

The Transportation of Fresh Food by Rail from and to the District of South Holland in Lincolnshire.

In 2006 a major UK food retailer said that the transport of fresh food by rail was only feasible in two places in the country. The two locations that generated enough outgoing volume of fresh foods were London and Spalding in Lincolnshire.



Executive summary - The University of Lincoln has conducted a review of the logistics of fresh foods in the district of South Holland in Lincolnshire. This report lays out the findings of that review and identifies an opportunity for a partial change in the mode of transport from road to rail. The report includes a review of the issues that will have to be addressed if a **Fresh Food Intermodal Hub** were to be created and also indicates the potential benefits to the District, County and Region if a **Rail Bridge** could be created.

Background

The area of South Holland in Lincolnshire is home to some of the major producers of fresh foods and produce in the UK. The factories based in and around Spalding obtain their raw materials from all over the world and then distribute their products to all of the major food retailers in the UK.

South Holland's position as one of the leading areas in the UK for food production has grown up over the past 50 years and the growth in this industrial sector continues with inward investment as well as organic growth.

The transport of raw and other materials into the area and finished product out is, in the main, carried using Large Goods Vehicles (LGVs). This flow of LGVs has an impact on the local road infrastructure and has an effect on general traffic flows because of the single carriage way nature of the local road network.

Food businesses in the district are biased towards fresh, chilled foods and fresh produce. This has an impact on the distribution system as raw materials arrival and final product despatch occurs on a daily basis for a large proportion of the companies. This daily movement of materials, both in and out of the district, means that the utilisation of new transport infrastructure could potentially be at a very high level.

The vast majority of the food output from the district goes to the major food retailers via their Regional Distribution Centres (RDC). This gives target clusters for outward transport links which is an essential element of rail based distribution systems.



The study

Food and Logistics Companies in South Holland have been surveyed to identify the barriers that are preventing the use of rail rather than road for the transportation of fresh foods into and out of the District. Once barriers have been identified the overall viability of an intermodal centre in South Holland has been appraised.

Possible sites for, and the size of, a Fresh Food Intermodal Centre have been identified taking into account the likely volumes of food to be handled, infrastructure requirements and proximity to the rail and road networks.

The study will -

Map the existing pattern of lorry movements of fresh produce to/from Spalding,

Identify 'clusters' of distribution traffic to and from other UK regions and mainland Europe where these might support trainload activity (e.g. upwards of 25 x 13.6m trailer loads). For these core routes the study will obtain the following information wherever possible:

- a. Number of trailer loads per day in each direction
- b. Target departure and arrival times
- c. Average payload / pallets / load factor in each direction
- d. Outline cost per trip (and basis of cost i.e. price per single trip, price per round trip etc).

Identify current strengths and weaknesses of existing road-based supply chain, to determine possible opportunities for rail to provide a competitive alternative (e.g. journey time / reliability).

Identify any opportunities to consolidate more activity through Spalding, or threats to loss of traffic from Spalding to other sites.

Identify how far the above volumes are likely to increase or decrease over time.



The Results

Barriers to the use of rail –

During interviews with companies it became apparent that rail had an image problem. Several attempts have been made over the years to move fresh food by rail and all had ended in various degrees of failure. Rail is once again being appraised because of its potential cost advantages and reduction in environmental impacts. It is hoped by the industry that a way can be found to make rail work and this was reflected in their willingness to discuss the matter but concerns must be addressed by the rail industry.

1. **Delivery Performance** - If rail is to be used in the transport of fresh foods it is imperative that the current level of delivery performance is matched by the rail network. On-time delivery of fresh foods is essential to all of the major retailers for the work of their RDC and the onward transport links to the retail stores. A late delivery at RDC level will result in a lack of products on the shelf, lost sales and, most importantly, the potential loss of customer loyalty. The average on-time delivery for the South Holland based logistics companies exceeds 99% for hitting a time window of target time +/- 15 minutes. That is a very high level of performance. Implications for the rail network are considerable if they are to match this level of performance. Any one-off operational rail network issues would have to be overcome without delay to the freight trains carrying fresh foods. Another, related, area of concern revealed in the work by the retailers was the fact that if one LGV is late an impact is felt but a small impact. If a train the equivalent of 25 or 30 LGVs is late that would potentially have a major impact on deliveries to stores.

