LK CONSULT LIMITED

PART OF THE LK GROUP

LAND AT PROPOSED FOOD PRODUCTION FACILITY SUNNYHILLS ROAD, LEEK

FLOOD RISK ASSESSMENT

FINAL

Prepared for:

Adams Food Ingredients Ltd

By:

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Date: 17 February 2010

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Document Verification

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Prepared By	M. Pickford – Geoenvironmental Scientist	**Signature**	
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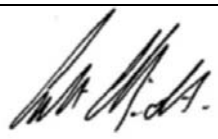
Authorised By	Dr S Elliott – Managing Director	**Signature**	

EXECUTIVE SUMMARY

Scope and Background

This Flood Risk Assessment (FRA) has been undertaken by Leyden Kirby Associates Ltd to support a planning application for development at Adams Food Ingredients, Sunnyhills Road, Leek. The development comprises a factory with associated car parking, loading, manoeuvring and landscaped areas.

This report has been prepared in accordance with *Planning Policy Statement 25: Development and Flood Risk* (PPS25) - *Annex E* and the guidance set out in the Practice Guide of June 2008. It summarises the methodology and results of the assessment.

In considering the proposals the following key principles have therefore been applied:-

- Identification of flood risks.
- Protection of users of the new development.
- No increased flood risk to third parties.

Consultations

Flood risk data was requested from the Environment Agency (EA). Flood levels at a number of model nodes along the River Churnet were provided. Consultation with regards to finished floor levels and safe access has also been undertaken and agreements have been reached.

Staffordshire Moorlands District Council was contacted concerning flood risk. They have not responded to date.

Severn Trent Water was consulted and has not responded to date. They have previously provided information on the adjacent site and this information has therefore been used. They state that they have no record of flooding events in this area due to lack of capacity of the sewers.

Flood Risk

The site itself is potentially vulnerable to fluvial flooding from the River Churnet to the south of the site.

The site is shown on the Environment Agency's (EA) website flood zone mapping as being partly within Flood Zone 2 – medium risk – annual probability of flooding between 1 in 100 and 1 in 1000.

Mitigation

Design

Severn Trent Water will require that the site be drained on a 'separate' system for foul and surface water and that surface water runoff be attenuated to a rate agreed before discharge into their surface water sewer.

The site falls naturally towards the river and site falls will be arranged to allow reasonably level access for occupants and visitors and allow the site to be free-draining in case of localised temporary ponding. The buildings will be constructed with floor levels a minimum of

300mm above the historic flood level, and above local ground level so there is no risk to buildings from any temporary local ponding in periods of high rainfall.

Soakaways may be feasible and their use will be investigated further. Attenuation will be incorporated into the site drainage to ensure that no above-ground ponding occurs for rainfall events with a probability of more than once in 30 years in accordance with design guidance for drainage.

Access

Safe means of access to and egress from the site and buildings to higher ground for pedestrians and emergency services is required under flood conditions, ideally above the 1% flood level increased for additional 20% flow (the design event). The levels on Sunnyhills Road at the new accesses for cars and HGVs appear to make this feasible. The Environment Agency has accepted that the access for cars and pedestrians is acceptable in emergency.

Conclusion

The development, as proposed, is at very low risk from fluvial flooding because site levels and ground floor levels will be elevated above likely flood levels. It is unlikely that flood resilience measures will need to be incorporated into the buildings designs by the developer or be required by building control. The feasibility of soakaways will be further investigated during the detailed design stages. The surface water drainage system will be designed to attenuate flows to any limits set by Severn Trent Water for acceptance into their surface water sewerage system.

CONTENTS

APPENDICES

1. INTRODUCTION

Government policy with respect to development in flood risk areas is contained within the Department of Communities and Local Government Planning Policy Statement 25 (PPS25) 'Development and Flood Risk' which was issued on 7th December 2006.

PPS25 builds on the previous guidance contained in Planning Policy Guidance Note 25 (PPG25) 'Development and Flood Risk' which was issued on July 17 2001, itself based on the DoE Circular 30/92 (MAFF Circular FD 1/92).

