KNOCKHARLEY LANDFILL LTD.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

VOLUME 2 – MAIN EIAR

CHAPTER 8 – ROADS, TRAFFIC & TRANSPORTATION

NOVEMBER 2018

Knockharley Landfill Ltd.

Kentstown, Navan,Co.Meath

FEHILY TIMONEY & COMPANY

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This chapter was prepared by Trafficwise Ltd.

8.1 Introduction

The Knockharley Landfill opened in December 2004 and accepts residual household, commercial and industrial wastes together with construction and demolition wastes.

The residual waste landfill operates on foot of two permissions Planning Reg. Ref. Nos. 01/5006 & NA/60336, and in accordance with Environmental Protection Agency (EPA) Industrial Emission Licence Ref. No. W0146-02. The EPA licence covers the acceptance of 200,000 tonnes of waste per annum of which 175,000 tonnes is for disposal and 25,000 tonnes is for recovery. Condition No.3 of the current planning consent (An Bord Pleanála Case Ref. PL17.220331) authorises the acceptance of up to 132,000 tonnes waste annually until end December 2010 with the permitted volume of waste reducing to 88,000 tonnes per annum after 2010.

It is proposed to increase the acceptance of waste at the landfill up to 440,000 tonnes per annum. The proposed development will include for acceptance of non-hazardous incinerator bottom ash, as well as household, commercial and industrial wastes, non-hazardous contaminated soils and construction and demolition (C&D) waste, residual fines material etc. The proposed development includes for the construction of dedicated IBA facility together with an increase in void capacity within the existing landfill footprint. The development includes for a leachate treatment plant for pre-treatment of leachate generated from the landfill, prior to its removal offsite and the construction of a biowaste treatment facility to stabilise biological fines.

8.1 Study Area and Methodology

8.1.1 Traffic & Transport Study Methodology

The traffic study has been conducted in accordance with the National Roads Authority (NRA) '*Traffic and Transport Assessment Guidelines*' (May 2014) whilst this report is structured in accordance with the general advice provided in the Chartered Institution of Highways & Transportation (CIHT) document '*Guidelines for Traffic Impact Assessment*' (September 1994); a document which is recognised by the NRA to represent a structured approach to the preparation and presentation of Traffic and Transport Assessments (formerly Traffic Impact Assessments).

This study identifies receiving road network traffic conditions together with the permitted traffic generation of the development and provides an assessment of the potential impact likely to arise directly from the current proposal. All sources of traffic generation are taken into consideration and include waste related transportation, construction traffic and traffic associated with the day to day operation of the landfill which includes for the removal of leachate off site and felled forestry.

To frame the traffic assessments in the context of previous applications determined for the site, reference is made to previous Traffic Impact Assessment reports and comparison is made with the assessment scenarios and the results of various sensitivity analyses which, from the perspective of traffic and transportation, the determination of the current permission is predicated.

8.1.2 Study Area

The study identifies how traffic from the proposed development can be accommodated on the local and strategic road network. Where appropriate, measures to address the management of both existing traffic and proposed development traffic on the road network are discussed.

8.1.3 Relevant Data Sources - Overview of Previous Planning Applications

In 2000, a Traffic Impact Assessment report accompanied the original planning application (Planning Reg. Ref. PL01/5006) for a residual landfill at Knockharley.

In 2005, the original report was reviewed and updated with new traffic surveys. The updated report addressed the traffic impact under application (PLNA/60336) which sought an increase in waste acceptance at the site. Both reports were prepared by Trafficwise Ltd.

Summary of Findings from Original Traffic Report (PL01/5006)

The traffic report which accompanied the original planning application (PL01/5006) was based upon the proposed acceptance threshold of 180,000 tonnes of waste per annum. In that report a 'sensitivity' assessment was carried out to investigate the traffic impact arising from a theoretical waste acceptance rate equating to 250,000 tonnes per annum.

The landfill was proposed to be served by a high-quality ghost island directing vehicular access to the N2 National Primary Road. The site access, as now serves the site, was designed by Trafficwise Ltd. to the NRA standard for a ghost island junction on the national primary road network and is provided with a right turn lane and a nearside auxiliary left turning lane. The geometry of the access was designed to Design Manual for Roads and Bridges (DMRB):TD42 '*Geometric Design of Major/Minor Priority Junctions*' and constructed in accordance with the requirements of the NRA: DMRB for a 100kph Design Speed. The access was subject to independent Road Safety Audits, Stages 1 and 2 at the design stage and Stage 3 Road Safety Audit was prepared upon completion of construction. All road safety auditing was carried out in accordance with NRA standard HD/19. The access infrastructure granted permission under the original application is the infrastructure which exists today.

Since the original permission for the landfill development was granted there is an increased pre-treatment obligation required for waste before being disposed at landfill. The forecast traffic figures in the traffic assessment report that accompanied the original application considered the then prevailing payloads of vehicles transporting untreated wastes to landfills. Typically wastes to landfill had arrived in refuse collection vehicles with average payloads of 8.5 tonnes and 14.5 tonnes. In the original traffic report, one third of all waste was assumed to arrive in typical refuse collection vehicles with a capacity for 8.5 tonnes and the remaining two thirds was assumed to arrive in larger bulk containers carrying 14.5 tonnes. These estimates of vehicle payload were based upon empirical data recorded at landfills operating at that time of preparing the traffic study and report.

