



Mercia EnviRecover

**PROPOSED DEVELOPMENT OF AN ENERGY FROM
WASTE FACILITY ON LAND AT HARTLEBURY TRADING
ESTATE, HARTLEBURY, WORCESTERSHIRE**

TRANSPORT ASSESSMENT

APRIL 2010

This report has been prepared in support of the planning application for the Mercia EnviRecover Development and has been prepared on behalf of Mercia Waste Management.



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1.0 INTRODUCTION

- 1.1 This Transport Assessment has been prepared by Axis on behalf of Mercia Waste Management (hereafter referred to as MWM) to consider highways and transport issues related to the development of a Renewable Energy Facility (known as Mercia EnviRecover) on land at Hartlebury Trading Estate, Hartlebury, Worcestershire.
- 1.2 MWM is responsible for managing waste and recycling collections and disposal in Herefordshire & Worcestershire under a contract with the County Waste Authorities awarded in December 1998.
- 1.3 The Mercia EnviRecover proposals include the construction of a renewable energy plant (with an integrated education / visitor centre), associated ancillary infrastructure, earthworks and landscaping. The facility would have an installed electricity generating capacity of circa 15.5 Megawatts (sufficient electricity supply to meet the domestic needs of over 20,000 homes) and would generate electricity by way of a steam turbine which would be driven through the combustion of approximately 200,000 tonnes per annum (tpa) of municipal residual waste (i.e. waste collected and managed by, or on behalf of, local authorities).
- 1.4 This report has been prepared to appraise the Waste Planning Authority (WPA) and Local Highway Authority (LHA), Worcestershire County Council (WCC), of the highway demand / impact case associated with the development proposals and to outline the design and nature of the proposed site access arrangements. This appraisal will include an assessment of existing local background highway conditions, a technical review of the proposed site access scheme and internal site layout and an assessment of the likely operational impact at key locations over the immediate highway network as a result of the predicted traffic movements related to the development scheme.

- 1.5 The report has been prepared in accordance with March 2007 Department for Transport (DfT) document "Guidance on Transport Assessment" for the preparation of Transport Assessment reports. Appendix B to these DfT guidelines identifies thresholds for the appraisal of transport impact of a new development site. Whilst municipal waste processing facilities are not included within the core list of land use thresholds, reference to the 'other considerations' section within the DfT guidance suggests that a more comprehensive 'Transport Assessment' style report would be appropriate for the consideration of the Mercia EnviRecover proposals.
- 1.6 The scope and nature of the assessment matters considered in this Transport Assessment reflects the extent of highways and transport issues identified as being of interest to WCC highways officers. This scope was identified during discussions during Winter 2009 / 2010. Details of relevant scoping correspondence and the Traffic & Transportation section of the Environmental Scoping Report are provided as **Appendix A** to this report.
- 1.7 The remainder of this Transport Assessment report therefore considers the following issues:
- A description of the location of the proposed Mercia EnviRecover facility and relevant planning history;
 - A review of prevailing highway operating conditions on key immediate sections of the local highway including baseline traffic demand and accident history;
 - A technical review of the development proposals including the layout of the site access arrangements to the public highway network, key internal site layout features and proposed operational measures to control traffic routing;

- A review of the predicted operation of the Mercia EnviRecover facility in terms of trip demand and the anticipated assignment of operational HGV traffic across the immediate local network;
- An assessment of the anticipated operational and environmental impact of development related trips at key locations on the immediate highway network;
- A consideration of anticipated key construction traffic issues; and,
- Summary and conclusions.

2.0 **SITE LOCATION & EXISTING BASE NETWORK CONDITIONS**

2.1 **Site location**

2.1.1 The strategic location of the Mercia EnviRecover proposal site at Oak Drive, Hartlebury Trading Estate is illustrated in **Figure 1** to this report. This plan identifies the location of the site in relation to the developed area of the Trading Estate, the extents of Hartlebury village and key local access routes such as the A449 Worcester Road, A442 Droitwich Road and B4193 Rectory Lane.

2.1.2 Details of the layout of the immediate local highway network to the proposal site are illustrated in **Figures 2 & 3** to this report, with photographs of key existing layout features illustrated in **Appendix B. Figures 2 & 3** illustrate the layout of existing immediate highway features to the proposal site including the internal Trading Estate road network.

2.2 **Existing site conditions and planning history**

Site layout and existing conditions

2.2.1 The proposal site comprises approximately 6 hectares of land on a broadly rectangular shaped plot situated in the centre of Hartlebury Trading Estate. The Trading Estate is located approximately 7km to the south-east of Kidderminster and approximately 1.5km to the east of Hartlebury. The Trading Estate itself covers an area of approximately 75ha (180 acres) and is served by a purpose-built access via Crown Lane, off the A449(T).

2.2.2 The Oak Drive proposal site for Mercia EnviRecover is broadly flat, undeveloped and colonised by varying degrees of scrub vegetation. The main / key features of the site include:

- An unmade access track which runs northwards and then north-east towards the private sewerage works which serves the Trading Estate;
- A small ditch / watercourse which runs through the site in a broadly north-south direction emerging from a culvert on the southern boundary of the site with Oak Drive;
- A hardstanding area of circa 45m x 25m in the south western corner, which is temporarily being used as a lorry park by an adjacent unit.

2.2.3 To the immediate north of the site is Waresley Landfill which is operated by Biffa Waste Services. To the immediate south of the site is Oak Drive, the estate road from which the proposal scheme would be accessed, beyond which is a range of medium / large scale industrial / commercial units. Existing industrial units located to the west and the private sewage works for the Trading Estate immediately abuts the north-west corner of the site. To the east of the site is a block of woodland, beyond which are further industrial units. Parts of the wooded area to the east, and in particular a stand of poplar trees immediately abutting the site boundary, are also understood to be afforded protection through a block Tree Preservation Order.

Planning History

2.2.4 During the late 1930's – early 1940's the Hartlebury Trading Estate site was originally developed as the Hartlebury RAF base. This involved the construction of a number of railway sidings off the Kidderminster - Droitwich railway line and a series of storage buildings. The development did not include any runways and the base effectively operated as a storage and distribution centre for the RAF until its closure in 1977.

2.2.5 Following the closure of the Hartlebury RAF base, the Trading Estate has developed as a major commercial site under a series of subsequent planning permissions. The most significant of these appears to be the granting of

outline planning permission (reference w/85/0033) for the development of 650,000sqft (60,387sqm) of new industrial warehouse units in the mid-1980s. The Trading Estate now covers over 75Ha (180 acres) of land, accommodating in excess of 100 companies and occupying around 139,000sqm (1,500,000ft²) of development.

- 2.2.6 The site of the proposed Mercia EnviRecover facility has been the subject of three relevant planning permissions within the last 10 years, which are discussed in more detail below.

Saville Gordon Estates Consent

- 2.2.7 On the 19th May 1999, the Trading Estates (then) owners Saville Gordon Estates plc submitted a planning application (reference 99/662) to Wychavon District Council for the development of industrial units within use classes B1, B2 and B8 on plots H2a, H294 and H600. The application was granted planning permission on 08th December 1999.

- 2.2.8 Following the grant of planning permission, plots H2a and H294 have been fully developed and as such, the planning permission remains extant in so far as the approved development of plot H600 and related areas is concerned (H600 primarily being the Oak Drive site now proposed for the Mercia EnviRecover scheme). Approved drawings relating to plot H600 illustrated the erection of five industrial units on the Oak Drive plot (unit references 610, 620, 630, 640 & 670) and which are understood to provide of the order of 138,600sqft (12,876sqm) floorspace available for unrestricted B2 / B8 land use.

Estech Europe Consents

- 2.2.9 On 14th December 2004, Worcestershire County Council's Planning Committee resolved to grant planning permission (reference 407596) for the development of a major waste management facility that was being promoted

on the Oak Drive site by Estech Europe. The formal granting of planning permission for the facility was confirmed on the 3rd February 2005. A second Estech Europe planning permission (reference 407658) was granted on 24th April 2006 and merely sought to make amendments to the original scheme.

2.2.10 The Estech Europe proposals were for the development of an autoclave waste treatment facility capable of managing 100,000 tonnes of residual waste per annum. The facility was to be contained within a single building measuring 120 metres long x 60 metres wide and 15m high (to ridge).

2.2.11 It is understood that planning approvals for the autoclave scheme expired on the 3rd February 2010 - with the development not coming forward on account of there being no guaranteed markets for the fibre end-product from the process.

2.2.12 In summary, it is evident from the above review of planning history that:

- The Hartlebury Trading Estate has expanded significantly in the last 20 years and contains a number of large industrial / employment units;
- The proposal site already benefits from part implemented planning permission for major industrial / commercial development;
- The site of the proposed Mercia EnviRecover facility has been the subject of two successful planning applications for major waste management development in the past 5 years.

Traffic demand associated with extant site uses

Estech Europe Autoclave Scheme

2.2.13 Given that the planning permission for the Estech Europe autoclave scheme expired in February 2010, the traffic demand associated with this permitted use cannot now be considered to represent 'committed' demand across the

network. Notwithstanding this, it is a useful exercise to understand the extent of traffic demand levels associated with the permitted scheme - as such demand levels effectively represent previously agreed acceptable traffic demand levels for a waste treatment use of the site.

- 2.2.14 Review of the planning submissions associated with the Estech Europe autoclave scheme identifies that this permitted facility was anticipated to generate of the order of 152 vehicle movements per day (76 in / 76 out).

Saville Gordon Estates Scheme

- 2.2.15 As noted above, the extant planning approval at the Oak Drive proposal site relates to the December 1999 permission for B1 / B2 / B8 industrial / commercial use. This scheme included for 12,876sqm of built development on the Oak Drive proposal site.
- 2.2.16 Whilst no end users for the proposed B1 / B2 / B8 development were identified at the time of planning permission, it is possible to estimate typical traffic demand levels associated with the operation of similar industrial / distribution facilities via reference to appropriate development site information held within the TRICS traffic generation database. TRICS is a widely accepted national database of historical trip demand data and contains observed traffic data for a large number of development-type sites and, as such, can be considered to produce reliable base trip rate data.
- 2.2.17 Trip rate estimates for B2 industrial units or B8 commercial warehousing land uses at the Hartlebury proposal site have been calculated through careful reference to example industrial estate / warehousing sites held on the TRICS database. Sites utilised for comparison were based on edge of town / stand alone facilities in order to meet to deliver a suitable match to Hartlebury Trading Estate site characteristics.

2.2.18 Reference to appropriate Industrial / Warehousing sites within the TRICS database (average trip rates) would suggest the following development trip rates (per 100sqm GFA), see also **Appendix C** to this report:

Average Trip Rates

Trip Rates (per 100sqm GFA)	Arrivals	Departures	Total
Industrial Unit			
08:00-09:00	0.461 / 0.028	0.174 / 0.040	0.635 / 0.068
09:00-10:00	0.252 / 0.019	0.234 / 0.036	0.486 / 0.055
13:00-14:00	0.254 / 0.027	0.257 / 0.029	0.511 / 0.056
17:00-18:00	0.118 / 0.032	0.319 / 0.015	0.437 / 0.047
12hr (07:00-19:00)	2.750 / 0.339	2.916 / 0.341	5.666 / 0.680
Commercial Warehousing			
08:00-09:00	0.289 / 0.058	0.112 / 0.041	0.401 / 0.099
09:00-10:00	0.192 / 0.050	0.159 / 0.054	0.351 / 0.104
13:00-14:00	0.201 / 0.056	0.119 / 0.030	0.320 / 0.086
17:00-18:00	0.071 / 0.034	0.231 / 0.026	0.302 / 0.060
12hr (07:00-19:00)	1.919 / 0.569	2.005 / 0.487	3.924 / 1.056

(Trips per 100sqm development GFA: All vehicles / HGVs)

2.2.19 Application of the available undeveloped 12,876sqm floorspace at the Oak Drive site to the above trip rates suggests that, if brought into use for commercial industrial / warehousing development, the proposal site could potentially generate of the order of 500 – 730 vehicle movements (in + out) over the core weekday 12 hour period 07:00-19:00 (based on average trip rates - see tables below).

Average Trip Demand

Trip Rates (per 100sqm GFA)	Arrivals	Departures	Total
Industrial Unit			
08:00-09:00	59 (4)	22 (5)	82 (9)
11:00-12:00	31 (5)	39 (4)	70 (9)
15:00-16:00	31 (8)	32 (4)	63 (12)
17:00-18:00	15 (4)	41 (2)	56 (6)
12hr (07:00-19:00)	354 (44)	275 (44)	730 (88)
Commercial Warehousing			
08:00-09:00	37 (7)	14 (5)	51 (12)
11:00-12:00	19 (8)	15 (5)	34 (13)
15:00-16:00	15 (6)	22 (5)	37 (11)
17:00-18:00	9 (4)	30 (3)	39 (7)
12hr (07:00-19:00)	247 (73)	258 (63)	505 (136)

Predicted vehicle trip demand: All vehicles (HGVs)

2.2.20 A significant proportion of such vehicle movements could be anticipated to be HGV trips – of the order of 12% of daily trip movements associated with industrial units (88 movements, in + out) and 27% of commercial warehousing trip movements (136 movements, in + out).

2.2.21 It is important to understand and consider such levels of ‘committed’ traffic flow when assessing the potential future impact of traffic demand associated with the proposed Mercia EnviRecover scheme - as the traffic associated with the proposed EnviRecover scheme would effectively ‘replace’ these committed demand levels over the network. The implications of this ‘net’ traffic demand case are considered in more detail in section 4.4 to this report.

2.3 **Description of key local highway network features**

2.3.1 The Mercia EnviRecover proposal site represents a vacant development plot located to the immediate north of Oak Drive, on the Hartlebury Trading Estate. Oak Drive is an industrial estate access road route of 7.0m – 7.5m width in the vicinity of the site and serves a wide range of frontage commercial units and development side roads. The route effectively operates as 20mph private road (i.e. not adopted public highway) with street lighting provided along the majority of its length (including the site frontage). The route is also subject to double yellow line parking control markings along the site frontage.

2.3.2 Oak Drive effectively operates as a cul-de-sac route, with through access to Ryeland Lane to the east being restricted via a locked gate (understood to be permanently locked and available for emergency access only). The route terminates approximately 300m to the west of the proposal site at a simple T-junction with the main Hartlebury Trading Estate spine road. This spine road provides 8.0m wide distributor route serving other frontage industrial units, access to the existing Waresley landfill site and onward local connections to Walton Road to the north and more strategic access to Crown Lane and the A449 dual carriageway to the south. The route is lit and provides a footway connection along its western frontage and is understood to be part of the

adopted public highway network (adopted section understood to extend northwards up to unit 21 of the Trading Estate), operating under a 30mph speed limit.

2.3.3 The Trading Estate spine road terminates at a simple T-junction with Crown Lane approximately 250m to the south of the connection with Oak Drive. A plan of the layout of this junction is illustrated in **Figure 3a** to this report, with photographs of key features illustrated in **Appendix B**. **Figure 2a** demonstrates practical lateral visibility deliverable from the trading estate spine road connection. These sightlines are considered suitable to encourage safe operation of the junction with respect to observed operating conditions on the relevant approach sections of Crown Lane:

- Leading direction (to the right): 2.4m by 220m
- Non-leading direction (to the left): 2.4m by 120m.

2.3.4 To the east, Crown Lane provides local rural lane access to the settlement of Elmley Lovett. This eastern section of Crown Lane is of approximately 5.0m width, with no footway provision and limited highway verge and is the subject of a formal operating width restriction - limiting access to cars / small LGV's and pedal cycles (via a 2.0m of 6'6" restriction). The formal width restriction begins immediately to the east of the T-junction with the trading estate spine road and is clearly signed on the trading estate and Crown Lane (west) approaches (see **Appendix B**).

2.3.5 To the west of the Trading Estate access junction, Crown Lane is of a 7.3m single carriageway distributor road standard, with wide verges to both sides (northern verge including a continuous footway feature). This route provides a good standard of vertical and horizontal design and was upgraded to its current alignment during the mid 1980s to provide a modern standard industrial distributor road route to specifically serve the Trading Estate site. Crown Lane is unlit and operates under national speed limit controls.

- 2.3.6 Approximately 1.4km to the west of the Trading Estate spine road access, Crown Lane connects to the A449 dual-carriageway route at a 4-arm roundabout junction, with the A449 southbound arm providing a free-flow connection to Crown Lane (see **Figure 3b & Appendix B**). The A449 dual carriageway operates under a 50mph speed limit through the junction and provides dual carriageway connections to Kidderminster and the A450 to the north and Worcester and the M5 motorway (via M5 Junction 6) to the south. The A449 is operated and managed by Worcestershire County Council following its de-trunking in October 2007 (via The A449 Trunk Road (Dudley, Staffordshire and Worcestershire) (Detrunking) Order 2007)). Crown Lane to the west of the A449 roundabout provides access to a large petrol filling station development and local country lane connections (not suitable for larger vehicles) towards A4025 Worcester Road (to Stourport).
- 2.3.7 Approximately 300m to the north of the Crown Lane roundabout, the A449 dual carriageway narrows to provide a single lane in both directions through the junction with the local side road connection to Old Worcester Road and Manor Lane. Old Worcester Road provides access to the main section of Hartlebury village and operates under a 30mph speed limit. The route also provides an alternative connection to Hartlebury Trading Estate via Station Road and the level crossing at Hartlebury station. All other routes off Worcester Road / Station road are protected (except for access) by weight restrictions - to discourage 'rat-running' by large HGVs. Manor Lane provides local residential connections to the settlement of Waresley.
- 2.3.8 The A449 route narrows to full single carriageway, 40mph operation 2km to the north of the Crown Lane roundabout (immediately to the northern extent of Hartlebury village). This section of the route provides access to Kidderminster and connects with the A450 at a signalised T-junction. The A450 provides opportunities for connections towards Stourbridge and Bromsgrove (the latter via the A448), however, access to the A450 is restricted for larger HGV units by the Worcester – Kidderminster rail bridge, which operates with a 13'6" height restriction (see photo in **Appendix B**).

