

**APB / 552-01-02c**

**2 May 2008**

**Sleaford Renewable Energy Plant  
Boston Road, Sleaford  
Updated Transport Statement**

Prepared on behalf of:



**eco2**



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**15 April 2008**

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## 1.0 INTRODUCTION

1.1 This Transport Statement has been prepared by AXIS on behalf of eco2 to consider highways and transport issues related to proposals for a Biomass Renewable Energy Plant (hereafter referred to as the Sleaford Renewable Energy Plant or Sleaford REP) at Boston Road, Sleaford. The proposal would involve the development of an electricity generating facility with an installed capacity of 40MW. Electricity will be generated by a steam turbine which would be driven through the combustion of biomass material (primarily straw) supplied via contracts with local farmers.

1.2 The Sleaford REP site is proposed to operate with an annual input capacity of approximately 240,000 tonnes per annum (tpa) of delivered biomass material, with the energy generating process resulting in approximately 25,000 tpa of ash waste (by weight) to be transported off-site.

1.3 This report has been prepared to appraise the Local Planning Authority (North Kesteven District Council - NKDC) and Local Highway Authority (Lincolnshire County Council - LCC) of the anticipated highways and transport issues associated with the development of the Sleaford REP. The report represents an updated and extended assessment of the impact of traffic demand associated with the Sleaford REP scheme, following discussions with officers of Lincolnshire County Council and effectively replaces the August 2007 TS report. The purpose of this extended report is to consolidate those additional assessment issues considered in the Highway Technical Notes (HTN) 1 - 4 prepared in support of the submission of the August 2007 TA. These Technical Notes are as follows:

- HTN 1 – ‘First principles’ review of trip generation and TA scope (first submitted 18 May 2007 and then update in 7 January 2008 to include scoping details);

- HTN 2 - Response to LCC Highways Comments of 12 November 2007
- HTN 3 – Updated capacity review of Boston Rd Sleaford, following Feb 2008 link counts (18 February 2008)
- HTN 4 – Consideration of capacity Issues at the Bone Mill Junctions (20 March 2008)

1.4 The scope and nature of the assessment issues included within this Transport Statement report reflects the extent of highways and traffic issues identified as likely being of material interest to the Local Planning Authority (LPA) / Local Highway Authority (LHA). This scope has been established during initial meetings and discussions with officers of both NKDC and LCC during Spring / Summer 2007 and the submission of an additional scoping report in January 2008 (see Appendix A to this report).

1.5 The structure of the remainder of this Transport Statement is as follows:

- A brief description of the site location and existing conditions - including a description of the local highway network immediately adjacent to the site, prevailing local planning and highway policy, local network accident history and historical background traffic demand patterns.
- A description of the development proposals for the site - including a review of the proposed access strategy and its acceptability with respect to prevailing local highway standards;
- An assessment of the anticipated future traffic generation to / from the site and the distribution of these trips over the local network;

- A consideration of the potential traffic impact of the traffic generated by the development scheme at key local junctions and highway links on the immediate highway network.

1.6 The report has been prepared to reflect March 2007 Department for Transport (DfT) "Guidance on Transport Assessment" for the preparation of Transport Statement / Transport Assessment reports.

## 2.0 **SITE LOCATION & EXISTING CONDITIONS**

### 2.1 **Site Location**

2.1.1 The location of the Sleaford REP proposal site is illustrated in Figure 1 to this report. This plan identifies the strategic location of the site in relation to the main built up area of the town of Sleaford, the general alignment of Boston Road and the proximity to the A17 and existing all movements interchange at Kirkby La Thorpe.

2.1.2 Photographs of existing key network layout features, including an aerial photograph of the immediate study area to the site are illustrated in Appendix B to this report.

### 2.2 **Description of Local Network**

#### *Existing Site Conditions*

2.2.1 The site comprises approximately 5.8 hectares of arable agricultural land which lies between Boston Road and the A17 (which runs some 150 metres to the north east). It is located approximately 1.6 kilometres east of Sleaford town centre and 650 metres from the edge of the main settlement boundary - defined locally by a railway line/embankment. To the East, at a distance of around 1 kilometre is the small hamlet of Kirkby la Thorpe.

2.2.2 The proposal site is ostensibly flat and open and has no obvious defining features, other than a drainage ditch on its northern edge, although it relates strongly to an (immediately) adjacent mature woodland copse, which narrows down into a broad hedgerow, and forms the site's eastern boundary. The copse contains, and largely conceals, a small water treatment / pumping facility adjacent to the site. Site boundary to the south is formed by the

alignment of Boston Road. Site boundary to the north and west currently shows few physical boundary features.

#### *Existing Site Access*

- 2.2.3 As noted above, the site is currently utilised for agricultural land use. Site vehicular access is therefore limited to existing field access points from the southern boundary route of Boston Road. No formal hard surfaced access is currently available. The general alignment of Boston Road in the immediate vicinity to the Sleaford REP proposal site is illustrated in Figure 2 to this report, with much of the site located on the inside of a bend in the mainline route.

#### *Existing Local Network Connections*

- 2.2.4 Boston Road provides 7.3m local distributor road standard access to the town of Sleaford to the west and connections to the A17 at Kirkby La Thorpe to the east. The section of route to the frontage of the proposal site is currently the subject of a general weight restriction relating to larger goods vehicles over 7.5t (except for access to frontage fields). This restriction is associated with the impact of the limited headroom railway bridge located approximately 650m to the west of the proposal site (4.2m operational height restriction) which limits the passage of large goods vehicles to / from Sleaford Town Centre. Warning signs associated with the height restriction and the demarcation of the beginning of the weight restriction are clearly marked on Boston Road close to the access to the A17 southwest of Kirkby La Thorpe (see Figure 2 and Appendix B to this report).
- 2.2.5 To the east of the proposal site, Boston Road connects to the A17 Sleaford Bypass at a local grade separated all movements junction at the hamlet of Kirkby La Thorpe. The A17 is of dual carriageway nature at this location,

although the route narrows to a single carriageway layout approximately 400m to the east of the main west facing access roads to the Kirkby La Thorpe interchange. To the east of the A17, Boston Road provides limited standard rural lane connections to Mount Road (cul-de-sac) and Church Lane (onward local road access to the hamlets of Kirkby La Thorpe and Ewerby).

2.2.7 The Boston Road connections to the A17 mainline route are of a limited layout standard, with merge / diverge provision currently being as follows:

*Diverge provision:*

- A17 Eastbound – simple taper diverge with deceleration section;
- A17 Westbound – simple taper diverge with deceleration section;

*Merge provision:*

- A17 Eastbound – simple ‘give way’ with no acceleration lane;
- A17 Westbound – simple ‘give way’ with no acceleration lane.

2.2.8 Such existing standard junction layout provision reflects the limited traffic demand for movements to / from the A17 currently experienced from Boston Road, particularly for movements to / from west facing side road junction routes (see para’s 2.2.17 & 2.2.18 to this report). This limited demand is anticipated to be as a result of:

- Boston Road only directly serves a small proportion of the town of Sleaford, with main access to the town being taken via the B1517 or B1518, and;
- The eastern, more remote, location of the Kirkby La Thorpe junction with respect to the main built up area of Sleaford makes this route more commodious / less attractive for general traffic movements to / from A17 west.

2.2.9 DMRB standard TD42 / 95 “Major / Minor Junctions” notes the following with respect to the provision of merge taper provision at local access points to dual carriageway routes:

***“Merging tapers shall only be used at dual carriageway junctions. They shall be provided where a ‘B’ road joins an ‘A’ dual carriageway road having a design speed of 85kph or above. They shall be provided generally where the design speed is 85kph or above and the volume of the left turning traffic in the design year exceeds 600 vehicles AADT. However, where the merging taper is for an up-gradient of greater than 4% or where the percentage of large goods vehicles exceeds 20% the threshold value may be reduced to 450 vehicles AADT. They shall never be used at single lane dualling junctions. They shall not be provided where the cost of provision would be excessive. (Paragraph 7.59)”***

*Existing Traffic Demand Conditions*

- 2.2.10 Available historical traffic data for the immediate highway network to the proposed Sleaford REP site is generally limited. Indeed, discussions with LCC officers has identified that the only count data historically available within the vicinity of the proposal site was a 12 hour manual classified link count undertaken in 2006 for the A17 mainline at the Kirkby La Thorpe Interchange. Such count data was undertaken during a ‘neutral’ month (May 2006) and for the section of A17 immediately to the east of the Boston Road access points. This count is therefore considered to represent suitable maximum local A17 demand conditions.
- 2.2.11 Details of the May 2006 A17 link count are illustrated in Appendix C to this report, with directional hourly profile information provided as Figures 3a & 3b. Review of the 2006 data identifies that the A17 demonstrates a generally low level of hourly demand for a dual carriageway route, with typical hourly flow being less than 1400 vehicles per hour during main daytime hours (two way). Peak background traffic demand on the A17 is noted to occur during the traditional AM / PM ‘rush hour’ demand periods of 08:00-09:00 (1641 vehicles per hour) and 17:00-18:00 (1687 vehicles per hour).

2.2.12 Maximum one-way directional demand on the A17 is noted to be less than 900 vehicles per hour in either direction, with typical weekday daytime demand being just 550-750 vehicles per hour. Such flows are well within the 1600 vehicles per lane broad capacity criteria identified for an operational lane on a dual carriageway grade separated route as set out in paragraph 3.3 of DfT standard TD 22/06 "Layout of Grade Separated Junctions" and suggests significant spare background operating capacity at this location. Indeed, it could be argued that dual carriageway provision represents an 'over supply' of link capacity at this location.

