

BAKKAVOR PIZZA, HOLBEACH ST MARKS

FLOOD RISK ASSESSMENT

BAKKAVOR GROUP

June 2010

BAKKAVOR PIZZA, HOLBEACH ST MARKS

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Date:

Richard Fillingham

25 June 2010

Checked by:

Date:

Amendment Record

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APPENDICES

Appendix A	Site Location Plan (Arctica)
Appendix B	Existing Site Layout (Arctica)
Appendix C	Flood Mapping Extracts/Model data (Environment Agency/South Holland District Council)
Appendix D	Proposed Development Layout (Arctica)

1 INTRODUCTION

- 1.1.1 This Flood Risk Assessment (FRA) has been prepared by R J Fillingham Associates Ltd. on behalf of the Bakkavor Group in support of the proposed extension of the Bakkavor Pizza building, Holbeach St Marks.
- 1.1.2 This Assessment has been prepared in accordance with PPS25/PPS25 Development and Flood Risk Practice Guidance and in consultation with the Environment Agency, Anglian Water and South Holland District Council.

2 PLANNING POLICY

2.1 National

2.1.1 PPS25 provides national planning guidance on the management of flood risk in respect to new development. Paragraph 5 states *'The aims of planning policy on development and flood risk are to ensure that flood risk is taking into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in these areas, policy aims to make it safe without increasing flood risk elsewhere and, where possible, reducing flood risk overall'*.

2.1.2 The PPS25 Development & Flood Risk Practice Guide was published in June 2008 and updated in December 2009. It provides comprehensive guidance on the implementation of PPS25.

2.2 Local

2.2.1 South Holland District Council's Strategic Flood Risk Assessment (SFRA) was originally published in December 2002 and updated in January 2010. The updated document is referenced by this FRA.

3 EXISTING SITE

3.1 General

- 3.1.1 The application site forms part of the wider existing Bakkavor Pizza factory site located directly off Sluice Road, approx. 2km to the west of Holbeach St Marks and approx. 8km to the north of Holbeach, Lincolnshire.
- 3.1.2 The application site boundary is indicated on an OS based location plan included within Appendix A
- 3.1.3 The wider site is bound to the south by the Sluice Road with workshop/farm buildings beyond, to the west by the Holbeach River with arable farmland beyond and to the north and east by arable farmland.

3.2 Levels

- 3.2.1 The site and wider surrounding area is flat.
- 3.2.2 Whilst a full topographical survey of the existing site related to OSBM is not available, we have been informed that the existing building finished ground floor level is set at 4.335m AOD.

3.3 Drainage

- 3.3.1 We understand that there are no public sewers within the vicinity of the site. Extracts of the public sewer records have therefore not been sought from Anglian Water.
- 3.3.2 The existing on site foul and surface water drainage systems are identified on the existing site layout drawing included within Appendix B.
- 3.3.3 The drawing confirms that the existing foul drainage discharges to a significant purpose built on site treatment plant.
- 3.3.4 The drawing also confirms that the site is served by two main surface water drainage networks. The largest of these networks, which serves the majority of the site, outfalls to the adjoining Holbeach River, via an on site balancing lagoon. The smaller network, which serves the application site area, outfalls to a drainage ditch to the east of the site with no evidence of any on site attenuation features.

4 POTENTIAL SOURCES OF FLOODING

4.1 Fluvial/Tidal Flooding

4.1.1 The nearest potential source of fluvial flooding to the site is represented by the Holbeach River that runs adjacent to the western boundary of the wider site. The Holbeach River is a tributary of the River Welland located approx. 2km to the north west of the site. The Holbeach River is a main drain, falling under the jurisdiction of the South Holland Internal Drainage Board (IDB). The River Welland is classified as Main River.

4.1.2 An extract of the Environment Agency's on line flood mapping is shown in Figure 1 below. The dark blue areas represent Flood Zone 3a, 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. The light blue areas represent Flood Zone 2, land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year. All remaining areas are classified as Flood Zone 1, land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year. The blue lines indicate watercourses that are designated as 'Main River'.

4.1.3 The approx. site location has been added to the indicative flood mapping extract, indicating that it lies entirely within Flood Zone 3a, assuming no flood defences exist.



Figure 1 – Environment Agency Floodplain Mapping Extract

- 4.1.4 The Environment Agency has confirmed that the site and surrounding area is afforded a significant degree of protection by tidal flood defences, consisting of earth embankments. The defences are noted to be in 'good' condition providing protection against a tidal flood event with an annual probability of between 1 in 100 (1%) and 1 in 150 (0.67%). The defences are inspected by the Environment Agency at regular intervals.
- 4.1.5 The Environment Agency has also provided modelled tidal flood levels for the area. The nearest modelled tidal flood levels to the site, at Fosdyke Bridge, are 5.85m AOD (1%) and 5.99 (0.5%).
- 4.1.6 The Environment Agency has confirmed that they do not have any records of flooding within the area.
- 4.1.7 In addition to the information provided by the Environment Agency, mapping within the SFRA (Maps 5, 12 and 13) confirm the actual flooding extents for the area with the benefit of the flood defences for the present day, 2055 and 2115 scenarios. It is noted that the site remains free from flooding in all cases.
- 4.1.8 A copy of all data supplied by the Environment Agency and the SFRA maps referred to is included within Appendix D.
- 4.2 Groundwater**
- 4.2.1 Groundwater flooding is highly variable and dependant on local conditions.
- 4.2.2 The SFRA states that there are no reports of groundwater flooding within the district and we are not aware of any evidence to suggest that the site is susceptible to groundwater flooding.
- 4.3 Overland Flows**
- 4.3.1 As the site lies within such a flat area served by an extensive IDB drainage network, the risk of flooding to the site via natural overland flows is considered low.
- 4.4 Existing Sewers**
- 4.4.1 The SFRA states that flooding from public sewers and highway drains is restricted to minor isolated areas within the district. We are not aware of any evidence to suggest that the site is susceptible to flooding from this source.
- 4.5 Reservoirs, Canals and Other Artificial Sources**
- 4.5.1 It is noted that a small silage/slurry lagoon is located approx. 0.5km to the south west of the site, associated with Majors Farm. Based on its size, distance from the site and the prevailing flat topography, it is not considered to pose a significant risk of flooding to the site.
- 4.5.2 It is noted that sluices present on the Holbeach River, downstream of the site. The SFRA states that the sizes of sluices within the district are commensurate with the respective waterways/drains and therefore the potential for their blockage is considered to be low.