2.3.9 To the south, the A449 provides connections to Worcester and Stourport (the latter via the A4025 at the Mitre Oak roundabout). This southern section of the A449 is mainly dual carriageway in nature, however, short sections of the route have been reduced to single carriageway operation as part of extensive corridor safety work undertaken in the late 2000's. The majority of the route operates under 50mph restrictions, with national speed limit covering the section to the south of the village of Ombersley. Connections to the M5 (via J6) are provided by a dual carriageway spur from the A449 roundabout at Claines - which operates as a northern bypass to Worcester.

2.4.1 **Recorded local background traffic demand**

2.4.1 Base traffic flow patterns for the immediate network to the proposal site have been established through the undertaking of detailed classified 12hr traffic surveys at the following network locations:

- Crown Lane / Hartlebury Trading Estate Spine Road;
- Crown Lane / A449 / Esso Garage roundabout.

These counts were undertaken in late January 2010. Traffic and weather conditions were normal, with no ice or snow.

2.4.2 **Figures 4(a-e) & 5(a-e)** to this report illustrates the observed 2010 background 12 hour (07:00-19:00) turning movements at the key local junctions as well as hourly flows for the additional following periods:

- AM Traditional Peak Period: 08:00-09:00;
- AM Morning Hour: 11:00-12:00;
- PM Afternoon Hour: 15:00-16:00;
- PM Traditional Peak Period 17:00-18:00.

This background turning count data has been presented in terms of the following vehicle classifications:

- Motor Cycles / Pedal Cycles
- Car / Light Goods Vehicles
- Other Large Goods Vehicles 1 (OGV1);
- Other Large Goods Vehicles 2 (OGV2);
- Public Service Vehicles (Bus / Coaches).

2.4.3 **Figures 6 & 8** to this report illustrate observed daily two way weekday flow demand profile on both the A449 and Crown Lane corridors immediate to the Crown Lane / A449 roundabout. Review of this demand information demonstrates that traffic flows on the A449 illustrate that maximum background demand conditions are predicted to occur during the traditional AM rush hour peak period 08:00-09:00 - when demand levels of the order of 2100 vehicles per hour (two-way) have been recorded to the immediate south of the Crown Lane roundabout. A secondary early evening peak is also recorded during the PM peak demand hour 17:00-18:00 - when two-way flow levels of the order of 1850 have been recorded.

2.4.4 Review of the peak demand flows on the A449 corridor suggests a tidal demand element, with southbound traffic movements (towards Worcester) being the dominant AM peak movements and northbound traffic movements being the dominant flow in the PM peak. Traffic demand during weekday off peak hours is substantially lower than peak levels, being less than 1400 vehicles per hour (two way) 09:00 - 16:00.

2.4.5 HGV demand levels on the A449 corridor across the core 12 hour period 07:00-19:00 are predicted to be of the order of 5%-6% of total recorded traffic volumes.

2.4.6 Traffic flow levels on Crown Lane (E) are substantially lower than that recorded for the A449 mainline. Maximum hourly 2-way flows recorded in

January 2010 were less than 500 vehicles per hour, with day-time flows between 09:00-15:00 being less than 300 vehicles per hour. The route also illustrates a degree of tidal flow demand, with eastbound (towards the Trading Estate) flows being the dominant movement in the AM peak and the reverse relationship taking place during the PM peak.

2.4.7 As a reflection of its Trading Estate access role, Crown Lane also demonstrates a more substantive level of HGV trip demand as a proportion of total flow demand. 12hr (07:00-19:00) observed vehicle split on Crown Lane is as follows:

- Motor Cycle / Pedal Cycle: 0.5%
- Car / LGV: 85.7%
- OGV 1: 8.6%
- OGV 2: 5.1%
- Public Service Vehicle: 0.1%

2.5 **Road safety: Review of Personal Injury Accident records**

2.5.1 An appraisal of the operational safety of the immediate local network to the Hartlebury Trading Estate site has been carried out through a review of Personal Injury Accident (PIA) data for the period 1 January 2004 to 30 September 2009 inclusive. Details of the location of the recorded accident events are illustrated in **Figure 9** to this report, with summary accident data provided by Worcestershire County Council included as **Appendix D** to this report.

2.5.2 Review of the available PIA data demonstrates that just four accident incidents have been recorded within the immediate search area of Crown Lane / A449 and other local junctions. All of the incidents recorded are of slight injury classification and have taken place on sections of Crown Lane (one to the west of the A449, 3 to the east). No accident incidents are

recorded at the main junctions of A449 / Crown Lane or the Trading Estate spine road / Crown Lane.

2.5.3 Two of the recorded accident incidents included larger HGV units (i.e. over 7.5t mgw), however, each of these events involved vehicles colliding with the HGV vehicle, as summarised below:

- Car on Crown Lane loses control on ice into path of on coming HGV, forcing the vehicle to jackknife in attempt to avoid a collision (Ref: 08CA00825);
- Car pulls out of side exit into the path of HGV on Crown Lane (Ref: 09C901629).

Neither incident appears to be directly related to unsafe operation of an HGV or poor highway layout.

2.5.4 As identified above, the A449 dual carriageway has been the subject of recent extensive corridor safety work implemented by the Highways Agency and Worcestershire County Council. This has included the lowering of the speed limit to 50mph, localised narrowings of the main carriageway and the closing of a number of gaps in the central reserve. The A449 route is also regularly targeted for speed enforcement exercises by West Mercia Constabulary. A review of recent accident information identifies that 11 personal injury accident incidents have been recorded over the past 5 years for the 5.3km A449 (S) stretch of 50mph route between Oldfield (immediately to the north of Ombersley village) and the Crown Lane roundabout.

2.5.5 Given the generally good accident record of the immediate local highway network to the Hartlebury Trading Estate, it is not considered that there are material prevailing road safety issues that would call into question the development of the proposal site for the proposed Mercia EnviRecover land use.

2.6 Sustainable transport connections

2.6.1 Whilst spatially well related to the main areas of waste arisings, the EnviRecover proposal site itself is located away from major centres of population. Given this locational characteristic, opportunities for staff / visitor access to the site via sustainable travel modes such as walking, cycling and public transport are generally limited. This section of the report considers the extent of such available local connections.

Walking / Cycling

2.6.2 IHT guidance 'Providing for journeys on foot' suggests that preferred maximum walking distances to everyday facilities is of the order of 1.2km and National Government guidance PPG13 'Transport' recognises 2km as an appropriate suitable regular walk distance for work related trips. The Hartlebury Trading Estate is located outside of a 1.2km walk catchment from local centres of population / settlements. It is therefore not considered that walking would likely represent an attractive regular commuting option to the proposal site. Notwithstanding this, footway connections are available along Crown Lane and the Trading Estate Spine Road.

2.6.3 Cycling is recognised as a sustainable, healthy and environmentally friendly form of transport. PPG13 notes that cycling has the potential to substitute for short car trips, particularly those under 5km and to form part of a longer journey by public transport. **Figure 10** to this report illustrates a 15 minute cycle catchment from the proposal site based on a cycle speed of 20kph. This catchment includes Hartlebury rail station, Hartlebury village and other local village settlements such as Elmley Lovett, Cutnall Green and Mustow Green. The proposed development would therefore potentially provide opportunities for employees and the public to cycle to the site. Suitable facilities would be provided at the site to support journeys by this travel mode (see section 3.7 to this TA report).

Public Transport

- 2.6.4 Guidance published by the Institution of Highways and Transportation 'Planning for Public Transport in Developments' recommends that the maximum distance to a bus stop from new development should be 400m - roughly equating to a five minute walk. There are no bus stops served by regular bus services available within this local walk catchment, making staff / visitor access by this travel mode unlikely. Closest bus stops to the site are located on the A449 at the Crown Lane roundabout, well over 1.5km walk from the site.
- 2.6.5 Hartlebury rail station is located approximately 1.5km walk / cycle from the centre of the proposal site. It is therefore unlikely that regular walk connections would take place to / from the proposal site, however, the station could be an attractive option as part of a longer linked cycle / train journey. Hartlebury station provides only limited morning and evening peak hour rail connections to Worcester, Droitwich, Kidderminster and Birmingham.
- 2.6.6 In summary, it is envisaged that the majority of regular staff / visitors to the proposed EnviRecover facility would likely visit the site using the private car. The site is located in an area which is relatively remote from large local centres of population and provides only limited access by walking / cycling and public transport. Given the generally low levels of staff numbers proposed to be based at the site (see section 3.5) to this report, it is not anticipated that the proposals would give rise to a significant demand for staff / visitor private vehicle travel.

3.0 **REVIEW OF THE DEVELOPMENT PROPOSALS**

3.1 **Development rationale**

3.1.1 MWM was awarded its waste management contract with Worcestershire County Council (WCC) and Herefordshire Council in December 1998. Significant progress has been made since that time in securing planning permission for, and developing, new and refurbished facilities such as Waste Transfer Stations (WTS), Household Waste Sites (HWS), Materials Recycling Facilities (MRFs) and ancillary equipment. The waste service has resulted in the client (the two County authorities) achieving all of its statutory targets to date in terms of recycling, landfill diversion and the Landfill Allowance Trading Scheme (LATS). This has included some limited sub-contracting of green waste to third party composters and some out-of-county Energy from Waste (EfW) use.

3.1.2 WCC has undertaken a detailed Best Practicable Environmental Option (BPEO) exercise to identify the preferred option for dealing with residual waste – that is the remainder of collected domestic and civic amenity waste after kerbside collection of recyclables, and un-segregated mixed wastes from household waste sites. The authorities also published, in 2004, a Joint Municipal Waste Management Strategy (JMWMS), in conjunction with the district authorities. Both the BPEO study and the JMWMS identified a preferred option that included some form of ‘thermal treatment’ for residual waste.

3.1.3 In 2009 representatives of the two Waste Disposal Authorities and the constituent District Councils in Worcestershire – the Joint Members Waste Forum – reviewed the JMWMS. This included an in-depth assessment of the options for dealing with residual waste. This exercise concluded that, of the range of scenarios analysed, the optimum solution for dealing most effectively with residual waste would be via a single EfW plant, capable of producing electricity and heat. MWM has separately conducted its own

Options Appraisal, and has arrived at the same broad conclusions as the Strategy review.

3.2 **Choice of development location: Review of transport sustainability**

3.2.1 The EnviRecover site at Hartlebury Trading Estate was selected following a lengthy and comprehensive site selection exercise, which considered over fifty possible sites within both Worcestershire and Herefordshire. A full copy of the site selection report is included as an Appendix to the Planning Statement..

3.2.2 One of the criteria included within the site selection process was an investigation of anticipated transport sustainability. A review of this transport accessibility case identified that the Hartlebury site provides excellent opportunities to minimise waste haulage, being located in a central location to the main County waste arisings (Worcester, Wyre Forest, Wychavon, Malvern, Bromsgrove & Redditch) and close to the County strategic road network.

3.3 **Description of the development proposals**

3.3.1 The Mercia EnviRecover facility is proposed to manage the recovery of residual municipal waste. Waste input would comprise of predominantly kerbside municipal arisings, however, in the earlier years of operation it is envisaged there may also be some capacity for the facility to accept additional residual domestic waste collected at local Household Waste Sites (HWS) or locally derived commercial waste. .As Mercia EnviRecover is designed for the management of residual municipal waste, the assessments within this TA have been undertaken on this basis - due to the very limited prospect of other waste streams being treated at the facility.

3.3.2 The waste processing capacity of the EnviRecover plant would be 200,000 tonnes per annum (tpa), providing a better alternative (further up the waste

hierarchy) to the disposal of residual waste at landfill - after recycling and composting has taken place. At 200,000 tonnes, the EnviRecover facility is scaled to meet current and future residual municipal waste treatment needs of Herefordshire & Worcestershire.

3.3.3 An indicative masterplan for the Mercia EnviRecover scheme is included as **Figure 11** to this report. This demonstrates that the proposals would include for three main elements:

- A built facility for the combustion of residual waste in order to recover energy (Energy from Waste facility);
- Associated ancillary infrastructure;
- Earthworks and landscaping associated with assisting the integration of the buildings into the site and surrounding area.

The main principles of these development elements are summarised below.

Energy from Waste Recovery Facility

3.3.4 The Mercia EnviRecover facility would be contained within two interconnected buildings, comprising a main building and a smaller secondary structure. The core elements of the Main Building would include:

- Waste reception (tipping) hall;
- Storage bunker;
- Ash bunker;
- Waste combustion grate and boiler;
- Flue gas treatment system;
- Education / visitor centre;
- Offices, workshop and stores;
- A chimney stack (hereafter referred to as the 'stack').

The secondary structure, the Turbine Complex would contain:

- Air cooled condensers;
- The turbine generator;
- An electrical sub-station; and
- A bypass station.

3.3.5 The plant would be designed to process circa 200,000 tpa of residual municipal waste collected within the Counties of Worcestershire and Herefordshire. Waste collected in areas proximate to the site would be delivered directly to the facility in kerbside Refuse Collection Vehicles (RCVs), whilst municipal waste arising in more distant areas would be delivered to the site in a 'bulked' form via MWM's existing network of Waste Transfer Stations (WTS). Section 4 to this report provides a more detailed review of this waste delivery strategy.

3.3.6 The Mercia EnviRecover facility would generate approximately 15.5 MW of electricity. In addition, the facility would also offer the potential to export excess heat to local businesses and properties.

3.3.7 Further technical details of process operation within the EnviRecover facility are provided in Chapter 5 of the Environmental Statement.

Ancillary Buildings and Infrastructure

3.3.8 The Mercia EnviRecover facility would require ancillary infrastructure and buildings in order to create a fully functional facility. This ancillary infrastructure would include:

- A gatehouse / weighbridge office at the entrance to register all waste carrying vehicles that enter and exit the site;

- Dual weighbridges (one for in-coming vehicles, the other for out-going vehicles);
- A car park (with a coach parking facility) for staff and visitors;
- Areas of hardstanding for the manoeuvring of large articulated vehicles; and
- A pedestrian over-bridge to gain access to the office and education / visitor centre.

Earthworks and Landscaping

3.3.9 Whilst the site benefits from a relatively even and flat landform, it is proposed that the main building would be constructed approximately 8m below existing ground level in order to assist in minimising its visual impact upon the surrounding area - although such a building form does also provide some functional benefits.

3.3.10 Furthermore the proposals would also include a comprehensive landscape scheme which would enhance the appearance of the facility and assist in the creation of improved nature conservation habitat. The landscape works would also incorporate a surface water drainage attenuation feature.

3.4 **Site access & car parking arrangements**

3.4.1 The Mercia EnviRecover plant would be served via a new dedicated vehicle access point direct from the Hartlebury Trading Estate private access road of Oak Drive. Details of the layout of this junction are illustrated in **Figure 12** to this report.

3.4.2 Under site operating procedures, all operational HGV service vehicles would “weigh in” at a dedicated entry weighbridge before proceeding to the relevant delivery / reception areas within the main building. The layout of the proposed access road is such that queuing vehicles approaching the site entry weighbridge would be accommodated within a widened on-site queuing area

capable of accommodating up to six full size bulk articulated HGV units (see **Figure 12** to this report). It is anticipated that the weighbridge would provide a minimum vehicle processing capacity of at least 1 vehicle every 90 seconds and could therefore provide a maximum site entry capacity of the order of 45 operational HGV vehicle movements per hour. A parallel 'bypass lane' is available for smaller staff / visitor vehicles to the immediate west of the entry weighbridge - to avoid vehicle conflicts with queuing operational HGV traffic.

- 3.4.3 All vehicles lanes within the site would be provided to a minimum standard of 3.65m carriageway and would be suitable to accommodate the swept path of maximum size articulated HGV unit. Details of AUTOTRACK vehicle swept path assessments of typical vehicle movements within the site are illustrated in **Appendix E** to this report.
- 3.4.4 All operational HGV service vehicles exiting the site would be required to "weigh out" at the dedicated exit weighbridge. This exit area also includes for a parallel bypass lane, and includes for a bus / coach parking bay and a dedicated exit from the staff / visitor car parking area. Lateral visibility at the site exit point to Oak Drive is generally good with clear sightlines available for in excess of 2.4m by 50m in both directions. Such sightlines are entirely appropriate for access to a 20mph speed limit route (the prevailing signed speed limit on the immediate section of Oak Drive).
- 3.4.5 It is proposed that 45 car parking spaces would be provided on site, including 4 spaces to disabled standard provision. This level of car parking has been identified as being suitable to accommodate proposed staffing levels at the site (including a requirement for some additional spaces to reflect short term parking demand surges during shift change periods) and a level of visitor provision. In addition, further car parking supply has been provided to reflect additional staffing levels associated with the relocation of the general MWM office base (12 staff members). Derivation of the proposed car parking supply at the site can be summarised as follows:

EnviRecover Staff:	(max 18 on day shifts + 3 for shift change):	21 spaces;
MWM office base:	(12 Staff):	12 spaces;
Visitor Spaces:	(to include technical visitor, education & MWM):	8 spaces;
Disabled Spaces	(+ 10% of total provision)	4 spaces
	Total Parking (inc disabled):	45 spaces

3.4.6 In addition to the above car parking supply levels it is proposed that the site layout would also deliver 2 covered motor cycle parking spaces and a covered cycle parking area suitable to accommodate up to 8 cycles.

3.5 **Proposed site operating hours and staffing levels**

Site operation and delivery periods

3.5.1 It is proposed that the Mercia EnviRecover facility would operate on a 24 hour, 7 days a week basis. The plant could be expected to shut down for appropriate short term periods for maintenance work.

3.5.2 The planning submissions for the Mercia EnviRecover facility seek the potential for waste input & ash export vehicle movements to / from the site to take place within the following delivery windows:

- Monday – Friday: 06:00 – 19:00
- Saturday: 06:00 – 19:00
- Sunday: 06:00 – 19:00

Typically the vast majority of waste input movements could be expected to take place during weekday daytime hours 08:00-16:00, with the remainder of the identified delivery periods allowing for operational flexibility and the receipt of bulked waste from more distant WTS / HWS facilities. Details of the anticipated delivery profile to / from the site is considered in more detail in section 4 to this report, which demonstrates that current waste delivery operations at existing waste reception sites do not typically result in a

material level of traffic demand before 07:00. On this basis, travel demand within this report has generally been modelled to take place between the hours of 07:00 – 19:00.