2. **Flexibility** – The ability of the current road based distribution system to respond to higher, or lower, volumes is seen as a major advantage in the fresh food businesses. Responses to promotional activity and seasonal variation are routinely made by increasing and decreasing the number of vehicles used. Load fill rates, the percentage of full space on the vehicles, are maintained at a high level for the outward journey from South Holland. Percentages varied from company to company but load fill rates of > 95% were common. This is partly due to the large number of vehicles per day going to the same destination. Generally only one of the vehicles would be sent at less than 100% full.

The fill rate on the return journey was not so high and very variable. The return leg of a journey is obviously used to return equipment such as pallets and crates – these typically occupy 30% capacity. Logistics companies attempt to identify a return load, especially on longer journeys. This is achieved in a variety of ways but the income gained from these journeys tends to be low as businesses in close proximity to RDC

know that they have a large number of potential hauliers and so prices usually cover only fuel costs. The ideal situation of finding a single pick up return load to South Holland from close to an RDC is the holy grail of the logistics companies – but they recognise that this is rarely possible. A technique of “Tramping” is sometimes used to allow a vehicle to pick up and drop off loads on their way back to South Holland. Tramping does delay the return of the vehicle to South Holland so this method is very often not optimal.

Because of the need to maximise flexibility and responsiveness the logistics companies need to be able to use rail as an option rather than be committed to it as the means of distribution on a daily basis. A small delay in a factory can currently be tolerated in the road system by the diversion of vehicles or the sending of additional LGVs with lower load fill. The order patterns in the fresh foods supply chain are such that the requirement for the food is not confirmed until the last possible moment. As a result it is not unusual for a factory to be chasing additional product for despatch. Chasing is a term used where foods are expedited through a factory to meet additional, unexpected orders. Logistics operations are where all of those issues are sorted out so that the retailer rarely sees an impact in terms of a shortage of supply or late delivery.

3. **Traceability** – The distribution of food is part of a supply chain that has to be able to guarantee the safety and quality of the food being moved. The logistics companies that handle food have a sophisticated system of traceability and record keeping in order to retain control over the safety and quality of the food they are transporting. Confidence in the system used during rail transport will be essential for companies to even consider the use of rail over the road based alternative. There is also an issue of ownership of the goods being transported using the rail network. The prepared food products are high value items with prices averaging £2200 per tonne currently. This is greatly reduced for fresh produce but the issue of ownership and transfer of ownership through the supply chain will have to be clarified, especially if the high value foods are to be attracted to the system.

4. **Double Handling** – Logistics companies believe that the smooth operation of the intermodal transfers is essential to a large take up of the rail service. Fresh produce and chilled food have to minimise the time they spend in distribution. This will allow departure times from the gate of the factory to be as late as possible to hit the window at the delivery end. It is currently perceived that the transfer points would be slow so that time gained on the track would be more than lost in the intermodal system at both ends giving a net slower distribution than is currently achieved.



5. **Cost** – Distribution costs for chilled products using LGVs, on average is split between –
- | | |
|----------------|-------|
| Cost of driver | – 30% |
| Fuel | - 35% |
| Vehicle costs | - 35% |

The overall cost of the journey is costed per mile with an average of 185p being declared by the logistics companies in the study. (The study took place near to the peak of fuel prices in 2008 with crude oil at \$140 per barrel.) There, naturally, was some reluctance to discuss costs in detail but these numbers do compare with costing models published by the road transport associations.

Logistics companies have been under pressure for some months now with high fuel prices and it can be seen that fuel is a significant cost which is obviously proportional to distance travelled. The variable costs of a journey of fuel and driver were identified as being the area of potential saving of a move to rail.

6. **Environmental Impact** – The environmental impact of road transport has been the subject of many studies. Most of the studies have concluded that a road transport leg of a food supply chain is almost insignificant in terms of carbon footprint for the whole product. Energy use in the growth, preparation and processing of food is very large in comparison with transport by road in the UK. Having said that, the food retailers are keen to enhance their green credentials wherever they can and as a result the environmental advantage of rail over road transport should not be ignored.