4.5.3 There are no other artificial sources identified within the vicinity of the site.

5 PROPOSED DEVELOPMENT

5.1 General

- 5.1.1 It is proposed to provide an extension to the southern elevation of the existing Pizza manufacturing building, located to the south eastern corner of the wider site.
- 5.1.2 The proposed extension has an area of approx. 1392m² and will generally accommodate a new pizza production/assembly line, including associated oven room and freezer.
- 5.1.3 The proposed extension is indicated on the layout drawing included within Appendix D.

5.2 Levels

- 5.2.1 The proposed development finished floor level will be set to match the existing finished floor level at 4.335m AOD.

5.3 Foul Drainage

- 5.3.1 The proposed extension will result in a marginal increase in foul discharge, from new hand basins and floor gullies. It is estimated that the increase in peak flow will be less than 0.5 l/s.

5.4 Surface Water Drainage

- 5.4.1 As previously stated, the proposed extension area is approx. 1392m². Of this figure, the majority will be either located beneath existing roof cover or will be constructed over existing hard standing areas. Both the existing roof and hard standing areas are already positively drained.
- 5.4.2 Only approx. 400m² of the proposed extension represents 'new' impermeable area. This would equate to a run-off of approx 7.2l/s in a 1 in 2 year event.
- 5.4.3 It is not considered viable to introduce SUDS techniques within the existing drainage system to mitigate for such a proportionately low increase in overall run-off. Subject to the approval/consent of South Holland IDB, the Environment Agency and the LPA, it is therefore proposed to drain surface water run-off from the proposed extension to the existing surface water drainage network, via either existing or re-located rain water pipes.
- 5.4.4 Whilst the existing surface water system pipe sizes are not noted on the existing drainage layout drawing, such a proportionately low increase in flow is unlikely to overload the existing drainage system. The relevant pipe sizes should, however, be identified on site to provide confirmation in this respect.
- 5.4.5 All surface water run-off associated with the proposed extension will be from roofs. No specific pollution control measures are therefore proposed in respect of the new run-off.

6 VULNERABILITY & COMPATIBILITY

6.1 General

6.1.1 In accordance with Table D2 of PPS25, the proposed residential development use is classified as 'less vulnerable'.

6.1.2 In accordance with Table D3 of PPS25, 'less vulnerable' development use is suitable for location within Flood Zones 1, 2 and 3a.

6.2 Sequential Test

6.2.1 Annex D of PPS25 recommends that the risk based Sequential Test should be applied at all stages of the planning process to steer new development to areas at the lowest probability of flooding.

6.2.2 The recent supplementary PPS25 FRSA (national) version 2.0 issued by the Environment Agency recommends the approach that should be adopted by LPAs in applying the Sequential Test to planning application sites located with Flood Zones 2 and 3a.

6.2.3 From the information supplied by the Environment Agency and contained within the SFRA, the site is considered to be at a low actual risk of fluvial/tidal flooding. It should also be noted that the proposal represents an extension of existing premises.

6.2.4 In consideration of the above, the sequential process can be deemed to have been reasonably applied in this instance.

6.3 Exception Test

6.3.1 In accordance with Annex D of PPS25, the Exception Test is not applicable in this instance.

7 ASSESSMENT OF FLOOD IMPACT

7.1 Fluvial/Tidal Flooding

7.1.1 From the information provided by the Environment Agency and contained within the SFRA, the site is considered to be a low actual risk of fluvial/tidal flooding, including an allowance for climate change.

7.1.2 There will therefore be no increase in the risk of fluvial/tidal flooding to other areas via the displacement of floodwater.

7.2 Groundwater

7.2.1 No specific information relating groundwater levels on the site is available, however, we are not aware of any evidence to suggest the site has been subject to groundwater flooding.

7.2.2 The risk of groundwater flooding to the proposed development is therefore considered to be low.

7.3 Overland Flows

7.3.1 As the site lies within a flat area benefiting from a significant IDB drainage network, the risk of flooding from natural overland run-off flows is considered low.

7.4 Existing Sewers

7.4.1 There are no records of, and we are not aware of any evidence to suggest that, the site has been subject to flooding resulting from deficiencies with the public, private or highway drainage networks. The risk of flooding to the proposed development from this source is therefore considered to be low.

7.5 Proposed Drainage

7.5.1 There will be a marginal increase in peak foul discharge, less than 0.5 l/s, as a result of the proposed extension. Such an increase is not considered likely to have a significant impact on the existing on site foul drainage network and treatment works. Any increase in flood risk to the site and surrounding areas is therefore considered to be insignificant.

7.5.2 Subject to the approval of South Holland IDB and the Environment Agency and confirmation of existing pipe sizes, it is proposed to connect the minimal new surface water roof run-off to the existing on site surface water drainage network. There will be a marginal increase in flood risk via this source to the site and other areas as a result. Assuming that the minimal increase in discharge is consented, it is anticipated that South Holland IDB will be able to manage the marginal increase in flood risk to other areas within their receiving drainage network.

7.6 Reservoirs, Canals & Other Artificial Sources

7.6.1 From the information contained with the SFRA, we understand that the local IDB drainage network is well maintained and unlikely to pose a significant flood risk to the site.

7.6.2 There are no other artificial sources identified that pose a significant flood risk to the site.

8 CONCLUSIONS & RECOMMENDATIONS

8.1 General

8.1.1 Based on the information supplied by the Environment Agency and contained within the SFRA, the site is considered to be at a low actual risk of fluvial/tidal flooding, including an allowance for climate change.