2.2.13 Figure 4 to this report illustrates the vehicle types recorded during the over the 12 hour survey period for the A17. This broad modal split is summarised below:

	Weekday (12 hr demand)
• Private Car/Light Goods;	82.7%
• OGV 1 Classification;	6.1%
• OGV 2 Classification;	10.8%
• Public Service Vehicles:	0.4%

2.2.14 Analysis of the modal split data demonstrates that up to almost 17% of vehicles currently utilising the A17 corridor can be classified as heavy goods vehicles.

2.2.15 Following discussions with LCC highways post the submission of the August 2007 TA document, Axis have undertaken further counts on key sections of the local network. This count data included the following:

- Peak hour link flow data on Boston Road to the east of the Kirby La Thorpe junction (Feb 2008);
- Link flow data ATC surveys on the merge / diverge connector links from the A17 Kirkby La Thorpe interchange (Aug 2007).

2.2.16 Reference to the classified traffic count information on Boston Road collected during the February 2008 survey exercise identifies the following maximum observed directional vehicular demand (excluding pedestrians and pedal cycles) during the core peak assessment periods (data taken from HTN3). Such demand flow levels are substantially below the operating link capacity of the route - which would be well in excess of 1000 vehicles per hour (two way).

	08:00-09:00	15:00-16:00	16:00-17:00	17:00-18:00
Eastbound	167	140	170	161
Westbound	229	158	150	151
<b>Total 2-way</b>	<b>396</b>	<b>298</b>	<b>320</b>	<b>312</b>

2008 2-way Traffic Flow Demand

2.2.17 Results of the A17 Kirkby La Thorpe connector road surveys demonstrate that, in general, traffic demand on the merge / diverge connector road arms is generally low. Figure 5(a-c) illustrates recorded weekday / 7-day average 24hr demand movements on the different approach slip roads. This demonstrates that the east facing connector links of westbound off-slip and eastbound on-slip were the busiest access points to the interchange. Demand on the west facing connector roads was recorded to be significantly lower than that for the east facing links (of the order of half) reflecting that these arms generally cater for local movements only, with other movements to / from Sleaford from the west being catered for by the Holdingham roundabout and the Bone Mills (Sleaford North) Interchange further to the west on the A17.

2.2.18 Traffic demand on the critical western on-slip (merge connector) was recorded to be the lowest of all of the junction connector links, being less than 600 vehicle movements per day (575 movements 5-day average and 521 movements 7-day average). Such daily movements are below the threshold for the requirement for merging tapers as set out in DMRB standard TD42 / 95 "Major / Minor Junctions" (see para 2.2.9 to this report). Figure 5d to this

report illustrates recorded hourly demand movements on the westbound merge slip. This demonstrates that apart for one hour on a Saturday morning, all survey hours showed demand of less than 55 vehicles per hour or less than one vehicle movement per minute. This does not represent a substantial level of merging flow.

2.2.19 Typical AM peak hour, PM peak hour and 12hr demand flows on the immediate local highway network to the proposal site are illustrated in Figures 5(a-c) to this report.

### 2.3 Personal Injury Accident Records

2.3.1 Personal Injury Accident data (PIA) for the immediate highway network to the Sleaford REP proposal site has been provided by LCC highways for the 5 year time period Jan 20021 to Dec 2006. A summary plan of the location of all 2001 - 2006 recorded accidents is summarised as Figure 6 to this report and detailed incident descriptions are provided in Appendix D.

2.3.2 Review of Figure 6, illustrates that 18 accidents have been recorded over the full search area. 3 of these accidents were classified as 'serious' incidents, with the remaining 15 incidents being of a 'slight' nature. No fatal accident incidents were recorded during the 5 year search period (see table below).

Year	Accident Type			Total
	Fatal	Serious	Slight	
2002	0	1	5	6
2003	0	0	3	3
2004	0	1	3	4
2005	0	1	2	3
2006	0	0	2	1
<b>Total</b>	<b>0</b>	<b>3</b>	<b>15</b>	<b>38</b>

2.3.3 More detailed review of the PIA data illustrates that just 5 accidents were recorded within the immediate vicinity of the slip road access points to the

Kirkby La Thorpe interchange. A range of causation factors were recorded for these incidents, with the one serious incident relating to a collision with a pedestrian who had entered the carriageway whilst attempting to catch a stray animal. It is not considered that the recorded incidents demonstrate a significant accident trend which would require improvements to address existing background safety conditions:

- Driver loses control on approach to bend in exit taper (eastbound exit);
- Driver pulls onto A17 into the path of an on-coming vehicle (eastbound entry);
- Driver conflict between vehicle entering carriageway and onset of single lane section (eastbound entry);
- Vehicle shunt to rear of stationary vehicle waiting to safely access the A17 mainline (westbound entry);
- Pedestrian hit attempting to catch a stray animal (west of eastbound exit).

2.3.4 It is not considered that this review of accident history identifies an accident concern at the interchange or indeed suggests that highway safety would be materially affected by the introduction of traffic associated with the Sleaford REP site. Two of the five accident incidents recorded, for example, relate to traffic movements at or near the eastbound entry slip road (which will be unaffected by Sleaford REP operational traffic due to routeing agreements – see para's 3.1.12 – 3.1.15 to this report) and a further incident relates to a 'one-off' pedestrian accident, unrelated to the operation of the junction itself.

2.3.5 In addition to those incidents recorded at the Kirkby La Thorpe interchange, a further six accidents have been recorded on the section of Boston Road between the proposal site and the village of Kirkby La Thorpe. Accident causation factors within this section of highway can be summarised as follows:

- Driver losing control \* 2;
- Collision with pedestrians making inappropriate manoeuvres \* 2;

- Driver skids on ice;
- Failure to stop on side road arm and collision with vehicle on main carriageway.

2.3.6 The majority of these incidents did not involve direct 'vehicle to vehicle' collisions and only one involved traffic accessing Boston Road from a side road. No accidents were recorded at or near to the frontage of the proposal site and no incidents involved HGV movements. It is not considered that any clear accident trend is demonstrated from the recorded incidents and it is concluded that the route would be suitable to accommodate additional development traffic without additional highway safety improvements.

2.3.7 Overall it is not considered that the recorded Personal Injury Accident data identifies any existing major road safety concerns across the study area. Accident rates at or near the Kirkby la Thorpe junction are low and there is no evidence to suggest that the existing junction layout results in any inherent safety issues for traffic movements entering or leaving the A17.

## 2.4 **Site Accessibility**

### *Walk / Cycle Access*

2.4.1 Boston Road provides opportunities for some walking and cycling links from the proposal site to the nearby town of Sleaford and other surrounding local villages. Footway provision already exists on the proposal site side of Boston Road with the site located within a suitable maximum walking catchment (1.2km – 2.0km) of parts of the built up area of the town. Furthermore, Boston Road is an existing quiet road cycle route for connections to local villages to the south and east of the town. Existing local cycle path connections to the site are illustrated in Figure 7 to this report, including a 5km 'as the crow flies' typical cycle catchment. This exercise demonstrates that all of the main built up area of Sleaford lies within a acceptable cycle journey catchment.

### *Access to Public Transport*

- 2.4.2 The Sleaford REP proposal site is not currently directly served by public transport services. Closest bus stops to the site are available on Boston Road, just to the west of the limited height railway bridge (at the junction with St Giles Avenue / Russell Crescent). These stops are served by the local Sleaford Town Circular Bus Service and offer a 30 minute Monday – Saturday weekday service.
- 2.4.3 The above bus connections are located approximately 800m from the Sleaford REP proposal site and are therefore outside a preferred day to day walking catchment for regular access to local public transport. (Ref: Institution of Highways and Transportation Document “Guidelines for Planning for Public Transport in Developments”). Given the strictly limited number of staff proposed to be employed at the Sleaford REP site (see Section 3 to this report), however, and the shift patterns proposed, it is not anticipated that the site will generate a significant level of public transport demand or that direct access by public transport services will be necessary.

## 2.5 **Review of prevailing Local Planning & Highway Policy**

- 2.5.1 A full review of planning policy relevant to the development of the Sleaford REP facility is provided as Chapter 5 to the Environmental Statement prepared to support the formal planning application (Axis Doc Ref: 552-01 / Environmental Statement / Final). This review of issues identifies that the scheme is designed to accord with both the Draft North Kesteven Local Plan and Lincolnshire Structure Plan policy (policies C16 and NE9 respectively). These policies identify the need to promote and encourage a range of renewable energy sources and those developments which deliver these objectives. The reasoned justification associated with Lincolnshire Structure Plan Policy NE9, for example, states:

***“For technological and economic reasons on shore wind (which is covered in more detail in Policy NE11) is currently the most viable and hence exploited renewable technology in the county, however other, perhaps more appropriate, if longer term opportunities are also considered to exist, notably biomass from energy crops, agricultural waste and biofuel production. Given Lincolnshire’s traditional agricultural heritage and expertise and the associated dominant land use and agricultural landscape, the county has a potentially contribution to make in this area, and such development would also have the advantage of additionally contributing to the revitalisation of the rural economy which other Policies in the Structure Plan seek to achieve”***

2.5.2 In addition the development of the Sleaford REP scheme will accord with general policy and strategic criteria as set out in a range of national and strategic guidance such as The May 2007 Energy White Paper, UK Biomass Strategy, PPS22 “Renewable Energy” and the emerging East Midlands Regional Spatial Strategy. These core policy documents identify the advantages of delivering renewable energy facilities and the locational factors which must be considered when assessing renewable energy facilities. Paragraph 24 of PPS22 notes:

***“...for biomass projects the need to transport crops to the energy production plant does have the potential to lead to increases in traffic. Local planning authorities should make sure that the effects of such increases are minimised by ensuring that generation plant are located in as close proximity as possible to sources of fuel that have been identified. But in determining planning applications, planning authorities should recognise that there are other considerations (such as connections to the grid and the potential to use heat generated from the project) which may influence the most suitable locations for such projects.”***

- 2.5.3 Relevant local transport policy for new development in Sleaford and North Kesteven is outlined in the Draft North Kesteven District Local Plan. In addition the local policy approach identified with the District Local Plan must also be considered alongside the general policy and strategy as identified in the 2<sup>nd</sup> Local Transport Plan (2006/7 – 2010/11) for Lincolnshire.
- 2.5.4 The Local Plan seeks to address movement and transport requirements in a manner that is appropriate to the District's particular characteristics and circumstances. The Plan identifies for example, that North Kesteven is a predominately rural district and that opportunities to promote alternatives to the use of the private car can often be restricted. It also identifies that contributions to deliver transport infrastructure improvements and facilities should only be provided where such contributions would be necessary and that any such provision should be of an appropriate nature and properly related to the impact of the development scheme proposed.