Proposed staffing levels

3.5.3 It is anticipated that the Mercia EnviRecover plant would be operated by a total staffing level of the order of 30 staff, with a day-time staffing level of 12-15 staff members, supplemented by shift workers to maintain 24 hour plant operation. It is anticipated that shifts would operate on a typical 6am, 2pm, 10pm shift pattern, with 3 staff members per shift (with two shifts effectively 'off' each day). Maximum daytime staffing levels can therefore be anticipated to be of the order of 18 staff members.

3.5.4 In addition to the core EnviRecover staff based on the site, it is proposed that plant operator MWM would seek to relocate some general office functions to Hartlebury site. Such relocation would include for of the order of 12 additional MWM staff members being based on the site.

3.6 **Operational HGV routing & enforcement**

3.6.1 In order to support the operation of the EnviRecover plant it is proposed that operational (HGV) traffic movements to / from the site would be encouraged to observe appropriate route corridors when travelling to / from the site. This routing strategy would seek to restrict operational traffic to only those roads suitable to accommodate regular HGV movements via reference to the WCC "Advisory Lorry Route Map" and would therefore minimise operational traffic impact on the immediate settlements of Hartlebury and Waresley.

3.6.2 A core element of the routing strategy is that all operational HGV movements to / from the EnviRecover site would utilise Crown Lane to access the A449 dual carriageway. Crown Lane is a suitable industrial standard local distributor road corridor, with no frontage residential property and provides

the most direct and efficient access from the Hartlebury Trading Estate site to the County Strategic Road network (A449). No operational HGV movements to / from the Mercia EnviRecover facility would be permitted via the northern Trading Estate access via Walton Road - except for those RCV street collection runs directly serving Hartlebury village or properties on Walton Road. Indeed, the centre of Hartlebury village and the eastern sections of Crown Lane and Walton Road are already prohibited for non-direct access related HGV movements by existing formal weight and width restrictions.

3.6.3 Liaison with WCC highways and local interest groups have identified a number of sensitive local routes that should be avoided by operational traffic movements associated with the EnviRecover Plant, particularly large bulk articulated HGV movements. The proposed local operational HGV routing strategy to / from the EnviRecover facility and existing local operating restrictions is summarised in **Figure 13** to this report. It is proposed that this local routing strategy would be adopted by MWM for the operation / contracting all large bulk articulated HGV movements to / from the site and would be promoted to those local district authorities operating direct RCV access to the site following local kerbside collection runs (chiefly Wyre Forest, Wychavon & Worcester City).

3.6.4 Route enforcement of all MWM bulk HGV vehicles would be delivered via driver monitoring using the vehicle satellite tracking system installed in all MWM vehicles. This system allows the operator to alert drivers should they not follow the prescribed route and also be utilised as evidence in staff disciplinary cases. It is proposed that this system would also be supported by the following measures:

- All driver staff to be provided with suitable route plan mapping before beginning a delivery run to the EnviRecover facility;
- Suitable signing strategy on immediate links and key junctions;
- A clear disciplinary procedure for drivers who flout routing agreements.

3.6.5 To support the development of the recently completed EnviroSort facility at Norton, MWM offered to install appropriate hardware to allow the satellite tracking of all district authority vehicles accessing this site. MWM have confirmed that they would promote a similar scheme for the vehicle fleet accessing the EnviRecover facility at Hartlebury.

3.7 **Measures to encourage sustainable travel**

3.7.1 MWM are committed to encouraging staff and visitor journeys to the site by alternative travel modes to the private car where practical. As part of this commitment, the scheme design would include the following:

- Covered and secure cycle parking for eight cycles;
- Staff shower, changing and locker facilities;
- Staff food preparation area to encourage staff to remain on-site during working hours.

3.7.2 The developer would also operate a Staff Travel Noticeboard within main staff areas, which would include up-to-date information regarding local bus services, cycle route information and encouraging car sharing. MWM would also offer an interest free loan scheme for cycle purchase using the DfT staff cycle loan system. An initial framework for the management of suitable travel initiatives as part of the operation of a formal on-site Travel Plan is included as **Appendix F** to this report.

4.0 **ANTICIPATED DEVELOPMENT TRIP GENERATION AND ASSIGNMENT**

4.1 **Core development trip generation assumptions**

4.1.1 Anticipated demand estimates for trip movements to / from the proposed Mercia EnviRecover facility have been calculated using a 'first principles' approach, based upon 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, MWM, being developed via operational experience of existing waste demand within the Herefordshire & Worcestershire.

4.1.2 Core operational trip generation assumptions are as set out below:

- Site open to delivery / collection for effectively 50 weeks per year (reflecting the storage capacity of the bunker to allow continued deliveries during scheduled short term maintenance periods);
- Material delivered / collected over a core 12 hour period, 07:00 - 19:00..

4.1.3 It should be noted that, following discussions with Worcestershire County Council Highways Officers it was concluded that the Transport Assessment (TA) should include for a number of highly 'robust' modelling parameters which would ensure the consideration of a 'worst case' review of anticipated re-development site operational HGV levels. In particular, due to the fact that weekend delivery activity is expected to be much less intensive than typical weekdays, the weekday daily and hourly demand estimates utilised within the capacity assessments set out within this TA have been calculated on the basis of a 5-day delivery week basis (effectively a 250 delivery day window per annum), rather than the proposed 7 day delivery window (350 delivery days per year). Such a methodology will ensure a conservative / over estimate of the likely weekday HGV operational traffic demand to / from the

site and thus ensure a robust assessment of highway network impact during traditional maximum background traffic demand periods.

4.1.4 As noted above, weekend demand to the re-development site is anticipated to be substantially lower than weekday operations and would typically relate to the following waste delivery movements:

- Some limited kerbside collection runs from local districts (mainly associated with busy waste weeks);
- Delivery of bulked waste from more distant WTS facilities;
- Delivery of waste from local HWS facilities (which are typically busier on weekends).

Review of existing waste deliveries taking place outside of the weekday periods at the current MWM municipal waste disposal facility (Hill & Moor landfill) would suggest that waste deliveries over the weekend period could represent of the order of up to 5% of weekly direct delivery waste and up to 15% of weekly bulked waste deliveries.

4.1.5 The low levels of weekend waste delivery demand, in combination with the lower levels of background network demand experienced over the immediate local network on Saturdays & Sundays, suggests that development traffic impact during these periods would not be of a material level. Accordingly, no detailed assessment of traffic demand during these weekend periods has been undertaken.

4.2 **Predicted operational HGV traffic demand**

Input Material HGV Traffic Demand

4.2.1 As noted in paragraph 3.3.1 to this report Mercia EnviRecover facility is designed to accept and treat municipal waste arisings from all districts within the counties of Herefordshire and Worcestershire. In order to ensure the most

efficient management of the transport of waste and to minimise vehicle miles, waste derived from more distant locations within the two counties would be bulked close to the point of waste arisings and delivered to the EnviRecover site in larger payload bulk haulage. This approach is already adopted throughout the counties with respect to the existing management and transport municipal waste arisings to final disposal at landfill.

4.2.2 Waste deliveries to the EnviRecover site can be anticipated to be made up of two main groups, as summarised below:

- **Direct delivery movements** – delivery to the proposal site as part of day-to-day kerbside collection runs from those county districts close to the Hartlebury site. Such direct delivery runs would be undertaken using Refuse Collection Vehicles with typical payloads of 5 – 8 tonnes per vehicle.
- **Bulk haulage movements** – delivery from more distant county districts which has been bulked at a WTS at the district of origin and transported to the site in large capacity vehicles. Such bulk haulage runs would be undertaken using articulated HGV with payloads of 16-20 tonnes per vehicle. NB – for the purposes of this assessment all MWM bulk vehicles have been modelled with an average carrying capacity of 16t-17t, in reality fleet renewal / upgrade is anticipated to increase such bulk haulage capacity closer to a 20t average load in future years. The use of lower carry capacities further reinforces the ‘robust’ nature of the traffic estimates inherent within this report.

4.2.3 In addition, during the early years of the operation of the EnviRecover facility it is anticipated that some additional waste deliveries would also be received from local County HWS sites. Such deliveries are expected to be phased out over time as kerbside collection volumes rise in line with population growth within the two Counties.

4.2.4 Details of the level of future annual residual municipal waste arisings predicted to be generated by each of the County districts have been provided by the proposed EnviRecover site operator, MWM. These predictions are based upon existing recorded residual waste arisings and take into account future predicted changes in population / economic activity within the core study areas (via reference to predicted population growth for County Districts as set out in the Regional Spatial Strategy). Predicted annual municipal residual waste demand levels from County districts for the proposed EnviRecover plant opening year of 2014 / 2015 and future forecast year of 2024 / 2025 are set out in the table below (see also **Appendix G**):

Municipal Waste Origin	Waste Tonnage 2008/2009 (Domestic waste & kerbside collection)	Waste Tonnage 2014/2015 (Predicted at Opening Year)	Waste Tonnage 2024/2025 (Predicted at Forecast Year)
WORCESTERSHIRE			
Redditch	17,735	18,826	21,096
Bromsgrove	21,597	22,925	24,223
Worcester City	19,523	20,724	24,291
Malvern Hills	16,110	15,497	17,110
Wychavon	30,327	32,193	35,278
Wyre Forest	27,491	29,183	30,481
HEREFORDSHIRE			
Herefordshire	45,946	42,376	48,269
TOTAL	182,729	181,724	200,748

(Tonnes per annum)

4.2.5 As noted above, it is anticipated that initially following opening of the EnviRecover facility, some waste collected at local HWS facilities within the two Counties may also be transported to the Hartlebury site for processing (of the order of 18,275 tonnes in opening year 2014 / 2015). By forecast year 2024 / 2025, however, effectively all waste received and treated at the Mercia EnviRecover facility is predicted to be derived from County kerbside municipal waste collections.

4.2.6 It is proposed that the above predicted waste inputs would be transported to the Mercia EnviRecover facility at Hartlebury on the basis of the import delivery strategy set out below (see also **Appendix H** to this report). NB –

The vehicle payloads identified for each of the waste origins are based on existing average vehicle fleet operating performance recorded by MWM at each of the district waste facilities.

Direct Delivery (2014 / 2015 opening year tonnages):

- All Wyre Forest: 29,183tpa in 8t RCV payload
- All Worcester City: 20,724tpa in 6.5t RCV payload
- 40% of Wychavon: 12,887tpa in 5t RCV payload
- 10% of Malvern Hills: 1,550tpa in 6t RCV payload
- 25% of Bromsgrove: 5,731tpa in 6t RCV payload

Bulk Haulage (2014 / 2015 opening year tonnages):

- 30% Herefordshire (via Leominster WTS): 12,713tpa in 17t HGV payload
- 70% Herefordshire (via Rotherwas WTS): 29,663tpa in 17t HGV payload
- 60% Wychavon (via Hill & Moor WTS): 19,316tpa in 17t HGV payload
- 10% Malvern (via Leominster WTS): 1,550tpa in 17t HGV payload
- 80% Malvern (via Hill & Moor WTS): 12,398tpa in 17t HGV payload
- 75% Bromsgrove (via WTS): 17,194tpa in 16t HGV payload
- All Redditch (via WTS): 18,826tpa in 16t HGV payload

County HWS derived waste (2014 / 2015 opening year tonnages):

- From County HWS sites: 18,275tpa in 8t transfer payload

4.2.7 Waste inputs have been modelled on the basis of a typical 50 week plant operational year, including for the 'worst case' traffic modelling assumption that all waste deliveries would take place over 5 days per week (i.e. an effective 250 day delivery window per annum). The only exception to this methodology is for the modelling of direct delivery movements from Worcester City. This collection authority currently operates an 'alternate week' collection approach, with the majority of the Worcester RCV fleet collecting residual municipal waste on one week and recyclables on the second week. This effectively halves the collection period available for pick up and delivery of waste to the proposed EnviRecover facility. Furthermore, review of delivery operation during the Worcester City kerbside collection

week suggests that residual municipal waste is mainly collected Tuesday – Fridays, with Monday levels being substantially lower. In order to reflect this specific operation of Worcester City collections, waste deliveries from this authority have therefore been modelled to take place over just 100 days per year (i.e. 25 * 4 day week). Ultimately, however, this is a substantial ‘worst case’ assessment approach, as it is known that up to 20% of Worcester City waste is delivered for disposal outside of their core 4 day period (i.e. during ‘off peak’ weeks or weekends).

4.2.8 Given that Worcester City typically operates an alternate week collection regime, operational HGV delivery estimates to the EnviRecover site have been carried out for two main scenarios:

- Peak Operational Day – i.e. when Worcester City vehicles are direct delivering to EnviRecover (40% of modelled days);
- Off-Peak Operational Day – i.e. when no Worcester City deliveries take place (60% of modelled days).

4.2.9 On the basis of the predicted annual tonnage figures set out in **Appendices F & G** and the operational assumptions set out above, it is therefore anticipated that 2014 / 2015 daily site waste input demand to the EnviRecover facility would likely be as follows:

- Peak Operational Day: 924 tonnes per day;
- ‘Off-Peak’ Operational Day: 717 tonnes per day.

4.2.10 Typical daily input traffic movements associated with each of the input waste streams for the site opening year of 2014 / 2015 can be expected to be as follows (see also **Appendix H** to this report). Estimates of operational demand for the future year scenario of 2024 / 2025 are included within **Appendix H**.

Peak Operational Day 2014 / 2015

Municipal Waste Origin	Annual predicted input tonnage	Vehicle payload (tonne per vehicle)	Total annual vehicle demand	Average daily vehicle demand
DIRECT DELIVERY				
Wyre Forest	29,183	8	3,648	15
Worcester City	20,724	6.5	3,188	32
40% Wychavon	12,877	5	2,575	10
10% Malvern Hills	1,550	6	258	1
25% Bromsgrove	5,731	6	955	4
Sub-Total				62
BULK HAULAGE				
30% Hereford (via Leom)	12,713	17	748	3
70% Hereford (via Rother)	29,663	17	1,745	7
60% Wychavon (via H&M)	19,316	17	1,136	5
10% Malvern (via Leom)	1,550	17	91	-
80% Malvern (via H&M)	12,398	17	729	3
75% Bromsgrove	17,194	16	1,075	4
Redditch	18,826	16	1,177	5
Sub-Total				27
COUNTY HWS	18,275	8	2,284	9
TOTAL				98

(Arrival movements)

Alternate Off-Peak Operational Day 2014 / 2015

Municipal Waste Origin	Annual predicted input tonnage	Vehicle payload (tonne per vehicle)	Total annual vehicle demand	Average daily vehicle demand
DIRECT DELIVERY				
Wyre Forest	29,183	8	3,648	15
Worcester City	-	-	-	-
40% Wychavon	12,877	5	2,575	10
10% Malvern Hills	1,550	6	258	1
25% Bromsgrove	5,731	6	955	4
Sub-Total				30
BULK HAULAGE				
30% Hereford (via Leom)	12,713	17	748	3
70% Hereford (via Rother)	29,663	17	1,745	7
60% Wychavon (via H&M)	19,316	17	1,136	5
10% Malvern (via Leom)	1,550	17	91	-
80% Malvern (via H&M)	12,398	17	729	3
75% Bromsgrove	17,194	16	1,075	4
Redditch	18,826	16	1,177	5
Sub-Total				27
COUNTY HWS	18,275	8	2,284	9
TOTAL				66

(Arrival movements)

- 4.2.11 In addition to the above predicted municipal waste inputs, the EnviRecover incineration process requires the import of Air Pollution Control (APC) materials to assist in the management of plant emissions. Assuming maximum operation of the plant at 200,000tpa input capacity, it is estimated that of the order of 3,600tpa of APC material input would be required. Based on a typical bulk APC vehicle payload of 20t, such APC related input demand would be of the order of 1 vehicle load per day.
- 4.2.12 The above review identifies that for a peak operational day, of the order of 60% of input waste / APC materials to the Mercia EnviRecover facility would be delivered via bulk haulage, with the remainder via kerbside RCV units (direct delivery) or transfer HGV or Ro-Ro vehicle (HWS waste). Given the larger payloads available via bulk haulage units, however, it is predicted that such waste input would only relate to approximately only one third of all peak day waste & APC input movements would be via large articulated HGV (or less than 30 vehicles per day).

Export Material HGV Traffic Demand

- 4.2.13 The incineration process at the EnviRecover plant would generate a range of waste products, that would require export from the site for final treatment / disposal. The nature of these waste outputs is as follows:
- Incinerator Bottom Ash (IBA) & Metals: 43,200 tpa*
 - APC & fly ash materials: 8,000 tpa.

(In order to ensure a robust appraisal of transport impact, this TA includes for an over-estimate of the modelling of expected IBA & Metals output levels. Ultimately such output levels would be dependent upon the nature of waste input materials received at the plant).

- 4.2.14 Such process waste materials would typically be exported from the EnviRecover plant using bulk haulage articulated HGV units, with a payload of the order of 20t.