The original proposed development for the disposal of 180,000 tonnes was estimated to have the potential to generate approximately **15,334 HGV trips per annum**. This equates to an average of **51 HGV trips per day** associated with the delivery of waste materials for both disposal and recovery. A vehicle 'trip' is defined by a vehicle 'movement' to and a vehicle 'movement' from the site.

Under the above traffic flow assessments, the development was shown through detailed network traffic modelling analyses not to have a significant impact on the operation and capacity of the receiving road network including the N2 National Primary Road, the R150 and the R153 Regional Roads.

Under planning application PL01/5006 the landfill was granted permission to accept 132,000 tonnes of material per annum.

It can be appreciated that when it was decided that the landfill could receive 132,000 tonnes of waste per annum, that decision was based upon the then prevailing policy where untreated waste was acceptable at landfill. Based on the principles of the original traffic assessment and the prevailing payloads of vehicles carrying untreated waste, the permitted 132,000 tonnes of untreated material was estimated as likely to have generated 5,175 refuse collection vehicles and 6,069 articulated vehicles per annum. This equates to a total potential HGV traffic generation of **11,245 HGV trips per annum** which in turn equates to an average value of **38 HGV trips per day** for the disposal or recovery of waste. This is the average traffic generation rate envisaged in the determination of that planning application.

Summary of 2005 Traffic Report Findings – (PL NA/60336)

Planning application PLNA/60336 sought to increase the annual volume of waste received at the site to 200,000 tonnes.

Since the grant of planning permission for the site under PL01/5006, national policy had been amended so that most waste received at landfill sites is pre-treated. The logistical implications of the waste treatment policy are that most waste arriving at the landfill must have been treated at a materials recovery or waste transfer facility where waste is bulked up which results in a significant increase of the average payload of vehicles arriving at landfill sites; correspondingly for the same annual disposal tonnage the traffic generation for landfill sites had decreased significantly since the original Traffic Impact Assessment (PL01/5006).

From a review of weighbridge data recorded at the site in 2005, the average payload of vehicles arriving at the site was 21.4 tonnes.

The proposed 200,000 tonnes annual threshold for treated waste in accordance with the 2005 traffic and transport assessment report was estimated to result in the generation of **9,345 HGV trips** per annum. This equated to **1,900 HGV trips** less than had already been considered in the determination and grant of the permission to receive 132,000 tonnes of untreated waste (the original permission).

The proposed 200,000 tonnes threshold was estimated to result in an average HGV traffic generation of **31 HGV trips per day**.

The forecast potential average traffic generation of 31 HGV per day operating at the proposed 200,000 tonnes threshold for treated waste is approximately 20% lower than the 38 HGV per day estimated to be generated by the permitted PL01/5006 development which included for 132,000 tonnes of untreated waste.

8.2 Existing Environment

8.2.1 General Location of Site and Road Network

The site is located in the townland of Knockharley, approximately 6km south of Slane on the west side of the N2 National Primary Route. Navan is located approximately 13km to the west of the site via Balrath Cross and the R153 Regional Road.

To the north, the site is bounded by the CR384 County Road running east-west. To the east the site is bounded by the CR384 running north-south between the N2 and R150. The CR384 in this location runs almost parallel to the N2. To the south, the site is bounded by farmland, which is generally located adjacent to the R150 on the Kentstown side of the N2. To the west, the site is bounded by mainly gently sloping farmland, mostly in large fields generally defined by mature hedgerows with some groups of trees.

The N2 has a posted speed limit of 100kph in the vicinity of the site and is the primary access route to and from the site.

Save for the CR384, which is not used by site traffic, the general road infrastructure in the immediate vicinity of the development site is of a relatively good standard in terms of road alignment, surfacing and cross-section.

8.2.2 Existing Site Access

The existing site enjoys direct vehicular access to the national roads network with primary access facilitated at a ghost island junction on the N2. The ghost island provides sheltered access for right turning vehicles travelling from the north. This is complimented with an auxiliary left turn deceleration lane to facilitate access for vehicles coming from the south. Both turning facilities aid in preserving the flow, speed and therefore the capacity of through traffic on the N2. The junction has been designed and constructed in accordance with the NRA: Design Manual for Roads and Bridges (DMRB) and has been the subject of Roads Safety Auditing (Stages 1, 2 and 3) in accordance with procedures set out in the relevant NRA guidelines.

The access road to the site from the N2 runs due west through arable lands, thereafter running under the CR384 County Road. The entrance proper to the site is located approximately 80 to 100 metres west of the underpass of the CR384. A security gate with closed circuit television is located on the access road. This aids site security staff in preventing unauthorised traffic from entering the site.

8.2.3 Existing HGV Routing

The original grant of permission conditions the site operator to provide a traffic management plan. The traffic management plan includes provisions for prohibiting traffic directly associated with the landfill from travelling along the R150 between its junctions with the N2 and the R153 in Kentstown. After the opening of the landfill site it was found at subsequent planning forums that the traffic management system of prohibiting landfill traffic by means of a contracted arrangement functions successfully and to the satisfaction of the Planning Authority. It should be noted nonetheless that other HGVs including waste industry related vehicles generated by nearby waste treatment facilities are not prohibited from using the R150.

8.2.4 Existing Policy - Local Authority Roads Network Objectives

In summarising the transport policies and programmes for County Meath and the local area in particular, reference has been made to the Meath County Development Plan 2013-2019.

