

**PROPOSED RENEWABLE ENERGY PLANT
BOSTON ROAD, SLEAFORD**

**Preliminary 'First Principles' Review of Anticipated Traffic Generation & Proposed
Transportation Assessment Scope**

1.0 Introduction

1.1 This Scoping Opinion has been prepared to consider traffic demand levels predicted to be generated by the proposed development of a new Renewable Energy Plant (REP) at Boston Road, Sleaford and to subsequently identify the likely scope of highways assessment required to support a formal planning application for the proposal scheme. The REP facility is to be fed by straw from farms within a local catchment of the proposal site and is anticipated to be primarily served by large HGV's, thereby managing overall vehicle numbers.

1.2 This scoping note provides a preliminary estimate of traffic demand and is based on a 'first principles' approach calculated via reference to key 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 developer, eco2, and are based on operational experience at similar facilities in the UK.

2.0 Proposed Development Scheme

2.1 The proposed REP development will comprise:

- The main REP facility, which would be comprised of linked structures including the boiler house and straw storage barns; and
- Associated infrastructure including a separate office, external hardstandings for vehicle manoeuvring / parking, a weighbridge, electricity sub-station, a surface water drainage scheme and perimeter landscaping.

2.2 It is proposed that the REP site would be accessed via a new junction connection to Boston Road. Due to a local restricted height railway bridge to the west, all operational traffic to / from the site will utilise the eastern section of Boston Road, connecting to the A17 Sleaford Bypass at the Kirkby La Thorpe interchange. No operational traffic will travel westwards towards Sleaford Town Centre. This local traffic routeing will be supported by the design of the proposed site access junction, which will restrict opportunities

for right turn (westward) exit from the site for large HGV operational vehicles. Such a design has been included at the request of LCC officers during pre-application discussions.

2.3 The REP site will be designed to process in the order of 240,000 tonnes per annum (tpa) of straw from contracted local farms. The site will operate for 50 weeks of the year (allowing for a 2 week shutdown / maintenance period during the summer) requiring straw at a rate of 30 tonnes per hour. The storage barns will allow for the storage of up to 3 days straw input - allowing for uninterrupted operation over weekend periods (when product input movements will be restricted) and some operational flexibility.

2.4 Physical waste arisings from the REP site will effectively be limited to ash from the burn process. Ash waste arisings can be separated into:

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

2.5 Input product and waste exports will be transported to / from the site in suitable maximum articulated HGVs - which will allow for maximum input / export tonnages per vehicle. The use of highest capacity vehicles will increase the delivery performance of the site and manage overall vehicle demand. Straw input vehicles to the site will be unloaded by four grab cranes, with a vehicle unloading time of the order of 30 minute per crane.

3.0 **First Principles Assessment: 'Typical' Operational Traffic Demand Levels**

3.1 Calculation of the 'first principles' estimation of anticipated 'typical' daily vehicle trip movements to / from the proposed REP plant is outlined in Appendix A to this note and is based on the following key assumptions.

Site Operation & Anticipated Delivery Practice

3.2 The proposed Biomass facility will operate 24 hours a day, 7 days a week over a 50 week period. On the basis of maximum operation of the site at 240,000 tpa, this will require of the order of 4800 tonnes of straw input to be delivered per week and 500 tonnes of total ash export (comprising ash, a small amount of residual char and conditioning water).

3.3 Straw input / ash waste export to / from the site will be restricted to 5.5 days per week, with a weekday delivery window of 12hrs per day (6 hours on a Saturday). Typical weekday delivery hours would be of the order of 07:00 – 19:00.

Vehicle Operating Assumptions

3.4 The following operating vehicle loading tonnages can be expected to be achieved to / from the proposed REP. These tonnage estimates have been generated based on experience at other locations and the carrying capacity of proposed vehicles;

- 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.

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

Staffing Levels

3.6 It is anticipated that the site will be operated according to the following staffing levels:

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

3.7 For the purposes of this preliminary assessment it has been assumed that all staff will access the site via the use of the private car. No account has been taken for any opportunities to encourage sustainable transport practice to reduce private vehicle demand such as car sharing, public transport or cycle usage (although sustainable transport will be encouraged as part of the transport plans).

Predicted daily traffic demand levels

3.8 Application of the predicted 'first principle' assumptions over the core delivery hours, suggests the following one way trip demand levels for a typical operational day:

Input:

Straw: 44 HGV movements per day

Output:

Bottom Ash: 4 HGV movements per day

Fly Ash: 2 HGV movement per day

Other:

Staff Vehicles: 18 private car vehicle movements per day.

3.9 Assuming no backloading of trips, operation of the REP facility can therefore be anticipated to generate the following total number of vehicle movements (in + out):

- HGV's: 100 trips per day
- Private Car: 36 trips per day.