### 3.0 DESCRIPTION OF THE DEVELOPMENT PROPOSALS

#### 3.1 Proposed Development Scheme & Operating Process

3.1.1 The scheme proposals for the Boston Road site promote the construction of a Renewable Energy Plant to generate electricity via the combustion of biomass material (primarily straw) supplied from within a local catchment. The site is proposed to process of the order of 240,000 tonnes per annum (tpa) of biomass input material and would generate a 40MW operating electricity supply.

##### *Development Scheme Elements*

3.1.2 A masterplan of the proposed development scheme is illustrated in Figure 8 to this report. Review of the masterplan layout demonstrates that the proposed scheme would comprise the following elements:

- New main site vehicular access from Boston Road;
- Main boiler house for the combustion of straw / input materials and associated stack of 50-60m;
- Storage barn facilities capable of storing up to 3 days straw input (to allow continuous electricity generation across weekends and during periods when input deliveries might be reduced in number);
- Associated infrastructure including a separate office, external hard-standing for vehicle manoeuvring / parking, a weighbridge, and an electricity sub-station;
- Surface water drainage attenuation lagoon and perimeter landscaping.

*Site operation activities*

- 3.1.3 All input vehicles to the site would be operated under an appropriate transport logistics contract, with materials transported using large HGV vehicles specifically modified in order to maximise biomass loads. Such an approach ensures high input tonnages per vehicle and would maximise the delivery performance of the site, therefore reducing overall vehicle demand movements to / from the site. The use of contracted vehicles also allows for the close control of vehicle routing and the ability to deliver suitable local routing agreements to minimise vehicle impact (see paragraphs 3.1.12 to 3.1.15).
- 3.1.4 Incoming straw loads to the site would be unloaded from input HGV on-site by four grab cranes - with a typical crane unloading capacity of the order of 30 minutes per vehicle. Input straw product would be transferred to the on-site barns where it would be stored until required. The grab cranes will include for weight measuring to record straw input levels and allow monitoring of stored supply levels.
- 3.1.5 As straw bales are required for fuel, the grab cranes would transfer them to a high level conveyor for transfer to the boiler house. The bales would then be shredded prior to being fed onto the combustion grade. The combusted biomass would heat water to drive a steam turbine which would in turn generate electricity. Electricity would be exported to the national grid via an on-site sub-station. A small quantity of lime reagent will be added to the burn process in order to assist in the removal of waste products from the flue gases.
- 3.1.6 Non straw fuel to the Sleaford REP facility (i.e. non treated wood, etc) would be handled in much the same manner as above, but would be required to be 'weighed-in' via an on-site weighbridge and would be unloaded in a separate

specific on-site wood store area. Materials would then be transferred to the boiler house by conveyor

3.1.7 Physical waste arisings from the Sleaford REP facility would effectively be limited to ash from the combustion process and residual lime reagent. Ash products would be quenched (wetted) and sold as an agricultural soil conditioner. Anticipated quantities of derived ash would equate to approximately 5.8% of biomass input by weight. These ash waste arisings can effectively be separated into:

- Bottom Ash - making up approximately three quarters of all ash arisings;
- Fly Ash – making up the remainder of ash waste.

NB - The wetting of the bottom ash will effectively result in a doubling of the export weight of the product. This water for the ash wetting process will be derived via the re-use of collected rainwater on site.

3.1.8 The proposed Sleaford REP facility has a design life of 25 years, following which it would require refurbishment for continued operation.

*Proposed Operating Hours*

3.1.9 The Sleaford REP site will operate for 50 weeks of the year (allowing for a 2 week shutdown / maintenance period during the summer) requiring an average hourly throughput of the order of 30 tonnes of straw to the facility. The on-site storage barns will allow for the storage of up to 3 days straw supply - allowing for both uninterrupted operation of the boiler over weekend periods (when product input movements will be restricted) and some operational flexibility.

3.1.10 It is proposed that the combustion process at the Sleaford REP facility would operate on a 24 hour basis, 7 days a week basis. Deliveries of biomass material and exports of ash waste, however, would be restricted to 5.5 days a week, viz:

- Monday – Friday 07:00 - 19:00, and;
- Saturdays 08:00 - 14:00.

No deliveries would take place on Sunday or public holidays.

#### *Staffing Levels*

3.1.11 Due to the high level of automation within the loading / unloading and combustion process, it is not anticipated that operation of the site would require significant staff input. Site operation would be undertaken via a five 12hr shift system, with a small number of other additional 'day staff'. It is anticipated that for a typical working weekday, the site will be manned on the basis of the following staffing levels:

- Day Staff – 10 members of staff;
- Shift Staff (12hr shifts) – 4 staff per shift

#### *HGV Routeing Agreement*

3.1.12 In order to support the operation of the Sleaford REP facility and to limit traffic impact on Sleaford Town Centre routes, it is proposed that operational (HGV) traffic movements to / from the site will only be undertaken via the agreed route corridors illustrated in Figure 9a&b to this report. Such a routeing agreement will be rigorously enforced by the site operator who will have direct control over HGV movements to / from the site, due to the fact that all delivery trips will be undertaken either by:

- HGV units directly owned and operated by the site operator, or;
- By contracted material providers whose terms of contract will include routeing agreements.

3.1.13 Figure 9 demonstrates that the proposed routeing agreement will result in all HGV delivery movements only accessing the site from Boston Road to the east, with operational movements utilising the Kirkby La Thorpe interchange to access the A17. All exiting operational traffic to / from the Sleaford REP site will also be required to utilise the west facing exit slip road at the Kirkby La Thorpe interchange. Any exit traffic with a destination to the east will be directed to travel west to the A17 / A153 Sleaford North interchange and perform a safe U-turn manoeuvre at this grade separated junction. As identified in section 4.2 to this report, it is not anticipated that significant levels of operational traffic will be generated which will require access to the A17(E).

3.1.14 No operational delivery movements will take place over the immediate local access routes of Mount Lane, Church Lane & Boston Road (west of site).

3.1.15 The above routeing agreement will be supported by a suitable signing strategy on local links and at key junctions.

## 3.2 **Site Access**

3.2.1 Vehicular access to the proposal site would be taken from Boston Road via a new industrial standard access junction located to the south eastern corner of the proposal site. The proposed layout of this new access is illustrated in Figure 10 to this statement and is based on a traditional simple T-junction layout. Lateral visibility splays of 2.4m by 215m are available in both directions from the proposed site access point.

- 3.2.2 A simple T-junction access scheme, is considered entirely appropriate when reviewed against highway design standards outlined in paragraph 2.15 & 2.16 in DETR TD42/95 "Form of Major / Minor Priority Junctions" which states:

***"2.15 Simple junctions are appropriate for most minor junctions on single carriageway roads, but must not be used for wide single carriageways or dual carriageways. For new rural junctions they shall only be used where the design flow of the minor road is not expected to exceed about 300 vehicles 2-way AADT, and that on the major road is not expected to exceed 13,000 vehicles 2-way AADT.***

***"2.16 At existing rural and at urban junctions the cost of upgrading a simple junction to providing a right turning facility will vary from site to site. However, upgrading should always be considered where the minor flow exceeds 500 vehicles 2-way AADT, a right turning accident problem is evident, or where vehicles waiting on the Major Road to turn right inhibit the through flow and create a hazard".***

As noted in Sections 4 & 5 to this Transport Statement, predicted development site related traffic demand levels are not anticipated to exceed the 300 vehicle per day threshold level for the provision of ghost island access arrangements, even including for 'absolute worst case' operating scenarios of the REP site operating at maximum theoretical input capacity. Furthermore, review of the PICADY junction capacity calculations for this site access design identifies that the proposed layout will provide substantial spare operating capacity even for 2022 future year design conditions with 'worst case' development traffic - with negligible delays for through traffic movements on Boston Road (see section 5.2 to this report).

- 3.2.3 At the request of LCC highways officers, the proposed site access junction layout has been modified to discourage large goods vehicle movements associated with the Sleaford REP facility from attempting to utilise the section

of Boston Road to the west of the site. This has been achieved through the use of suitable geometric design parameters within the layout such as width restrictions on exit lanes and limited entry / exit turning radii. Such a layout strategy accords with the proposed routeing agreement developed to manage operational movements to / from the site (see para's 3.1.12 – 3.1.15 above) and also assists in reinforcing the existing height / weight restrictions associated with the limited height railway bridge to the west of the site. It is anticipated that the combination of the proposed access design, routeing agreement and bridge height limit will result in no HGV's associated with the Sleaford REP proposal site entering Sleaford Town Centre via Boston Road.

3.2.4 Swept path assessments demonstrating typical operational and staff trip movements to / from the proposal site at the proposed site access junction are illustrated in Appendix E to this report. The site access provides suitable stacking distance for an additional full size operational vehicle on the approach to the site entry barriers gates and sufficient vehicle storage space is provided on site to accommodate vehicles waiting to be unloaded (including for 'one-off' situations of unloading crane failure, etc).