In June 2006, the N2 Realignment Scheme (incorporating a Bypass of Ashbourne) opened for public traffic. The M3 Clonee to Kells Motorway opened in June 2010. This project involved the construction of a 50km section of motorway/dual carriageway and 11km of single carriageway. The scheme also involved the construction of a further 24km of link roads and widening and re-alignment of other roads. The improvement to the N3 is acknowledged to have afforded direct traffic relief to the N2. It is considered likely that a portion of traffic on the regional roads linking between the N2 and N3 through Rathoath (R155, R125), Dunshaughlin (R125), Kentstown (R153, R150) etc. may have been attracted to transfer from the N2 to the upgraded N3 which is vastly improved over the quality and capacity of the N2.

Minor improvements, including resurfacing works, have been implemented at the nearby Rathdrinagh Crossroad Junction, R150 crossroad and the R153 Balrath Cross and the approach roads leading to these junctions. Save for isolated junction improvement works, overlays for pavement strengthening, traffic calming and other low-cost safety and further general road maintenance measures it is understood that the Local Authority has no proposals to significantly upgrade the N2 in the vicinity of the site.

The Meath County Development Plan 2013-2019 outlines its commitment to reviewing proposals for the construction of a bypass at Slane.

In the long term, the Leinster Outer Orbital Route has been identified by the Dublin Regional Authority and the Mid-East Regional Authority, now known as the Eastern and Midlands Regional Assembly, as a key strategic link between Drogheda-Navan-Trim-Maynooth-Naas-Wicklow. This scheme would comprise a road corridor connecting Drogheda and Navan with Enfield and Naas. It would serve as a second bypass of Dublin City to complement the M50 and would link the majority of Dublin's main radial routes: M1, M2, M3, M4 and M7. The M11 would not be served by the Leinster Orbital Route. The proposed scheme would be provided with a new interchange with the existing N2 or future M2 Ashbourne to Ardee Road. If built, the interchange is expected to be located in the vicinity of the existing Knockharley landfill. Notwithstanding the fact that access to the existing landfill is of high quality, a nearby interchange providing additional accessibility to new strategic infrastructure would benefit the landfill development. NRA appointed consultants undertook a Feasibility Study for the proposed Leinster Orbital Route and this was submitted to the Department of Transport in 2007. It appears unlikely that the orbital route will be constructed during the lifetime of the landfill development. The Transport Strategy for the Greater Dublin Area 2016-2035 confirms that up to the horizon year of the plan, no work will take place on this road, though its route will be kept clear of development for possible later implementation.

8.2.5 Existing Opening Hours

The operational hours of the site are:

- Operating hours are 07:300-18:30 hrs Monday to Saturday inclusive
- Waste acceptance hours are 08:00-18:00 hrs Monday to Saturday inclusive.

The site does not operate on Sundays or Bank Holidays. This constitutes approximately 300 working days per annum. Although the site does not accept waste before 08:00 hrs, in the interest of traffic safety on the N2 vehicles arriving from 07:30 hrs are permitted to enter the site, however they are not permitted to cross onto the weighbridge before 08:00 hrs. The length of the internal road network is approximately 800m from the N2 to the weighbridge and this ensures that any short-term queuing arising does not have the potential to back up to and interfere with the free flow of traffic on the N2.

8.2.6 Existing Traffic Flows

Overview of Surveys

Classified CCTV traffic turning count surveys have been carried out by Abacus Transportation Surveys Ltd. at the existing access to the landfill site. The turning count survey was undertaken on Tuesday 10th February 2015 between 07:00 hrs and 19:00 hrs. A further classified CCTV traffic turning count survey was undertaken at N2/R150 O'Brien's Cross on 5th September 2016. In addition, Abacus also carried out an Automatic Traffic Counter (ATC) survey on the N2 mainline carriageway at a location approximately 100m south of the site access. The ATC count spans the period from midnight on Thursday 5th February 2015 to midnight on Thursday 12th February 2015. A further ATC survey was undertaken at the same location and spans Saturday 3rd September 2016 to Friday 9th September 2016.

To provide empirically based forecasts of the likely distribution of traffic generation to and from the landfill, reference is made to previous traffic counts undertaken on behalf of Trafficwise Ltd. by Abacus Transportation Surveys in May 2010 at Rathdrinagh Cross, O'Brien's Cross and Balrath Cross. Abacus were instructed by Trafficwise Ltd. to identify and separate landfill HGV traffic from all other HGV at each count location thus providing a distribution to the greater road network. Notwithstanding that the data is from 2010, these surveys combined with other data sources and current weighbridge data are considered a reasonable basis upon which to estimate the likely future distribution of site generated HGV on the road network in the vicinity of the site.

All turning count survey data from 2016, 2015 and the origin destination survey data from 2010 including survey location mapping is provided in Appendix 8.1.

Receiving Road Traffic Flows

The automatic traffic counter survey data provides a continuous record of:

- Traffic Volume by Direction
- Vehicle Classification (Category of Vehicle) by Direction
- Vehicle Speed by Direction.

Comprehensive summaries and analyses of the ATC survey data are provided in Appendix 8.2.

The principal receiving road in the vicinity of the site which currently carries practically all landfill generated traffic and which has the potential to carry traffic from the proposed development is the N2 National Primary Road and to a lesser extent the R150 (east of O'Brien's Cross Roads) and the R153 (west of Balrath Cross Roads).

