability to absorb development of considerably greater magnitude than that proposed here.
- 3.27. Having regard to the low level nature of the proposal, it is considered that landscaping will only draw attention to a form of development that will go largely unnoticed in the landscape.

External Lighting

- 3.28. It is not proposed to include lighting that will spill beyond the limited confines of the plant area itself. The lighting will, in the main, be low level and required for Health and Safety Reasons where there is access for personnel.

Flood Risk and Drainage

- 3.29. The site lies within Flood Zone 3a and, accordingly, a Flood Risk Assessment has been carried out in accordance with the requirements of the NPPF.
- 3.30. Surface water from the site including leachate from the silage clamps will be pumped into the digesters and the lagoon that is proposed as part of the development. No run-off will be able to leave the site.

Ecology

- 3.31. The application site is in the corner of an open field that has routinely been cultivated with oilseed rape. There are no existing natural features on the site and no habitats capable of accommodating protected species. The surrounding farmland is in monoculture.

Historic and Archaeological Statement

- 3.32. The application site lies in open countryside away from any Listed Buildings, Scheduled Ancient Monuments or conservation areas.
- 3.33. The nearest Listed Building is 1.5km to the south east within the settlement of Crowland and is not visible from the application site and vice versa. The intervening Welland Bank to the west of Crowland obscures all the views from Crowland towards the application site. The tallest structure is the CHP building, which, at 4.650m to the eaves (monopitch roof), is significantly smaller than the adjacent grain stores.
- 3.34. There are no scheduled ancient monuments or preserved trees on the application site or in its vicinity.
- 3.35. The County Council Historic Environment Department has confirmed that there are no known archaeological sites nearby. No further archaeological input is required for this proposal.

4. CONCLUSIONS

- 4.1. The proposal represents a sustainable form of development that is required to be located on the existing farm in order to take advantage of the proximity of the adjacent grid connection point, the close proximity of maize and rye production on the farm and the utilisation of electricity in the adjacent grain stores.
- 4.2. Both the importation of feedstock and the export of digestate involve the use of agricultural vehicles moving within the confines of the farm on farm tracks and minor roads. The generation of traffic is, therefore, no different were any other crop to be grown on the same fields. Less inorganic fertilizer will be used on the farm following the production of digestate.
- 4.3. The small scale of the buildings and plant, and the location away from public vantage points will result in a form of development that will have a relatively light touch on the landscape.
- 4.4. There will be little or no odour or noise generated by the proposal.
- 4.5. The project complies with the prevailing Development Plan policies together with national guidance contained within the NPPF on climate change and renewable energy production.
- 4.6. International agreements and national planning guidance point towards the ever increasing need to ensure energy is produced in more environmentally responsible ways to reduce carbon emissions and assist in the slow down in global warming

Appendix A

Odour Management Proposals

EVERGREEN GAS LTD



ODOUR MANAGEMENT WITHIN THE ANAEROBIC DIGESTION PLANT AT ADAM'S FARM, COMMON DROVE, CROWLAND,

Article I. The Process

Anaerobic digestion (AD) is a biological process by which naturally occurring anaerobic bacteria break down organic matter to produce biogas for the production of renewable energy. There are four stages within the AD process:- hydrolysis, acidogenesis, acetogenesis and methanogenesis. The feedstock is gradually broken down to produce different substrates reducing the complexity of the compounds at each stage. Longer chain fatty acids produced within the process are degraded to acetate & formate to be used directly by methane-forming bacteria to produce methane and carbon dioxide.

Article II. Plug flow Design

The nature of the plug flow system allows the four phases to occur separately within the tank as the feedstock moves slowly along the digester laterally. This is distinct from a continuous-stirred tank reactor (CSTR) where the four stages occur together, and in which a small proportion of feedstock spends only a few hours in the digester. The minimum guaranteed residence time within the Adam's Farm AD plant is in excess of 4 weeks, allowing time for the crop to be fully digested and maximum biogas to be captured. The resultant digestate will be stable and benign while retaining useful plant nutrients for crop production.

Article III. Hydrogen Sulphide

Hydrogen sulphide (H₂S) is produced by sulphate reducing bacteria in the presence of sulphate compounds (maize or rye feedstock will contain little or no sulphur compounds). H₂S causes a pungent odour if biogas is released and can be corrosive in engines if it is not scrubbed out of the gas or prevented from being released within the process. The Evergreen Gas design achieves this prevention through the scientific dosing of ferric chloride, which reacts with H₂S compounds to produce iron sulphide and hydrogen chloride, as illustrated in the equation below. The sulphur will therefore remain stable within the digestate to be used as a crop nutrient without causing any odour issues.



As an integral part of the management and monitoring of the AD process, the quality of the biogas, including H₂S, is measured by means of a portable gas monitor. Monitoring is carried out daily by the trained AD plant operator as part of routine checks and reporting. The quality of the gas will be recorded as a minimum once a week. Further scrubbing of the gas is available via oxygen injection prior to the biogas exiting the process tank.

Article IV. Biogas Take-Off

The unique fibre glass domes on the Evergreen Gas AD plant and the sealed concrete roof ensure that all biogas is captured from the process which is then piped to the separate double-membrane gas holder before being piped to the CHP.

Each of the independent domes has its own isolation valve which is closed when a dome is temporarily removed for maintenance, ensuring that biogas is not released to the atmosphere.

Article V. Sample of Digestate

A sample of the type of digestate which will be produced by the Adam's Farm AD plant was presented at a Cranford Parish Council meeting and to Kettering Borough Council officers to demonstrate its benign nature. This was in relation to a plant currently under construction at Cranford in Northamptonshire and all parties considered that any odour present was inoffensive and remained local to its container. The Kettering Borough Council EHO officer's details are available on request.

There is no proposed storage of liquid digestate on the site. The resultant digestate from the process is passed through system that drives the liquid fraction off using heat from the CHP unit. The largely dry fraction then falls into a storage bin ready for collection when sufficient has been accumulated. The dry digestate has little odour beyond leaf litter or that of domestic compost.

Article VI. Summary

- a. Plug Flow System -the resultant digestate will be stable and benign while retaining useful plant nutrients for crop production.
- b. Hydrogen Sulphide - the sulphur will therefore remain stable within the digestate to be used as a crop nutrient without causing any odour issues.
- c. The quality of the gas will be recorded as a minimum once a week.
- d. Design of biogas take-off - each independent dome has its own isolation valve on the gas take-off pipe which is closed in the event that the dome is removed therefore ensuring that biogas is not released to the atmosphere.