8.1.2 The risk of flooding to the application site from all other sources is also considered to be low.

8.1.3 The risk of flooding to other areas from all sources, as a result of the proposed extension, is considered to be low.

8.2 Mitigation Measures

8.2.1 No on site flood defence measures are proposed.

8.2.2 As the proposed extension will not displace floodwater, no flood water storage mitigation measures are required.

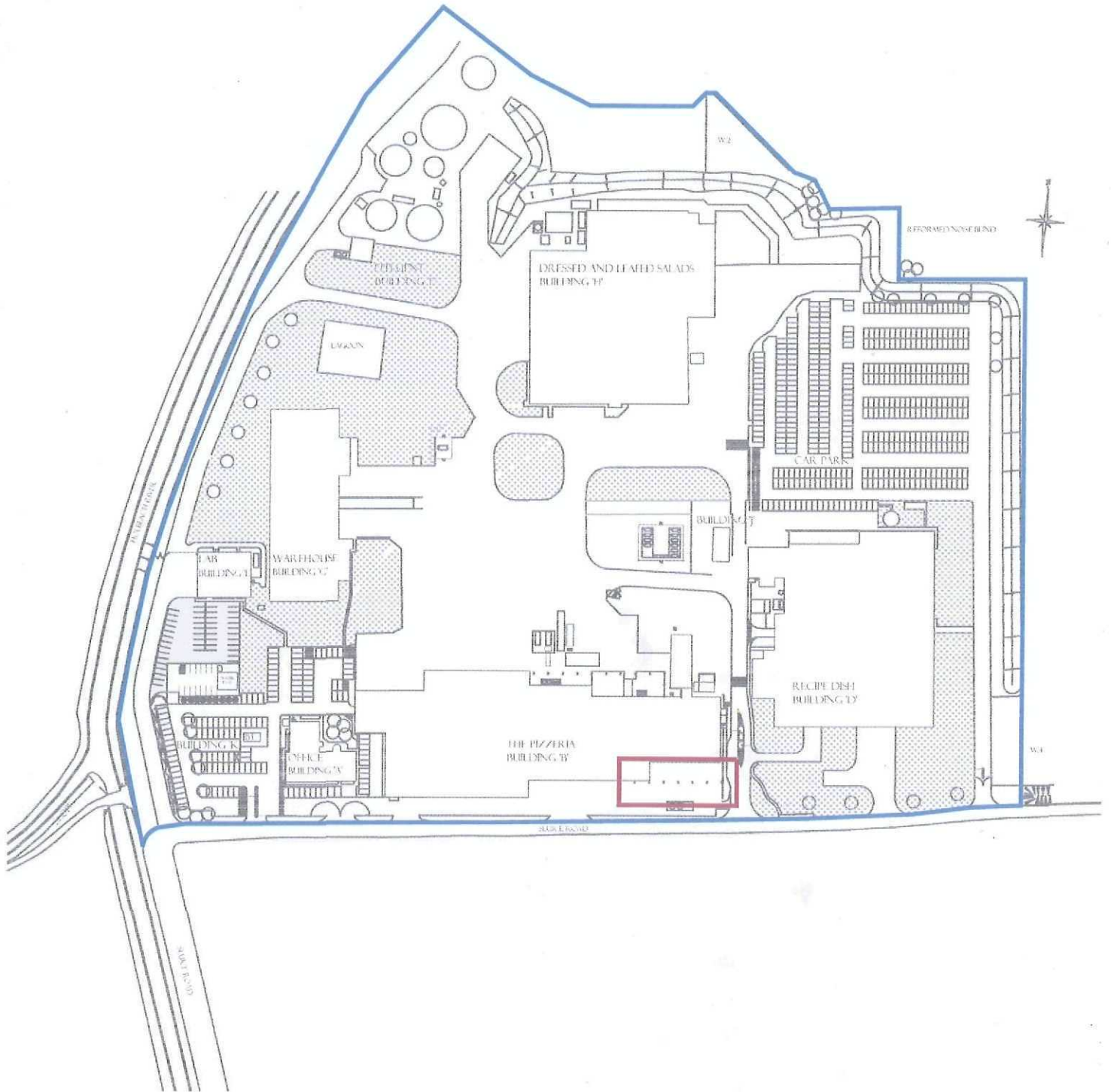
8.2.3 There are no other specific mitigation measures proposed.

8.3 Residual Flood Risk

8.3.1 There are no significant residual flood risks to property or life identified.

APPENDICES

APPENDIX A



no	date	drawn	notes	checked

PROJECT
**BAKAVOR PIZZERIA
 HOLBEACH
 ST MARKS**

DRAWING
**SITE
 LOCATION PLAN**

ARCTICA
 ARCHITECTURE & DESIGN CONSULTANTS
 Telephone 01780 482200 Fax 01780 480716
 succeed@arctica.co.uk

FIGURE SCALE FROM THIS DRAWING
 THE CONTRACTOR IS TO TAKE ALL
 DIMENSIONS ON SITE AND ADAPT
 DISCREPANCIES TO THE ORIGINAL
 DESIGNING DOCUMENT