7. **The honey pot effect** – South Holland has a large group of food importers, packers, processors and agricultural businesses who would all potentially benefit from the provision of an intermodal hub in the district to allow them to gain access to the rail network for part of their distribution systems, thus increasing efficiencies. In addition, just outside the district are a large number of high volume food businesses that could potentially bring their products to, or pick up their raw materials from, South Holland as part of their operations. Wisbech is a local centre for large food companies and discussions with companies from that area have suggested a level of interest in a provision in or around Spalding. Indeed it is known that one company currently based in Cambridgeshire is considering a move of its facility, and 60 jobs, to Spalding simply to be nearer to the existing road transport in the district. The attraction of a rail link could see such decisions repeated and amplified as the current level of logistics performance would be enhanced by the cost advantages of a move to rail.

The recent rate of growth in logistics operations in South Holland has been around 5 to 10% per year. It is anticipated that the provision of a rail link and the subsequent honey pot effect could well see growth in logistics continuing that trend into the future. The economic benefit to the district will be substantial and made on a sustainable basis because of the cost benefits to businesses located locally.



8 **Growth of distribution** – The weight and momentum of food processing and packing companies in the district has been growing over recent years. Growth has been organic with companies gaining more business in their current facilities; extensions to factories have also caused growth in the quantity of transport required. Finally there have been new facilities built in the district and the investment in the manufacturing base is increasing with inward investment and also the setting up of new businesses.

Logistics companies in the district are building a reputation for their high performance and as a result they have been attracting food from outside the area to take advantage of the order picking and load consolidation services offered. This has been most recently noticed as a company in Norfolk have started to use warehousing, order picking, load consolidation and logistics services from a Spalding based company. The presence of a rail link in the Spalding area would also act as a magnet for other major logistics companies to expand their operation into the Spalding area.

9 **Timing of Deliveries** – Most deliveries take place overnight. LGVs en route to more distant RDC are likely to leave the district in the late evenings with closer RDC being despatched thorough the night with arrival times planned to allow picking times and onward distribution to the retail store.

The major retailers in the UK are moving their business onto 24 hour / 7 day systems and if significant advantages could be gained from a road/rail hub then a review of their operations would allow them to be exploited. There is no reason for a rail system to be constrained by the delivery windows developed for road transport.

10 **Volumes** – The district of South Holland moves a massive quantity of materials by road each year. Spalding is the home of major distribution companies serving the retailers. Just 3 major chilled food distributors move a massive 600 loads per day out of the district on average. This accounts for only 60% of all the outward movements of chilled foods and fresh produce so the district despatches around 1000 loads per day. When ambient foods (mainly canned goods) are added a further 200 loads per day can be added. These goods are for nationwide distribution but 30% of these goods are sent to the areas of Manchester, Newcastle and Falkirk/Glasgow. (in a ratio of 5:2:3 respectively) So there are daily movements of 108 LGVs to Scotland. Spalding is also a centre for the distribution of cut flowers and on average 75 loads per day leave the district.

In total therefore there are 1275 loads per 24 hours leave the Spalding area with around 380 loads per day moving an economic distance to the north.

The district of South Holland is also a major destination for materials from all over Europe. Fresh products are imported from Italy, France and especially Spain. One manufacturing company alone brings in 48 LGVs per week from Mercia in the south of Spain and a further 8 LGVs from Perpignan in France. Indeed that same manufacturer, part of a very large food group, is currently investigating the use of rail from Mercia to Daventry intermodal centre and then onward road transport from Daventry to Spalding.

Distribution Data LGVs per day average.

This is a table that summarises data collected during the study on the destination for LGV freight leaving the district of South Holland.

To keep the data in a manageable form a Depot location has been selected if the retailer has more than one depot in the area. It is common practice for orders to be switched between depots for operational reasons when an alternative exists in the area. This practice of switching a depot is not done on a daily basis but does occur to balance activity during seasonal periods, promotions etc and to cope with store openings and closures.