Analysis of the traffic flow data on the N2 recorded by the ATC surveys is summarised in the graphical output provided in Appendix 8.2 as follows:

- Figure 1 Total & Average Daily Two-way Traffic Flows 2015
- Figure 2 Total & Average Daily Traffic Flows by Direction 2015
- Figure 3 Hourly Traffic Flow - Friday 6 February 2015
- Figure 4 Hourly Traffic Flow - Saturday 7 February 2015
- Figure 5 Hourly Traffic Flow - Sunday 8 February 2015
- Figure 6 Hourly Traffic Flow - Monday 9 February 2015

- Figure 7 Hourly Traffic Flow - Tuesday 10 February 2015
- Figure 8 Hourly Traffic Flow - Wednesday 11 February 2015
- Figure 9 Hourly Traffic Flow - Thursday 12 February 2015
- Figure 10 Average Weekday Hourly Traffic Flow 2015
- Figure 11 Total & Average Daily Two-way HGV Traffic Flows 2015
- Figure 12 Total & Average Daily HGV Traffic Flows by Direction 2015
- Figure 13 Hourly HGV Traffic Flow - Friday 6 February 2015
- Figure 14 Hourly HGV Traffic Flow - Saturday 7 February 2015
- Figure 15 Hourly HGV Traffic Flow - Sunday 8 February 2015
- Figure 16 Hourly HGV Traffic Flow - Monday 9 February 2015
- Figure 17 Hourly HGV Traffic Flow - Tuesday 10 February 2015
- Figure 18 Hourly HGV Traffic Flow - Wednesday 11 February 2015
- Figure 19 Hourly HGV Traffic Flow - Thursday 12 February 2015
- Figure 20 Average Weekday Hourly HGV Traffic Flows 2016
- Figure 21 Total & Average Daily Two-way Traffic Flows 2016
- Figure 22 Total & Average Daily Traffic Flows by Direction 2016
- Figure 23 Hourly Traffic Flow - Friday 6 February 2016
- Figure 24 Hourly Traffic Flow - Saturday 7 February 2016
- Figure 25 Hourly Traffic Flow - Sunday 8 February 2016
- Figure 26 Hourly Traffic Flow - Monday 9 February 2016
- Figure 27 Hourly Traffic Flow - Tuesday 10 February 2016
- Figure 28 Hourly Traffic Flow - Wednesday 11 February 2016
- Figure 29 Hourly Traffic Flow - Thursday 12 February 2016
- Figure 30 Average Weekday Hourly Traffic Flow 2016
- Figure 31 Total & Average Daily Two-way HGV Traffic Flows 2016
- Figure 32 Total & Average Daily HGV Traffic Flows by Direction 2016
- Figure 33 Hourly HGV Traffic Flow - Friday 6 February 2016
- Figure 34 Hourly HGV Traffic Flow - Saturday 7 February 2016
- Figure 35 Hourly HGV Traffic Flow - Sunday 8 February 2016
- Figure 36 Hourly HGV Traffic Flow - Monday 9 February 2016
- Figure 37 Hourly HGV Traffic Flow - Tuesday 10 February 2016
- Figure 38 Hourly HGV Traffic Flow - Wednesday 11 February 2016
- Figure 39 Hourly HGV Traffic Flow - Thursday 12 February 2016
- Figure 40 Average Weekday Hourly HGV Traffic Flow 2016

Appendix 8.2, Figure 2 shows, by direction, the total daily traffic flow passing the existing site access location on National Road N2. The average daily traffic flow in 2015 was 3,295 vehicles northbound (toward Slane) and 3,635 vehicles per day southbound (toward Ashbourne). In September 2016 some 19 months later, the average daily traffic flow was 4,253 vehicles northbound and 4,377 vehicles southbound.

Excluding weekend traffic, the average weekday traffic flow in 2015 was 3,564 northbound and 3,895 southbound. The equivalent flow in 2016 was 4,592 northbound and 4,488 southbound.

The lowest 2015 daily traffic flow occurred on Sunday with 2,529 vehicles northbound and 3,064 southbound in 24 hours whilst the highest daily flow occurred on Monday with 3,898 vehicles northbound and 3,846 southbound. The lowest 2016 daily traffic flow similarly occurred on Sunday with 2,783 vehicles northbound and 2,938 southbound in 24 hours whilst the highest daily flow recorded in 2016 occurred on Tuesday with 4,717 vehicles northbound and 5,025 southbound.

Appendix 8.2, Figures 3 to 9 show the recorded hourly traffic flow over the course of the 2015 weeklong survey whilst Figure 23 to 29 show the corresponding traffic flows recorded in the 2106 surveys. In both cases the profile for the average daily weekday flows shows typical tidal commuter traffic pattern with peaks occurring generally between 07:00-08:00 hrs and 17:00-18:00 hrs respectively in the morning and evening.

Common to both the 2015 and 2016 surveys is that the predominant weekday traffic flow is southbound in the morning (toward Ashbourne) and northbound in the evening. As is typical for commuter traffic, the morning peak is more intense with an average morning weekday peak flow of 509 vehicles southbound and 152 northbound between 07:00-08:00 hrs in 2015.

The corresponding flows in 2016 show a decrease in the morning peak southbound flow to 439 vehicles and an increase to 223 vehicles northbound. Both surveys show that weekday evening peak is less intense but more prolonged than in the morning. Extending from 16:00 to 19:00 hrs the weekday evening peak flows in 2015 were approximately 382 northbound and 185 southbound per hour. In 2016 the evening peak hour flows were in the order of 444 northbound and 247 southbound.