Leyden Kirby Associates Ltd have prepared this Flood Risk Assessment (FRA) in line with PPS25 Annex E and the guidance set out in the Practice Guide of June 2008.

This FRA has been prepared to support the planning application to construct an industrial development at the site. A location plan and proposed development plan are included in Appendix A.

The Local Planning Authority (LPA) will make the final decision with regard to any planning application. PPS25, paragraph 26, confirms that *'Following the coming into force, on 1st October 2006, of the amendment to Article 10 of The Town and Country Planning (General Development Procedure) Order1995 (the "GDPO"), LPAs are required to consult the Environment Agency on all applications for development in flood risk areas *except minor development), including those in areas with critical drainage problems and for any development on land exceeding 1 hectare outside flood risk areas.'* Since the site area is greater than 1.0ha, the EA should be consulted by the LPA.

2 PROPOSED DEVELOPMENT SITE

2.1 The Site

The site is located north of Sunnyhills Road and east of Newcastle Road in the area of Leek, Staffordshire, at National Grid Reference 397670 355420. A site location plan is included in Appendix A. The site is bounded to the east by Barnsfield Industrial Estate (with the Kerrygold Company adjacent to the eastern boundary). The site has most recently been part the Kerrygold Company and was used partly as a staff car park. Recently, all hardstanding on the site has been removed.

The site is approximately 2.23ha in size. The site falls from north to south with an approximate elevation of between 145m and 148m AOD.

2.2 Site Reconnaissance

Currently the site is grassed and hummocky with a slight fall (approximately 3m) from north to south. Considerable earth movement works has taken place on the site to remove the former access and car park infrastructure.

2.3 Development Proposals

The proposed development comprises a new factory building with associated loading and manoeuvring areas, car parking and landscaping.

2.4 Vulnerability

The proposed use of the site as a factory can be classified within the 'Less Vulnerable' categories in Table D2 of PPS 25. The site is shown on the Environment Agency's (EA) website flood zone mapping as being partly within Flood Zone 2 – medium risk – annual probability of flooding between 1 in 100 and 1 in 1,000. PPS25 confirms that the development is acceptable in this flood zone.

2.5 The Sequential and Exception Tests

PPS 25 requires that the Sequential Test be applied to proposals in Zones 2 and 3 to determine if there are any 'reasonably available' and suitable alternative sites at lower flood risk. Since comparison of flood level information from the EA with topographical data for confirms that the site is only slightly affected by the 1000-year (Zone 2) flood event, and at low risk of flooding within that zone, a Sequential Test for suitable alternative sites may therefore be unnecessary. The issues of safety and reduction in flood risk to others required by an Exception Test are addressed in this document, and the site is partly 'brownfield'.

3 ASSESSMENT OF FLOOD RISK

The level of detail entered into in any flood risk assessment is dependent upon the scale and potential impact of the proposed development (PPS25 Annex E), and the vulnerability classification of the proposed land-use (PPS25 Annex D). In this case the Client is seeking planning consent to construct buildings which can be classified within the 'Less Vulnerable' categories in Table D2 of PPS25.

The site is of medium local scale and of potentially low impact to others. The site was previously mostly permeable and therefore a significant increase in impermeable area will result from the development. The resultant runoff will need to be managed so as not to create an increased risk of flooding to others.

3.1 Information from the Environment Agency

Flood risk information was requested from the Environment Agency and information has been downloaded from their website and this, with relevant correspondence, is included in Appendix B and summarised below:

Flood Zone Maps and Modelled Flood Levels

The initial phase in identifying whether a site is potentially at risk of flooding is to consult the Environment Agency's Flood Zone maps, available on the Environment Agency's website. However, these are (often) based on coarse scale modelling and provide only an initial indication of the flood risk to a site. The Environment Agency Flood Zone maps were developed using a very coarse Digital Elevation Map (DEM), and are superseded by a more detailed analysis of modelled flood levels and topographic survey levels.