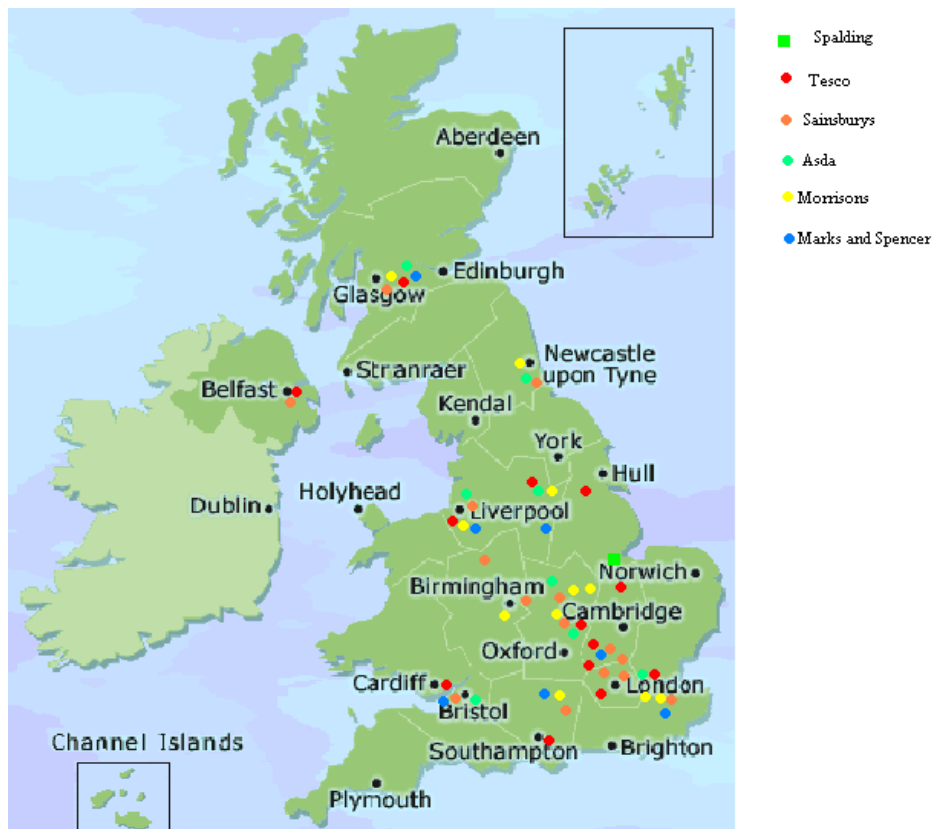
Destination	Total
Scotland	
Livingstone	40
East Kilbride	23
Falkirk	21
Bellshill	15
Cumbernauld	15
Total Scotland	114
Northwest England	
Middlewich	68
St Helens	38
Skelnersdale	34
Stockton on tees	24
Crew	26
Total Northwest	190
Northeast England	
Northwich	29
Sherburn	17
Washington	16
Stockton	12
Total Northeast	74
Grand Total.	378

Table 1 - the average daily Large Goods Vehicles leaving South Holland with destinations to the North of the UK.

This is a table that summarises data collected during the study on the destination for LGV freight leaving the district of South Holland to the midlands and south of the UK.

Destination	Total
London and South East	448
Southwest England and Wales	179
Midlands	268
Grand Total.	895

Table 2 - the average daily Large Goods Vehicles leaving South Holland with destinations to the South, Southwest and Midlands.



A Map of the UK showing the Regional Distribution Centres of the 5 top food retailers. Clusters in Scotland, North West and North East would be likely first targets for fresh food by Rail Bridge from Spalding.

11 **Primary Distribution** – A large part of the distribution between manufacturers and retail RDC is controlled by the retailer. Hauliers are contracted by the retailers to go to manufacturers to pick up food products. The manufacturers invoice the retailer with a factory gate price and the cost of distribution is born by the retailer. The massive purchasing power of the retailers has allowed them to negotiate very good prices for distribution services. As a result in recent years the transport industry has consolidated into fewer, larger companies able to deliver a nationwide service. So – the main drivers for a move to rail rests with the retailers, however the logistics companies are keen to use rail as a method of reducing costs and increasing their margins when completing contract work for the retailers.