Appendix 8.2, Figure 10 shows the average traffic flow recorded for each hour of the day over the course of the 2015 survey whilst Figure 20 shows the corresponding data for 2016. In 2015 the average weekday traffic flow between the hours of 07:00 and 19:00 hrs is 231 vehicles northbound and 232 vehicles southbound per hour. In 2016 the corresponding average weekday hourly traffic flows are 292 vehicles northbound and 297 vehicles southbound per hour. Weekday daily traffic flows are consistent both in terms of hourly flow and daily pattern and this is highlighted in the graphical output of Appendix 8.1.

The weekday morning peak hour occurs during 07:00 to 08:00 hrs when, in 2015 the road carried an average of 509 vehicles northbound and 152 vehicles southbound. The corresponding flows in 2016 show a decrease in the morning peak southbound flow to 439 vehicles and an increase to 223 vehicles northbound.

The recorded weekday morning peak two-way flow is approximately 1.4 times the recorded weekday average hourly traffic flow between 07:00 and 19:00 hrs in 2015, reducing to approximately 1.25 in the 2016 surveys.

The weekday evening peak hour period in both ATC traffic surveys is less well defined as there is a general rise in traffic flows for a three-hour period between 16:00 and 19:00 hrs. During the recorded peak of 16:00 to 17:00 hrs the road carries 357 vehicles northbound and 193 vehicles southbound in 2015 increasing to 400 vehicles northbound and 250 vehicles southbound in 2016. The evening peak two-way flow in 2015 is approximately 1.2 times the recorded weekday average hourly traffic flow between 07:00 and 19:00 hrs, in 2016 the peak equates to 1.3 times the hourly average.

Table 8.1 provides a summary of the recorded 2015 and 2016 speed statistics for northbound and southbound traffic passing the existing site access over the course of the 7-day survey. The separation distance is set at a standard 4 seconds to avoid records of platooning traffic.

Receiving Road HGV Traffic Flows 2015 Surveys

Appendix 8.2, Figure 12 shows the 2015 average weekday daily HGV traffic flow is 600 vehicles per day northbound (toward Slane) and 586 vehicles per day southbound (toward Ashbourne). The lowest daily HGV traffic flow was Sunday with 236 HGV northbound and 92 southbound in 24 hours whilst the highest daily flow was occurred on Wednesday with 669 HGV northbound and 597 southbound.

Appendix 8.2, Figures 13 to 19 show the 2015 recorded hourly HGV traffic flow over the course of the weeklong survey. The profile for the average weekday daily HGV flow is considered typical of the pattern of commercial traffic flows expected on regional and national roads which tend to show a distribution curve resembling the mathematical ‘standard normal distribution’ (Gaussian).

Appendix 8.2, Figure 20 shows the weekday average HGV traffic flow recorded for each hour of the day over the course of the survey. **The average weekday traffic flow on the N2 between the hours of 07:00 and 19:00 hrs was recorded in 2015 as 38 HGV northbound and 37 HGV southbound per hour**.

The 2015 morning peak hour HGV traffic flow occurred between 09:00 to 10:00 hrs which was two hours after the commuter peak hour period nevertheless it should be noted that the peak two-way HGV flow of 89 was only marginally higher than the average (practically a constant value) two-way flow for the period 07:00 to 16:00 hrs which is 79 HGV per hour.

During the weekday HGV morning peak hour 09:00 to 10:00hrs the N2 in 2015 carried a two-way flow of 89 HGV which is approximately 1.1 times the recorded weekday average hourly HGV traffic flow between 07:00 and 19:00 hrs. The evening peak hour period was less intense with a total two-way HGV flow of 81 vehicles between 16:00 and 17:00 hrs which was practically equivalent to the weekday hourly average recorded between 07:00hrs and 19:00 hrs.

Receiving Road HGV Traffic Flows 2016 Surveys

Appendix 8.2, Figure 32 shows the 2016 average weekday daily HGV traffic flow is 590 vehicles per day northbound (toward Slane) and 527 vehicles per day southbound (toward Ashbourne). This constitutes a reduction in the average daily HGV flow in the order of approximately 6% between 2015 and 2016. The lowest daily HGV traffic flow in 2016 is recorded as Sunday with 176 HGV northbound and 96 southbound in 24 hours whilst the highest daily flow occurred on Wednesday with 652 HGV northbound and 663 southbound.

Appendix 8.2, Figures 33 to 39 show the recorded hourly HGV traffic flow over the course of the weeklong survey. The profile for the average weekday daily HGV flow is considered typical of the pattern of commercial traffic flows expected on regional and national roads.

Appendix 8.2, Figure 40 shows the weekday average HGV traffic flow recorded for each hour of the day over the course of the survey. **The average weekday traffic flow on the N2 between the hours of 07:00 and 19:00 hrs is 37 HGV northbound and 31 HGV southbound per hour**.

The morning peak hour HGV traffic occurs between 09:00 to 10:00 hrs which is two hours after the commuter peak hour period. The peak two-way HGV flow of 77 is only marginally higher than the average (practically a constant value) two-way flow for the period 07:00 to 16:00 hrs which is 69 HGV per hour.

During the weekday HGV morning peak hour 09:00 to 10:00hrs the N2 carries a two-way flow of 77 HGV which is approximately 1.1 times the recorded weekday average hourly HGV traffic flow between 07:00 and 19:00 hrs. The evening peak hour period is less intense with a total two-way HGV flow of 77 vehicles between 16:00 and 17:00 hrs which is equivalent to the weekday hourly average recorded between 07:00hrs and 19:00 hrs.