The Flood Zones divide the floodplain into three categories of flood risk, and do not take flood defences into account. PPS25 defines the Flood Zones as:-

- Flood Zone 1 – little or no risk, with annual probability of flooding from rivers and the sea of less than 0.1% (1 in 1000).
- Flood Zone 2 – low to medium risk, with annual probability of flooding of 0.1 to 1.0% from rivers and 0.1 to 0.5% from the sea.
- Flood Zone 3 – high risk of flooding with an annual probability of flooding of 1.0% or greater from rivers, and 0.5% or greater from the sea.

Flood risk data was requested from the Environment Agency (EA). Flood levels at a number of nodes along the River Churnet were provided with an extract from the EA web-based flood mapping which shows the approximate extent of the flood zone. No flood defences are indicated on the flood map.

The Groundwater Source Protection Zone (GSPZ) information was accessed on the EA website. The site is located within the 'total catchment' source protection zone of three boreholes.

The following comprises a summary of the usual EA guidance that would apply to this site:

- Normal EA requirements are to allow a minimum freeboard for habitable ground floors of 600mm above the flood level which would result from a 1% annual probability flood

event allowing for the additional effects of climate change (20% additional flow). Compromise can sometimes be negotiated.

- Car parking should ideally be above the 1% level, but can be accommodated lower with suitable safeguards.
- Similarly, safe access for pedestrians should be above the 1% probability plus climate change allowance level, although compromise can sometimes be made where this is not possible provided the access is still 'safe' under flood conditions.

3.2 Information from Other Consultees

The Local Authority, Staffordshire Moorlands District Council, has been contacted during this FRA process but has not responded to date.

Severn Trent Water (STW) was consulted but no response has yet been received. STW has previously undertaken a Hydraulic Assessment of sewerage crossing the adjacent site to determine the feasibility of the diversion of foul and surface water sewers. They state within their report that they have no record of flooding events in this area due to lack in capacity of the sewers. They also make recommendations within the report of the diversion of the sewers. This indicates that there is currently little spare capacity in the surface water sewer that discharges to the river Churnet, and therefore it is very likely that they will require substantial attenuation of flows from the site and/or reinforcement of the surface water sewer.

3.3 Flood Zone

The site is shown on the Environment Agency's (EA) website flood zone mapping as being partly within Flood Zone 2 – medium risk – annual probability of flooding between 1 in 100 and 1 in 1,000. From EA data it appears not to benefit from formal flood defences and is likely to be at most risk of direct flooding from the river. However, comparison of the modelled 1000-year flood level data with topographic information across the site shows that flood level would vary from 145.48m upstream (west) to 144.5m downstream (east). General site levels are higher than this and the lowest point on the site is around 144.5m in the middle of the site. The site is therefore only slightly affected in the 1000-year event. An extract from the topographical survey is included in Appendix A.

3.4 Managing Surface Water and SuDS

PPS25 recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface run-off from development sites through the use of Sustainable Drainage Systems (SuDS), this being complementary to the control of development within the floodplain.

SuDS will not alleviate flooding in an area prone to flooding; however, properly designed SuDS have the potential to prevent the surface water runoff from new development worsening the flood risk.

PPS25 Annex F paragraph F5 states that *'The effective disposal of surface water from development is a material planning consideration in determining proposals for the development and use of land'*.

PPS25 Annex F paragraph F6 states that *'Surface water arising from a developed area should, as far as practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account. This should be demonstrated as part of the flood risk assessment'.*

The Building Regulations Requirement H3 stipulates that rainwater from roofs and paved areas is carried away from the surface to discharge to one of the following, listed in order of priority:

a) an adequate soakaway or some other adequate infiltration system,

b) a watercourse or, where that is not practicable,

c) a sewer.