There have been some recent uses of the rail network by retailers for their primary distribution. Around 40 vehicle loads per week of ambient food products are transported to a major retailer in Scotland from a factory in the district. The food is taken to an intermodal centre in Ely in Cambridgeshire where it is placed in a warehouse and loaded onto standard rail freight carriages when the train arrives. The train then goes to Wembley in North London where additional carriages are added. The whole train is then sent to Scotland where it is unloaded and the foods placed onto LGVs for onward transport to the RDC. This system of operation would not be suitable for the movement of fresh foods because of the time delays.

Discussion –

So, what is the size of the opportunity in the South Holland district to develop and sustain an intermodal centre to provide access to the rail network, for the manufacturers and distribution companies, for their raw materials coming in and final products leaving the district.

The provision of an intermodal centre would enhance the position of South Holland as a centre of fresh food manufacture and packing in the UK. This would serve to enhance the positions of companies already established in the district but would also act as a magnet for future inward investment.

Before any system could be developed the current image of rail would have to be tackled and the basic food safety and quality issues would have to be overcome. In order to maximise the attractiveness of a system to the logistics companies it has to be an option for routing materials that can be used tactically when it is the more economic or business choice.

For example – We have to shift 10 loads from Spalding to Falkirk tomorrow. 8 of them will be available in time for the train at 23:00. and 2 will not be available until 03:00. Tactically we decide to send 6 LGVs loads using rail and the other 4 will go by road. This is because we need to pre-book space on the train and recent performance has indicated that 2 of the 8 are likely to be late and miss the train.

The decision, from the point of view of the logistics company, is no different than the decision to drive on the A1 or the M1. It is merely a routing decision, road or rail just extends the choice available.

This leads to the type of system by which food is transported by rail. Without doubt the logistics companies would prefer a system that is similar to one used for the channel tunnel. A roll on roll off system, where the whole LGVs is transported, by rail without the use of fuel or driver. This would reduce the cost of transport for a large part of the journey to around 35% of the route by road. Additional cost would be incurred in the intermodal hubs and a charge would be made by the rail freight operator. The logistics companies feel strongly that this maximises their options when deciding the routing and timing of their vehicles on a daily basis. They feel that the fact that the whole rig, tractor and trailer, was transported would allow the use of current systems of temperature control and position monitoring as well as quickening the loading and unloading of trains. This method would also leave open the options for the return journey.

The standard track configurations are not suitable for handling the channel tunnel freight trains but the advantages of a roll on roll off system are so great that it was felt it would be worthy of further investigations.

The alternate system would be to use a swap-body system based on insulated and refrigerated “reefer” shipping containers. There is concern about the temperature control and traceability of this system. It is assumed that reefers will be accumulated at the intermodal hub to await the train – and loading onto the correct train would be the responsibility of the intermodal hub operator rather than the logistics company driver.

There is a possibility that a reefer could be lost or loaded wrongly and the high value of the food – maybe up to £50000 – along with the tight delivery performance requirements means that the costs of errors are high.

It is felt that the requirements of a Fresh Food Intermodal Hub will be different from a hub designed to handle long life foods and non food products. Transit times through the hub will need to be very rapid with LGVs arriving close to train departure times because of the need to suit factory manufacturing schedules. A factory manufacturing fresh food will usually have a range of products that are made sequentially through the day. LGVs will not always be able to leave the factory until the last product has been manufactured and by definition this will be as late as possible to maximise the freshness of the product.

It is felt that the Fresh Food Hub, at least initially, will need to be designed to allow rapid loading with little requirement for storage of loads waiting to load. The throughput will be such that loads, in LGV or swap body form, will not be able to be queued at the Hub. It should be assumed that they will arrive on a just in time basis for rapid loading and departure.

The district of South Holland has become a home for large logistics businesses that act as load consolidators. These businesses receive, or collect, products from factories in the area and may pick up additional products from different factories onto LGVs. These consolidated load systems allow for more efficient full loads to be sent to an

RDC even if an individual factory does not produce enough products to fill the vehicle. The task of load consolidation currently takes place in large warehouses in and around the Spalding area. In the future, as the uptake of rail transport increases, it would make sense for the warehousing and load consolidation businesses to be located adjacent to the Fresh Food Hub. This would minimise distances for the movement of completed loads from the warehouses to the rail head.