- 4.2.15 On the basis of the 'worst case' modelling scenario of an effective 250 day export window and the identified 20t vehicle payload, average daily export traffic movements associated with export material demand for maximum site operation of 200,000tpa can be expected to be as follows (see also **Appendix H** to this report):

Municipal Waste Origin	Annual predicted input tonnage	Vehicle payload (tonne per vehicle)	Total annual vehicle demand	Average daily vehicle demand
EXPORT				
Bottom Ash & Metals	43,200	20	2,160	9
APC export material	8,000	20	400	2
TOTAL	51,200		2,560	11

Total Operational HGV Demand

- 4.2.16 On the basis that no 'backloading' would be undertaken at the EnviRecover facility (i.e. HGV vehicles would operate full in one direction only, i.e. arriving full and leaving empty or vice versa), the Mercia EnviRecover site can be anticipated to generate the following typical daily operational HGV demand at 2014 / 2015 year of opening (for both 'peak' operational day and alternate 'off-peak' operational day):

Peak Operational Day 2014 / 2015

Vehicle Demand	Arrival	Departure	Total 2-way
INPUT			
Direct Delivery (RCV)	62	62	124
Bulk Haulage (HGV)	27	27	54
HWRC (Transfer)	9	9	18
APC material (HGV)	1	1	2
Sub-Total	99	99	198
EXPORT			
Bottom Ash & Metals	9	9	18
APC Residues	1	1	2
Sub-Total	10	10	20
TOTAL	109	109	218

(Vehicles per day)

Alternate 'Off-Peak' Operational Day 2014 / 2015

Vehicle Demand	Arrival	Departure	Total 2-way
INPUT			
Direct Delivery (RCV)	30	30	60
Bulk Haulage (HGV)	27	27	54
HWRC (Transfer / Ro-Ro)	9	9	18
APC material (HGV)	1	1	2
Sub-Total	67	67	134
EXPORT			
Bottom Ash & Metals	9	9	18
APC Residues	1	1	2
Sub-Total	10	10	20
TOTAL	77	77	154

(Vehicles per day)

- 4.2.17 Review of the above table demonstrates that for peak operational days (i.e. when Worcester City direct delivery movements are taking place) worst case operational HGV demand to / from the Mercia EnviRecover facility could be of the order of 218 operational HGV movements per day (in + out). Of this predicted total demand, some 78 vehicles, or 36% could be expected to be large bulk articulated HGVs, with the remainder being kerbside RCVs or transfer vehicles from County HWS sites.
- 4.2.18 Review of predicted off-peak total operational HGV movements suggests a substantially reduced level of overall demand, with just 154 HGV movements (in+out) predicted for such days, (78 being larger bulk HGV units).

Predicted operational HGV daily demand profile

- 4.2.19 Typically municipal waste treatment plants do not experience substantive levels of operational HGV demand during the traditional weekday AM & PM rush hour periods (08:00-09:00 & 17:00-18:00) - reflecting standard waste collection patterns operated by waste authorities. In general, delivery demand is spread across the weekday day-time period (08:00-16:00), reflecting the operational patterns for each of the main input / export categories:

- *Direct Delivery:* RCV deliveries to processing facilities generally follow completion of a street collection round (i.e. when the RCV unit is approaching its payload capacity). Many RCV vehicles undertake 2 rounds per day. Morning rounds begin at 06:00-07:00, with the RCV reaching carrying capacity post 09:00. Most afternoon collection rounds are completed by 15:00-16:00.
- *Bulk Haulage:* bulk HGV deliveries to the site take place from district Waste Transfer Stations, where kerbside collected waste is bulked and loaded into the bulk carrier. Typically such bulk haulage takes place following delivery of the district waste to the local WTS and therefore primary bulk haulage demand takes place during weekday daytime hours.
- *Ash export / IPC export:* such materials are delivered / exported across the full weekday delivery window and would likely be operated by a dedicated bulk vehicle fleet - operating a continuous day time delivery cycle. Typically traditional rush hour periods are avoided, where possible, to ensure the most efficient delivery times and to avoid periods of network congestion.

4.2.20 In order to provide an indication of the nature of the vehicle operational demand profile anticipated to be experienced at the EnviRecover facility, **Figures 14 & 15** to this report demonstrate the input / export HGV demand profile associated with existing deliveries to the MWM landfill facility at Hill & Moor, Evesham (taken from weighbridge records). The Hill & Moor landfill facility currently accepts the majority of the residual municipal waste generated within the Counties of Herefordshire & Worcestershire - which in future would transfer to the EnviRecover facility at Hartlebury. The Hill & Moor site accepts both direct delivery waste from the local district authorities of Wychavon, Worcester City and Malvern Hills as well as bulk deliveries from more distant authorities. It is therefore considered that review of the vehicle

demand profile experienced at the Hill & Moor site provides a good comparison to the likely future operation of the Hartlebury site.

4.2.21 Review of the demand profiles identified from the Hill & Moor weighbridge records demonstrates the following:

- *Direct Demand:* vehicle arrival demand illustrates two main peak periods, a morning peak of 10:00-12:00 and a second mid-afternoon peak of 14:00-16:00. Peak hourly arrival demand takes place between 15:00-16:00 when almost a quarter of all direct delivery arrivals were recorded.
- *Bulk HGV Demand:* vehicle arrival demand illustrates an early delivery peak during the period 08:00-10:00, when a total of up to 40% of bulk arrivals take place. A secondary peak takes place for the period 14:00-16:00 – also of the order of 38-40% of total daily demand.

4.2.22 Ash export from the site is anticipated to be undertaken on a continuous export cycle using a small fleet of bulk transfer vehicles. For the purposes of this assessment, it is assumed that this transfer cycle would generate 2 export vehicle movements per hour (1 in + 1 out) to / from the EnviRecover site during the delivery period (07:00-19:00).

4.2.23 Application of the predicted total daily vehicle demand to the relevant hourly demand profiles identified above is set out in **Appendix I** to this report - for both opening year 2014 / 2015 and future year 2024 / 2025 'peak' operational demand conditions. Two-way 2014 / 2015 opening year demand is also summarised in the table below (for peak operational day and 'off-peak' demand day):

2014 / 2015 Peak Operational Day Demand (Off-Peak Demand)

Time (Hour Start)	Direct Delivery	Bulk Delivery	Ash + Other Exports	Total
07:00	0 (0)	0 (0)	2 (2)	2 (0)
08:00	2 (2)	10 (10)	2 (2)	14 (14)
09:00	6 (2)	10 (10)	2 (2)	17 (12)
10:00	16 (9)	2 (2)	2 (2)	20 (13)
11:00	28 (16)	4 (4)	2 (2)	34 (22)
12:00	14 (7)	6 (6)	2 (2)	22 (15)
13:00	12 (6)	4 (4)	2 (2)	18 (12)
14:00	18 (10)	8 (8)	2 (2)	28 (20)
15:00	36 (20)	8 (8)	2 (2)	46 (30)
16:00	8 (5)	2 (2)	2 (2)	11 (9)
17:00	0 (0)	0 (0)	2 (2)	2 (2)
18:00	0 (0)	0 (0)	2 (2)	2 (2)
TOTAL	142 (78)	54 (54)	24 (24)	220 (156)

Vehicle trips: in + out

4.3 Predicted staff / visitor travel demand

EnviRecover Staff Demand

4.3.1 As set out in section 3.5 to this report, the EnviRecover plant is anticipated to employ a total of 30 staff members. Given the 24 hour nature of facility operation, it is anticipated that the site would be operated on a shift system, with a maximum of 18 staff members typically on duty during day time periods. In addition to this base operational staff demand, a further 12 MWM office staff are also anticipated to be based at the site (see paragraph 4.3.3 to this report).

4.3.2 Given the site's relatively remote location and the nature of the shift system likely to be introduced, it is anticipated that the majority of staff would seek to access the site via the private car. To ensure a robust demand assessment, for this analysis each staff travel movement has therefore been modelled as a separate private car trip (i.e. taking no account of car sharing opportunities or the use of public transport / walking / cycling). Predicted travel to work related staff movements for operational staff at the EnviRecover plant are therefore as illustrated below (see also **Appendix J** to this report):

Time (Hour Begin)	Arrivals	Departures
06:00		3
07:00	1	
08:00	15	
09:00		
10:00		
11:00		
12:00		
13:00	3	
14:00		3
15:00		
16:00		
17:00		16
18:00		
07:00-19:00	19	19
06:00-19:00	19	22

Shift change
Weighbridge op
Day Staff

Shift change

Day Staff + Weighbridge op

MWM Office Relocation

4.3.3 As identified in section 3.5 to this report, it is proposed that as part of the EnviRecover proposals, the site operator, MWM, is likely to transfer some office based staff to new offices within the scheme. It is proposed that up to 12 MWM office staff could be based at the Hartlebury site in future. For the purposes of this report all staff have been modelled as operating a 9-5 shift pattern and would travel to the site as individual car drivers. Such an approach ensures the modelling of a 'worst case' local traffic demand case. (see **Appendix J** to this report).

Visitor / 'Ad-hoc' staff movements

4.3.4 As noted in section 3.3 to this report, the Mercia EnviRecover facility would include for a visitor centre for education related visits. In addition, it can be expected that the site would also generate some additional technical / professional visitor movements. At this preliminary stage it is difficult to accurately predict the frequency of visitor events, however, it is anticipated that the majority of such demand would relate to accompanied school trips – accessing the site via minibus / coach.

4.3.5 In order to ensure a robust traffic demand assessment associated with visitor travel and other staff movements unrelated to 'journey to work' movements, it has been proposed to model an additional three vehicle arrival / vehicle departure movements per hour for the weekday hours of 09:00-17:00 for the EnviRecover facility and an additional vehicle movement per hour for the relocated MWM offices.

4.3.6 Total staff and visitor traffic demand modelled for the weekday daytime period (07:00-19:00) is therefore as follows:

Time (Hour Start)	Arrivals	Departures	Total (2-way)
07:00	1	0	1
08:00	30	3	33
09:00	4	4	8
10:00	4	4	8
11:00	4	4	8
12:00	4	4	8
13:00	7	4	11
14:00	4	7	11
15:00	4	4	8
16:00	4	4	8
17:00	3	31	34
18:00	0	0	0
TOTAL	69	69	138

(Car trips)

4.3.7 Review of the above table demonstrates a maximum car trip demand associated with the Mercia EnviRecover scheme of the order of 140 vehicles (in+out) across the weekday day-time period 07:00-19:00. Maximum hourly demand is anticipated to take place for the hour 17:00 – 18:00, when of the order of 34 vehicle trips are predicted (in+out).

4.4 Predicted total EnviRecover traffic demand

4.4.1 Summation of the above staff / visitor car trip demand levels to the predicted operational HGV traffic levels set out in Section 4.1 to this report, identifies the following overall levels of vehicular demand to the EnviRecover site for the 2014 / 2015 opening year (also summarised in **Figures 16 & 17** to this report). Total vehicle demand estimates for the 2024 / 2025 future year are illustrated in **Appendix K**.

2014 / 2015 Peak Operational Day Demand (Off-Peak Demand)

Time (Hour Start)	Car / LGV Trip Demand	OGV1 Demand	OGV 2 Demand	Total Vehicles
07:00	1 (1)	0 (0)	2 (2)	3 (3)
08:00	33 (33)	3 (1)	12 (12)	48 (47)
09:00	8 (8)	4 (2)	12 (12)	24 (22)
10:00	8 (8)	16 (9)	5 (5)	29 (22)
11:00	8 (8)	29 (16)	5 (5)	42 (29)
12:00	8 (8)	14 (8)	8 (8)	30 (23)
13:00	11 (11)	13 (7)	7 (7)	31 (25)
14:00	11 (11)	18 (18)	9 (9)	38 (30)
15:00	8 (8)	36 (20)	10 (10)	54 (38)
16:00	8 (8)	8 (5)	4 (4)	20 (16)
17:00	34 (34)	1 (0)	2 (2)	37 (36)
18:00	0 (0)	0 (0)	2 (2)	2 (2)
TOTAL	138 (138)	142 (78)	77 (77)	357 (293)

Vehicle trips: in + out

4.4.2 Review of this information demonstrates that maximum vehicular demand to / from the EnviRecover site is proposed to take place for the hour 15:00-16:00 - when a total of 54 vehicle movements (in + out) per hour could be expected to be generated by the site on a peak operational day. Such demand levels represent less than 1 development vehicle movement per minute.

4.5 Consideration of 'net' traffic impact

4.5.1 The likely 'net' operational traffic impact of the development of the Oak Drive site under the EnviRecover scheme is effectively the difference between the predicted total 'new' trip demand anticipated to be generated by the proposals (i.e. as set out in sections 4.4) and the traffic demand levels

associated with the operation of the site under extant B2 industrial / B8 commercial land use permissions (see section 2.2 to this report).

4.5.2 The tables below illustrate the difference in traffic generation levels between the extant B2 / B8 site land uses and predicted total combined traffic demand associated with the EnviRecover proposals (2014 peak operational day). In order to ensure a robust appraisal, predicted traffic demand associated with the EnviRecover scheme has been compared against estimates for the permitted B2 / B8 land uses calculated using average trip rates from TRICS (as set out in Section 2.2 to this report).

2014 peak day EnviRecover demand v use of Oak Drive for 12,876sqm B2 land use (all vehicles)

Trip Rates (per 100sqm GFA)	Arrivals	Departures	Total
Weekday			
AM Peak (08:00-09:00)	37 / 59 / -22	11 / 22 / -11	48 / 82 / -34
Weekday Pk (11:00-12:00)	21 / 31 / -10	21 / 39 / -18	42 / 70 / -28
Weekday Pk (15:00-16:00)	27 / 31 / -4	27 / 32 / -5	27 / 83 / -36
PM Peak (17:00-18:00)	4 / 15 / -11	32 / 41 / -9	36 / 50 / -20
12hr (07:00-19:00)	178 / 354 / -176	178 / 375 / -197	357 / 730 / -373

EnviRecover scheme / B2 Extant Development / Difference

2014 peak day EnviRecover demand v use of Oak Drive for 12,876sqm B8 land use (all vehicles)

Trip Rates (per 100sqm GFA)	Arrivals	Departures	Total
Weekday			
AM Peak (08:00-09:00)	37 / 37 / 0	11 / 14 / -3	48 / 52 / -4
Weekday Pk (11:00-12:00)	21 / 19 / +2	21 / 15 / +6	42 / 34 / +8
Weekday Pk (15:00-16:00)	27 / 15 / +12	27 / 22 / +5	27 / 37 / +10
PM Peak (17:00-18:00)	4 / 9 / 15	32 / 30 / +2	36 / 39 / -3
12hr (07:00-19:00)	178 / 247 / -69	178 / 258 / -80	357 / 505 / -149

EnviRecover scheme / B8 Extant Development / Difference

4.5.3 The tables above (and additional hourly analysis included in **Appendix C** to this TA) demonstrate that the anticipated overall 'net' traffic impact of the EnviRecover scheme during weekday daytime periods would be a reduction in total vehicle volumes when compared to development of the Oak Drive site for the permitted B2 / B8 scheme. Across the course of the core 12hr (07:00-19:00) delivery period identified for the EnviRecover facility, total traffic

demand associated with the EnviRecover proposal scheme could be between 150-375 vehicle movements per day less than current permitted development on the site.

4.5.4 It is accepted, however, that a substantive proportion of EnviRecover development trip movements would relate to operational HGV movements (either delivering waste or exporting ash). The tables below therefore compare predicted HGV demand levels associated with the EnviRecover scheme to those HGV demand totals anticipated to be generated by permitted B2 / B8 land uses.

2014 peak day EnviRecover demand v use of Oak Drive for 12,876sqm B2 land use (HGVs)

Trip Rates (per 100sqm GFA)	Arrivals	Departures	Total
Weekday			
AM Peak (08:00-09:00)	7 / 4 / +3	8 / 5 / +3	15 / 9 / +6
Weekday Pk (11:00-12:00)	17 / 5 / +12	17 / 4 / +13	34 / 9 / +25
Weekday Pk (15:00-16:00)	23 / 8 / +15	23 / 4 / +19	46 / 12 / +34
PM Peak (17:00-18:00)	1 / 4 / -3	1 / 2 / -1	2 / 6 / -4
12hr (07:00-19:00)	109 / 44 / +65	109 / 44 / +65	218 / 88 / +130

EnviRecover scheme / B2 Extant Development / Difference

2014 peak day EnviRecover demand v use of Oak Drive for 12,876sqm B8 land use (HGVs)

Trip Rates (per 100sqm GFA)	Arrivals	Departures	Total
Weekday			
AM Peak (08:00-09:00)	7 / 7 / 0	8 / 5 / +3	15 / 12 / +3
Weekday Pk (11:00-12:00)	17 / 9 / +9	17 / 5 / +12	34 / 13 / +21
Weekday Pk (15:00-16:00)	23 / 6 / +17	23 / 5 / + 18	46 / 11 / +35
PM Peak (17:00-18:00)	1 / 4 / -3	1 / 3 / -2	2 / 8 / -6
12hr (07:00-19:00)	109 / 73 / +36	109 / 63 / +46	218 / 136 / +82

EnviRecover scheme / B2 Extant Development / Difference

4.5.5 Review of the HGV comparison exercise demonstrates that anticipated HGV traffic levels for the EnviRecover scheme during weekday periods are anticipated to be of the order of two-thirds to double that associated with the permitted B2 / B8 land uses over the core 12hr day-time period 07:00-19:00. During the traditional AM & PM 'rush hour' periods, however, delivery of the EnviRecover scheme could actually result in a small net reduction in HGV trips when compared to the current permitted land use

operation (compared to B8 land use). Furthermore, it must also be born in mind that the current B2 / B8 permission provides no restrictions on larger vehicle movements outside of the core day-time period, with the potential for additional vehicles during evening or night times. No such evening / night time movements are proposed to serve the EnviRecover site.

4.5.6 Given the above review it can be concluded that the development of the Oak Drive site for the EnviRecover proposal scheme is unlikely to result in a material worsening in network traffic demand, when compared to the permitted major B2 / B8 scheme. Indeed, the EnviRecover scheme is anticipated to generate fewer overall traffic movements across the day and the potential for reduced HGV demand during traditional network AM & PM peak periods. The EnviRecover scheme could generate an increased level of HGV movements when compared to the B2 / B8 permitted use, however, such EnviRecover HGV movements would generally be restricted to core day-time periods, whereas the permitted B2/B8 scheme allows for unrestricted HGV access and therefore could result in additional evening / night time movements. It is therefore concluded that any 'net' impact associated with traffic operations for the EnviRecover facility is likely to be marginal when compared to accepted traffic effects associated with the permitted B2 / B8 scheme.