SCALE 1/2500 @ A4	JOB 10-04
NUMBER 108	REV

APPENDIX B

ARCTICA ENGINEERING
 1000 UNIVERSITY AVENUE, SUITE 100
 VANCOUVER, BC V6L 1A1
 TEL: 604.271.1111

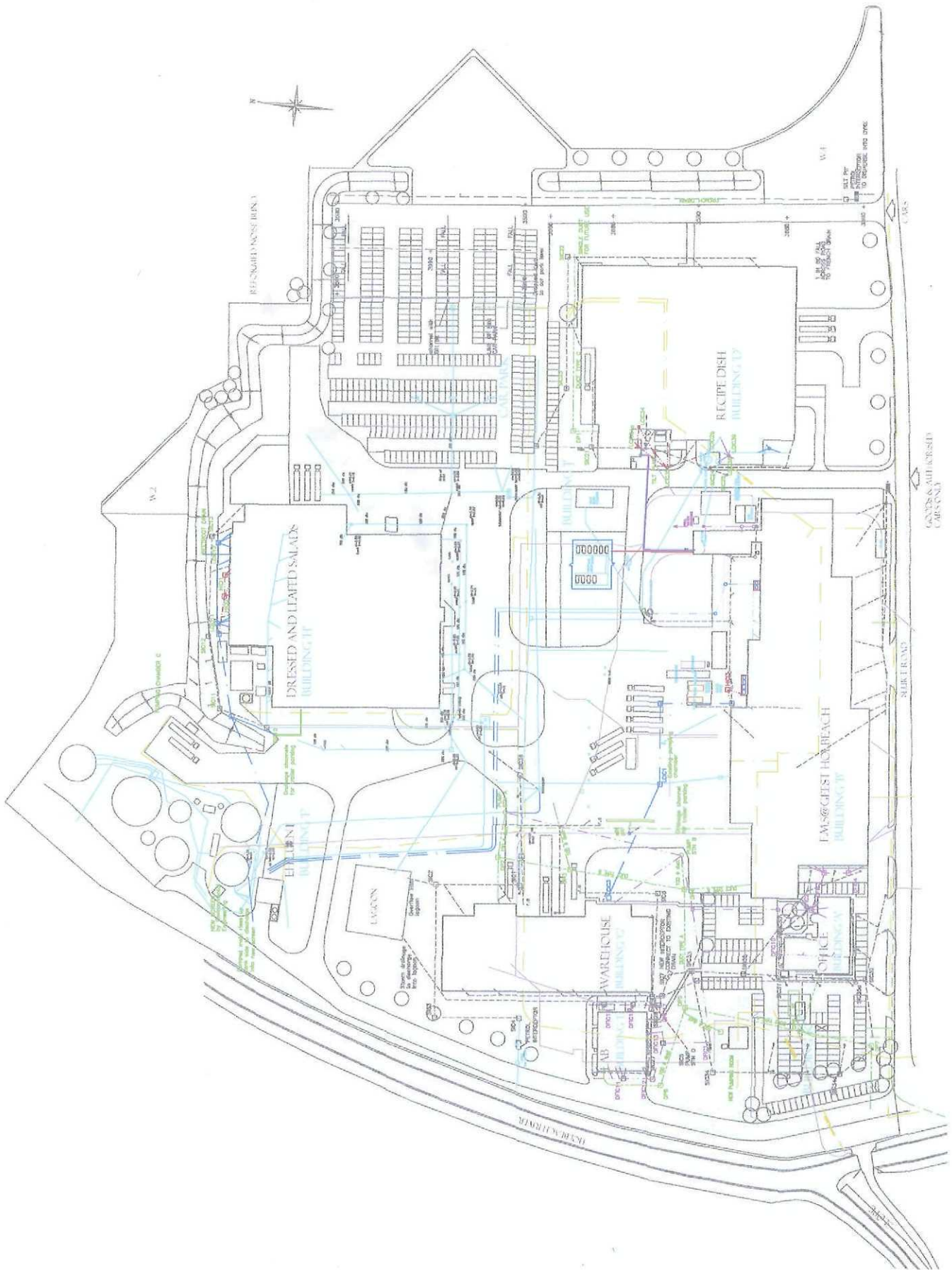
- DOMESTIC WASTE
- WASTEWATER
- ELECTRICITY
- EXISTING SERVICES
- FACTORY WASTE HIGH CHIE
- FACTORY WASTE LOW RISK
- EFFLUENT
- WANG WATER
- SURFACE WATER
- TELECOM
- STEAM
- GAS PIPE

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Project	Existing Services	Scale	1:1000
Client	Chester Inc.	Date	2010-01-15
Drawn	J. Smith	Checked	M. Jones
Issue	01	Revision	A

ARCTICA
 ENGINEERING
 Telephone: 604.271.1111 Fax: 604.271.1112
 www.arctica.ca

PROJECT		DATE	NO.
GUEST HQ/BEACH PROJECT/STOCK		03/05	
DRAWING		REV	A
SITE PLAN		NUMBER	01
		REV	A
		NUMBER	01



APPENDIX C



Mr Richard Fillingham
RJ Fillingham Associates Ltd
richard@rjfillinghamassociates.co.uk

Our ref: CCN-2010-24124
Date: 24 June 2010

Dear Mr Fillingham

Basic Flood Risk Assessment Data Request for Sluice Road, Holbeach St Marks, Lincolnshire

Thank you for your request of 26 May 2010 to use Environment Agency data, Product 3, in the development of the Flood Risk Assessment (FRA) for the above site. The information is attached.

If you have requested this information to help inform a development proposal, then you should note the detail in the attached advisory text on the use of Environment Agency Information for Flood Risk Assessments / Flood Consequence Assessments.

Flood Map

A copy of the Flood Map for your area is enclosed. The Flood Map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood event with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

The Flood Map only indicates the extent and likelihood of flooding from rivers or the sea. It should also be remembered that flooding may occur from other sources such as surface water sewers, road drainage, etc.

Tidal Flood Levels

Please find attached available **tidal** flood levels as requested. These levels have an assessment date of 2006, which should be used in any consideration of future increases due to climate change. The levels are in metres above Ordnance Datum Newlyn (mODN) and are valid for 12 months from the date of issue.

Tidal Defence Information

The tidal defences protecting this site consist of earth embankments. They are in a good condition and provide protection against a flood event with between a 1% and 0.67% chance of occurring in any year (between 1 in 100 and 1 in 150). We inspect these defences regularly to ensure that any potential defects are identified early.

Contd.../

Waterside House, Waterside North, Lincoln, LN2 5HA
Customer services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

Weekday Daytime calls cost 8p plus up to 6ppm from BT Weekend Unlimited. Mobile and other providers' charges may vary

Land Drainage

The information provided is limited to flood risk from the sea and rivers with catchment areas greater than 3km². The property is in an area of extensive land drainage which may pose an additional risk of flooding. Further information should be sought from the South Holland Internal Drainage Board (tel: 01553 669500).