### 3.3 **Car Parking**

3.3.1 Sufficient car parking would be made available for staff and visitor parking in dedicated car parking areas. Figure 8 to this report demonstrates that of the order of 20 car parking spaces will be provided with formal car parking areas close to the main control room and welfare facilities. At least one car parking space will be provided at disabled standard.

3.3.2 In addition to the staff and visitor parking areas, a suitable standard coach parking facility will also be provided on site to serve educational visits.

### 3.4 **On-site Staff Facilities & Travel Plan**

3.4.1 The operator of the Sleaford REP proposal site is committed to encouraging sustainable transport options to / from the site where appropriate and practical and supports the principle of the operation of a Travel Plan.

3.4.2 Eco2 is currently investigating Travel Plan options for the Sleaford REP scheme and consider that any plan would likely include the following elements:

- Identification of a Travel Plan Coordinator at the site to organise and implement the Travel Plan;
- Deliver a range of 'physical' and 'operational' plan initiatives at the site;
- Undertake monitoring surveys of staff travel patterns at the site and adopt a Plan review timetable.

3.4.3 Anticipated Physical and Operational initiatives to be delivered at the site are likely to include:

*Physical Measures:*

- Provision suitable level of secure cycle parking and signage within development curtilage;
- Provision of suitable changing, showering and locker facilities;
- Provision of staff mess / food preparation area;
- Provision of dedicated pedestrian and cycle routes within the development curtilage;
- Provision of a Travel Plan noticeboard at the site.

*Operational Travel Plan Measures:*

- Liaison with LCC public transport officers and operators to ensure up to date public transport maps and information is available on site;
- Promotion of suitable travel campaigns supporting the use of sustainable transport options;
- Offering of interest free cycle loan system via DfT 'Cycle to work scheme'
- Free fluorescent bibs to be made available to all regular staff walk / cycle users;
- Encouraging staff to take part in a car sharing scheme;
- Development of a guaranteed 'ride home' scheme.

3.4.3 It is anticipated that the delivery of a Travel Plan at the proposal site covering the above issues would be secured by the Local Planning Authority via a suitably worded planning condition, which would require a formal Travel Plan Framework document to have been prepared and agreed with council officers prior to the first occupation and operation of development elements.

**3.5 Optional Improvement to West Bound A17 On-Slip**

3.5.1 Irrespective of whether there is any necessity for improvement to the existing layout of the A17 Kirkby La Thorpe interchange (see the review of capacity issues included as Section 6 to this report), as part of the negotiation process with the LHA, the developer of the Sleaford REP scheme has investigated improvement options to the westbound merge layout at this junction. A proposed layout which meets DMRB design standards as set out in TD 42/95 is presented in Appendix L which includes:

- Large scale (1:500) drawing of the improvement option (Drawing number Figure B dated 21 May 2007); and
- Stage 1 Safety Audit of the proposed new layout.

- 3.5.2 It is believed that physical construction works for the new westbound merge layout could be delivered within the existing highway boundary limits (which are understood to be located to the back of the existing roadside ditch feature). Some local re-profiling or culverting of a short section of the length of ditch might be required, but this would again be deliverable with highway land.
- 3.5.3 The new westbound merge layout would be implemented by the developer if requested to do so by the planning authority as a condition of planning consent.

#### 4.0 **ANTICIPATED TRIP GENERATION AND DISTRIBUTION FROM THE DEVELOPMENT SITE**

##### 4.1 **Estimated Development Trip Generation**

4.1.1 Anticipated demand estimates for trip movements to / from the proposed Sleaford REP facility have been calculated via a 'first principles' approach, based on main site operating assumptions such as anticipated site processing capacity, site operating / delivery hours and anticipated input / export vehicle tonnages. Base information and operating assumptions have been provided by the site operator and have been developed through operational experience at similar facilities in the UK and Europe.

##### *Operating Demand Assumptions*

4.1.2 Calculation of the 'first principles' estimate of vehicle trip movements is outlined in Appendix F to this report and is based on the following methodology:

- Maximum site processing capacity of 240,000tpa of straw / input material;
- Site operational for 50 weeks per year;
- Material delivered / collected over 5.5 days per week;
- Material delivered / collected over a 12 hour day (weekday);
- Ash waste product produced at rate of 5.8% of total input material levels.

4.1.3 Biomass material will be input to the boiler house on a continuous basis over a 24hr period during site operational periods, with a predicted hourly demand capacity of approximately 30 tonnes per hour. In order to achieve maximum site operating capacity, straw will need to be delivered at a relatively constant

rate across the year, with some stocks stored on-site within the storage barns to cover those days when deliveries do not take place.

- 4.1.4 On the basis of a 50 week operational year, it can be anticipated that site operating capacity will be of the order of 4800t per week of input material. Assuming a typical 5.5 day weekly delivery / export window, it can be anticipated that maximum site demand will be of the order of 867 tonnes per full working day of biomass input and 136 tonnes per day ash production (including char and moisture weight).

#### *Vehicle Operating Assumptions*

- 4.1.5 The following operating vehicle loading tonnages are anticipated to be achieved when servicing the Sleaford REP facility. These tonnage estimates have been generated via reference to operational experience at other locations and the loading capacity of the proposed contracted vehicle fleet:

- HGV Straw Input: 19 tonnes per vehicle;
- Lime Input: 30 tonnes per vehicle;
- Bottom Ash Export: 23 tonnes per vehicle;
- Fly Ash Export: 16 tonnes per vehicle.

- 4.1.6 All vehicles will operate in one direction only (i.e. either arrive full / leave empty or vice versa). No 'back-loading' will take place at the site.

#### *Staff Traffic Movements*

- 4.1.7 It is anticipated that the Sleaford REP facility will be operated according to the staffing levels identified in paragraph 3.1.11. In order to ensure a robust assessment of anticipated vehicular demand relating to the operation of the proposal site, for the purposes of this assessment it has been assumed that

all staff will access the site using of the private car. No account has therefore been taken for any opportunities to encourage sustainable transport practice to reduce private vehicle demand, such as car sharing or walking / cycling opportunities.

*Predicted daily traffic demand levels*

4.1.8 Application of the 'first principle' traffic generation assumptions over the proposed core delivery period, suggests the following one-way trip demand levels for a typical operational day:

**Input Movements:**

Straw: 44 HGV movements per day

**Output Movements:**

Bottom Ash: 4 HGV movements per day;

Fly Ash: 2 HGV movement per day;

**Other:**

Staff Vehicles 18 staff movements per day

4.1.9 Assuming no back-loading of operational vehicles, day to day operation of the Sleaford REP facility can therefore be anticipated to generate the following total number of daily vehicle movements (in + out):

- HGV operational movements: 100 trips per day;
- Staff (private car) movements: 36 trips per day

4.1.10 Overall two-way trip movements to / from the site for a typical operational day are therefore anticipated to be of the order of 136 vehicle movements per day. Such demand levels are significantly lower than the threshold levels for ghost island junction provision as identified in DfT guidance TD42/95 and support the justification for the proposed simple site access T-junction layout (see section 3.2 to this report).

*'Worst Case Demand' Sensitivity Test*

- 4.1.11 As noted above, typical operation of the site is not anticipated to reach the 300 vehicle per day threshold level for provision of more substantial access arrangements. Indeed, it is considered that vehicle loading / unloading operating constraints at the site are such that there are no circumstances where such a threshold would be exceeded, even should the site operate for short periods at maximum theoretical input capacity.
- 4.1.12 As noted in section 3.1 to this report, straw delivery vehicle unloading would be undertaken at the site by four grab crane facilities which operate with an approximate 30 minute vehicle unloading capacity. Such operation will therefore restrict theoretical maximum site input HGV demand to 96 vehicles per day (assuming 'worst case' 12 hr operation at 8 vehicles per hour) or 192 operational vehicle movements per day (to / from the site). Including the ash output movements, this would effectively represent a maximum daily site operational HGV demand of the order of 204 HGV movements per day (In + Out). Such 'absolute worst case' maximum levels are still well below the identified DfT threshold of 300 vehicles per day for the requirement for a ghost island access to / from a new side road facility. In addition, the total 12hr demand levels identified above would be spread evenly across the daytime period (due to the operating constraints associated with crane grab capacity), which would further limit the effects of operational traffic demand.
- 4.1.13 It should be noted, however, that the above identified maximum theoretical vehicle input levels are considered highly unlikely to occur in practice - as the Sleaford REP facility is designed to allow for on-site storage of straw input materials to provide up to three days operating supply. Such practice will result in little need for intensive delivery operation. The maximum unloading scenario outlined above has therefore only been included in this assessment in order to provide comfort to highway authority officers re: operational impact

- as it effectively considers the impact of 'absolute worst case' site maximum future development demand conditions at the REP scheme.

4.1.14 The 'worst case' traffic demand conditions have been included within this report to act as a 'sensitivity test' to the base typical demand estimates and do not represent anticipated day to day traffic conditions associated with the operation of the REP site.

## 4.2 **Development Trip Distribution and Assignment**

4.2.1 The distribution and assignment of traffic over the immediate local highway network to the development site has been estimated via reference to both:

- Proposed local routeing agreements for development traffic on Boston Road & A17 corridors – i.e. no HGV trips via Boston Road (W);
- Details of the distribution of the local catchment for commercial straw supply contracts (see Appendix G to this report).

4.2.2 Given the identified catchment of commercial straw supply contracts illustrated in Appendix G, it is anticipated that the majority of straw delivery vehicles would approach the proposed Sleaford REP facility via the A17 from the west of the Kirkby La Thorpe interchange (reflecting also the available major road connections to the remainder of the North Kesteven District from this direction such as A17(W), A15 and A153).