Recorded Vehicle Speeds

Table 8.1 below provides a summary of the recorded 2015 and 2016 speed statistics for northbound and southbound traffic passing the existing site access over the course of the 7-day surveys.

Table 8-1: ATC Speed Records

Speed (kph)	2015 Speed Survey				2016 Speed Survey			
	Northbound		Southbound		Northbound		Southbound	
	No.	%	No.	%	No.	%	No.	%
00-10	0	0%	0	0%	0	0.0	0	0.0
10-20	2	0%	0	0%	1	0.0	1	0.0
20-30	17	0%	3	0%	30	0.2	17	0.1
30-40	15	0%	15	0%	23	0.3	10	0.2

Speed (kph)	2015 Speed Survey				2016 Speed Survey			
	Northbound		Southbound		Northbound		Southbound	
	No.	%	No.	%	No.	%	No.	%
40-50	39	1%	36	0%	89	0.9	67	0.6
50-60	66	1%	39	1%	96	1.4	104	1.2
60-70	187	3%	176	2%	253	3.0	201	2.5
70-80	1,062	11%	1,136	11%	1,499	12.0	1,135	9.5
80-90	4,118	43%	3,959	44%	5,620	45.9	4,746	38.9
90-100	4,941	82%	4,225	78%	5,635	79.9	5,681	74.1
100-110	1,652	95%	1,805	93%	2,294	93.7	2,749	91.1
110-120	438	99%	593	98%	705	97.9	930	96.9
120-130	114	100%	158	99%	214	99.2	345	99.0
130-140	41	100%	61	100%	85	99.8	93	99.6
140-150	12	100%	19	100%	26	99.9	49	99.9
150-160	2	100%	9	100%	9	100.0	15	100.0
160-170	2	100%	3	100%	3	100.0	3	100.0
Total Sample	**12,708**	**100%**	**12,240**	**100%**	**16,582**	**100%**	**16,146**	**100%**
Average	**91kph**		**92kph**		**92kph**		**94kph**	
85th Percentile	**101kph**		**103kph**		**103kph**		**105kph**	

8.2.7 Traffic Generation of Existing Landfill (Traffic Survey Data)

Light Traffic

The classified traffic turning count surveys undertaken on Tuesday 10 February 2015 included the existing site access. The recorded data includes the cumulative traffic flows generated at the existing access which are shown in Appendix 8.1.

The 2015 survey recorded a total of 14 cars and vans inbound movements (11 car and 3 vans) at the existing access and some 14 outbound movements of which 11 were cars and 3 were vans.

The 2015 survey established that the morning peak hour for light vehicles at the existing site access occurs between 08:00 and 09:00 hrs, during which a total of 5 inbound vehicle movements and 1 outbound movement were recorded. The preceding hour similarly had 5 inbound vehicles but no outbound vehicles.

The evening peak hour for light vehicles at the existing site access occurred from 17:00-18:00 hrs, during which a total of 5 outbound movements was recorded with no inbound movements. From discussions with the operators of the site, the recorded light traffic generation is considered representative of current traffic generation.

HGV Traffic

The 2015 survey data shows a total of 5 No. inbound HGV movements and 5 outbound HGV movements were generated at the existing site access. HGV traffic was generated continuously throughout the day from 07:00 hrs through to 16:00 hrs, albeit that the level of HGV activity is generally greater in the mid-morning than in the evening. HGV traffic generation during the survey dropped after 16:00 hrs.

The development peak hour for HGV traffic was recorded as 10:00 to 11:00 hrs during which a total of 1No. HGV leaves the site and 3No. HGV enter. Over the 12 -hour survey period 07:00-19:00 hrs the site generated an average of less than one HGV movement inbound and outbound every two hours.

8.2.8 Daily Traffic Profile and Distribution

Over the course of the traffic surveys in February 2015 the site generated low HGV traffic volumes as waste acceptance was generally confined to importing ash from the incineration plant located nearby in Duleek, due to a temporary period of limited waste acceptance at the site. The recorded volume of traffic is not considered a large enough sample from which to derive a reasonable and representative daily profile of HGV traffic movements or to determine a meaningful distribution of the volumes of traffic forecast as likely to be generated by the proposed development when operating at greater capacity and receiving greater quantities of waste.

Trafficwise Ltd. prepared the original planning application for the landfill and also prepared traffic assessments and analyses for various other proposals at the site. A comprehensive traffic study was undertaken by Trafficwise Ltd. in 2010. Based upon our experience of landfill and other waste recovery infrastructure and given our knowledge of this particular site the daily traffic pattern of arrivals and departures recorded in the 2010 analysis are considered representative. Normal daily HGV traffic patterns are manifest at the site access and the profile resembles a flat 'normal' type distribution typical of landfill sites, with a modest peak generally occurring before noon and stretching into the late afternoon. HGV traffic generation at the site access is typically low in the commuter peak hour periods in the morning and evening.

In addition to the 2010 detailed analysis of traffic movements current estimates of daily traffic patterns and the distribution of HGV to the receiving road network are informed by the examination of recent weighbridge data recorded between January 2016 to and September 2016.