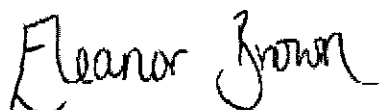
History of Flooding

With regards to the history of flooding I can advise that we do not have any records of flooding in this area. It is possible that other flooding may have occurred that we do not have records for, and other organisations, such as the Local Authority or Internal Drainage Boards, may have records.

This information is provided subject to the enclosed notice, which you should read.

If you have any queries or would like to discuss the content of this letter further please contact Eleanor Brown using the telephone/email details below. Please quote our CCN reference number in all correspondence where data is referenced, including the Flood Risk Assessment.

Yours sincerely



FOR John Ray

Flood Risk Mapping & Data Management Team Leader

Direct dial 01522 785028

Direct fax 01522 785018

Direct e-mail eleanor.brown@environment-agency.gov.uk

Enc.

Flood Map

Tidal Flood Levels

Standard Notice (Commercial)

FRA Advisory Text

Use of Environment Agency Information for Flood Risk Assessments / Flood Consequence Assessments

Important

If you have requested this information to help inform a development proposal, then you should note the following:

In **England**, you should refer to the Environment Agency's Flood Risk Standing Advice and PPS25 and its associated Practice Guide for information about what flood risk assessment is needed for new development in the different flood zones. These documents can be accessed via:

<http://www.environment-agency.gov.uk/research/planning/82587.aspx>

<http://www.communities.gov.uk/publications/planningandbuilding/pps25floodrisk>

<http://www.communities.gov.uk/publications/planningandbuilding/pps25practiceguide>

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

In **Wales**, you should refer to TAN15 for information about what flood consequence assessment is needed for new development in the different flood zones

<http://new.wales.gov.uk/topics/planning/policy/tans/tan15?lang=en>

You should also refer to any Strategic Flood Consequence Assessment produced by your local planning authority.

In **both England and Wales** you should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a flood risk or flood consequence assessment (FRA/FCA) where one is required, but does not constitute such an assessment on its own.
2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. The information produced by the local planning authority referred to above may assist here.
3. Where a planning application requires a FRA/FCA and this is not submitted or deficient, the Environment Agency may well raise an objection.
4. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with the local planning authority.

Flood Map centred on Sluice Road, Holbeach St Marks - created June 2010 [Ref: CCN-2010-24124]



Scale 1:24,000

-  Main River
-  Raised Defences
-  Flood Storage Areas
-  Area at Risk of Flooding from Rivers or The Sea
-  Extreme Flood Outline

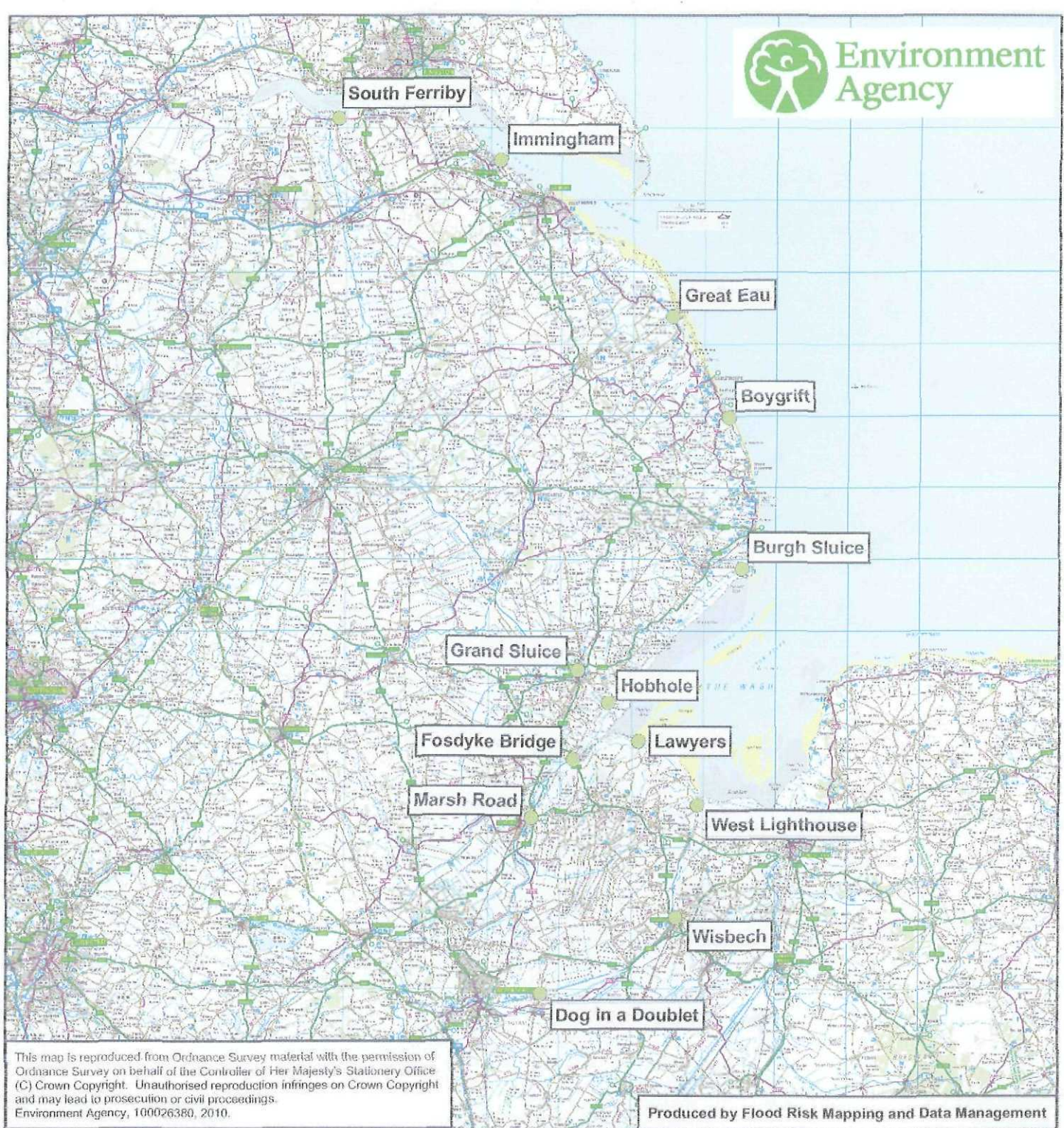
Dark blue shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year.
- or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.