4.5.7 Notwithstanding the above broad conclusions regarding the 'net' traffic impact of the EnviRecover re-development proposals, in order to provide a comprehensive appraisal of local network impact, this TA report has considered site specific operational capacity assessments including for the full future operation of the EnviRecover proposals (i.e. all predicted development traffic being added 'extra over' to observed 2010 background traffic volumes). This ensures in a 'worst case' assessment of EnviRecover impact as it effectively considers all development traffic movements as 'new' to the network and therefore takes no account of the level of permitted traffic demand already associated with the Oak Drive site.

4.6 Local assignment of development traffic demand

Operational HGV assignment

4.6.1 As noted in section 3.6 to this report, operational HGV trip movements to / from the EnviRecover site would be subject to a routing strategy and enforced, where practical, via satellite vehicle tracking and a driver code of practice.

4.6.2 The proposed vehicle routing strategy for operation of the Mercia EnviRecover facility identifies the following route assignment (see also **Appendix L** to this report):

WASTE INPUT:

Direct Delivery

- Wyre Forest: 75% via A449 (N)
25% via A4025 / A449 (S)
- Worcester City: All via A449 (S)
- 40% of Wychavon: 50% via A442 / A450 / A449 (N)
50% via A4133 / A449 (S)
- 10% of Malvern Hills: All via A4025 / A449 (S)
- 25% of Bromsgrove: All via A448 / A450 / A449 (N)

Bulk Haulage

- 30% Herefordshire (via Leominster WTS): All via A449 (S)
- 70% Herefordshire (via Rotherwas WTS): All via A449 (S)
- 60% Wychavon (via Hill & Moor WTS): All via A449 (S)
- 10% Malvern (via Leominster WTS): All via A449 (S)
- 80% Malvern (via Hill & Moor WTS): All via A449 (S)
- 75% Bromsgrove (via WTS): All via A449 (S)
- All Redditch (via WTS): All via A449 (S)
- APC Input: All via A449 (S)

Other Inputs

- County HWS: 70% via A449 (S)
30% via A449 (N)

MATERIALS EXPORT:

Bulk Export:

- Bottom Ash & Metals: All via A449 (S)
- APC Output: All via A449 (S)

(A449 (N) – South of Crown Lane / A449 (N) = North of Crown Lane)

4.6.3 Based on the predicted operational HGV volumes predicted for the site opening year of 2014 / 2015, the above route assignment predicts the following daily turning movements on the A449 on key approaches to the Crown Lane roundabout (see also **Appendix L**):

	HGV Numbers		Percentage	
<i>Direct Delivery Input:</i>				
• A449 (N)	40	(40)	33%	(67%)
• A449 (S)	82	(20)	67%	(33%)
<i>Bulk Haulage Input:</i>				
• A449 (N)	0	(0)	0%	(0%)
• A449 (S)	54	(54)	100%	(100%)
<i>Other Input (HWS & APC In):</i>				
• A449 (N)	6	(6)	27%	(27%)
• A449 (S)	16	(16)	73%	(73%)
<i>Materials Export:</i>				
• A449 (N)	0	(0)	0%	(0%)
• A449 (S)	22	(22)	100%	(100%)
Total Operational HGV:				
• A449 (N)	46	(46)	21%	(29%)
• A449 (S)	174	(112)	79%	(71%)

2014 / 2015 Peak Operational Day (Off-Peak Operational Day)

4.6.4 Details of the calculation of the wider local network assignment of operational HGV traffic are also illustrated in **Appendix M** to this report, with predicted hourly traffic demand levels on key route corridors illustrated in **Figures 18(a-e) - 19(a-e)**. Review of this demand information illustrates the following daily (07:00-19:00) route impact for the EnviRecover facility at opening year 2014 / 2015.

2014 / 2015 Peak Operational Day Demand (Off-Peak Demand)

Route Corridor	Direct Delivery OGV1	Bulk Haulage OGV 2	Total
A449 to Kidderminster	24 (24)	0 (0)	24 (24)
A450 / A448 to Bromsgrove	8 (8)	0 (0)	8 (8)
A442 to Droitwich	14 (14)	0 (0)	14 (14)
A4052 to Stourport	12 (12)	0 (0)	12 (12)
A4133 to Droitwich	10 (10)	0 (0)	10 (10)
A449 South of Ombersley	74 (10)	78 (78)	152 (88)
TOTAL	142 (78)	78 (78)	220 (156)

HGV vehicles In + Out

4.6.5 Review of this operational assignment information suggests that maximum impact would take place on the A449 (S) corridor – reflecting the passage of bulk transport vehicles towards M5 J6 and direct delivery vehicles to Worcester City. Other local route corridors are not anticipated to experience EnviRecover operational HGV demand levels of in excess of 25 vehicles per day.

Staff / Visitor Traffic Assignment

4.6.6 In order to ensure the most robust assessment of staff / visitor car traffic input at the key local junction of A449 / Crown Lane roundabout, all such vehicle movements have been assigned via this junction. Turning movements to / from Crown Lane have been calculated via observed turning proportions to / from the main A449 approach arms. In the case of the core 12 hour weekday study period of 07:00-19:00, this represents the following assignment:

	Car Numbers	Percentage
<i>Staff / Visitor Arrivals:</i>		
• A449 (N)	44	63%
• A449 (S)	25	37%
<i>Staff / Visitor Arrivals:</i>		
• A449 (N)	44	63%
• A449 (S)	25	37%

Local junction assignment

4.6.7 Predicted total development trip assignment at the local roundabout junction of A449 / Crown Lane is illustrated in **Figures 20-23(a-e)** to this report. These figures set out trip demand levels for key assessment hours for the following scenarios:

- 2014 / 2015 Opening Year Peak Operational Day;
- 2014 / 2015 Opening Year Alternate Off-Peak Operational Day;
- 2024 / 2025 Future Year Peak Operational Day;
- 2024 / 2025 Future Year Alternate Off-Peak Operational Day..

4.6.8 Similarly, predicted total development trip assignment at the local T-junction Crown Lane / Hartlebury Trading Estate spine road is illustrated in **Figures 24-27(a-e)** to this report.

5.0 KEY ASSESSMENT PARAMETERS

5.1 Assessment time periods

5.1.1 In order to provide a robust assessment of the anticipated operational traffic impact of the proposed EnviRecover development, this Transport Assessment seeks to assess the time periods of maximum potential traffic impact of the development proposals and those time periods when underlying background traffic demand on the local network would also be substantive. On this basis the following time periods have been considered for inclusion in detailed impact assessment:

- Weekday: 08:00-09:00
- Weekday: 11:00-12:00
- Weekday: 15:00-16:00
- Weekday: 17:00-18:00
- Weekday: 12 hour period 07:00-19:00.

5.2 Future year traffic growth assumptions

5.2.1 It is anticipated that the initial 'opening year' of the EnviRecover proposal site would be 2014 / 2015 to allow for the undertaking of all site preparation / construction tasks and the commissioning and installation of the incinerator technology. For the purposes of this assessment a 2014 opening year data has been utilised for core traffic demand assessments.

5.2.2 In order to ensure a suitable assessment of development impact, operational assessments have been carried out for a 'future year' of 2024, effectively 10 years post the proposed opening date of the facility. The consideration of future year conditions reflects good practice guidelines set out in DfT document "Guidance on Transport Assessment", with a 14 year design horizon from date of submission of the planning application ensuring an extremely robust modelling approach.

5.2.3 2014 / 2024 background traffic demand flows have been estimated via application of NRTF(97) central growth estimates for all base traffic movements, which have subsequently been adjusted to reflect local traffic trends (Hereford & Worcestershire) utilising the TEMPRO national trip end model. The full calculation methodology of the adjusted NRTF factors are included as **Appendix M** to this report.

	2010-2014	2010-2029
Weekday AM Peak	1.049	1.164
Weekday Inter Peak	1.052	1.198
Weekday PM Peak	1.052	1.183
Average Weekday	1.051	1.182

5.2.4 Predicted 2014 background traffic flows at the A449 / Crown Lane roundabout and Crown Lane / Trading Estate junction are illustrated in **Figures 29 & 29(a-e)**, with 2024 future year background demand illustrated in **Figures 30 & 31(a-e)**.

5.3 **Other local development**

5.3.1 Formal scoping discussions with WCC highways have not identified any substantive ‘committed’ local development schemes that would need to be specifically included within network capacity assessments to support the Mercia EnviRecover proposals. Officers did note, however, that an emerging small residential + community facility scheme was currently being considered for land adjacent to Waresley Park, near to the key A449 / Crown Lane roundabout.

5.3.2 At the time of preparation of this report, it is understood that this local development scheme only represents an initial proposal and therefore enjoys no formal planning designation. Notwithstanding this, as the proposal is identified in the South Worcestershire Joint Core Strategy Group, Strategic Housing Land Availability Assessment, inclusion of this emerging

development proposal within the capacity assessments, it was agreed with WCC officers that illustrative traffic movements associated with a development scheme at this location should be included within future network modelling to ensure the most robust appraisal of local capacity conditions.

5.3.3 For the purposes of the EnviRecover assessments, future illustrative trip demand to / from the Waresley Park scheme area have been estimated on the basis of a maximum 100 residential dwellings and an associated community facility.

5.3.4 Predicted average trip demand to / from these facilities has been estimated via reference to the TRICS database and is illustrated in **Appendix N** to this report and summarised below for the key assessment periods identified in Section 5.1. All vehicle movements have been modelled as car / LGV trips.

Time (Hour Start)	Arrivals	Departures	Total
08:00 - 09:00	25	46	71
11:00 – 12:00	29	29	58
15:00 – 16:00	39	33	72
17:00 – 18:00	45	30	75
12 hour 07:00 – 19:00	361	370	731

(Car / LGV movements)

5.3.5 For the purpose of this assessment, all trips associated with the proposed Waresley Park site are predicted to access the local network via Crown Lane and on-ward connections to the A449 at the Crown Lane / A449 roundabout. Turning movements at the roundabout junction have been assigned via observed car turning proportions between Crown Lane (E) and the A449 approach / exit arms. This local assignment is illustrated in **Figure 32**.

5.3.6 **Figures 33(a-e) & Figures 34(a-e)** to this report demonstrate the combined background + committed development traffic demand at the A449 / Crown Lane roundabout for 2014 opening year and 2024 future year respectively – such estimates are henceforth referred to within this report as ‘Baseline’ traffic flows.

5.4 **Baseline + development traffic demand**

5.4.1 Baseline + development traffic flows have been calculated by the summation of the predicted development traffic flows to the baseline traffic volumes described above. The following scenarios have been considered in this report for the time periods set out in section 5.1 to this report:

- 2014 Baseline + EnviRecover Peak Day: **Figures 35 & 36(a-e)**
- 2014 Baseline + EnviRecover Off Peak Day: **Figures 37 & 38(a-e)**
- 2024 Baseline + EnviRecover Peak Day: **Figures 39 & 40(a-e)**
- 2024 Baseline + EnviRecover Off Peak Day: **Figures 41 & 42(a-e)**

6.0 **ASSESSMENT OF ANTICIPATED DEVELOPMENT TRAFFIC IMPACT**

6.1 **Introduction**

6.1.1 This section of the report considers the assessment of the operation of the immediate local highway network to the proposed EnviRecover site and the ability of this network to accommodate the additional traffic flow movements predicted in Section 4. The extent of operational impact assessment included within this section reflects the scope of work requested by WCC officers during formal scoping discussions and includes:

- Link / flow impact for the immediate local routes of Crown Lane and the A449 north and south of the Crown Lane roundabout;
- Junction operational capacity assessments for A449 / Crown Lane roundabout and the Crown Lane / Trading Estate access Spine Road.

6.1.2 The percentage link impact analysis and the junction capacity assessments have been carried out for the development opening year of 2014 and future year horizon of 2024 (where appropriate). Traffic flows for these assessments have been estimated through reference to locally adjusted NRTF central growth factors as outlined in Section 5 to this report.

6.2 **Link flow impact assessment**

6.2.1 Link / flow operational assessments have been carried out for key sections of the main identified vehicle routing corridor to serve the proposed EnviRecover site. In particular assessments have been carried out for:

- A449 North of Crown Lane Roundabout;
- A449 South of Crown Lane Roundabout;
- Crown Lane East of A449 Roundabout.

6.2.2 It is considered that these sections of route network would experience the maximum link demand associated with the development scheme - given that they would effectively accommodate all operational HGV movements to / from the EnviRecover facility site and the vast majority of staff vehicle movements. Should link impact levels on these immediate sections of route prove to lie within acceptable thresholds, it can reasonably be concluded that development traffic at more remote network locations would also be within suitable thresholds

6.2.3 Reference to Institution of Highways and Transportation (IHT) 'Guidelines for Traffic Impact Assessment' suggests that more detailed analysis of highway impact and / or capacity improvements is only likely to be required where 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.

6.2.4 It is noted, however, that this traditional assessment approach has been reviewed and updated in March 2007 DfT "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.”

6.2.5 Notwithstanding this recent DfT advice, in the case of the immediate local highway network to the Hartlebury Trading Estate site which operates with substantial spare capacity and no real evidence of network congestion, it is considered that the traditional 5-10% thresholds still represent a reasonable initial ‘contextual guide’ as to the level / extent of development traffic operational impact on immediate local routes.

6.2.6 The tables below demonstrate predicted changes in 2014 baseline two-way link flows (all vehicles) on the immediate sections of Crown Lane and the A449 dual carriageway corridors in the vicinity of the Crown Lane roundabout following development of the proposed EnviRecover facility (see also **Figures 43(a-e) & 44(a-e)** to this report)

A449 North of Crown Lane

	2014 Opening Year Peak Day Operational Demand			2014 Opening Year Off - Peak Day Operational Demand		
	Devel Trips	Baseline flows	%age Increase	Devel. trips	Baseline flows	%age Increase
(08:00-09:00)	20	2233	0.9%	20	2233	0.9%
(11:00-12:00)	14	1036	1.3%	14	1036	1.3%
(15:00-16:00)	17	1518	1.1%	17	1518	1.1%
(17:00-18:00)	22	1984	1.1%	22	1984	1.1%
Weekday 12 hour (07:00-19:00)	133	17884	0.7%	133	17884	0.7%

2 way flow totals (Total vehicles)

A449 South of Crown Lane

	2014 Opening Year Peak Day Operational Demand			2014 Opening Year Off - Peak Day Operational Demand		
	Devel Trips	Baseline flows	%age Increase	Devel. trips	Baseline flows	%age Increase
(08:00-09:00)	28	2180	1.3%	27	2180	1.2%
(11:00-12:00)	28	1019	2.7%	15	1019	1.5%
(15:00-16:00)	37	1374	2.7%	21	1374	1.5%
(17:00-18:00)	15	1869	0.8%	15	1869	0.8%
Weekday 12 hour (07:00-19:00)	224	16893	1.3%	160	16893	0.9%

2 way flow totals (Total vehicles)

Crown Lane (east of A449 roundabout)

	2014 Opening Year Peak Day Operational Demand			2014 Opening Year Off - Peak Day Operational Demand		
	Devel Trips	Baseline flows	%age Increase	Devel. trips	Baseline flows	%age Increase
(08:00-09:00)	48	533	9.0%	47	533	8.8%
(11:00-12:00)	42	271	15.3%	29	271	10.6%
(15:00-16:00)	54	459	11.7%	38	459	8.2%
(17:00-18:00)	37	545	6.7%	36	545	6.7%
Weekday 12 hour (07:00-19:00)	357	4721	7.6%	293	4721	6.2%

2 way flow totals (Total vehicles)

6.2.7 Review of the above tables demonstrates that even assuming for worst case peak operational day conditions, the EnviRecover facility is not predicted to generate an increase in total traffic demand on immediate sections of the A449 in excess of 3% of predicted baseline traffic demand. Such levels of traffic are not anticipated to result in any material impact on the operation of this strategic County road route. Indeed, over the course of the main 12hr delivery window, overall 2-way link impact would be less than 1.5% of baseline traffic levels.

6.2.8 Higher levels of percentage change are predicted for the immediate section of Crown Lane on the approach to the proposal site junction. Such levels are more a reflection of the existing low levels of trip demand on this route, rather than any over-capacity issues. Even including for maximum predicted development traffic levels, future year Baseline + Development traffic volumes (less than 600 vehicles per hour two-way) are predicted to be well

below link capacity thresholds for a local distributor road of this nature (link capacity for such a route being in excess of 2000 vehicles per hour).

6.3 Junction capacity assessments

6.3.1 Junction capacity assessments have been undertaken for the following locations on the immediate local highway network to the EnviRecover proposal site:

- Crown Lane / Trading Estate Junction (T-junction);
- Crown Lane / A449 (4-arm roundabout).

6.3.2 Capacity assessments for the two junctions have been undertaken using DfT software programs PICADY & ARCADY, which model priority junction and roundabout layout capacity respectively. Within the model input, traffic flows are split into 15-minute time segments. The results generated in the models indicate the peak Ratio of Flow to Capacity (RFC) in a time period and the anticipated traffic queues. RFC values between 0.00 and 0.85 are generally considered to represent stable and acceptable operating conditions. Values between 0.85 and unity (1.0) represent variable operation (i.e. possible queues building up at the junction during the period under consideration and increases in vehicular delay moving through the junction). RFC values in excess of unity represent overloaded conditions (i.e. congested conditions).

Crown Lane / Hartlebury Trading Estate Spine Road Junction

6.3.3 PICADY assessments of junction capacity have been undertaken for relevant 2024 future design year baseline + EnviRecover scenario's. The results of these capacity runs are summarised in the following table, with model outputs attached as **Appendix O** to this report.