4.2.3 As identified in paragraphs 3.1.12 - 3.1.15 to this report, it is proposed that HGV operational traffic to / from the proposal site will be subject to local routeing arrangements restricting traffic to agreed local route corridors. This routeing agreement will ensure that all operational traffic will approach the site via Boston Road and the A17 and that any exiting traffic to destinations via

A17(E) will be required to U-turn at the A17 / A315 Bone Mills (Sleaford North) interchange.

4.2.4 In order to ensure a comprehensive appraisal of development traffic demand at the A17 / Boston Road junction, however, two assignment scenarios have been considered (see Figure 11 to this report):

- All approach traffic (including staff vehicles) via A17(W) – Base Scenario;
- 80% of all approach traffic via A17(W), 20% via A17(E) – Sensitivity Scenario.

As identified via reference to a review of the anticipated straw catchment area (see Appendix G to this report), it is anticipated that the majority of the main commercial straw contracts relating to the Sleaford REP site will be generated from origins served by A17(W). The 20% value for traffic from the A17(E) as utilised in the sensitivity distribution has therefore simply been included to provide an absolute 'worst case' indication of traffic demand on this eastern section of route.

4.2.5 Peak hour and 12 hour traffic volumes over the immediate highway network to the proposal site under these assignment scenarios and the two demand scenarios outlined in section 4.1 are illustrated in Figures 12a&b and Figure 13a&b to this report.

## 5.0 **ASSESSMENT OF ANTICIPATED DEVELOPMENT TRAFFIC IMPACT**

### 5.1 **Introduction**

5.1.1 This section of the report considers the assessment of the operation of the local highway network to the proposed Sleaford REP facility and the ability of this network to accommodate the additional development traffic flow movements predicted in Section 4. Impact assessment has been carried out through the consideration of key junction capacity assessments and link / flow assessment for the key distributor road link of the A17 connector roads at the A17 Kirkby la Thorpe Interchange (which will effectively accommodate all Sleaford REP operational movements).

### 5.2 **Junction Capacity Assessments**

5.2.1 Junction capacity assessment work has been undertaken at two main locations on the immediate local highway network:

- Site access junction to Boston Road;
- Operation at the internal junctions to the Bone Mills Interchange (Sleaford North).

#### *Site Access Junction to Boston Road*

5.2.2 Section 4 to this TA has demonstrated that predicted daily development site related traffic demand levels are not anticipated to exceed the 300 vehicle per day (two-way) threshold level identified in DfT standard TD42/95 for the provision of ghost island standard access arrangements, even including for the 'absolute worst case' daily operating scenarios.

5.2.3 Notwithstanding the above, AXIS has undertaken peak hour PICADY capacity assessments on the proposed T-junction layout to demonstrate the level of anticipated junction capacity and delay for future year conditions. These PICADY assessments have been based on the following assessment criteria:

- Traffic flow estimates based on the Feb 2008 background traffic information collected for the Boston Road corridor. In order to provide a robust assessment of future demand, assessments have been undertaken for the future design year of 2022, based on the TEMPRO / NRTF central growth factor (2008-2022) of 1.245. The derivation of growth factors is set out in Appendix C to HTN4 (included as Appendix H to this TA).
- Predicted development HGV demand movements assigned 100% to / from A17 at Kirkby La Thorpe interchange to the east of the site and based on the 'absolute worst case' sensitivity test levels;
- Predicted staff car trip demand assigned 50% east to A17 and 50% west to Sleaford Town Centre.

5.2.4 The results of the 2022 future year AM / PM peak hour site access junction assessments are provided as Appendix I to this TA report, with the results of the peak hour 'worst case' development demand scenarios summarised in the tables below.

*AM Peak Hour*

Approach Movement: Site Access Exit	Flow	Max RFC	Max Queue
<b>08:00-09:00</b>			
Site Exit (Right Turn)	-	-	-
Site Exit (Left Turn)	8	0.025	-
Boston Rd (Right Turn Entry)	13	0.053	-

*PM Peak Hours*

Approach Movement: Site Access Exit	Flow	Max RFC	Max Queue
<b>17:00-18:00</b>			
Site Exit (Right Turn)	5	0.013	-
Site Exit (Left Turn)	13	0.020	-
Boston Rd (Right Turn Entry)	8	0.015	-

5.2.5 Review of the PICADY model results demonstrates that the proposed site access junction will operate with substantial levels of spare capacity at the future design year. All key turning movement RFC's would be at well below critical 0.85 values and with negligible queuing or delay impact on through movements along Boston Road. There is sufficient spare capacity within these assessment results to suggest that the junction could accommodate a significant rise in background traffic movements on Boston Road without any material impact in operation.

5.2.6 Given the above analysis, it is concluded that the proposed site access junction represents an entirely suitable layout which would deliver appropriate levels of operational capacity and safety. Site traffic demand, even for absolute worst case site maximum levels, would be below daily side road traffic thresholds identified in DfT standards TD42/95 and there is no evidence to suggest that the operation of the junction would result in a material impact on the safe operation of through traffic movements on Boston Road.

*Internal Bone Mills (Sleaford North) Junctions*

5.2.7 The impact of Sleaford REP traffic at the Bone Mills interchange has been considered in detail within document HTN4 (submitted to LCC in March 2008). The main elements of this document are included as Appendix H to this Transport Statement.

5.2.8 The conclusions of the HTN4 report are summarised below:

**6.1 This report has been prepared to consider highway capacity issues at the Bone Mills Interchange and to assess the potential operational impact of additional Sleaford REP operational HGV traffic movements. This assessment has been carried out through an appraisal of both junction capacity and link / flow percentage impact.**

**6.2 The Bone Mills Interchange is made up of two main internal junction elements. A ghost island T-junction to the north and a southern roundabout layout. These access points provide 'grade separated' access to the on / off slip roads to the A17 Sleaford Bypass. In addition the southern roundabout also serves surrounding local industrial estate development. Both junctions are of a suitable design standard and regularly cater for large HGV movements.**

**6.3 Traffic demand at the Bone Mills Interchange associated with the Sleaford REP proposal scheme is anticipated to be minimal, with the majority of trips remaining on the A17 mainline from origins from the west. Development traffic utilising the main interchange internal junctions would be limited to:**

- **Eastbound 'U' turn traffic which has been routed away from the Kirkby La Thorpe interchange;**
- **Trips from north-east origins likely to be served by the A153.**

**Even taking into account 'worst case' traffic generation assumptions, maximum two way traffic associated with the Sleaford REP site would only be of the order of 57 HGV trips per day.**

**6.4 Junction capacity tests have been undertaken for a future year of 2022. These tests demonstrate that the southern roundabout junction would be operating efficiently (including anticipated worst case Sleaford REP operational traffic). Tests at the northern T-junction layout show that this layout would also operate efficiently for background + development conditions for off-peak and PM peak periods. AM peak demand conditions illustrate over-capacity on the A17 off-slip access to the junction. Such**

***over-capacity conditions, however, are related to background demand flows. Indeed, no Sleaford REP traffic is predicted to utilise this approach arm. Comparison junction capacity tests for 'with development' demand illustrate that the effects of this traffic during AM peak periods would be marginal and certainly not of an extent that would require any capacity improvements to mitigate.***

***6.5 Additional link / flow assessments reflects the results of the junction capacity tests. This link flow analysis demonstrates that key approach routes would only experience overall traffic flow increases of less than 3% under Sleaford REP development conditions. HGV increases would typically be under 10%.***

***6.6 Overall, it is concluded that the development of the Sleaford REP facility would not result in a material change in operational or environmental capacity conditions at the Bone Mills interchange. There is therefore no requirement for any highway improvement works at this location to support the development of the Sleaford REP proposal scheme.***

5.2.9 Given the above, it is concluded that the development of the Sleaford REP scheme will not result in a material impact at the Bone Mills Interchange.

### 5.3 Link Flow Impact Assessment

5.3.1 DfT document "Guidance on Transport Assessment" suggests that the assessment of network traffic impact should be considered for future year scenarios post development opening year. Paragraph 4.47 of the DfT guidance document states:

***"For the local transport network a development should be assessed with regard to the Local Development Framework and for a period of no less than five years after the date of registration of a planning application. Should the development take place over a longer period it would be appropriate to extend the length of the assessment period."***

5.3.2 In order to provide a robust assessment of development impact, operational assessments have therefore been carried out for the future years of 2012 “Opening Year” and 2022 “Design Year”. Such an approach accords with DfT guidance and represents a future design year 15 years post the application date of the scheme proposals. To ensure the most robust assessment of network operation, it is assumed that the Sleaford REP facility would be operating at full capacity (240,000 tpa straw input) at both year of opening and the future design year.

5.3.3 Future background traffic demand estimates have been calculated via reference to NRTF central / TEMPRO growth factors for North Kesteven District as outlined in Appendix C to HTN4 and summarised below:

- Opening Year 2012 (Factor 2008-2012): 1.070
- Opening Year 2022 (Factor 2008-2022): 1.245

5.3.4 Traditionally, link flow assessment criteria have been based on those percentage impact thresholds identified in 1994 Institution of Highways and Transportation ‘Guidelines for Traffic Impact Assessment’. This document suggested that more detailed analysis of highway impact and / or capacity improvements was only likely to be required for situations when either:

- Traffic to / from the development exceeds 10% of existing two way traffic on the adjoining highway; or,
- Where traffic to / from the development exceeds 5% of the existing two way traffic flow on the adjoining highways at locations where traffic congestion exists within the assessment period or in other sensitive locations.