4.0 **First Principles Assessment: Maximum Theoretical Operational Traffic Demand Levels**

4.1 As noted above, predicted two-way trip movements to / from the site for a typical operational day are not anticipated to be in excess of 150 vehicle movements per day.

4.2 Maximum 'worst case' HGV demand at the site is not anticipated to reach a 200 vehicle per day threshold, due to vehicle unloading operating constraints at the site. As noted above, straw delivery unloading at the site would be undertaken by four grab cranes, each of which operate with a 30 minute vehicle unloading capacity. Such operation will therefore restrict theoretical maximum HGV input demand to 96 vehicles per day (based on a 'worst case operation of 8 HGV vehicles an hour, across the full 12 hour window) or 192 vehicles per day (in + out). Hourly input levels above this maximum rate could not be processed by site input cranes and would result in significant vehicle unloading delays and would effectively be unsustainable. Moreover, there remains an over-riding input limitation which is the grate's maximum capacity to burn fuel. This is only around 5% higher than the 30 tonnes per hour design capacity. The maximum delivery rate would very soon fill the storage barns and thereafter would have to reduce because the grate would not be able to keep up with deliveries.

4.3 It should be noted, that the above identified maximum theoretical vehicle demand is considered highly unlikely to occur in practice – as the REP facility is designed to allow for on-site storage of straw input materials to provide for up to three days operating supply. In addition, straw materials will be covered and stored at origin locations and will not be subject to seasonal supply issues. Such practice will result in a strictly limited requirement for 'intensive' delivery operation.

5.0 Trip Distribution and Assignment

5.1 As noted above, straw input materials will be generated from farms within a local catchment area.

5.2 It is anticipated that all operational traffic will access the wider highway network via Boston Road connections to the A17 Sleaford Bypass at the Kirkby La Thorpe Interchange. Review of the locations of commercial straw supply contracts for the REP site have identified that the majority of straw delivery vehicles would approach the REP facility from the west of Kirkby La Thorpe interchange. This distribution also reflects the key major A road connections to the remainder of North Kesteven District that are available from this direction (A17(W), A15 and A153).

5.3 In order to provide a robust assessment of development demand on the A17 corridor, it is proposed that the following distribution assumptions should be considered:

- Base anticipated case (all traffic to / from A17 to the west of Kirkby La Thorpe);
- Sensitivity case (80% traffic to the west / 20% to the east).

5.4 It is anticipated that final agreed local HGV haulage routes could be supported by a suitable HGV routing agreement to / from the site and the implementation of weight restrictions / supporting signage to deter traffic from utilising inappropriate routes. It is proposed that a substantial proportion of straw input to the site will be transported via contract haulage agreements which can be directly controlled by the REP site operator. The suggested routeing agreement for Sleaford REP would seek to restrict HGV traffic movements at Kirkby La Thorpe village by requiring any eastbound 'exit' vehicles to initially travel westbound on the A17 and undertake a safe U-turn at the nearby Sleaford North (A17 / A153) grade separated interchange. The impact of this routeing agreement is will be considered within the TS.

6.0 Location and extent of detailed highway capacity assessment

6.1 The review of predicted development traffic generation identifies that the REP scheme will typically generate only strictly limited levels of traffic demand. Typically the site is not anticipated to generate in excess of 100 operational vehicle movements per day (in + out) or 8-9 vehicles per hour. Staff traffic demand will also be strictly limited. Absolute 'worst case' maximum operational traffic demand is not anticipated to exceed 16 vehicles per hour (in + out).

6.2 On the basis of the above demand estimates, it is considered that detailed highways capacity assessment can be limited to the locations identified below:

- Site Access Junction;
- Link Impact on A17 Sleaford Bypass.

In reality, given the generally low background traffic demand on Boston Road and the strictly limited development traffic demand, no circumstances are anticipated where capacity / congestion issues will be identified at the site access junction. It is therefore considered that detailed PICADY assessments at this location would be of only limited value.

6.3 Impact assessment on the A17 Sleaford Bypass will be carried out via link / flow capacity assessment.

7.0 Formal Assessment Scope

7.1 Highways and traffic impact issues will ultimately be considered within a formal Transport Statement report. Such a report would be prepared on the basis of the new Guidelines for Transport Assessment published by DfT in March 2007. Review of this document in combination with LCC's "Development Guide on Transport and New Development Issues in Lincolnshire (Jan 2005) suggests the following document scope:

Appraisal of Existing Network:

- Review of existing traffic demand along Boston Road and A17 Sleaford Bypass where appropriate;
- Review of existing local accident history on key network sections;
- Review of available local public transport services and walking / cycling opportunities within the vicinity of the site;
- Understanding of other committed local development proposals / local highway schemes which could impact on the future background operation of the local network.