Light blue shows the extent of the Extreme Flood Outline, which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

These two colours show the extent of the natural floodplain if there were no flood defences or certain other man-made structures and channel improvements. Sites outside the two extents, but behind raised defences, may be affected by flooding if the defences are overtopped or fail.

Created by the Flood Risk Mapping & Data Management Team, Lincoln



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	3.80	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	536610	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	4.88	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	3.87	4.00	4.13	4.22	4.32	4.42	~

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No Intellectual Property Rights are transferred or licensed to you save those which are expressly provided in this agreement

6. Assignment

You may not transfer or in any other way make over to any third party the benefit of this agreement either in whole or in part

7. Waiver

Failure by either of us to exercise or enforce any rights available to it, or any forbearance, delay or grant of indulgence, will not be construed as a waiver of rights under this agreement or otherwise

8. Entire agreement

This agreement constitutes the entire agreement between us and supersedes all oral or written agreements, representations, understandings or arrangements (whether previous, contemporaneous or future) relating to its subject matter. You agree to waive any right to rescind this agreement by virtue of any misrepresentation and not to claim damages for any misrepresentation that is not fraudulent

9. Severance

If any part of the agreement is found by a court of competent jurisdiction or other competent authority to be unenforceable, then that part will be severed from the remainder of the agreement which will continue to be valid and enforceable to the fullest extent permitted by law

10. Variation and Termination

This agreement may not be amended, modified, varied or supplemented but it may if both of us agree be terminated or replaced by a new agreement

11. Relationship of Parties

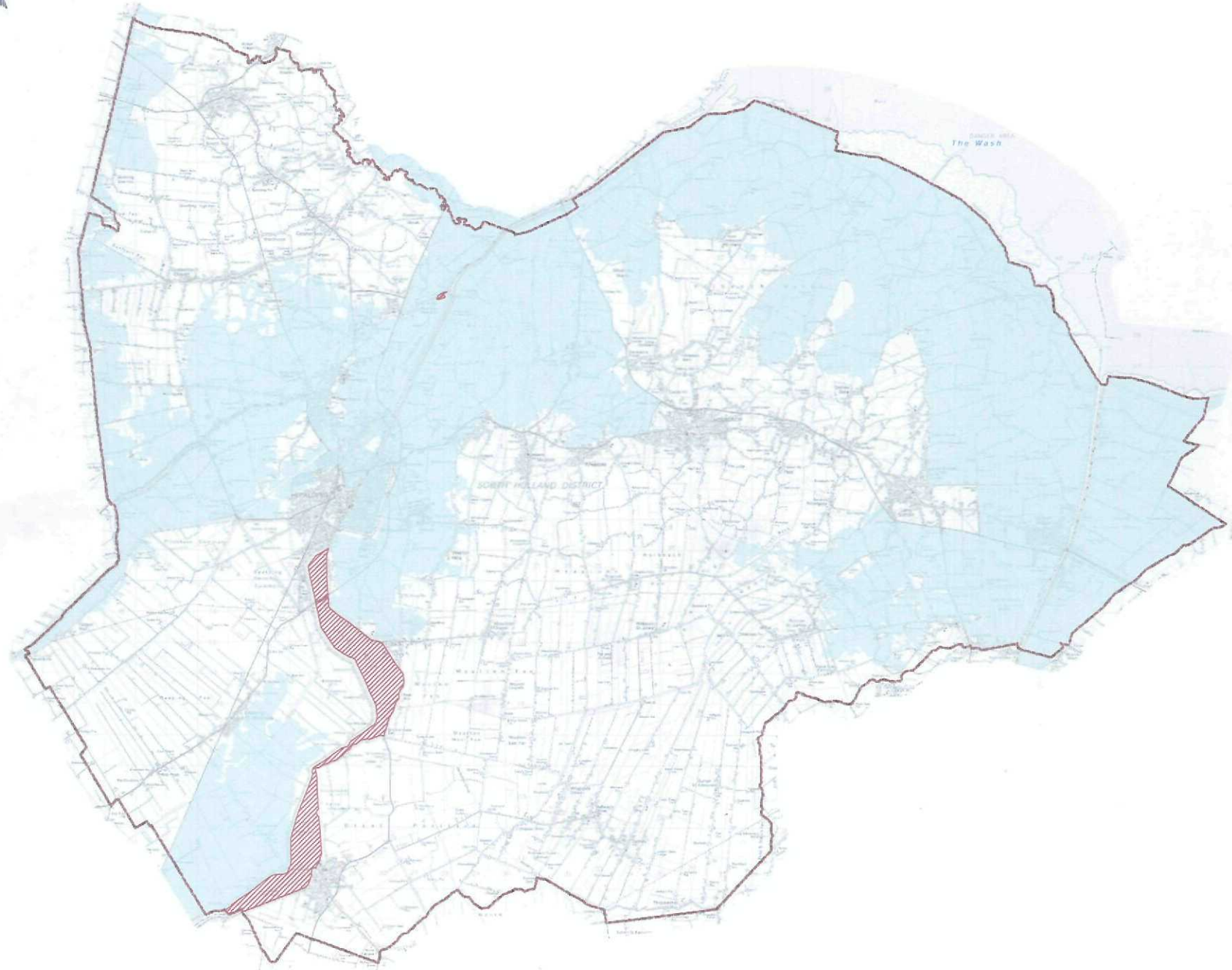
We are not in a partnership or joint venture, nor is either of us the agent of the other or authorised to act on behalf of the other

12. Rights Of Third Parties

No third parties shall have rights to enforce any part of this agreement under the Contracts (Rights of Third Parties) Act 1999