This position has been recently reviewed and updated in March 2007 DfT document “Guidelines for Transport Assessment” which notes:

***“If the TA confirms that a development will have material impact on the highway network, the level of impact at all critical locations on the network should be established. A particular example of material impact would be a worsening of congestion. In congested areas, the percentage traffic impact that is considered significant or detrimental to the network may be relatively low (possibly below the average daily variation in flow), and should have been determined in discussions with the relevant highway authorities. For the avoidance of doubt, the 1994 guidance regarding the assessment thresholds of 10 per cent and 5 per cent levels of development traffic relative to background traffic is no longer deemed an acceptable mechanism, since it creates an incentive in favour of locating development where high levels of background traffic already exist.”***

Notwithstanding these observations, in the case of the strategic highway network to the Sleaford REP site (which has been demonstrated to be operating with significant spare capacity and with little or no congestion - see Section 2.2 to this report), it is considered that the traditional 5% and 10% thresholds still represent a reasonable ‘guide’ as to the level / extent of development traffic impact on immediate local routes.

- 5.3.5 It should be noted however, that the percentage change methodology is of less assistance when reviewing operating impact on those local highway links which currently experience extremely low levels of background flow demand – as in such cases, relatively small levels of additional traffic demand can lead to significant percentage change values. In such cases, the percentage change value derived by the methodology can be misleading and does not accurately reflect the practical operational impact of additional traffic. This is considered to be of particular relevance in the case of the critical westbound merge connector road to the A17 at Kirkby La Thorpe interchange, which currently experiences very low hourly weekday traffic flow demand of less than 55 vehicles per hour. Any additional traffic demand on this link will therefore represent a significant percentage change value, when in practice,

such small flow increases will only represent a few additional vehicles per hour and have no material operational impact.

*A17 Mainline*

5.3.6 Operational assessments have been carried out for the immediate sections of the A17 mainline close to the A17 Kirkby La Thorpe interchange, through reference the background link flow data collected in 2006 for the mainline and 2007 for the connector road links. This data has been used to estimate general traffic demand conditions on the mainline route both to the immediate east and west of the interchange.

5.3.7 The tables below demonstrate predicted changes in 2012 Opening Year and 2022 Future Year background 12 hour two way link flows on the A17 adjacent to Kirkby La Thorpe Interchange as a result of the Sleaford REP proposal. This table includes summary results for both the typical site operation demand position identified in this report and the sensitivity scenario based on theoretical maximum site operation (based on the maximum practical grab crane unloading capacity). Details of the traffic data utilised to inform these impact assessments is illustrated in Appendix J to this report, which also includes hourly link / flow demand estimates for the traditional AM & PM peak periods

2012 Opening Year Assessments

	A17(W) Kirkby La Thorpe			A17(E) Kirkby La Thorpe		
	Devel trips	B'ground flows	%'tage Increase	Devel. trips	B'ground flows	%'tage Increase
2012 Typical Demand (Base Distribution)	136	16952	0.80%	0	17947	0.0%
2012 Typical Demand (Sensitivity Distribution)	128	16952	0.76%	28	17947	0.16%

2 way flow totals

Proposed Sleaford Renewable Energy Plant  
 Boston Road, Sleaford  
 Updated Transport Statement

	A17(W) Kirkby La Thorpe			A17(E) Kirkby La Thorpe		
	Devel trips	B'ground flows	%'tage Increase	Devel. trips	B'ground flows	%'tage Increase
2012 Worst Case Demand (Base Distribution)	240	16952	1.42%	0	17947	0.0%
2012 Worst Case Demand (Sensitivity Distribution)	232	16952	1.37%	46	17947	0.26%

2 way flow totals

### 2022 Future Year Assessments

	A17(W) Kirkby La Thorpe			A17(E) Kirkby La Thorpe		
	Devel trips	B'ground flows	%'tage Increase	Devel. trips	B'ground flows	%'tage Increase
2022 Typical Demand (Base Distribution)	136	19725	0.69%	0	20833	0.0%
2022 Typical Demand (Sensitivity Distribution)	128	19725	0.65%	28	20833	0.13%

2 way flow totals

	A17(W) Kirkby La Thorpe			A17(E) Kirkby La Thorpe		
	Devel trips	B'ground flows	%'tage Increase	Devel. trips	B'ground flows	%'tage Increase
2022 Worst Case Demand (Base Distribution)	240	19725	1.22%	0	20833	0.0%
2022 Worst Case Demand (Sensitivity Distribution)	232	19725	1.18%	46	20833	0.22%

2 way flow totals

5.3.8 The above analysis identifies that typical day-to-day development traffic movements on the mainline A17 are unlikely to be in excess of 18 vehicles per hour (8 HGV's and 10 staff movements) and that 12 hour link flow impact is anticipated to be less than 1% at the site opening year 2012, Even when 'absolute worst case' sensitivity scenario demand conditions are considered

(based on theoretical maximum site input levels) 12 hour development link flow impact is not anticipated to exceed 1.5% of background demand flows. Such impact levels are well below traditional IHT guideline thresholds and it is therefore concluded that development of the Sleaford REP facility is unlikely to result in a material change in operating conditions on the A17 mainline route.

*A17 Connector Road Flow / Boston Road*

- 5.3.9 Appendix J to this report also provides an indication as to the level of percentage impact anticipated to be experienced on the Kirby la Thorpe interchange merge / diverge connector roads and on the frontage section of Boston Road to the Sleaford REP proposal site. As identified in para 5.2.5 to this report, however, a simple consideration of impact in terms of percentage change on these local routes can be potentially quite misleading, due to the very low background traffic demand currently experienced on some of these links.

*Boston Road:*

- 5.3.10 Typically development link flow impact on Boston Road is not anticipated to be substantial. Peak hour percentage change values presented in Appendix J to this report identifies that development traffic demand associated with typical day-to-day operation of the Sleaford REP will be less than 10% of background traffic demand at the 2012 opening year even taking into account the low background demand / spare capacity nature of this route (see para 2.2.16). Such demand flows represent a maximum two way demand of just 18 vehicles per hour (8 HGV, 10 staff) or less than 1 vehicle every three minutes. It is not anticipated that such demand will result in a material traffic impact on this link, particularly given the substantial existing spare operating capacity identified on this link.

- 5.3.11 Assessment of the 'worst case' sensitivity traffic demand scenario, demonstrates hourly impact levels of generally less than 10% of background demand. Maximum hourly directional demand impact will occur in the PM peak (10.4% for the eastbound movement). Such traffic demand during the PM peak is considered to reflect the distribution of staff exit movements modelled in the link / flow assessment (100% to / from the east). In reality it is anticipated that some staff movements from the REP site may in fact travel westbound towards Sleaford town centre, therefore further reducing impact on the eastern section of Boston Road to negligible levels.

*Connector Road Impact*

- 5.3.12 Link flow percentage impact has also been considered for the A17 Kirkby La Thorpe connector road flows, with the results illustrated in Appendix J to this report. This analysis takes into account the proposed HGV routeing strategy which seeks to restrict HGV access to the A17 eastbound via the Kirkby La Thorpe eastbound merge link, (with HGV vehicles U-turning at the Bone Mills Interchange further to the west on the A17).
- 5.3.13 Review of this link flow assessment exercise indicates that development traffic impact on the east facing connector road links to the A17 will be strictly limited. Development demand for both typical day-to-day operation and the 'worst case' sensitivity demand scenario are not anticipated to exceed 3.5% of 2012 opening year hourly background demand levels and 12 hour demand less than 2.0%. Such small percentage change represents the strictly limited development traffic demand predicted to utilise these links.
- 5.3.14 Percentage change levels on the west facing slip roads to the Kirkby La Thorpe interchange are predicted to be much higher than for those on the east-facing links. This is considered to be more a reflection of the low levels of background traffic experienced on these links than substantial

development demand movements. Peak hour 2012 opening year background flows on these links are predicted to be less than 80 vehicles per hour or in the order of just 1 existing vehicle movement per minute. Any additional development trips are therefore likely to result in a large percentage change.

5.3.15 Figures 12 & 13 to this report demonstrate the maximum predicted development traffic demand levels on the west facing connector slip roads. This demonstrates that typical day-to-day hourly demand (including all staff trips) is anticipated to be less than 14 movements per hour during peak hours and of the order of only 4 movements per hour (operational HGV's) during other weekday daytime hours. Such levels of additional demand represent less than 1 vehicle every 4 minutes (peak hours) or 1 vehicle every 15 minute off peak - such demand will not represent a material change in operating conditions on these links and could be successfully accommodated by the existing layout.

5.3.16 Review of the 'worst case' maximum theoretical demand conditions on the west facing slip roads, demonstrates similar results to the day-to-day scenarios. Development traffic increases on these links will be limited (less than 20 vehicles per hour (mostly staff car trips) peak hour and 8 vehicles per hour off-peak (operational HGV traffic)) and will not represent a practical impact on background operational conditions.

#### 5.4 **Review of Traffic Related Environmental Impact**

5.4.1 Reference to Institute of Environmental Assessment (IEA) guidelines for the assessment of road traffic, suggests the following general rule of thumb when considering the need for detailed analysis of environmental effects:

***“Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%)”***

5.4.2 IEA guidance notes that the most discernable environmental impacts of road traffic are considered to be noise, severance and pedestrian delay & intimidation. In terms of these potential impacts, IEA guidance notes the following:

- In general, people are unable to perceive a change in noise nuisance for changes in noise levels of less than 3dB(A), such changes requires a “doubling or halving in the level of traffic”.
- At low flows, increases in traffic of around 30% can double the delay experienced by pedestrians attempting to cross a road.
- Severance and intimidation are much more sensitive to traffic flow and DoT suggest 30%, 60% and 90% changes in traffic levels should be considered as ‘sight’, ‘moderate’ and ‘substantial’ impacts respectively;
- Other environmental impacts (e.g.: pollution, ecology, etc) are less sensitive to traffic flow changes, and it is recommended that, as a starting point, a 30% change in traffic would represent a reasonable threshold for undertaking a detailed highway link assessment.