Possible locations for the Hub within the district is a complex decision. The Hub needs excellent road links as well as being close to the current rail system to gain access to the rail network. There are possible locations to the north of Spalding, between the town and Pinchbeck and also near a site currently run by a large logistics company at Donnington. This is near to the A52 which links with the A17 nearby.

There are also options to the Southwest near Deeping St Nicholas. The rail network crosses the A16 which is the road forming the Spalding bypass. Both of these possible locations have large quantities of land around them that could potentially be developed given the support of the planning authorities.

Given no constraints the ideal location would be close to the Wardentree Lane Industrial Estate which is the current home of 3 large logistics companies and several large food factories. There are two possible sites, neither of which has a direct link to the rail network at this point and major investment would be required to bring a rail spur to this location.

Decisions on the location of a Fresh Food Intermodal Hub will have to be agreed through the Local Planning Authority and taking into account the current Local Plan and the emerging Local Development Framework. The potential for the Hub to become the core of a Transformational Site for the district means that the area planned would have to be a minimum of 50Ha. And ideally considerably larger to allow for future expansion.

Work has been done on the land area currently occupied by seven major Logistics and Warehousing companies in the district. (Aerial photographs of those sites are attached in the appendix of this report) The current area is for these seven is 38 Ha.

Where Next?

The creation of a Fresh Food Intermodal Hub in South Holland is a major investment that will have a far reaching impact on the Food Manufacturers and logistics companies of the district and beyond.

To move the project further will take a strong level of interest from all of the stake holders, retailers, logistics companies, food manufacturers, local and regional government, but before any interest can be raised the basic requirements of the system will have to be thought through. Unless the proposed system can guarantee the safety and quality of the food it will not move forward. Next to be thought through and planned will be the economics and reliability/flexibility of the proposed system. It is safe to say that if the proposed system is unable to perform at a very high level of on time delivery, and do so at a cost no greater than the current road based system, it will not progress far off of the drawing board.

It is a proposal of this report that the next logical stage in this project would be to hold a meeting involving all of the stake holders. Retailers, Manufacturers, Network Rail, Rail Freight Group and Logistics Companies should attend along with local, regional and national Government. The meeting should consider the points raised in this report and find a method by which the project could be moved forward. The University would be happy to be involved in that process.





FAST FRUIT/TURNERS
OF SOUTH,
DUNNINGTON

Area - 2.5 Ha

Notes - Adjacent rail line.
Some warehousing.