13. Governing Law

This agreement shall be governed and construed in accordance with English law



NOTES

1. The potential flooding consequences shown on this map relate to flooding from the sea, river flows and rainfall drainage & sewer systems in any other account the presence of current flood risk management, construction, flood or flood defences.
2. In addition to the potential flood extent shown on this map, there may be shallow flooding in low lying or areas.
3. The consequences designated as being an Actual Risk arise from direct overtopping of defences, whereas the words 'could' refer to an armed breach of defences or some defences. Flood Risk has been assigned to areas in places where the flood risk is not a direct result of an armed breach and the defence level is less than the maximum level for structural safety of the defence.
4. The consequences designated as being a Potential Risk arise from direct overtopping of defences, whereas the words 'could' refer to an armed breach of defences which is assumed could occur at any point along the defences.
5. The potential flood consequences relate to flood probability (return period) as follows:

Probability Band	Annual probability of Flooding from a river (fluvial)	Annual probability of Flooding from the sea (tidal)
Low	<0.1%	<0.1%
Medium	1% - 0.1%	0.5% - 0.1%
High	>1%	>0.5%

6. Functional Floodplain encompasses areas where water is expected to flow or be stored in times of flood.
7. Land outside South Holland District is not considered.
8. This map shows the extent only of the flooding; probability bands relevant to the map title.

Map Legend

- Flooding Probability bands:
- High
 - Low or medium, but reliant on present or by flood defences for its protection
 - Functional Floodplain
 - South Holland District Boundary

REV	DATE	REMARKS
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ROYAL HASKONING
 50 TWELVE HOUSE
 BRETTON
 PETERBOROUGH
 CB3 9EY
 TEL: +44 (0)1753 334455
 FAX: +44 (0)1753 267243

SOUTH HOLLAND DISTRICT COUNCIL
 DISTRICT COUNCIL OFFICES
 PROBY ROAD
 SINGING
 LINCOLNSHIRE
 PE15 2BE

UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT
 Actual Risk Extent
 District - Year 2115
 1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Jan 2010 REV NO:
 SCALE: 1:50,000 @ A1 (MAP NO): 13

NOTES

1. The probability of flooding is presented as a range of risk levels (Low, Moderate, High) based on the return period of the flood event. The return period is based on the probability of a flood event occurring in any given year.
2. The return period is presented as a range of risk levels (Low, Moderate, High) based on the probability of a flood event occurring in any given year.
3. The return period is presented as a range of risk levels (Low, Moderate, High) based on the probability of a flood event occurring in any given year.
4. The return period is presented as a range of risk levels (Low, Moderate, High) based on the probability of a flood event occurring in any given year.
5. The return period is presented as a range of risk levels (Low, Moderate, High) based on the probability of a flood event occurring in any given year.

Return Period	Annual Probability of Exceedance (1/Year)	Return Period (Years)
100	0.01%	100
10	0.1%	10
2	0.5%	2

6. Flood risk is defined as the combination of the probability of a flood event occurring and the potential damage to property and infrastructure.
7. The return period is presented as a range of risk levels (Low, Moderate, High) based on the probability of a flood event occurring in any given year.

Map Legend

- Flooding Probability Levels
 - High
 - Medium
 - Low
- Other Features
 - Water Bodies
 - Transportation
 - Other



REV	DATE	REMARKS

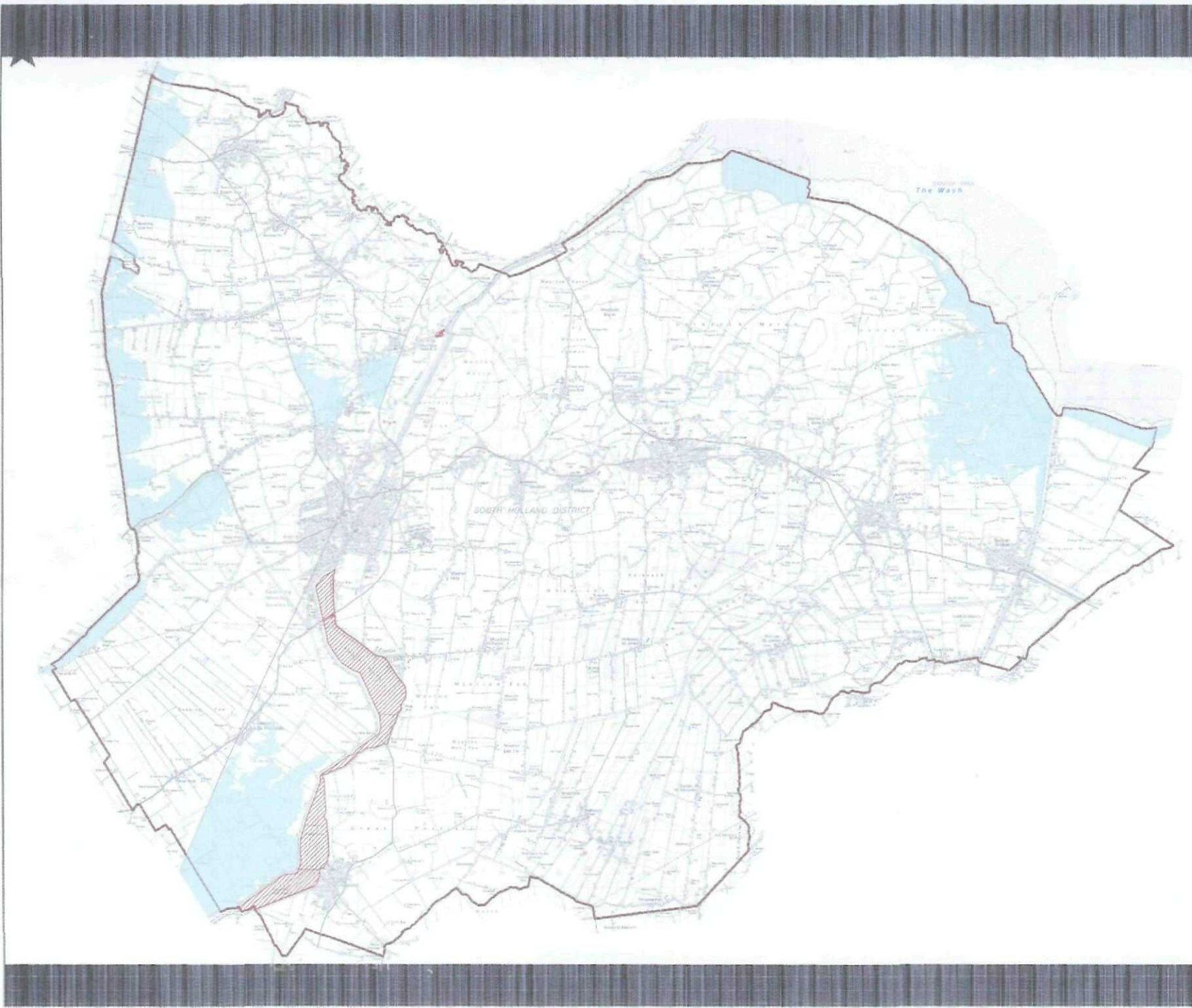
This map is prepared from the data provided by the relevant departments of the City of South Holland. The City of South Holland is not responsible for any errors or omissions in the data provided.