Daily Profile of HGV Traffic Generation

Appendix 8.3, Figure 1 shows the daily profile of inbound and outbound HGV traffic movements over the course of the 2010 traffic surveys and also shows the cumulative two-way HGV traffic generation over the course of the working day. Trend lines are provided to show the typical distribution of traffic streams throughout the working day. The 2016 weighbridge data confirms a similar average daily pattern of HGV traffic movements.

The 2010 survey data shows that the landfill site generated a total two-way flow of 73No. HGV movements (**36No. Inbound and 37No. Outbound**). An average of 6No. HGV movements per hour were generated over the same timescale. During the development peak hour of 11:00 to 12:00 hrs a total of 15No. HGV movements were generated, 9No. in and 6No. out. The average weekday HGV traffic generation of the site in 2016 was **48 vehicle trips** which equates to an increase of approximately 30% over the date of the 2010 survey.

The daily profiles shown in Appendix 8.3 show that there are relatively low numbers of HGV generated at the site in the traditional morning commuter peak hour (08:00-09:00 hrs) and there is no HGV traffic generated in the traditional evening commuter peak hour (17:00-18:00 hrs). From experience in reviewing and assessing weighbridge data at this and other landfill sites together with the records of Materials Recovery Facilities, the above profile of HGV traffic generation is considered representative for Knockharley Landfill and indeed typical of the daily profile or pattern of flow recorded at landfill developments in general. Appendix 8.3, Figure 2 shows the 2010 recorded HGV traffic generation pattern based upon the hourly percentage of the total inbound, outbound and two-way HGV flows respectively.

Daily Profile of Light Traffic Generation

Appendix 8.3, Figure 3 shows the daily profile of inbound and outbound light traffic movements over the course of the 2010 traffic surveys and also shows the cumulative two-way flow traffic generation over the course of the working day. The recorded pattern and volume of traffic is considered representative of the current levels of light vehicle traffic generation. The 2010 survey shows that the landfill site generated a total two-way flow of 29No. light vehicle movements (15No. Inbound and 14 No. Outbound).

Save for the entry and egress of staff in the morning and evening there was an average of less than 1 No. light vehicle movement per hour generated over course of the working day. Sources of such traffic include visitors, meter readers, postman and other traffic associated with the day-to-day running of the site.

Some 40% of the total daily inbound light traffic is manifest principally by staff entering between 07:00-08:00 hrs whilst some 57% of the total outbound light traffic is manifest by staff leaving the site in the period 17:00-18:00 hrs. Appendix 8.3, Figure 4 shows the light traffic generation pattern based upon the hourly percentage of the total inbound, outbound and two-way light traffic flows respectively.

Distribution of Existing Landfill Traffic

The traffic count surveys of May 2010 identified the following distribution patterns at the site access:

Table 8-2: Local Distribution of Landfill Traffic (at Site Access)

Vehicle Type	HGV		Cars	
Direction of Travel	To/From North	To/From South	To/From North	To/From South
%age	52%	48%	41%	59%

The figures shown in Table 8.2 above for HGV distribution should only be considered in the context of the local turning movements of traffic to and from the existing site access. They are not representative of the distribution of landfill HGV traffic in the wider context of the receiving road network. Table 8.2 shows that 52% of HGV traffic in the surveys arrived at/departed the landfill access from/to the North, this does not however mean that 52% of all HGV traffic originated generally from the north or were required to pass through, say Ardee or Slane. This is because the existing Panda Waste MRF at Rathdrinagh Crossroads (north of the landfill) was, at the time of the traffic survey in 2010, pre-treating approximately 50% of all inbound Residual MSW before it was brought to landfill for disposal. At that time, this HGV traffic transporting residual MSW had predominantly travelled from the south, passing the landfill access on the way to the Panda Waste MRF before arriving at the landfill access. This local distribution of traffic is confirmed in the base traffic survey video data.

To establish the distribution of HGV traffic from the wider strategic road network weighbridge records for the site for 2016 have been analysed. The recorded weighbridge data for the site includes customer data which enables identification of the origin of waste and thus facilitates an analysis of HGV traffic distribution on a wider scale. The roads network serving the site and the number of route options is not complex and in the interest of maintaining such simplicity the distribution of HGV traffic to the wider road network has been analysed based upon routing north/south/east/west of the existing site. For the purposes of this study the local road network has been defined as that portion of the N2 between Rathdrinagh Cross and Balrath Cross. The categorised traffic surveys of 2010 taken in concert with the weighbridge data for 2016 shows that HGV generated by the site is currently distributed in the following proportions shown in Table 8.3. For the purposes of the traffic assessments and in the interest of simplicity it is assumed that light traffic distribution to the greater roads network is in the same proportions as that shown for HGV in Table 8.3.

Table 8-3: Distribution of Landfill Traffic (Greater Road Network)

Direction	To/From **N2 North**	To/From **N2 South**	To/From **R150**	To/From **R153**
%age	5%	85%	5%	5%

8.3 Forecast Traffic Generation of the Proposed Development

8.3.1 Overview

It is proposed to increase the acceptance of waste at the landfill from the current permitted annual rate of 88,000 tonnes to a maximum annual total of up to 440,000 tonnes.