The Groundwater Source Protection Zone mapping from the EA website shows that the site is within the total catchment source protection zone of three boreholes. However the site is reasonably remote from the closest two and there should therefore be no barrier to the use of soakaways provided suitable protection measures are included in the design. Two preliminary infiltration tests have therefore been undertaken at the site to give an indication of the feasibility of employing soakaways as a mitigation method. The tests were located in the proposed car park area in the south and the HGV manoeuvring area in the west, because these are the most likely locations. The results of these tests, although not conclusive, show that infiltration methods should be feasible to a limited extent in the made ground layers to about 1.2-1.4m depth, which could be suitable for soakaway construction if the material is of sufficient permeability.

Severn Trent will require that the site be drained on a separate system, with only foul drainage connected into the foul/combined sewerage system. No guidance has been received from either EA or STW on maximum discharge rates for surface water from the site but, from previous experience, the maximum surface water discharge rate is likely to be restricted to that which previously drained from the site when used for car parking or the current 'greenfield' runoff rate.

For the proposed development, roof-water from the buildings could be discharged to soakaway or surface water sewer without treatment, but with any necessary attenuation to limit flows. Runoff from site roads, pavements and parking should be discharged via silt trap and interceptor to soakaway or surface water sewer after attenuation, in accordance with any agreement reached with Severn Trent.

As the potential for infiltration methods has not yet been quantified, the necessary storage volumes required to achieve various levels of attenuation cannot be calculated. Design standards require that flows from the 30-year event are accommodated without any above-ground surcharge, but the additional flows over the 30-year event and up to the 100-year event may be stored temporarily above ground level if site levels are arranged accordingly and suitable safeguards are incorporated into the design. A detention pond has therefore been included in the provisional drainage designs based on no infiltration being possible. Additional attenuation or soakaway provision can be achieved under roads and parking/manoeuvring areas as required.

Sewerage and attenuation designs will be addressed during the detailed design stage of the project, after assessment of infiltration and storage options, and after negotiation with Severn Trent Water.

3.5 Mitigation Measures

3.5.1 Flood levels and Proposed Site Levels

The Environment Agency has provided modelled flood level and flow data for a number of nodes along the River Churnet. Plans of the location of these nodes and the modelled sections, along with a detail showing the relevant sections related to the site, are provided in Appendix B.

There are 3 nodes relevant to the site:

- 36059 just downstream of the bridge and relevant to the general manoeuvring area in the west.
- 35775 about level with the loading bays on the west side
- 35675 around the proposed site entrance in the east.

The modelled data indicates flood levels above ordnance datum of 145.06m, 144.56m and 144.09m respectively for the 100 year event and 145.48m, 144.92m and 144.50m respectively for the 1000 year event.

Interpolating the data for 20% increase in flow (climate change allowance) for the 100 year event gives levels of 145.3m, 144.8m and 144.3m approximately for the 'design' event. However, a measured flood level of 145.64m has been recorded immediately downstream of the bridge. This is higher than the 1:1000 year modelled level of 145.48m by 160mm, and higher than the 'design' event at that point by 340mm.

The Environment Agency requires floor levels for habitable use to be above the 1% probability fluvial flooding level, increased to account for a possible 20% increase in flow, and then with a freeboard allowance on top. The Environment Agency generally requires a freeboard of 600mm above the higher of the modelled ‘design’ flood level or the worst measured level, but will accept a lower freeboard in this case if 600mm cannot be achieved. (See correspondence in Appendix B)

This information was submitted to the Environment Agency for their comment and advice. They have stated that, in this instance, given that the historic flood level appears to be higher than the 1000 year level, they require the minimum finished floor level to be 145.94m AOD. This will provide a 300mm freeboard above the historic measured level and over 1.1m freeboard over the ‘design’ modelled event.

Comparison of existing site levels with the modelled levels at the three relevant sections indicates that the site serves no flood storage function at events more frequent than the 100-year event but may provide a small amount at the 100-year event allowing for climate change and at the 1000-year event. Scope is available in setting levels for landscaping, parking and manoeuvring areas to off-set any minor storage lost and this can be addressed at detailed design stage if found to be significant.