5.4.3 As noted in section 5.2 to this report, analysis of the 12hr link flow demand on the immediate highway network to the proposal site demonstrates that, in general traffic terms, the development of the Sleaford REP facility will not result in a material change in traffic volumes. Even including for ‘worst case’ sensitivity test scenarios, development traffic impact during key site operating periods (12 hour daytime period) is well below IEA 30% guideline threshold levels. Indeed, predicted link flow increase on the main A17 dual carriageway route are not anticipated to reach levels in excess of 1.5%, substantially below the predicted thresholds for material environmental impact.

*A17 mainline: HGV Impact*

5.4.4 In order to ensure the most robust appraisal of environmental impact, however, additional tests have been undertaken to review changes in HGV link flows demand. This appraisal has been carried out on the same basis as that for the assessment of general traffic movements – i.e. based on existing classified background traffic movements, as taken from the base 12 hour 2006 mainline surveys and 2007 connector road surveys (see Appendix K to this report). The tables below illustrate the results of the two HGV tests undertaken, these are as follows:

- Review of changes in all OGV1 / OGV2 / PSV traffic demand;
- Review of changes in OG2 / PSV traffic demand (i.e. larger vehicles)

Base data associated with these tests are provided in Appendix K to this report.

*OGV1 / OGV2 / PSV Traffic*

	A17(W) Kirkby La Thorpe			A17(E) Kirkby La Thorpe		
	Devel trips	B'ground flows	%'tage Increase	Devel. trips	B'ground flows	%'tage Increase
2012 Typical Demand (Base Distribution)	100	3073	3.25%	0	3102	0.00%
2012 Typical Demand (Sensitivity Distribution)	100	3073	3.25%	20	3102	0.64%
2012 Worst Case Demand (Base Distribution)	204	3073	6.64%	0	3102	0.00%
2012 Worst Case Demand (Sensitivity Distribution)	204	3073	6.64%	38	3102	1.23%

2 way flow totals

*OGV2 / PSV Traffic Only*

	A17(W) Kirkby La Thorpe			A17(E) Kirkby La Thorpe		
	Devel trips	B'ground flows	%'tage Increase	Devel. trips	B'ground flows	%'tage Increase
2012 Typical Demand (Base Distribution)	100	2036	4.91%	0	2009	0.0%
2012 Typical Demand (Sensitivity Distribution)	100	2036	4.91%	20	2009	0.99%
2012 Worst Case Demand (Base Distribution)	204	2036	10.02%	0	2009	0.0%
2012 Worst Case Demand (Sensitivity Distribution)	204	2036	10.02%	38	2009	1.89%

2 way flow totals

5.4.5 The results summarised in the above tables demonstrate that predicted additional development HGV levels on the key A17 corridor will be substantially less than the minimum IEA 30% guideline threshold. Indeed, increases in large HGV movements associated with the typical operation of the Sleaford REP facility are anticipated to only reach levels of the order of 5%. Sensitivity assessments assuming for 'absolute worst case' development traffic demand and 100% western approach distribution, notes that even for this extreme theoretical operating scenario, HGV increases will still be less than 10% of background HGV traffic demand levels on the A17 mainline over the core 12 hour period.

*Boston Road: HGV Impact*

5.4.6 Current HGV levels on Boston Road between the A17 junction at Kirkby La Thorpe and Sleaford are negligible (less than 1% of background movements recorded during the February 2008 surveys), due to the impact of the height restriction at the railway bridge which deters HGV movements to / from Sleaford Town Centre. The Sleaford REP proposals will result in an increase in HGV numbers on this section, however, it is not anticipated that this will

lead to any material operational issues as the route is generally free flowing and is of a standard suitable to accommodate such traffic (see paras 5.3.10 & 5.3.11).

5.4.7 The additional HGV movements are also not anticipated to result in any material environmental impact, as there are no direct frontage properties along this section of route.

## 5.5 **Impact Summary**

5.5.1 Given the above review of anticipated link flow impact and reference to IEA guidelines, it can be concluded that the development of the Sleaford REP facility will not result in a material change in operational or environmental capacity conditions over the immediate key local highway network. It is therefore concluded that there is no requirement for supporting highway improvement works over and above those works to deliver the site new access junction off Boston Road.

## 6.0 **SUMMARY & CONCLUSIONS**

6.1 This Transport Statement has considered the highways and traffic issues associated with the development of a new Renewable Energy Plant at Boston Road, Sleaford and represents an update to the original August 2007 report to incorporate technical work submitted to LCC post this date. The proposal would involve the development of an electricity generating facility with an installed capacity of 40MW. Electricity will be generated via a steam turbine which would be driven through the combustion of biomass material (primarily straw) supplied via contracts from farms within a local catchment. The site is proposed to operate with an operating capacity of 240,000 tonnes per annum (tpa) of delivered biomass material, with the energy generating process resulting in approximately 25,000 tpa (by weight) of ash waste material.

### *Existing Network Conditions*

6.2 The proposal site is currently utilised for agricultural land use, with existing vehicular access limited to field access points from the southern boundary route of Boston Road. No formal hard surfaced access is currently available. Boston Road provides local distributor road standard access to the town of Sleaford to the west and connections to the A17 at the Kirkby La Thorpe interchange to the east. The section of route to the frontage of the proposal site is currently the subject of a general weight restriction relating to larger goods vehicles over 7.5t (except for access to frontage fields / properties). This weight restriction is associated with the low railway bridge located to the west, the operational impact of which is to effectively limit movements to / from Sleaford town centre on this route to cars, light vans, pedal cycles and motorcycles.

6.3 To the east of the proposal site Boston Road connects to the A17 Sleaford Bypass at a local grade separated all movements junction at the village of

Kirkby La Thorpe. The A17 is of dual carriageway nature at this location, although the route narrows to a single carriageway layout approximately 400m to the east of the main slip road connections to Boston Road. The Boston Road connections to the A17 mainline route are of a limited layout standard, with the merge / diverge provision currently being of a simple give way arrangement, with no acceleration lane. This level of provision reflects the existing low level of demand for side road traffic.

- 6.4 Review of 2006 traffic flow data for the A17 route demonstrates a generally low level of hourly demand, with typical daytime flow being less than 1400 vehicles per hour during main daytime hours (two way). Maximum directional demand on the A17 has been noted to be less than 900 vehicles per hour in either direction, with typical weekday daytime demand being 550-750 vehicles per hour. Such flows are well within the 1600 vehicles per lane broad capacity criteria identified for a single running lane on a dual carriageway grade separated route as set out in DfT standards and suggests significant spare background operating capacity at this location.
- 6.5 An audit of recorded Personal Injury Accident data for the local network to the Sleaford REP has been carried out. This review identified that just five accidents have been recorded within the vicinity of the Kirkby La Thorpe interchange, only two of which were related to access routes which will be utilised by regular Sleaford REP operational traffic demand. In addition, six further incidents were recorded on the section of Boston Road between the proposal site frontage and the A17 junction. The majority of these Boston Rd incidents were not 'vehicle to vehicle' accidents and appear to relate to loss of control factors or driver error. Overall it is considered that the review of accident trends does not identify any existing major road safety concerns across the study area. Accident rates at or near the Kirkby la Thorpe junction are low and there is no evidence to suggest that the existing junction layout

suffers from any inherent safety issues for traffic movements entering or leaving the A17.

#### *Development Scheme*

- 6.6 The scheme proposals envisage the construction of a Biomass REP to generate electricity via the combustion of biomass material (primarily straw) supplied from within a local catchment. The site is proposed to process of the order of 240,000 tonnes per annum (tpa) and would generate a 40MW supply. Physical waste arisings from the Sleaford REP facility would effectively be limited to ash from the burn process which would be quenched (wetted) and sold as an agricultural soil conditioner. Anticipated quantities of derived ash waste would equate to approximately 5.8% of biomass input by weight.
- 6.7 Vehicular access to the proposal site would be taken from Boston Road via a new industrial standard access junction located to the south eastern corner of the proposal site. Predicted development site related traffic demand levels are not anticipated to exceed the 300 vehicle per day threshold level for the provision of ghost island access arrangements, even including for 'absolute worst case' operating scenarios of the REP site operating at maximum theoretical input capacity. Furthermore, review of the PICADY junction capacity calculations for this site access design identifies that the proposed layout will provide substantial spare operating capacity even for 2022 future year design conditions with 'worst case' development traffic - with negligible delays for through traffic movements on Boston Road.
- 6.8 At the request of LCC highways officers, the simple T-junction arrangement has been modified to discourage large goods vehicle movements associated with the Sleaford REP facility from utilising Boston Road to the west of the site.

- 6.9 All input vehicles to the site would be operated under an appropriate transport logistics contract working to routing agreements, with materials transported using large HGV vehicles specifically modified in order to maximise straw loads. Such an approach ensures high input tonnages per vehicle and would maximise the delivery performance of the site, therefore reducing overall vehicle demand movements to / from the site. Incoming straw loads to the site would be unloaded on-site by two grab cranes – which operate with a typical crane unloading time of the order of 30 minutes per vehicle.