2024 Baseline + EnviRecover Peak Operational Day

Approach movement:	Flow	Max RFC	Max Queue
(08:00-09:00)			
Side road exit arm (B-AC)	140	0.280	1
Crown Lane (E) to TE access (C-B)	43	0.072	-
(11:00-12:00)			
Side road exit arm (B-AC)	136	0.252	1
Crown Lane (E) to TE access (C-B)	25	0.025	-
(15:00-16:00)			
Side road exit arm (B-AC)	312	0.585	2
Crown Lane (E) to TE access (C-B)	22	0.012	-
(17:00-18:00)			
Side road exit arm (B-AC)	424	0.783	4
Crown Lane (E) to TE access (C-B)	34	0.021	-

2024 Baseline + EnviRecover Off-Peak Operational Day

Approach movement:	Flow	Max RFC	Max Queue
(08:00-09:00)			
Side road exit arm (B-AC)	139	0.278	1
Crown Lane (E) to TE access (C-B)	43	0.072	-
(11:00-12:00)			
Side road exit arm (B-AC)	125	0.230	1
Crown Lane (E) to TE access (C-B)	25	0.025	-
(15:00-16:00)			
Side road exit arm (B-AC)	299	0.559	2
Crown Lane (E) to TE access (C-B)	22	0.012	-
(17:00-18:00)			
Side road exit arm (B-AC)	423	0.781	4
Crown Lane (E) to TE access (C-B)	34	0.021	-

6.3.4 Review of the above results demonstrates that maximum RFC is predicted to occur during the weekday PM peak hour period of 17:00 – 18:00 for peak operational day development traffic demand and relates to exit movements from the Trading Estate Spine Road onto Crown Lane. Maximum RFC predicted during this period would be 0.781, with an associated queue of four vehicles. This level of junction operation and queuing is considered to reflect satisfactory conditions, with RFC's below the critical 0.85 threshold for improvement / further assessment.

6.3.5 It should be noted that the EnviRecover site is not anticipated to generate a substantive operational HGV demand during the PM peak hour and that any development traffic demand at this time would be more related to staff car

movements. Review of the junction capacity results during key operational HGV demand periods (11:00-12:00 and 15:00-16:00) illustrate that the junction is predicted to be operating with substantial levels of spare capacity, with maximum RFC of just 0.585 and maximum queuing levels of just 2 vehicles.

A449 / Crown Lane Roundabout

6.3.6 ARCADY assessments of junction capacity at the key A449 / Crown Lane roundabout have also been undertaken for the 2024 future design year Baseline + EnviRecover scenario. The results of these capacity runs are summarised in the following table, with model outputs attached as **Appendix O** to this report. NB - The ARCADY model includes for the effects of the free flow left turn lane between A449 (N) and Crown Lane, via the removal of this traffic movement from vehicle traffic modelled at the A449 (N) stopline. This is a standard modelling approach for free-flow left turn facilities at roundabout junctions.

2024 Baseline + EnviRecover Peak Operational Day

Approach movement:	Flow	Max RFC	Max Queue
(08:00-09:00)			
A449 (N)	1369	0.571	2
Crown Lane (E)	240	0.339	1
A449 (S)	981	0.529	2
Crown Lane (W)	146	0.203	1
(11:00-12:00)			
A449 (N)	575	0.229	1
Crown Lane (E)	192	0.160	1
A449 (S)	597	0.316	1
Crown Lane (W)	58	0.063	1
(15:00-16:00)			
A449 (N)	618	0.248	1
Crown Lane (E)	379	0.325	1
A449 (S)	897	0.499	1
Crown Lane (W)	120	0.167	1
(17:00-18:00)			
A449 (N)	748	0.298	1
Crown Lane (E)	475	0.436	1
A449 (S)	1200	0.684	3
Crown Lane (W)	120	0.223	1

2024 Baseline + EnviRecover Off-Peak Operational Day

Approach movement:	Flow	Max RFC	Max Queue
(08:00-09:00)			
A449 (N)	1369	0.571	2
Crown Lane (E)	239	0.338	1
A449 (S)	980	0.529	2
Crown Lane (W)	146	0.203	1
(11:00-12:00)			
A449 (N)	575	0.228	1
Crown Lane (E)	181	0.151	1
A449 (S)	597	0.310	1
Crown Lane (W)	58	0.063	1
(15:00-16:00)			
A449 (N)	618	0.247	1
Crown Lane (E)	379	0.313	1
A449 (S)	897	0.492	1
Crown Lane (W)	120	0.165	1
(17:00-18:00)			
A449 (N)	748	0.298	1
Crown Lane (E)	475	0.436	1
A449 (S)	1200	0.684	3
Crown Lane (W)	120	0.223	1

6.3.7 Review of the above results demonstrates that maximum RFC is predicted to occur during the weekday peak hour period of 17:00 – 18:00, relating to the A449 (S) approach. Maximum RFC predicted during this period would be just 0.684, with an associated queue of 3 vehicles. All other junction approach arms are predicted to operate with substantive spare capacity across all future year modelled time periods.

6.3.8 This level of junction operation and queuing is considered to reflect entirely satisfactory future year operating conditions, with RFC's well below the critical 0.85 threshold for improvement / further assessment - even for worst case future year traffic demand scenarios. It is therefore concluded that no junction improvements are required at this location to support the proposed EnviRecover scheme.

6.4 **Review of traffic related environmental impact**

6.4.1 The potential highways and transport related environmental impact of the operation of the EnviRecover proposal scheme has been assessed via reference to the methodology set out in the Institute of Environmental Assessment (IEA) document “Guidelines for the Environmental Assessment of Road Traffic”. The IEA guidelines have been prepared to inform the environmental assessment of road traffic associated with major new developments and are designed to assist in the assessment of off-site traffic impacts. Alternative guidelines and established procedures exist for the environmental assessment of new road / highway infrastructure (as set out in Design Manual for Roads and Bridges), however, such procedures are not directly relevant to the case of the EnviRecover scheme - which would not involve new off-site road construction.

6.4.2 IEA guidelines suggest the following general ‘rules of thumb’ when considering the initial appraisal or ‘screening’ of environmental impact and the identification of where more detailed analysis of specific environmental effects might be required:

“Rule 1: 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%)

Rule 2: Include any other specifically sensitive areas where traffic flows have increased by 10% or more”

6.4.3 With respect to Rule 1 (30% threshold), IEA guidance notes that traffic forecasting is not an exact science and that it is generally accepted that accuracies greater than 10% are not achievable. Day-to-day variation of traffic on a route corridor is frequently at least some + or – 10% of data recorded on a single survey date. The IEA guidelines therefore suggest that, at a basic level, projected changes in traffic of less than 10% would create no discernable environmental impact.

6.4.4 IEA guidance further notes that the most discernable environmental impacts of road traffic are considered to be noise / vibration, severance and pedestrian delay & intimidation. In terms of these potential impacts, IEA guidance states 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 (community disruption) and intimidation are much more sensitive to traffic flow and DfT suggest 30%, 60% and 90% changes in traffic levels should be considered as 'sight', 'moderate' and 'substantial' impacts respectively.

6.4.5 Other environmental impacts (e.g.: pollution, ecology, etc) are considered to be less sensitive to traffic flow changes, and IEA guidelines recommended that, as a starting point, a 30% change in traffic would represent a reasonable threshold for the need to undertake a more detailed assessment of environmental conditions. Where there are major changes in the composition of the traffic flow, say a much greater flow of HGVs, the IEA guidance identifies that a lower percentage change threshold might be appropriate and the assessor should use their professional judgement as to whether additional detailed assessment is required.

6.4.6 Guidance with respect to IEA Rule 2 (10% threshold) identifies that the assessor should consider the inclusion of any other locations or network links where a 10% change in traffic demand is predicted in specific environmentally 'sensitive' areas. Suggested locations highlighted in the IEA guidelines which could be considered to represent a 'sensitive' receptor include accident blackspot locations, conservation areas, hospitals, links with

high pedestrian flows, etc. IEA guidance notes that it would not normally be appropriate to consider links where traffic flows have changed by less than 10% unless there are significant changes in the composition of traffic, e.g.: a large increase in the number of heavy goods vehicles. Again the assessor is charged with utilising their professional judgement to determine whether further assessment is necessary in such cases.

Review of changes in overall traffic demand levels

- 6.4.7 As identified in section 6.2 to this report, analysis of daily link flow demand on the immediate sections of both Crown Lane and the main A449 has demonstrated that in general traffic terms, the development of the proposed Mercia EnviRecover scheme would not result in a substantive change in overall traffic volumes.
- 6.4.8 Overall increases in traffic flow on the main A449 route as a result of the EnviRecover proposals are predicted to be less than 3% of baseline flows (when measured over both the core 12hr period and for specific assessment hours). Such changes in flow demand are well below IEA Rule 1 & 2 screening thresholds and therefore, on preliminary review at least, this would suggest that the potential for general traffic related environmental impact on the immediate sections of the A449 corridor is likely to be slight. Further detailed review of HGV impact is set out in the paragraphs below.
- 6.4.9 Maximum future percentage change in overall local traffic volumes is predicted to occur on Crown Lane - of the order of 6-7% of baseline two way flow when measured across the core 12 hour weekday daytime period (07:00-19:00). It is noted, however, that some individual assessment hours show a potential increase in overall traffic flow demand of the order of 10-15% on Crown Lane - although such higher percentage changes are more a reflection of the generally low baseline levels of traffic demand experienced on the link during these time periods. Indeed, combined baseline + development traffic levels during the hours of maximum percentage impact

are well below baseline traffic levels recorded at other times, suggesting that the environmental effects of development traffic are unlikely to result in material worsening of overall environmental conditions. Given that Crown Lane is a purpose built industrial standard access road route with very low pedestrian flow demand and no frontage residential properties / community land use, it is not considered that the route represents a 'sensitive' location and therefore the Rule 2 IEA threshold should not apply in this case. The operation of Crown Lane is not considered to be sensitive to community severance or pedestrian delay / intimidation issues due to its current nature, location and highway network role. This position is reflected by the fact that predicted changes in general traffic demand on Crown Lane are identified to be well below Rule 1 (30%) threshold levels.

Review of changes in HGV traffic demand levels

- 6.4.10 The tables below demonstrate predicted changes in 2014 baseline two-way HGV demand on the local links of Crown Lane and the A449 dual carriageway (in the vicinity of the Crown Lane roundabout) following development of the proposed EnviRecover facility (see also **Figures 43(a-e) & 44(a-e)** to this report). These figures demonstrate that the percentage change in HGV levels on all links would be substantially higher than the predicted changes in overall traffic flow. It should be noted, however, that such increases in HGV movements do not take account of the 'net' impact arguments set out in section 4.5.

A449 North of Crown Lane

	2014 Opening Year Peak Day Operational Demand			2014 Opening Year Off - Peak Day Operational Demand		
	Devel Trips	Baseline flows	%age Increase	Devel. Trips	Baseline flows	%age Increase
(08:00-09:00)	1	111	0.8%	1	111	0.8%
(11:00-12:00)	9	95	9.7%	9	95	9.7%
(15:00-16:00)	11	89	12.8%	11	89	12.8%
(17:00-18:00)	0	67	0.3%	0	67	0.3%
Weekday 12 hour (07:00-19:00)	45	1024	4.3%	45	1024	4.3%

2 way flow totals (Total HGVs)

A449 South of Crown Lane

	2014 Opening Year Peak Day Operational Demand			2014 Opening Year Off - Peak Day Operational Demand		
	Devel Trips	Baseline flows	%age Increase	Devel. Trips	Baseline flows	%age Increase
(08:00-09:00)	14	86	16.3%	13	86	14.9%
(11:00-12:00)	24	96	25.5%	12	96	12.0%
(15:00-16:00)	34	96	35.5%	18	96	18.9%
(17:00-18:00)	2	76	3.2%	2	76	2.8%
Weekday 12 hour (07:00-19:00)	173	1081	16.0%	109	1081	10.1%

2 way flow totals (Total HGVs)

Crown Lane (east of A449 roundabout)

	2014 Opening Year Peak Day Operational Demand			2014 Opening Year Off - Peak Day Operational Demand		
	Devel Trips	Baseline flows	%age Increase	Devel. Trips	Baseline flows	%age Increase
(08:00-09:00)	15	50	30.1%	13	50	27.7%
(11:00-12:00)	34	42	79.6%	21	42	49.1%
(15:00-16:00)	46	43	106.4%	30	43	69.0%
(17:00-18:00)	3	55	4.8%	2	55	4.2%
Weekday 12 hour (07:00-19:00)	219	546	40.1%	155	546	28.4%

2 way flow totals (Total HGVs)

A449 North: Review of HGV Impact

- 6.4.11 HGV flow changes on the A449 corridor to the north of the Crown Lane junction are predicted to fall below IEA Rule 2 (10%) screening thresholds and are substantially less than the IEA Rule 1 (30%) guideline threshold. HGV flow increases on this route would generally be less than 10 vehicles

per hour (two-way) and represent less than 1.5% of total baseline traffic demand. On the basis of this review, it is concluded that any EnviRecover traffic related environmental impact on the A449 (N) corridor would be marginal and in the judgement of the assessor requires no further detailed review.

A449 South: Review of HGV Impact

6.4.12 HGV flow changes on the A449 corridor to the south of the Crown Lane junction would generally lie within IEA Rule 1 (30%) screening thresholds, the only exception being the hour 15:00-16:00 for the peak operational day scenario. The increase in flows would, however, be typically above Rule 2 (10%) guideline thresholds associated with more 'sensitive' locations. Given that the A449 corridor to the south of the Crown Lane roundabout is typically of rural dual carriageway character, catering for a range of large goods vehicles and operates under a 50mph speed limit, it is considered that it is questionable as to whether the route represents a 'sensitive' location which would require further detailed consideration under IEA Rule 2 guidance. Judgement of current operating conditions along this section of route corridor, which are characterised by low pedestrian flows, relatively limited frontage properties (many of which are commercial properties predominantly accessed by car) and the existing severance effects of the dual carriageway layout, would suggest that the maximum levels of hourly traffic demand predicted on this route (less than 35 vehicles per hour, two-way) is unlikely to give rise to a material worsening of traffic related environmental impact on the A449 (S) corridor.

6.4.13 Indeed, the time periods of identified maximum hourly development flow impact on the A449 (S) typically take place during periods of generally lower baseline traffic demand, hence the higher percentage impact. During such periods predicted combined baseline + development levels are still significantly lower than maximum baseline demand at peak network demand times. This would suggest that development traffic is unlikely to result in a

measurable overall worsening of environmental conditions and certainly other operational criteria such as driver delay, road safety and pedestrian delay would not be materially affected at such times. Given this review of issues it is concluded that any EnviRecover traffic related environmental impact on the A449 (S) corridor would likely be classified as 'slight' and therefore in our judgement requires no further detailed assessment.

- 6.4.14 Notwithstanding this general conclusion, it is noted that Sytchampton Endowed First School is located on a frontage land plot to the A449 (S) corridor, approximately 3.5km to the south of the Crown Lane roundabout. The site is a rural school of approximately 110 pupils, serving surrounding villages / hamlets. It is considered that the nature of this school use could potentially be considered as representing a 'sensitive' receptor, the effects on which should be given some further review.
- 6.4.15 Review of relevant environmental conditions at the Sytchampton school receptor site, identifies that school facilities are set back from the boundary to the A449, with the school playground and the majority of school buildings located to the rear of frontage properties. Given the results of the noise and air quality assessments associated with the operation of the A449 corridor to the south of Crown Lane, it is not anticipated that the proposed levels of development traffic demand would give rise to a material change in these key environmental criteria.
- 6.4.16 Site observations suggest that the majority of children attending the school travel to / from the site as a car passenger. Only a strictly limited number of children were recorded as arriving at the school on foot, with all such movements being accompanied by an adult. The site is directly served by a connection from the A449 eastern footway (approximately 1.8m-2.0m in width), with a hard surfaced crossing point observed within the A449 central reserve for movements from properties to the west. Very few persons were noted to utilise this crossing during site visits. Dedicated school warning signage, including flashing warning lights and vehicle actuated displays (see

Appendix B to this report) is provided for both A449 approach directions, reinforced by white line 'slow' markings. No personal injury accident incidents have been recorded within 100m either side of the Sytchampton school site within the most recent five year search period.

- 6.4.17 As noted above, most pupils were observed to be delivered to the school by car, with the majority of vehicle parking taking place in the village hall car park facility off Cow Lane - immediately to the south of the school site. This car parking area provides parking opportunities for in excess of 30 vehicles and allows for direct access to the school grounds (to the rear & monitored by school staff) without the need for access via the A449 frontage footpath. The presence of this off-road parking facility, providing safe & convenient school access, reduces the impact of A449 traffic movements on school journeys and therefore would minimise any impact associated with additional development traffic movements.
- 6.4.18 Site visits identified that some school related parking also took place within the nearby lay-by on the southbound carriageway (immediately to the south of Cow Lane – see **Appendix B**), with parents then accompanying their children to the school gates on foot via the A449 footway. No crossing of the A449 is required as part of these movements.
- 6.4.19 Given the operational characteristics of the immediate section of the A449, the substantive safety mitigation features already in place and existing school parking arrangements, it is considered unlikely that the proposed levels of EnviRecover operational traffic would result in a material change in environmental conditions at the Sytchampton school site. The dual carriageway nature of the A449 in this location already exhibits a substantive community severance effect and, as a consequence, pedestrian access via the A449 frontage is relatively limited. The additional development traffic levels are therefore not considered to result in a further material change in pedestrian amenity. Immediate local highway safety management measures are already of a high standard and it is therefore concluded that no additional

measures would be required to accommodate / mitigate EnviRecover traffic movements.