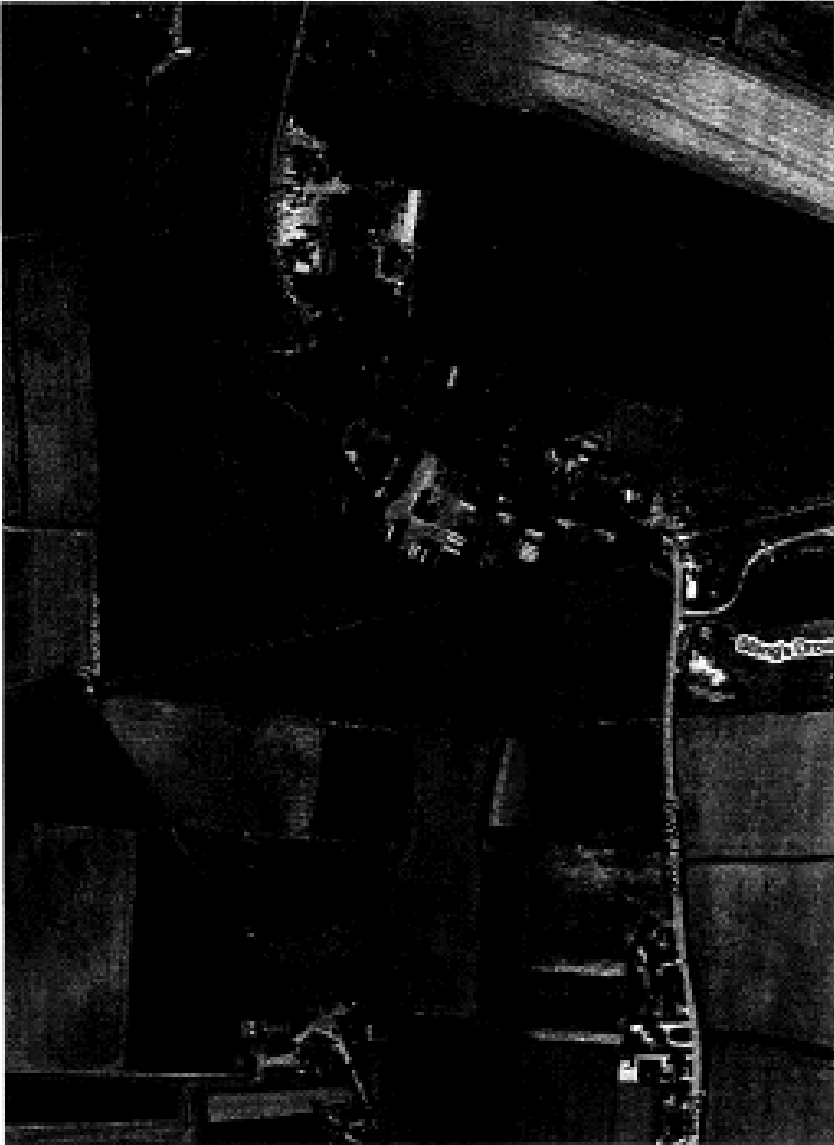


Fouler Welch

Area - 18 Ha

Nobos - Extensive
warehousing for
order picking.

- Location next to
old rail line track
bed.



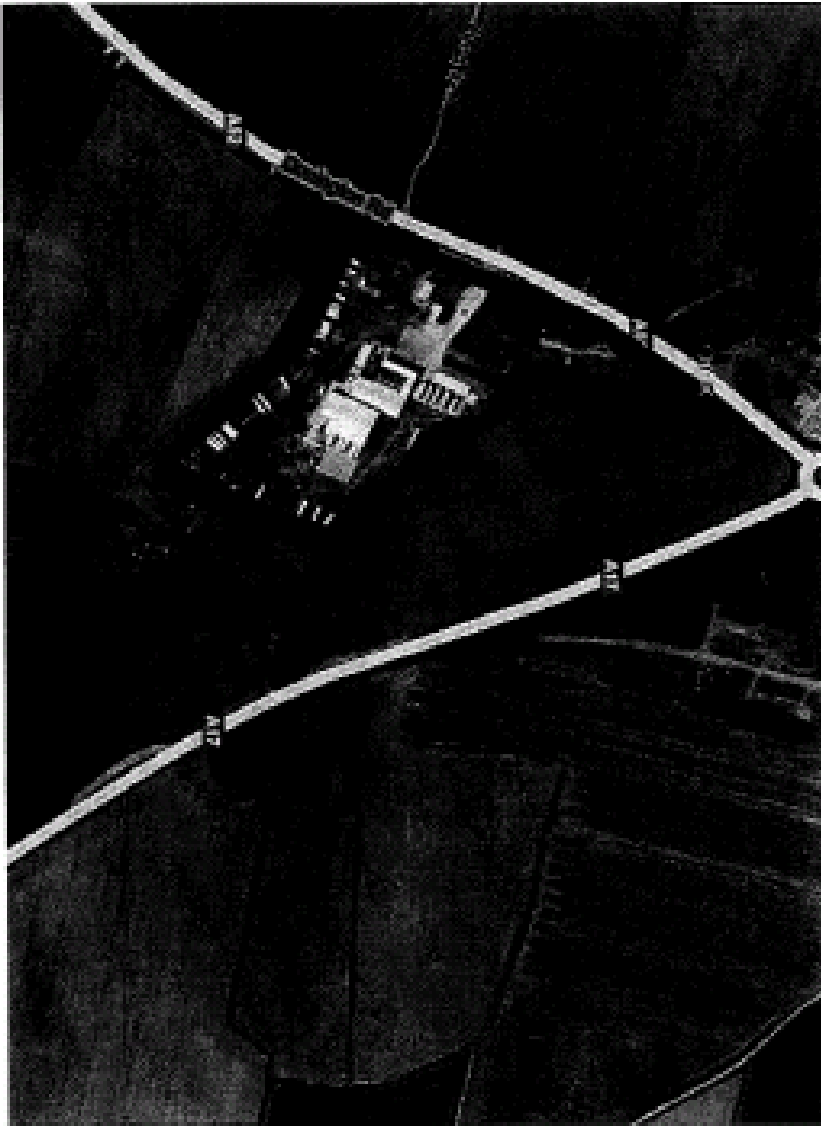
HARBREVE INTERNATIONAL

QUARRIES.