Review of Development Scheme:

- Review of design of site access junction via reference to prevailing local and national highway design standards;
- Review of internal site design including vehicle manoeuvring areas, car parking, HGV storage, etc;
- Review of opportunities to provide suitable walking / cycling access to the development scheme;
- Review of measures to be included within staff Travel Plan package. Given the strictly limited number of staff to be based at the Sleaford REP site, any Travel Plan to be adopted at this location would be

anticipated to be small scale in nature and based on the DfT 'minimalist' approach.

Estimate of REP Development Trip Generation and Distribution

Trip Generation

- Estimate of anticipated daily operational HGV trip generation levels to / from the site via reference to a 'first principles' traffic demand model similar to that set out in Section 3 above;
- Sensitivity test including for 'worst case' maximum theoretical daily HGV demand levels;
- Estimate of staff vehicle trip movements similar to that set out in Section 3 above;

Trip Distribution / Assignment

- Estimate of trip distribution / assignment via reference to predicted straw catchment and available local HGV standard route corridors;
- Assessment of Base / Sensitivity distribution scenarios to include appraisal of impact on A17(E) and identification of the number of U-turn movements associated with the routeing agreement.

Identification of Network Impact

- Consideration of estimated traffic impact of development proposals via operational assessment of key network links (via an assessment of percentage increase in background traffic levels) and junction capacity (using appropriate local modelling software (ARCADY, PICADY, etc);
- Operational capacity assessments to include the following key locations:
 1. Site access / Boston Road (AM & PM peak);
 2. A17 Sleaford Bypass (link impact) – 12 hour demand (full REP weekday operational period).
- Impact assessment to be undertaken at proposed project opening year and a suitable future design year date (5 / 10 years after opening – LCC to advise);
- Background traffic growth on local road network to be calculated based on TEMPRO growth factors;
- Comparison of predicted development traffic demand levels to key environmental impact thresholds set out in Institute of Environmental Assessment (IEA) document "Guidelines for the environmental assessment of road traffic".

7.2 Additional scoping appraisal information is included in Appendix A to this report, based on the example scoping forms included within the DfT TA guidelines.

TABLE A - CALCULATION OF 'FIRST PRINCIPLES' TRAFFIC DEMAND

**TRAFFIC FLOW CALCULATIONS
SLEAFORD RENEWABLE ENERGY PLANT**

ASSUMPTIONS

Operating regime			
Operating hours	h/d	24	
Operating days	d/week	7	
Operating weeks	week/y	50	Annual shutdown for 2 weeks during summer
Delivery days	d/week	5.5	
Availability, excluding at hours		94%	
Material inputs			
Straw	t/h	30.21	
Lime reagent	t/h	0.20	
Material exports			
Total ash	%mass	5.80%	
Of which: bottom ash	%total ash	75%	Remainder of ash goes to fly ash
Char with bottom ash	%mass	10%	In addition to basic mass of ash
Char with fly ash	%mass	5%	In addition to basic mass of ash
Moisture in bottom ash	%mass	50%	
Vehicle carrying capacities			
Straw lorry	tonnes	20	Typically 3 layers of 12 bales; each 0.55 tonnes
Bottom ash lorry	tonnes	26	
Fly ash lorry	tonnes	13	Lower capacity assumed - may be volume limited due to low density
Lime reagent	tonnes	30	lower capacity assumed - may be volume limited due to low density
Staff levels			
Day staff	#	10	
Shift workers/shift	#	4	12h shifts; 5 shift system

CALCULATIONS

	annual (t)	weekly (t)	del day (t)	non del day (t)	Delivery Hours Per Day
Performance					
Straw input	238,538	4,771	867	0	
Lime input	1,579	32	6	0	
Bottom ash export	21,790	436	79	0	
Fly ash export	3,632	73	13	0	
HGVs (one way)					
Straw	11927	239	44	0	3.62
Lime Input	53	2	0.2	0	0.03
Bottom ash	839	17	4	0	0.26
Fly ash	280	6	2	0	0.09
Totals					
HGVs (one way)	13099	264	50	0	3.97
Cars (one way)			18	18	

HGV's

APPENDIX A

Initial appraisal consultation form

This form is provided for advisory purposes only, and is circulated as an example of best practice. Authorities may modify it as they see fit.

The form is designed to assist and expedite pre-application discussions for proposed developments by identifying the types of information likely to be relevant to the consideration of planning applications.

Completion of this form is voluntary. However, it will facilitate the decision as to which kind of assessment is appropriate for the development.