Crown Lane: Review of HGV Impact

- 6.4.20 Review of the HGV flow change analysis of Crown Lane to the east of the A449 roundabout, identifies both 12hr and peak hour HGV levels in excess of both IEA Rule 1 (30%) and Rule 2 (10%) guideline screening thresholds. Ordinarily, such impact levels would suggest a requirement for a detailed review of traffic related environmental effects, however, such a conclusion would not take into account the specific nature or function of Crown Lane. As noted above, the route was improved over 20 years ago to primarily act as the Trading Estate Access Road and therefore was designed and constructed to act as an industrial distributor road and to accommodate substantive levels of HGV traffic.
- 6.4.21 As identified in previous sections of this TA report, Crown Lane also operates with an excellent safety record and has been predicted to continue operating with free flow conditions for future development scenarios with no recorded congestion or delay issues. Indeed, the link is predicted to operate with substantial spare operating capacity. Furthermore, Crown Lane is characterised as having no frontage residential properties and does not act as a main pedestrian link between local settlements. It is therefore considered that there are few environmental receptors that would experience any material change in local conditions as a result of additional development traffic on this link. Given this review of conditions it is ultimately concluded that traffic / HGV related environmental impact would likely be classified as 'slight' and requires no further detailed assessment.
- 6.4.22 Notwithstanding the above conclusions regarding likely impact levels on local routes, in order to provide a comprehensive review of the environmental effects of the EnviRecover development, a detailed assessment of the key traffic related environmental issues of Noise, Vibration and Air Quality has

been included within the formal Environmental Statement document (Chapters 11 & 12 respectively). As noted above, IEA guidelines consider these factors to represent some of the most sensitive environmental criteria to changes in traffic flow (along with severance and pedestrian delay / intimidation issues - which have not been included in detail within this assessment due to the low levels of pedestrian activity on key local routes)

6.4.23 The noise assessment set out in Chapter 11 of the ES considers Road Traffic Noise & Vibration Issues in detail and concludes the following:

- From the results of the background noise survey and observations at the nearest residential receptors, it is clear that the noise climate is dominated by existing local and distant road traffic noise (i.e. along A449 and A442, Crown Lane and Walton Road), occasional aircraft movements and local industrial activities.
- The resultant change in noise levels associated with the vehicle movements has been calculated using 'Calculation of Road Traffic Noise' (CRTN): 1988. The dwellings positions on Manor Lane (albeit set back from Crown Lane at distance) are identified as likely being the most sensitive receptors to any direct EnviRecover traffic flow increase.
- DETR 'Guidance on the new approach to appraisal': 1998 for road traffic assessment, paragraph 6.8 notes "*only those properties experiencing changes greater than 3dB(A) should be taken into account.*" November 2006 DfT Transport Analysis Guidance (TAG unit 3.3.2) also states "*It should be recognised that, in many situations, relatively large changes in traffic flows are required to bring about significant changes in the response to noise levels in the longer term. For freely flowing traffic, a difference of about 3dB in noise level is required before there is a statistically significant change in the average assessment of nuisance.*"

- The likely noise impacts in development 'opening year' of 2014 on the immediate sections of local highway to the EnviRecover site range between +0.2 to +1.1dB LAeq_{12hour}. Such levels are well below appropriate guidance thresholds. The highest likely impact associated with maximum hourly EnviRecover traffic movements shows increases in noise level of +0.3dB(A) to +2.2dB(A). Traffic noise impacts on the A449 corridor (both north and south of Crown Lane Roundabout) are demonstrated to be below +0.5dB(A).
- Based on studies of HGV vibration impact, it is concluded that the only situation likely to generate any measurable vibration effects would be when HGVs travel close to properties (i.e. within 10 metres) and are required to pass over speed 'humps'. The general movement of HGVs on relatively smooth access roads (even at close distance) does not normally give rise to excessive ground borne vibration. Given the above review and the fact that no HGV movements over traffic calming features would take place on the proposed EnviRecover HGV haulage route, no material road traffic vibration effects are predicted as a consequence of the proposal scheme.

6.4.24 Chapter 12 of the Environmental Statement includes for the detailed review of air quality issues within the vicinity of the proposal site. This appraisal includes for the direct assessment of air quality effects associated with the predicted increases in traffic movements via reference to the screening methodology outlined in Section 3, Volume 11 of Department of Transport document Design Manual for Roads and Bridges. The results of this detailed analysis can be summarised as follows:

- The largest increases in nitrogen dioxide concentrations are predicted close to Crown Lane, between the A449 junction and the industrial estate junction. This is not predicted to represent a substantive risk as there are no areas of human habitation immediate to this route.

- The closest residential dwelling to the main haulage route is Oldhouse Farm – predicted increases in traffic related nitrogen dioxide at this receptor are less than 0.33% of the air quality objective.
- Increases in air pollutant levels on the A449 corridor are not considered to reach significant levels.

6.5 Summary of impact

6.5.1 The above review of predicted operational and environmental impact criteria identifies the following:

- General traffic increases as a result of the EnviRecover proposals would be low, of the order of less than 3% on the main A449 corridor and between 10-15% on the more lightly trafficked route of Crown Lane. Both of these route corridors operate with free flowing traffic and little evidence of congestion, queuing or driver delay.
- Junction operational assessments demonstrate that both the Crown Lane / A449 roundabout and Crown Lane / Trading Estate Spine Road access junction would operate with spare capacity even at future year 2024 / 2025 including for predicted EnviRecover peak operational days. Detailed ARCADY & PICADY capacity model results demonstrate that the additional development traffic would not result in any substantive additional driver delays.
- Reference to IEA screening guidelines would suggest that overall changes in traffic flow over the immediate local network associated with the EnviRecover scheme would not give rise to a material change in environmental conditions. Even when considered in terms of changes in HGV flows only, the nature of surrounding links and the relatively limited extent of local receptors suggests that any local development traffic related environmental effects would only be of a

'slight' impact classification. This conclusion is supported by results of detailed noise, vibration and air quality assessments at critical points on the immediate network, which identify that EnviRecover traffic related impacts for these key environmental effects would not exceed minimum guideline thresholds.

7.0 CONSTRUCTION TRAFFIC ISSUES

7.1 Introduction

7.1.1 Construction of the Mercia EnviRecover project is anticipated to take place over five main phases which are likely to be the subject of several separate construction contracts. These phases are:

- Site establishment & enabling works;
- Earthworks and foundations;
- Structural works;
- Process / equipment installation;
- Commissioning.

7.1.2 Details of the main processes associated with each construction phase are outlined further within Chapter 5 of the Environmental Statement. The precise nature of construction operations can only be fully determined following detailed design of project elements and the appointment of a preferred contractor. It is anticipated, however, that construction of the main facility would involve a standard range of building and engineering activities.

7.1.3 Subject to obtaining the necessary planning permission, permits and licenses, it is currently anticipated that construction work would commence in late 2010 / early 2011 and last around 37 months. Such project timescales would also include for building internal fit-out and commissioning of plant, with main site works (site clearance, earthworks, and erection of building) to take place in the first 18 months of the construction project.

7.1.4 Construction hours are proposed to be 07:00 to 19:00 weekdays and 07:00 to 13:00 on Saturdays. No work is planned on Sundays or Bank Holidays, however, there may be occasions, as is often the case with major engineering contracts, that work would need to be undertaken outside of these hours. It is suggested that any such non-standard working hours be

controlled by a suitably worded planning condition, whereby MWM could only carry out such work following prior notification and agreement with Worcestershire County Council. HGV movements would also not be permitted outside of the hours outlined above without prior written agreement with the Local Highway Authority and any requirement for abnormal loads would be suitably managed.

7.1.5 Development construction would likely be phased in order to minimise development construction demand and limit hourly increases in development traffic demand. Even at peak levels, construction traffic demand is not anticipated to be close to those levels associated with the ultimate operation of the site, post opening of the proposed EnviRecover land use.

7.1.6 Vehicle deliveries to / from the site during the construction phase would be managed, where at all practical, to avoid impact on traditional AM / PM rush hour periods. In addition, further on-site vehicle management practices would seek to limit typical construction highway network impacts such as dirt, dust, noise and vehicle related vibration.

7.2 **Construction Traffic Management Plan**

7.2.1 MWM recognise that the delivery of the Mercia EnviRecover scheme would represent a major construction project in the local area and that it is essential that any disturbance to neighbours and the local community be minimised during the construction period. To this end it is proposed that a Construction Traffic Management Plan (CTMP) is prepared (under the control of a planning condition), to ensure that the best available techniques necessary to minimise / mitigate adverse effects would be adopted. It is anticipated that the CTMP would encompass:

- Agreed construction operating hours & vehicle delivery hours;
- On-site construction vehicle parking & manoeuvring;
- Off-site construction vehicle routing;

- Management and procedures for access by abnormal loads;
- Local signage strategy;
- Storage of materials;
- Construction noise management;
- Construction dust management.

7.2.2 In addition, the CTMP would seek to ensure that all construction HGV related traffic on the local network, is routed via Crown Lane to the A449. This proposed local haulage route is considered entirely suitable to accommodate construction HGV movements, with Crown Lane being of industrial distributor road standard and the A449 forming part of the County strategic road network. The use of such a haulage route would minimise impact on key local settlements.

7.2.3 No construction HGVs would be permitted to utilise the local routes towards Elmley Lovett or the northern Trading Estate Access route to Walton Road. Construction routing would be supported by a suitable local construction traffic signage strategy to / from the A449 corridor.

7.3 **Anticipated construction traffic demand associated with key construction activities**

7.3.1 The following paragraphs set out the nature of main traffic demand elements associated with the anticipated main development construction phases.

Site establishment and enabling work

7.3.2 It is not anticipated that site establishment works would require substantive construction related HGV volumes, with main demands relating to staff travel and the transport of cleared materials from site. Key tasks during this initial construction phase would include:

- Vegetation clearance;
- 'Break out' of existing hardstanding (existing lorry park area likely to be retained to act as part of initial site compound);
- Formation of temporary access road to adjacent sewerage facility;
- Diversion of existing watercourses and provision of temporary settlement lagoons.

7.3.3 It is anticipated that construction staffing levels for this initial site establishment work, which could be expected to last for approximately two months, would be of the order of 60 persons. On the basis of operational experience at other major construction projects, which has highlighted a staff vehicle occupancy rate of the order of two persons per vehicle, this could represent a staff vehicle demand of approximately 30 vehicles associated with site preparation tasks.

Excavation of main building pit and site earthworks

7.3.4 Major earthworks operations on the site would be related to excavation and piling associated with the formation of the main building pit to accommodate the main building and ramped vehicle access roads. It is anticipated that an excavation area of 140m by 70m by 8m would be required to be formed (72,800m³ of material). Construction of this pit feature and associated piling is anticipated to require a minimum work duration of 13 weeks.

7.3.5 It is anticipated that some of the excavated material would be retained on site for landscaping. The majority of excavated material would comprise of Mercia Clays, which have a number of potential commercial uses. The final destination of the excavated materials would ultimately be determined by the main site contractor, but options for disposal include:

- Brick manufacturing material at the nearby brick works;
- Restoration material at nearby adjacent landfills;

- Restoration material for the Hill & Moor landfill site or other closed landfills in the area.

- 7.3.6 Approximately 13,650m³ is anticipated to be treated and screened on site and utilised for landscaping / site protection uses – suggesting a total export volume of approximately 60,000m³ of Mercia Clays to market. Based on a density ratio of 1.8 m³/t this would relate to 108,000 tonnes of material.
- 7.3.7 Export of this material would be carried out via 44t axel weight vehicles, which can carry a typical payload of 29t, which would represent of the order puff 3700 HGV export movements to remove all excavation materials from the site. Should local disposal to local landfill / brick construction be deliverable, all such movements could effectively be limited to internal connections within the main Trading Estate site. This would minimise any transport impacts on the wider local highway network.
- 7.3.8 Ultimately should excavated material be required to be exported from site to off-Trading Estate locations, it is anticipated that this could result in of the order of 60 HGV export movements per day (120 in+out) – based on a minimum export period of 12-13 weeks and a weekday delivery window. Even including for other I HGV movements during this construction period associated with additional supporting construction tasks at this time, HGV demand levels would be still be substantially less than predicted future waste RCV / HGV levels associated with the operation of the EnviRecover project (218 HGV movements in+out) and therefore would not be anticipated to result in an unacceptable short term traffic related impact over the local network.
- 7.3.9 It is anticipated that daily construction staffing levels for the site earthworks stage would be of the order of 60 - 100 staff, which would represent a staff vehicle demand of approximately 30-50 vehicles.

Building structural works

- 7.3.9 Foundations for the frame of the main building are likely to be founded using either a piled or pad solution. The proposed EnviRecover building would be mainly of steel frame construction, with an external envelope of masonry blocks, sheeting rails, timber, metal cladding and glazing.
- 7.3.10 Building slabs would be cast in-situ and it is likely that concrete would be sourced from an on-site batching plant, with aggregates supplied to the site by bulk HGV to limit vehicle movements.
- 7.3.11 All building construction materials would be delivered to the site by HGV.
- 7.3.12 Ultimately such product delivery traffic levels would be expected to be substantially less than the daily HGV demand levels associated with the future operation of the EnviRecover facility.
- 7.3.13 Building construction work could be expected to take place over a core period of approximately 16 months duration. Construction staffing levels over this period could vary from between 100 – 200 staff members on site each day. Such levels represent a likely staff vehicle demand of between 50-100 vehicles associated with building construction tasks.

Process equipment installation & commissioning

- 7.3.14 All process equipment would be delivered to the site by HGV. It may be necessary for some equipment to be transported to the site via special bulk haul vehicles / abnormal load vehicles. The access and operation of such vehicles would be carefully managed via dedicated procedures and would need to be agreed in advance with the local highway authority and West Mercia Constabulary (where relevant).

7.3.15 Site commissioning stages are not anticipated to generate substantial levels of HGV vehicles, with traffic demand typically limited to the transport of technical staff & operatives. Some main external civil engineering work would be undertaken towards the end of the construction programme to deliver completed site infrastructure. Such tasks could include provision of main internal site access roads, external hardstanding and drainage and utility infrastructure. Some levels of material supply would be required to deliver these site engineering tasks, but in general traffic levels are not anticipated to be substantive.

7.3.16 It is anticipated that construction staffing levels would be at their highest during the process installation stage, due to the need for a range of skilled operatives. Daily staffing levels at this time could reach levels of up to 250 construction staff – with an associated vehicle demand of 125 staff vehicles, with such demand levels taking place for 6 - 9 months. Ultimately, towards the completion of the commissioning periods and the delivery of final construction elements, staffing levels could be expected to fall - with final months construction staff requirements being of the order of 120 operatives. .

7.4 **Summary**

7.4.1 On the basis of the above review of main construction tasks, it is not considered that construction of the proposal scheme would generate a material level of HGV demand. None of the construction phases are anticipated to generate HGV levels in excess of those predicted to occur upon full operation of the EnviRecover facility. Maximum construction periods could result in the requirement for up to 250 staff to be based at the site (125 vehicles), however, such peak traffic levels would not be experienced across the duration of the construction programme and would typically take place when construction HGV demand would be limited. It is therefore ultimately concluded that there would be no requirement for local highway network operational or environmental improvements over and above existing provision to accommodate predicted levels of construction traffic demand..

8.0 SUMMARY AND CONCLUSIONS

8.1 This Transport Assessment has been prepared by Axis on behalf of Mercia Waste Management (MWM) to consider highways and transport issues related to the development of a Renewable Energy Facility (known as Mercia EnviRecover) on land at Hartlebury Trading Estate, Hartlebury, Worcestershire. The report has been prepared in accordance with March 2007 Department for Transport (DfT) document "Guidance on Transport Assessment" for the preparation of Transport Assessment reports, with the scope and nature of the assessment matters included reflecting the extent of highways and transport issues identified as being of interest to WCC highways officers.

Site location & existing planning position

8.2 The proposal site comprises a broadly rectangular shaped vacant development plot situated on Hartlebury Trading Estate, off the private access road of Oak Drive. The site is currently undeveloped but has been the subject of a number of successful planning applications. Indeed a review of the recent planning history for the proposal site identifies the following:

- The Oak Drive site of has been the subject of two successful planning applications for major waste management (autoclave) development in the past 5 years. Both of these approvals have since lapsed.
- The Oak Drive site currently benefits from part implemented planning permission for major industrial / commercial (B2 / B8) development (for up to 12,876sqm on the proposal site land holdings).

8.3 Review of the planning submissions associated with the autoclave waste permissions at the Oak Drive site identified that this permitted facility was anticipated to generate of the order of 152 vehicle movements per day (76 in / 76 out). Trip rate estimates for the permitted commercial / industrial scheme

(based on typical B2 / B8 land uses) would suggest that such a development could generate in the order of 500-730 vehicle movements (in+out) of which 90-135 could be expected to be HGV movements. It is important to understand and consider such levels of 'committed' traffic flow when assessing the extent of future development traffic impact - as the traffic associated with the proposed EnviRecover scheme would effectively 'replace' these committed demand levels over the network.

Immediate local highway network and observed background operating conditions

- 8.4 Access from the proposal site to the wider highway network would be via connections from Oak Drive to the main Hartlebury Trading Estate Spine Road. This spine road provides an 8.0m wide distributor route (part of the adopted highway network) serving other frontage industrial units, access to the existing Hartlebury landfill site and onward local connections to Walton Road to the north and more strategic access to Crown Lane and the A449 dual carriageway to the south.
- 8.5 Crown Lane is of a 7.3m single carriageway distributor road standard to the west of the main Trading Estate access point, providing wide verges to both sides (northern verge including a continuous footway feature). The route provides a good standard of vertical and horizontal design and was upgraded to its current alignment during the mid 1980s to provide a modern standard industrial distributor road route specifically to serve the Trading Estate site.
- 8.6 Approximately 1.4km to the west of the Trading Estate spine road access, Crown Lane connects to the A449 dual-carriageway route at a 4-arm roundabout junction. The A449 dual carriageway operates under a 50mph speed limit through the junction and provides dual carriageway connections to Kidderminster and the A450 to the north and Worcester and the M5 motorway (via M5 Junction 6) to the south. The A449 southbound arm

approach to the roundabout junction provides a free-flow connection to Crown Lane to assist vehicle movement to / from the Trading Estate.

- 8.7 Base traffic flow patterns for the immediate network to the proposal site have been established through the undertaking of detailed classified 12hr traffic counts at key local junctions (Jan 2010). Review of this background demand information demonstrates that traffic flows on the A449 show maximum conditions during the traditional AM rush hour peak period 08:00-09:00 - when demand levels of the order of 2100 vehicles per hour (two-way) have been recorded on the A449(S). A secondary early evening peak is also recorded during the PM peak demand hour 17:00-18:00 - when two-way flow levels of the order of 1850 have been recorded.
- 8.8 Traffic flow levels on Crown Lane (E) are substantially lower than that recorded for the A449 mainline. Maximum hourly 2-way flows recorded in January 2010 were less than 500 vehicles per hour, with day-time flows between 09:00-15:00 being less than 300 vehicles per hour. Site observations and local experience have identified that the local network to the EnviRecover proposal site generally operates with a significant level of spare capacity with no recorded regular congestion or network delays.
- 8.9 Review of personal injury accident data demonstrates that just four accident incidents have been recorded within the immediate search area of Crown Lane / A449 and other local junctions. All of the incidents recorded are of slight injury classification. No accident incidents are recorded at the main junctions of A449 / Crown Lane or the Trading Estate spine road / Crown Lane. None of the recorded incidents appear to be related to unsafe operation of an HGV or factors associated with poor highway layout. The A449 dual carriageway route to the south of the Crown Lane roundabout has been the subject of recent extensive corridor safety work, including 50mph speed restrictions.