*Site Operating Parameters*

- 6.10 The site will operate for 50 weeks of the year (allowing for a 2 week shutdown / maintenance period during the summer) requiring an hourly throughput of the order of 30 tonnes per hour of straw to the Sleaford REP facility. The on-site storage barns will cater for the storage of up to 3 days straw input - allowing for both uninterrupted operation of the boiler over weekend periods (when product input movements will be restricted) and some site operational flexibility.
- 6.11 It is proposed that the combustion process would operate on a 24 hour basis, 7 days a week basis. Deliveries of straw / exports of ash waste, however, would be restricted to Monday – Friday, over a 12 hour delivery window (07:00-19:00) and a six hour delivery period on a Saturday (08:00-14:00). No deliveries will take place on Sundays or public holidays.
- 6.12 Operational HGV movements to / from the site will be subject to a routing agreement, restricting traffic to agreed route corridors. All HGV delivery movements will access the site from Boston Road to the east, with operational movements utilising the Kirkby La Thorpe interchange to access the A17. Exit movements to the A17(E) will be required to utilise the A17 west

facing entry slip road only and undertake a safe U-turn at the grade separated A17 / A153 'Sleaford North' Interchange.

*Anticipated Development Trip Demand*

- 6.13 Anticipated demand estimates for trip movements to / from the proposed Sleaford REP facility have been calculated via a 'first principles' approach, based on main site operating assumptions such as anticipated site processing capacity, site operating / delivery hours and anticipated input / export vehicle tonnages.
- 6.14 On the basis of a 50 week operational year, it can be anticipated that site operating capacity will be of the order of 4800t per week of input material. Assuming a typical 5.5 day weekly delivery / export window, it can be anticipated that maximum site input demand will be of the order of 867 tonnes per full working day of straw input and 92 tonnes per day ash waste production for export (inc char and moisture content).
- 6.15 Assuming no back-loading of operational vehicles, day to day operation of the Sleaford REP facility can therefore be anticipated to generate the following total number of daily vehicle movements (in + out):
- HGV operational movements: 100 trips per day;
  - Staff (private car) movements: 36 trips per day
- 6.16 In order to provide comfort to LCC officers re: traffic impact levels for the Sleaford REP scheme, a sensitivity test has been carried out assuming for 'absolute worst case' theoretical maximum site input capacity. This sensitivity assessment has been based on the vehicle unloading capacity of the four grab crane facilities (30 minutes per vehicle). Such operation would result in a theoretical maximum site input HGV demand of 96 vehicles per day

(assuming 12hr operation at 8 vehicles per hour) or 192 movements (in + out). Such operating levels are considered highly unlikely to occur in practice, as the Sleaford REP facility is designed to allow for on-site storage of straw input materials to provide up to four days operating supply – resulting in little need for such intensive delivery operation.

*Development Traffic Distribution & Assignment*

6.17 The distribution and assignment of traffic over the immediate local highway network to the development site has been predicted via reference to both proposed local routeing agreements for Boston Road & A17 and details of the catchment of commercial straw supply contracts. Given the identified distribution of commercial straw supply contract catchment, it is anticipated that the majority of straw delivery vehicles would approach the proposed Sleaford REP facility via the A17 from the west of the Kirkby La Thorpe interchange. In order to ensure a wide ranging appraisal of development traffic demand at the A17 / Boston Road junction, however, two assignment scenarios have been considered:

- All approach traffic (including staff vehicles) via A17(W) – Base Scenario;
- 80% of approach traffic via A17(W), 20% via A17(E) – Sensitivity Scenario.

*Assessment of development traffic operational and environmental impact*

6.17 The assessment of development traffic impact has been carried out through Impact assessment has been carried out through the consideration of key junction capacity assessments and link / flow assessment for the key distributor road link of the A17 connector roads at the A17 Kirkby la Thorpe

Interchange (which will effectively accommodate all Sleaford REP operational movements).

*Junction Capacity.*

- 6.18 Junction capacity assessment work has been undertaken at two main locations on the immediate local highway network:
- Site access junction to Boston Road;
  - Operation at the internal junctions to the Bone Mills Interchange (Sleaford North).
- 6.19 Review of the PICADY model results demonstrates that the proposed site access junction would operate with substantial levels of spare capacity at the future design year. All key turning movement RFC's would be at well below critical 0.85 values and with negligible queuing or delay impact on through movements along Boston Road. There is sufficient spare capacity within these assessment results to suggest that the junction could accommodate a significant rise in background traffic movements on Boston Road without any material impact in operation.
- 6.20 It is therefore concluded that the proposed site access junction represents an entirely suitable layout which would deliver appropriate levels of operational capacity and safety. Site traffic demand, even for absolute worst case site maximum levels, would be below daily side road traffic thresholds identified in DfT standards TD42/95 and there is no evidence to suggest that the operation of the junction would result in a material impact on the safe operation of through traffic movements on Boston Road.
- 6.21 Traffic demand at the Bone Mills Interchange associated with the Sleaford REP proposal scheme is anticipated to be minimal, with the majority of trips

remaining on the A17 mainline from origins from the west. Development traffic utilising the main interchange internal junctions would be limited to:

- Eastbound 'U' turn traffic which has been routed away from the Kirkby La Thorpe interchange;
- Trips from north-east origins likely to be served by the A153.

Even taking into account 'worst case' traffic generation assumptions, maximum two way traffic associated with the Sleaford REP site would only be of the order of 57 HGV trips per day.

6.22 Junction capacity assessments at Bone Mills interchange demonstrate that the development of the Sleaford REP facility would not result in a material change in operational or environmental capacity conditions at the Bone Mills interchange. There is therefore no requirement for any highway improvement works at this location to support the development of the Sleaford REP proposal scheme.

#### *Link Flow Assessment*

6.22 Link flow operational assessments have been concentrated on the immediate sections of the A17 close to Kirkby La Thorpe interchange, through reference to the background link flow data collected in 2006 and connector road data from 2007.

6.23 Typical day-to-day development traffic movements on the mainline A17 are unlikely to be in excess of 18 vehicles per hour (8 HGV's and 10 staff movements) and that 12 hour link flow impact is anticipated to be less than 1% at the site opening year 2012, Even when 'absolute worst case' sensitivity scenario demand conditions are considered (based on theoretical maximum site input levels) 12 hour development link flow impact is not

anticipated to exceed 1.5% of background demand flows. Such impact levels are well below traditional IHT guideline thresholds and it is therefore concluded that development of the Sleaford REP facility is unlikely to result in a material change in operating conditions on the A17 mainline route

- 6.24 Typically development link flow impact on Boston Road is not anticipated to be substantial. Peak hour percentage change values identify that development traffic demand associated with typical day-to-day operation of the Sleaford REP will be less than 10% of background traffic demand at the 2012 opening year even taking into account the low background demand / spare capacity nature of this route (see para 2.2.16). It is not anticipated that such demand will result in a material traffic impact on this link, particularly given the substantial existing spare operating capacity identified on this link.
- 6.25 Link flow percentage impact has also been considered for the A17 Kirkby La Thorpe connector road flows. This exercise indicates that development traffic impact on the east facing connector road links to the A17 will be strictly limited. Development demand for both typical day-to-day operation and the 'worst case' sensitivity demand scenario are not anticipated to exceed 3.5% of 2012 opening year hourly background demand levels and 12 hour demand less than 2.0%. Such small percentage change represents the strictly limited development traffic demand predicted to utilise these links.
- 6.26 Percentage change levels on the west facing connector road links to the Kirkby La Thorpe interchange are predicted to be much higher than for those on the east-facing links. This is considered to be more a reflection of the low levels of background traffic experienced on these links than substantial development demand movements. Peak hour 2012 opening year background flows on these links are predicted to be less than 80 vehicles per hour or in the order of just 1 existing vehicle movement per minute. Any additional development trips are therefore likely to result in a large percentage change.

Typical day-to-day hourly demand (including all staff trips) on the west facing connector road links is anticipated to be less than 14 movements per hour during peak hours and of the order of only 4 movements per hour (operational HGV's) during other weekday daytime hours. Such levels of additional demand represent less than 1 vehicle every 4 minutes (peak hours) or 1 vehicle every 15 minute off peak - such demand will not represent a material change in operating conditions on these links and could be successfully accommodated by the existing layout.

#### Environmental effects of traffic demand

- 6.26 In order to ensure the most robust appraisal of environmental impact, additional tests have been undertaken to review changes in HGV link flow demand on the A17 following development of the Sleaford REP facility. Review of predicted additional development HGV levels on the key A17 mainline corridor demonstrates that impact will be substantially less than minimum IEA 30% guideline thresholds for material environmental impact. Indeed, typical HGV increases are anticipated to only reach levels of the order of 5% of 2012 background demand. Sensitivity assessments assuming for 'absolute worst case' development traffic demand demonstrate that even for this extreme theoretical operating scenario, HGV increases will still only be in the order of 10% of background HGV traffic demand.
- 6.27 Current HGV levels on Boston Road between the A17 junction at Kirkby La Thorpe and Sleaford are negligible (less than 1% of background movements recorded during the February 2008 surveys), due to the impact of the height restriction at the railway bridge which deters HGV movements to / from Sleaford Town Centre. The Sleaford REP proposals will result in an increase in HGV numbers on this section, however, it is not anticipated that this will lead to any material operational issues as the route is generally free flowing and is of a standard suitable to accommodate such traffic. The additional

HGV movements are also not anticipated to result in any material environmental impact, as there are no direct frontage properties along this section of route.

- 6.28 Given the above review of anticipated future operational highway conditions and reference to appropriate guideline standards, it can be concluded that the development of the Sleaford REP facility will not result in a material change in operational or environmental capacity conditions over the local highway network. Development traffic flow increases will generally be low and it is considered that there is no requirement for significant development related off-site highway improvement works to support the scheme.
- 6.29 Notwithstanding the conclusions of paragraph 6.28 above, at the request of the LHA, the Developer has investigated improvement options to the westbound merge layout at the junction of Boston Road and the A17 which would meet appropriate highway design standard as set out in DMRB guidance TD42/95. This preferred layout option is described in Appendix L to this report. The Developer of the Sleaford REP scheme has indicated that he would be prepared to fund and implement these proposals if requested to do so by the planning authority as a condition of planning consent.