Part A: General

Reference: *N34/1111/07*

Developer (agent) details

Name: <i>ANDREW BELL</i>	Company: <i>AYIS</i>
Address: <i>CAMELLIA HOUSE 76 WATER LANE WILMSLOW, SK9 5BB</i>	
Telephone: <i>01625 418 718</i>	Facsimile: <i>01625 418 678</i>
E-mail: <i>andrewbell @ axisped.co.uk.</i>	

Development details

Brief description (including existing site use) <i>Sleaford Renewable Energy Plant - Straw fired power station</i>	
Location: <i>BOSTON ROAD, SLEAFORD</i>	
Number/street name/road	<i>BOSTON ROAD</i>
Town/city/county	<i>SLEAFORD</i>
Size (e.g., GFA, no. of units)	
Opening year(s):	<i>2012</i>

Typical Demand.

Please tick the applicable box from the questions below

- | | Yes | No |
|--|-------------------------------------|-------------------------------------|
| (i) Is the development residential with more than 50 units? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| (ii) Is the development non-residential with a GFA of over 500 sq. m? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| (iii) Is the development likely to generate over 30 two-way vehicle trips per hour? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| (iv) Is the development likely to generate over 10 HGV's a day? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| (v) Is the development likely to generate one or more special-order abnormal loads a year? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

If the answer to any of the above questions is **Yes**, please complete **Parts B, C and D of this form**.

Please note that the information provided in Parts B, C and D will be used for any subsequent assessment that may be required for this planning application.

Part B: Travel characteristics in the vicinity of the development site

Journeys to and from the development site

Provide an estimate of journeys to and from the development site during the peak traffic periods, for each category of travel listed in the table below. For example, peak travel periods for residential and employment uses are normally 08:00 to 09:00 and 17:00 to 18:00 during weekdays. For retail developments, the peak hour normally falls on Saturday between 11:00 and 16:00.

TYPICAL DEVELOPMENT DEMAND.

Travel mode	Weekday peak hour of adjacent road network		Weekday peak hour of proposed development		Weekend peak hour of proposed development	
	AM	PM	AM	PM	Saturday PM	Sunday PM
Walk						
Cycle						
Car with driver only	10 }	10 }	As per road network peak		10 }	10 }
Car with passenger						
Bus						
Train						
Taxi						
Delivery/goods vehicles (up to 7.5 t)						
Heavy goods vehicles (over 7.5 t)	8-9	8-9			8-9	NO DELIVERY
Abnormal loads						
Special abnormal loads						

Committed developments and programmed highway improvements

In order to assess the impact of your development, please identify nearby major developments that have planning consent and any highway schemes that are programmed (by the local highway authority or the Highways Agency) but are yet to be implemented.

None identified in discussions with LCC.

Part C: Transport impacts

Identify the likely transport impacts of the development.

Please tick the applicable box from the questions below

	Yes	No
(i) Will the development increase conflicts among all types of vehicles?	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Will the development increase conflicts between vehicles and pedestrians?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(iii) Will the development increase conflicts between vehicles and cyclists?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(iv) Will the development provide on-site parking? If YES, please provide total number of parking spaces proposed: <u>20</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(iv) Will the development increase demand for on-street parking?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(v) Will the developments increase traffic queues and delays at nearby junctions? If YES, please identify the critical junctions in box C1 below	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(vi) Will the development increase traffic noise? If YES, please briefly describe the nature of the impact and identify in box C2 the areas likely to be affected.	<input type="checkbox"/>	<input type="checkbox"/>
(vii) Will the development reduce air quality? If YES, please briefly describe the nature of the impact and identify in box C3 the areas likely to be affected.	<input type="checkbox"/>	<input type="checkbox"/>
(viii) Will traffic generated by the development affect the areas of townscape, landscape and the natural historic environment importance?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

C1: Please identify all the critical junctions from question (v)

Main 'impact' at Kirkby La Thorpe interchange. No capacity issues anticipated.

C2: Please describe the nature of the noise impact from question (vi)

To be considered in detail in Environmental Statement.

No changes in noise levels of greater than +3dB(A).

C3: Please describe the nature of the impact on air quality from question (vii)

Considered in Environmental Statement.

Part D: Transport impact mitigation

Identify the likely mitigation measures.

Please tick the applicable box from the questions below

	Yes	No
(i) Will the development provide measures to improve safety for all road users?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(ii) Will the development provide measures to promote walking?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(iii) Will the development provide measures to promote cycling?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(iv) Will the development provide measures to promote the use of public transport?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(v) Will the development provide measures to minimise car parking?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(vi) Will the development provide measures to improve freight traffic movements, where applicable? (e.g. for warehouse and distribution centres)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(vii) Will the development provide mitigation measures? (e.g. public transport services and facilities, pedestrian and cyclists facilities, highway improvements)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

D1: Please describe the main mitigation measures that are likely to be proposed

- Footways to / from development site.
- Cycle facilities on-site.
- Operation of Travel Plan initiative.
- Contracted straw collection to maximise efficiency of HGV trip

Signed: 

Date: 19/12/07