Site accessibility

- 8.10 Whilst spatially well related to the main areas of waste arisings, the EnviRecover site is located away from major centres of population. Given this locational characteristic, opportunities for staff / visitor access to the site via sustainable travel modes such as walking, cycling and public transport are generally limited. It is therefore envisaged that the majority of regular staff / visitors to the proposed EnviRecover facility would likely visit the site using the private car. Given the levels of staff numbers proposed to be based at the site, it is not anticipated that the proposals would give rise to a significant demand for staff / visitor private vehicle travel.
- 8.11 The EnviRecover site at Hartlebury Trading Estate was selected following a lengthy and comprehensive site selection exercise, which considered around fifty possible sites within both Worcestershire and Herefordshire. An analysis of the transport sustainability undertaken to inform the site selection process identified that the Hartlebury site provides excellent opportunities to minimise waste haulage, being located in a central location to the main County waste arisings (Worcester, North Wychavon, Wyre Forest, Bromsgrove & Redditch) and close to the County strategic road network.

Mercia EnviRecover Development Proposals

- 8.12 The Mercia EnviRecover facility is proposed to manage the recovery of residual municipal waste. Waste input would comprise of predominantly kerbside residual municipal arisings, however, in the earlier years of operation it is envisaged there may be some capacity for the facility to also accept additional residual domestic waste collected at local Household Waste Sites (HWS) within the two counties.
- 8.13 Waste processing capacity at the EnviRecover plant would be 200,000 tonnes per annum (tpa) and is scaled to meet current and future residual municipal waste processing needs of Herefordshire & Worcestershire. The

EnviRecover facility would generate approximately 15.5 MW and would also offer the potential to export excess heat to local businesses and properties.

8.14 The proposals would include for three main elements:

- A built facility for the combustion of residual waste in order to recover energy (Energy from Waste facility);
- Associated ancillary infrastructure;
- Earthworks and landscaping associated with assisting the integration of the buildings into the site and surrounding area.

Proposed site access arrangements

8.15 The EnviRecover plant would be served by a new dedicated vehicle access point direct from the frontage Hartlebury Trading Estate private access road of Oak Drive. All operational HGVs would “weigh in” at a dedicated entry weighbridge before proceeding to the relevant delivery / reception areas within the main building. The layout of the proposed access road is such that queuing vehicles approaching the site entry weighbridge would be accommodated within a widened on-site queuing area capable of accommodating up to six full size bulk articulated HGV units.

8.16 All vehicles lanes within the site would be provided to a minimum standard of 3.65m carriageway and would be suitable to accommodate the swept path of maximum size articulated HGV unit.

8.17 It is proposed that 45 car parking spaces would be provided on site, including 4 to disabled standard provision. This level of car parking has been identified as being suitable to accommodate proposed staffing levels at the site (including a requirement for some additional spaces to reflect short term parking demand surges during shift change periods) and a level of visitor provision.

Operational HGV routing

- 8.18 Waste collected in areas proximate to the site would be delivered directly to the facility in kerbside Refuse Collection Vehicles (RCVs), whilst municipal waste arising in more distant areas would be delivered to the site in a 'bulked' form, via MWM's existing network of Waste Transfer Stations (WTS). Operational traffic movements to / from the site would be encouraged to observe appropriate route corridors. This routing strategy would seek to restrict operational traffic to only those roads suitable to accommodate regular HGV movements and would therefore avoid operational traffic impact on the immediate settlements of Hartlebury and Waresley. Much of these areas are already protected by existing vehicle width / weight restrictions.
- 8.19 A core element of the routing strategy would be that all operational vehicle movements to / from the EnviRecover site would utilise Crown Lane to access the A449 dual carriageway. Crown Lane is a suitable industrial standard local distributor road corridor, with no frontage residential property and provides the most direct and efficient access from the Hartlebury Trading Estate site to the County Strategic Road network (A449). No operational HGV movements to / from the Mercia EnviRecover facility would be permitted via the northern Trading Estate access via Walton Road - except for those RCV street collection runs directly serving Hartlebury village or properties on Walton Road.
- 8.20 Liaison with WCC highways and local stakeholders have identified sensitive local routes that should be avoided by operational traffic movements associated with the EnviRecover Plant, particularly large bulk articulated HGV movements. It is proposed that this local routing strategy would be adhered to by all MWM bulk haulage vehicles and adopted, where practical, by those local district authorities operating direct RCV access to the site following local kerbside collection runs (Wyre Forest, Malvern Hills, Wychavon & Worcester City). MWM operate a satellite tracking system which allows for en-route management of its vehicle fleet.

Anticipated operational HGV trip demand : Waste Inputs

- 8.21 Anticipated demand estimates for trip movements to / from the proposed EnviRecover facility have been calculated using a 'first principles' approach, based upon 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, MWM, and have been developed via operational experience of existing waste demand within the Herefordshire & Worcestershire. Future annual waste forecasts have been based on future predicted changes in population / economic activity within the core study areas.
- 8.22 For the purposes of the highway capacity assessments set out within the formal TA report, base daily traffic demand levels associated with the EnviRecover site have been calculated on the basis of a 5-day delivery week basis (effectively of the order of 250 delivery days per year), rather than the proposed 7 day delivery window available (350 delivery days per year). This reflects the fact that only limited waste input takes place on weekend dates. Such a methodology would ensure a conservative / over estimate of the likely weekday HGV operational traffic demand to / from the site and thus ensure a robust assessment of highway network impact during traditional maximum background traffic demand periods.
- 8.23 The only exception to this methodology is for the modelling of direct delivery movements from Worcester City – as this collection authority currently operates an 'alternate week' collection approach, with the majority of the RCV fleet collecting residual municipal waste on one week and recyclables the second week. This effectively halves the collection period available for pick up and delivery of waste to the proposed EnviRecover facility from this area. Given that Worcester City typically operates an alternate week collection

regime, operational HGV delivery estimates to the EnviRecover site have been carried out for two main scenarios:

- Peak Operational Day – i.e. when Worcester City vehicles are direct delivering to EnviRecover (40% of modelled days);
- Off-Peak Operational Day – i.e. when no Worcester City deliveries take place (60% of modelled days).

8.24 On the basis of the predicted annual tonnage figures it is therefore anticipated that daily site waste input demand to EnviRecover would likely be as follows:

- Peak Operational Day: 924t per day / 98 HGV arrivals
- 'Off-Peak' Operational Day: 717t per day / 66 HGV arrivals

8.25 In addition to the above predicted waste inputs, the EnviRecover operational process requires the import of Air Pollution Control (APC) materials to assist in the management of plan emissions. Assuming maximum operation of the plant at 200,000tpa input capacity, it is estimated that of the order of 3,600tpa of APC material input would be required. Based on a typical bulk APC vehicle payload of 20t, such APC related input demand would be of the order of 400HGV arrivals per annum or 1-2 vehicles per day.

Anticipated operational HGV trip demand : Waste Product Export

8.26 The incineration process at the EnviRecover plant would generate a range of waste products, that would require export from the site for final treatment / disposal. The nature of these waste outputs is as follows:

- Incinerator Bottom Ash & Metals: 43,200 tpa
- APC + fly ash export materials: 8,000 tpa.

8.27 Such waste materials would typically be exported from the EnviRecover plant using bulk haulage articulated HGV units, with a payload of the order of 20t. On the basis of the 'worst case' modelling scenario of an effective 250 days export window per annum and the identified 20t vehicle payload, average daily export traffic movements associated with export material demand can be expected to be of the order of 11 bulk HGV movements per day.

Anticipated operational HGV trip demand : Total HGV demand

8.28 On the basis that no 'backloading' would be undertaken at the EnviRecover facility (HGV vehicles would operate full in one direction only, i.e. arriving full and leaving empty or vice versa), the EnviRecover site can be anticipated to generate the following typical daily operational HGV demand at 2014 / 2015 year of opening (for both 'peak' operational day and alternate 'off-peak' operational day):

- Peak Operational Day: 218 HGV trips (in+out)
- Off-Peak Operational Day: 154 HGV trips (in+out).

8.29 Typically municipal waste treatment plants do not experience substantive levels of operational HGV demand during the traditional weekday AM & PM rush hour periods (08:00-09:00 & 17:00-18:00) - reflecting the municipal waste collection patterns operated by waste authorities. Review of the demand profiles identified from Hill & Moor landfill site weighbridge records (existing disposal site for Herefordshire & Worcestershire residual municipal waste) demonstrates the following:

- *Direct Demand:* vehicle arrival demand illustrates two main peak periods, a morning peak of 10:00-12:00 and a second mid-afternoon peak of 14:00-16:00. Peak arrival demand takes place between 15:00-16:00 when almost a quarter of all direct delivery arrivals were recorded.

- *Bulk HGV Demand:* vehicle arrival demand illustrates an early delivery peak during the period 08:00-10:00, when a total of up to 40% of bulk arrivals take place. A secondary peak takes place for the period 14:00-16:00 – also of the order of 38-40% of total daily demand.

8.30 Ash export from the EnviRecover site is anticipated to be undertaken on a continuous export cycle using a small fleet of bulk transfer vehicles. For the purposes of this assessment, it is assumed that this transfer cycle would generate 2 export vehicle movements per hour (1 in + 1 out) to / from the EnviRecover site during the core delivery period (07:00-19:00).

8.31 Application of the predicted total daily operational HGV demand to relevant hourly demand profiles identifies the following hourly demand for 2014 / 2015 opening year conditions (2-way estimates):

- 08:00-09:00: Peak day: 14 HGVs Off-peak day: 14 HGVs
- 11:00-12:00: Peak day: 22 HGVs Off-peak day: 15 HGVs
- 15:00-16:00: Peak day: 46 HGVs Off-peak day: 30 HGVs
- 17:00-18:00: Peak day: 2 HGVs Off-peak day: 2 HGVs
- 07:00-19:00: Peak day: 218 HGVs Off-peak day: 154 HGVs

Staff / visitor car trip demand

8.32 The EnviRecover plant is anticipated to employ a total of 30 staff members. Given the 24 hour nature of facility operation, it is anticipated that the site would be operated on a shift system, with a maximum of 18 staff members typically on duty during day time periods. In addition, the site operator, MWM, is likely to transfer 12 office based staff to new offices within the scheme and some visitor trips can also be anticipated each day. It is therefore estimated that a maximum of 140 car trip movements could be expected to take place across the core weekday day-time period 07:00-19:00 associated with staff / visitor movements. Maximum hourly staff / visitor car trip demand is

anticipated to take place for the hour 1700-18:00, when of the order of 34 vehicle trips are predicted (in+out).

Consideration of 'Net Traffic Demand'

- 8.33 The likely 'net' operational traffic impact of the development of the Oak Drive site for the EnviRecover scheme is effectively the difference between the predicted total 'new' trip demand anticipated to be generated by the EnviRecover proposals and the traffic demand levels associated with the operation of the site under extant B2 / B8 industrial / commercial land use permissions.
- 8.34 Review of 'net' traffic demand estimates concludes that the development of the Oak Drive site for the EnviRecover proposal scheme is unlikely to result in a material worsening in network traffic demand, when compared to the permitted major B2 / B8 scheme. Indeed, the EnviRecover scheme is anticipated to generate fewer overall traffic movements across the day and the potential for reduced HGV demand during traditional network AM & PM peak periods. The EnviRecover scheme could generate an increased level of HGV movements when compared to the B2 / B8 permitted use, however, such EnviRecover HGV movements would generally be restricted to key day-time periods, whereas the permitted B2/B8 scheme allows for unrestricted HGV access and therefore could result in additional evening / night time movements. It is therefore concluded that any 'net' impact associated with traffic operations for the EnviRecover facility is likely to be marginal when compared to accepted traffic effects associated with the permitted B2 / B8 scheme.
- 8.35 Notwithstanding the above broad conclusions regarding the 'net' traffic impact of the EnviRecover re-development proposals, in order to provide a comprehensive appraisal of local network impact, this TA report has considered site specific operational capacity assessments including for the full future operation of the EnviRecover proposals (i.e. all predicted

development traffic being added 'extra over' to observed 2010 background traffic volumes). This ensures in a 'worst case' assessment of EnviRecover impact as it effectively considers all development traffic movements as 'new' to the network and therefore takes no account of the level of permitted traffic demand already associated with the Oak Drive site.

Local assignment of EnviRecover Operational HGV Traffic

8.36 Operational HGV trip movements to / from the EnviRecover site would be subject to a routing strategy and enforced, in the case of MWM's bulk haulage fleet (which serves County WTS facilities), via satellite vehicle tracking and a driver code of practice. Review of vehicle origins / destinations and predicted local route options, identifies the anticipated HGV demand on key local route corridors (in+out):

- A449(N) to K'minster: Pk Day: 24 HGVs Off Pk: 24 HGVs;
- A450 / A448 to B'grove: Pk Day: 8 HGVs Off Pk: 8 HGVs;
- A443 to Droitwich: Pk Day: 14 HGVs Off Pk: 14 HGVs;
- A4052 to Stourport: Pk Day: 12 HGVs Off Pk: 12 HGVs;
- A4133 to Droitwich: Pk Day: 10 HGVs Off Pk: 10 HGVs;
- A449 (S) of Ombersley Pk Day: 152 HGVs Off Pk: 88 HGVs.

8.37 Review of this operational HGV assignment information demonstrates that maximum HGV demand would likely take place on the A449 (S) corridor – reflecting the passage of bulk transport vehicles towards M5 J6 and direct delivery vehicles to / from Worcester City. Other local route corridors are not anticipated to experience EnviRecover operational HGV demand levels in excess of 25 vehicles per day (in + out).

Impact Assessment

- 8.38 The extent of impact assessment included within this section reflects the scope of work requested by WCC officers during formal scoping discussions. Assessments have been carried out for the proposed site opening year of 2014 and a future design year of 2024. The inclusion of such future year appraisal reflects good practice set out in DfT guidance. Additional traffic estimates associated with a proposed residential / community development at Waresley Park have also been included to ensure the most robust estimate of future local network operating conditions.
- 8.39 Review of the link impact assessment results identifies that general traffic increases as a result of the EnviRecover proposals would be low, being of the order of less than 3% on the main A449 corridor and between 10-15% on the more lightly trafficked route of Crown Lane at opening year 2014 (peak day operation). Both of these route corridors operate with free flowing traffic and little evidence of congestion, queuing or driver delay. It is not considered that such traffic increases would result in any material operational impact of local network routes.
- 8.40 Detailed junction operational assessments demonstrate that both the Crown Lane / A449 roundabout and Crown Lane / Trading Estate Spine Road access would operate with substantial spare capacity - even at future year 2024 / 2025 including for EnviRecover peak operational days. Detailed ARCADY & PICADY capacity model results demonstrate that the additional development traffic would not result in any substantive additional driver delays or congestion. No local network capacity improvements are therefore considered necessary to accommodate EnviRecover traffic demand.

Traffic related environmental issues

- 8.41 Reference to IEA screening guidelines would suggest that overall changes in traffic flow over the immediate local network would not give rise to a material change in traffic related environmental conditions. Even when considered in terms of changes in HGV flows only, the nature of surrounding links and the relatively limited extent of local receptors suggests that any local development traffic related environmental effects would only be of a 'slight' impact classification. This conclusion is supported by results of detailed noise, vibration and air quality assessments at critical points on the immediate network - which identify that EnviRecover traffic related impacts for these key environmental criteria would not exceed minimum guideline thresholds.

Construction traffic issues

- 8.42 MWM recognise that the delivery of the Mercia EnviRecover scheme would represent a major construction project in the local area and that it would be essential that any disturbance to neighbours and the local community be minimised during the construction period. To this end it is proposed that a Construction Traffic Management Plan (CTMP) would be prepared (under the control of a planning condition), to ensure that the best available techniques necessary to minimise / mitigate adverse effects would be adopted. It is anticipated that the CTMP would encompass issues such as construction operating hours & vehicle delivery hours, on-site construction vehicle parking & maneuvering, off-site construction vehicle routing, management of abnormal load access, local signage strategy and construction noise & dust management.
- 8.43 All construction HGV related traffic on the local network would be routed via Crown Lane to access the A449. This proposed local haulage route is considered entirely suitable to accommodate construction HGV movements, with Crown Lane being of industrial distributor road standard and the A449

forming part of the County strategic road network. The use of such a haulage route would minimise impact on key local settlements.

- 8.44 Development construction would likely be phased in order to minimise development construction demand and limit hourly increases in development traffic demand. Even at peak levels, construction traffic HGV demand is not anticipated to exceed those levels associated with the ultimate operation of the site, post opening of the proposed EnviRecover land use. Maximum construction traffic HGV demand is anticipated to take place during the initial earthworks phase of construction - associated with the excavation of the building pit. It is anticipated, however, that excavated materials could potentially be disposed of immediately to the proposal site, avoiding the need for substantial off-site road haulage.

Summary

- 8.45 Given the review of anticipated future operational highway conditions and reference to appropriate guideline standards, it is concluded that the development of the EnviRecover plant at the Oak Drive proposal site Hartlebury, would not result in a material impact on operational or environmental conditions over the local highway network. Development traffic flow increases would generally be low when compared to baseline flow demand and the core local haulage routes of Crown Lane and the A449 are of a suitable standard to accommodate operational HGV traffic and have few immediate sensitive receptors. It is therefore considered that there are no requirements for development related off-site highway improvement works to support the EnviRecover scheme.