3.5.2 Safe Access

Safe means of access to and egress from the site and buildings to higher ground for pedestrians and emergency services is required under flood conditions, ideally above the 1% flood level increased for additional 20% flow (the design event). The road level on Sunnyhills Road along the site boundary varies between 145.4m in the west to 144.85m at the new car and pedestrian access in the east, dipping slightly to around 144.5m in the centre, and is around 144.7m at the proposed HGV access towards the west. Higher

ground and road access outside flood extents is available to both the east and west. The EA has confirmed that the car and pedestrian access (the most vulnerable users) is acceptable in safety terms and this can also be made available for emergency vehicles. The HGV access is slightly lower and would potentially be flooded to a depth of 100mm at the 100y plus climate change allowance (design) event and 440mm if an allowance is made for the observed historic flood level (increase of 340mm on this event). This would not prevent HGVs from entering or leaving the site and gaining higher ground in emergency, should it be necessary.

3.5.3 Flood Resilience and Resistance

No buildings are expected to be affected by flooding and therefore no mitigation is recommended.

3.6 Residual Risks

It is impossible to completely guard against flooding since extreme events greater than the design standard event are always possible. In this situation any excess water will naturally run off south towards the River Churnet given the site gradient and therefore ground floors of buildings should be set nominally above local ground levels. Flooding from the river is currently improbable because ground levels on site will be generally above the 'design' flood level.

Therefore it is not intended that flood resistant materials need be used in the construction of the proposed buildings in line with the current recommendations from the ODPM (now Department of Communities and Local Government) *'Preparing for Floods'* guidance document.

It is not considered that a formal emergency evacuation plan will be necessary. However, it would be prudent for staff and visitors to be made aware of the recommended routes away from the site should flooding be expected. The EA has indicated that the site is covered by the Leek flood warning area under risk from the River Churnet, and the operator should therefore register under the flood warning system.