ROYAL HASKONING
 10000
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SOUTH HOLLAND DISTRICT COUNCIL
 SOUTH HOLLAND DISTRICT COUNCIL
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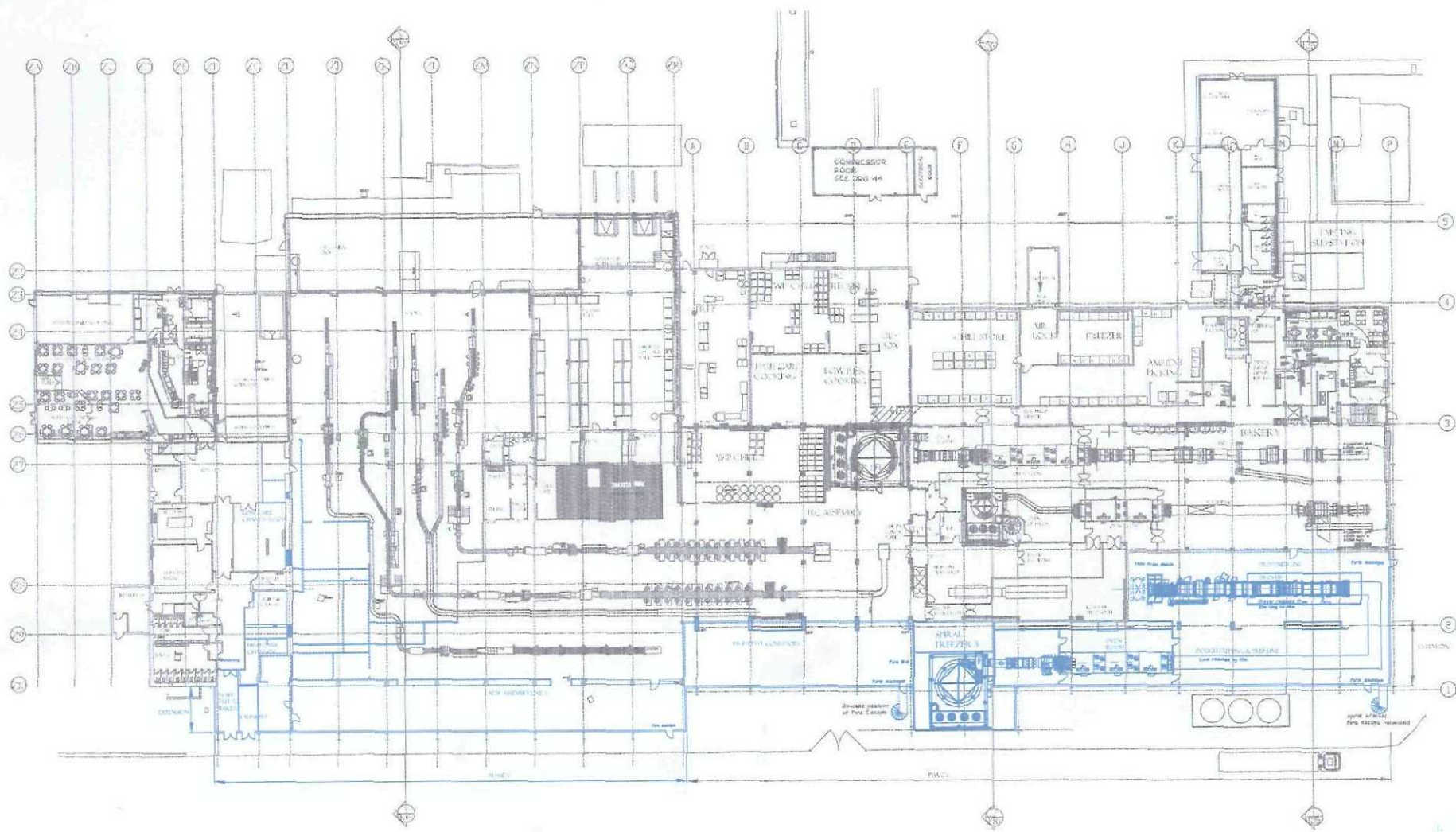
UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT
 Actual Risk Extent
 District - Present Day
 1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Jan 2010
 SCALE: 1:50,000
 SHEET: 5



APPENDIX D

THIS DRAWING IS THE PROPERTY OF ARCTICA ENGINEERING INC. AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.



SEC.
 BLUE LINES - PHASE I
 1/2" Proposed new
 structure & equipment
 BLACK LINES - Existing
 structure & equipment

0 5 10 15 20 25 30
 Feet

NO.	DATE	DESCRIPTION



PROJECT		
BACKYARD HARBOUR III PIZZA BUILDING		
DRAWING		
PROCESSED GROUND PLAN		
ASCALE	ASCALE	BY
1:250	1:500	10/01
NUMBER	REV	
104	A	