Area - 5 Ha.

Notes - No Warehousing
on site.

- Location adjacent
to rail line.



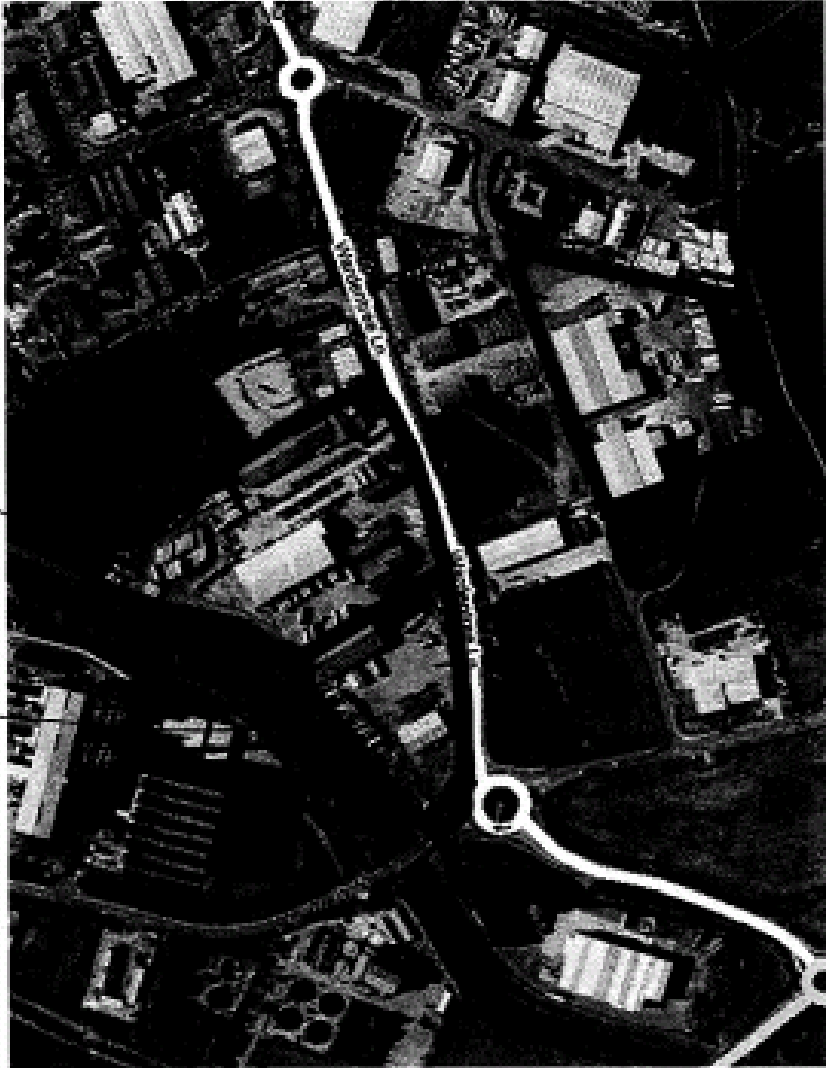
BROWNS -

~~BRA~~ SUTHERTON

Area 3.5 Ha

Notes - Rapidly expanding
warehousing facility.

FRESH LINC



G1ST

GARNNS

FRESH LINC -
AND
G1ST -
AND
GARNN (AMBIENT)

FRESH LINC -
Area - 3 Ha
Notes - Extensive
warehousing for lead consolidation

G1ST -
Area - 4.2 Ha
Notes - Extensive
warehousing for lead consolidation

GARNNS - (Ambient)
Area - 2 Ha
Notes - Some storage