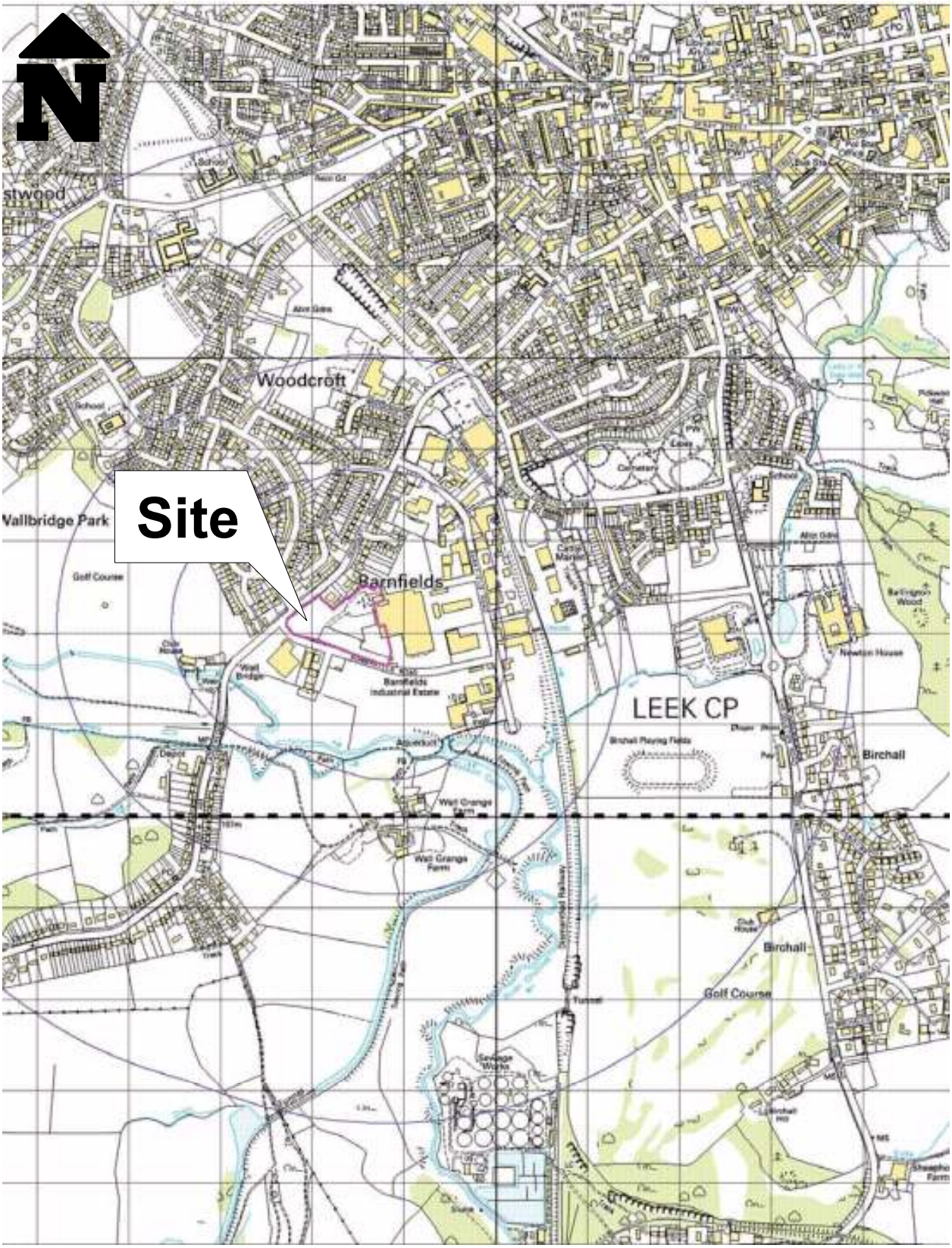
4 SUMMARY & CONCLUSIONS

- The site is indicated to be partly located in Flood Zone 2 but level information confirms it is mostly in Flood Zone 1 and at minimal risk of flooding.
- Sequential and Exception Test evidence may not be required.
- 'Safe Access' is achievable from Sunnyhills Road under most conditions.
- Ground floor levels should be at or above 145.94m AOD and nominally above local ground levels
- Use of soakaways for rainwater disposal may be feasible and should be investigated further during detailed design
- Attenuation of surface water runoff will be required before discharge to the surface water sewer and discharge limits should be agreed with Severn Trent Water and Environment Agency.

APPENDIX A

SITE DATA

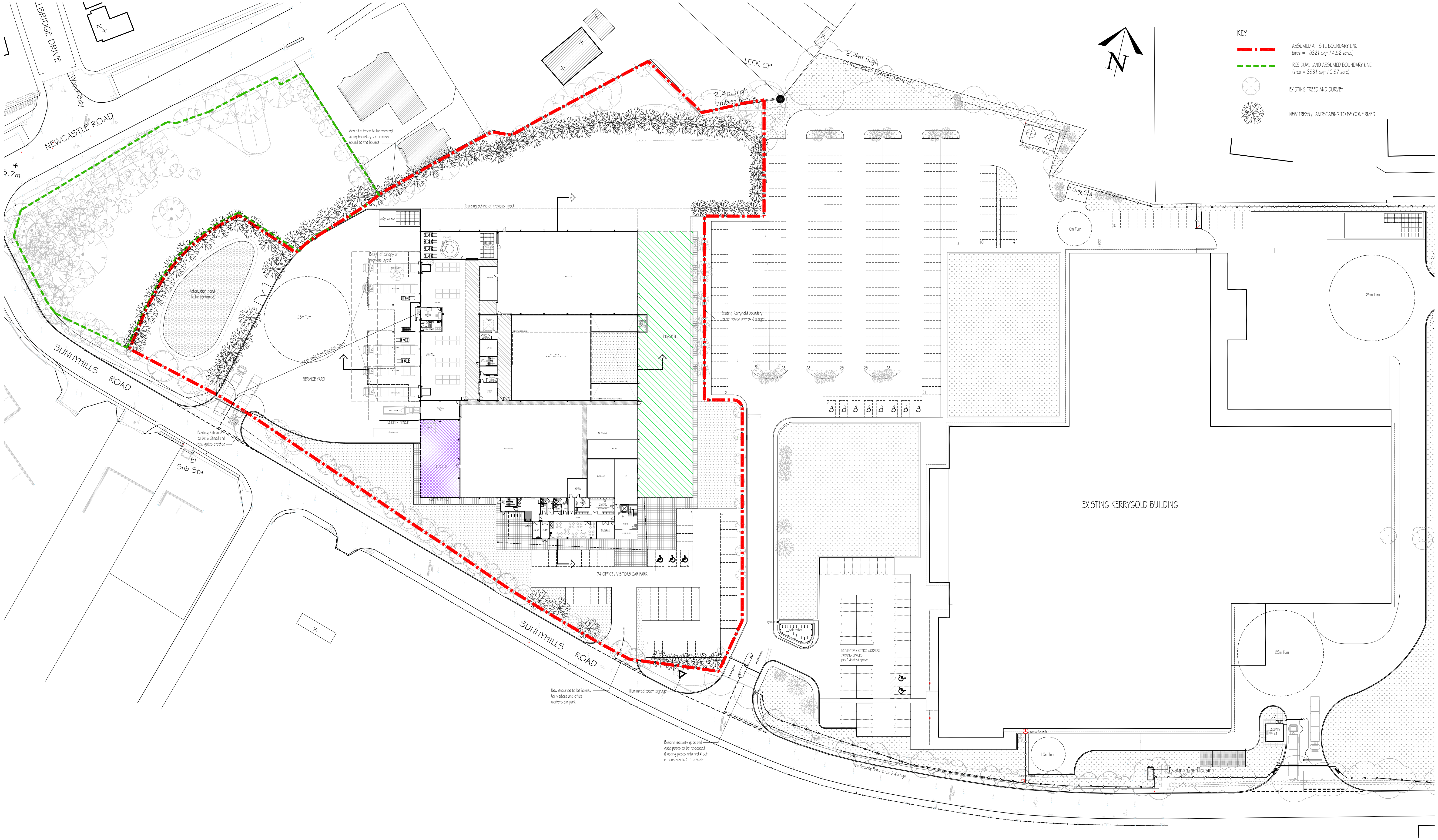
- **Location Plan**
- **Proposed Development Plan**
- **Previous Parking Areas**
- **Extract from Topographical Survey**



Location Plan, Adams Food Ingredients, Leek

Drawn: February 2010 **Scale: NTS**

LK ASSOCIATES LIMITED



PRELIMINARY ISSUE

FEASIBILITY CONCEPT SUBJECT TO SITE SURVEY AND PLANNING

REVISION	DESCRIPTION	DRAWN	CHECKED	DATE
G	Updated following client meeting 04/02/2010	MA	MA	05/02/2010
F	Updated following client meeting 28/01/2010	MA	MA	03/02/2010
E				
D	Attenuation pond shown, building layout and areas revised	DCM	MA	12-10-2009
C	Plan revised as per client and design team meetings and discussions	DCM	MA	01-10-2009
B	Value engineering done and phasing shown	DCM	MA	21-09-2009
A	Plan updated as per client and design team meeting	DCM	KDM	02-09-2009

PRELIMINARY INFORMATION TENDER CONSTRUCTION AS BUILT

W O O D S H A R D W I C K

SCALE 1:500 @ A1

TITLE ADAMS FOOD INGREDIENTS LEEK

DRAWN DCM CHECKED KDM

DATE SEPTEMBER 2009

DETAIL SITE LAYOUT

CONTRACTORS MUST CHECK ALL DIMENSIONS ON SITE. ONLY FIGURED DIMENSIONS ARE TO BE WORKED FROM. DISCREPANCIES MUST BE REPORTED TO THE ARCHITECT BEFORE PROCEEDING. © THIS DRAWING IS COPYRIGHT

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