The development proposal includes the following pre-treatment, recovery and disposal activities:

1. Landfilling of non-hazardous household, commercial and industrial wastes, including stabilised residual fines
2. Landfilling of Construction & Demolition (C&D) waste, including non-hazardous contaminated soil
3. Acceptance of incinerator bottom ash (IBA)
4. Biowaste treatment

Landfilling of Non-hazardous household, commercial and industrial wastes

Landfilling of non-hazardous household, commercial and industrial waste including stabilised residual fines is currently undertaken at the facility and the proposal includes for an increase in the quantum of this material accepted for landfilling at the site. The proposed increase will be accommodated within the current permitted landfill footprint. These materials will be delivered in bulk articulated delivery vehicles carrying a typical average payload of 23.8 tonnes. These vehicles enter the site laden and leave empty.

Landfilling of C&D waste incl. non- hazardous contaminated soil

Landfilling of soils is currently undertaken at the facility. C&D wastes will be transported in articulated tipper trailers. For the purposes of the traffic assessment it is assumed from inspection of site weighbridge records that the capacity of such trailers carrying C&D wastes including non-hazardous soil and stones is 24.1 tonnes.

Acceptance of Incinerator Bottom Ash

It is proposed to develop a dedicated area for the placement of incinerator bottom ash (IBA). IBA will be transported in articulated vehicles. For the purposes of the traffic assessment it is assumed from inspection of site weighbridge records that the capacity of such trailers carrying IBA is 25.6 tonnes.

There is potential for IBA to be exported from the site for potential reuse trials in future years depending to aid the development of a future market for IBA re-use market. It is assumed that this material can be exported in similar vehicles carrying similar tonnages to those vehicles that transported the material to the site. Therefore, in the potential event that IBA material was being both imported to the site and exported from the site at the same time, backhaul of this material is expected - accordingly whether these materials remain within the site or get exported the volume of traffic generated at the facility is assumed to be unaffected.

Other Sources of HGV Traffic Generation

In addition to the schedule of waste imports outlined above, the landfill will also have the potential to generate HGV arising from the transport of construction fill and cover materials. It is calculated that up to a total of 50,000 tonnes of fill and cover material may be needed at the site, but this is expected to be won principally on site and from the proposed acceptance of soil and stones and C&D waste materials. The inclusion of an allowance for the importation of fill materials is considered to be a conservative approach.

The export of leachate from the existing landfill also generates HGV traffic. Currently leachate removal results in an average of 2No. HGV trips per day. For the purposes of assessment and based on the data presented in Chapter 2 – 'Description of the Development', it is calculated that the development could generate some 45,000 tonnes of leachate which will be tankered from the site. Tree felling could generate up to 75 HGV movements over a 5-year period.

8.2.1 Tonnages for Acceptance/Export

Table 8.4 provides a summary of the proposed potential tonnages of waste materials accepted at the site and materials exports from the site.

Table 8-4: Potential Tonnages Accepted

Waste Stream	Potential Tonnage	
Incinerator Bottom Ash	150,000t	150,000t
Non-hazardous Soil & Stones and C&D Waste	50,000t	290,000t
Residual MSW	140,000t	
Residual Fines	55,000t	
Bulky Waste/Street Cleanings	45,000t	
Leachate Disposal	45,000t	Export
Felled Timber and Barsh	360t (over a 5 yr period)	Export
Cover Material (Provisional)	(50,000t)	(50,000t) Won on site or from inputs

Based upon the above potential tonnages proposed to be accepted at the site together with ancillary processes such as cover materials import leachate disposal and timber the following Table 8.5 provides an estimate of the potential annual and daily average traffic generation of the landfill site under the current proposals. The average payload for each waste stream has been determined empirically from weighbridge data. In the interest of simplicity, it is assumed for the purposes of the traffic assessment that the proposed development will reach the proposed acceptance capacity of 440,000 tonnes per annum in the Opening Year assumed to be 2019. It is proposed that the development site will import and export waste between the hours of 07:30 and 18:00 hrs Monday to Saturday inclusive. Current weighbridge data shows that activity on Saturdays is on average approximately one quarter of that for weekdays. For the purposes of the assessment of traffic it is assumed that the site operates for a total of 258 days per annum based upon [(52 wks x 5 days) +(52 wks x ¼ days) – 15 days] where the 15 days include 9 bank holidays and Christmas.

Table 8-5: Potential Annual Traffic Generation

Waste Stream	Tonnage	Vehicle Payload	Annual Vehicle Trips			Daily Trips
			Waste Inbound	Bi-product Outbound	Total Trips	
Incinerator Bottom Ash	150,000t	25.6t	5,556	--	5,556	23
Non-hazardous Soil & Stones and C&D Waste	50,000t	24.1t	2,174	--	2,174	8
Residual MSW#	140,000t	23.8t	6,087	--	6,087	23
Residual Fines	55,000t	23.4t	2,391	--	2,391	9

Waste Stream	Tonnage	Vehicle Payload	Annual Vehicle Trips			Daily Trips
			Waste Inbound	Bi-product Outbound	Total Trips	
Bulky Waste/Street Cleanings	45,000t	22.5t	1,957	--	1,957	8
Total Waste Streams	**440,000t**	**NA**	**18,164**	**--**	**18,164**	**71**
Leachate Disposal	45,000	NA/27t	--	1,667	1,667	7
Timber and brash	360	NA/25	--	15/an	15/an	0
Cover Material (Provisional)	(50,000t)	(23t/NA)	(2,174)	--	(2,174)	(7)

The average daily HGV traffic generation of **78** vehicles is based upon the assumption that the export of any potential recovered materials e.g. IBA for a re-use trials, would be by backhaul.

8.2.2 Construction Phase – HGV Traffic Generation

Construction traffic will be generated by the proposed development. In the interest of simplicity, it is assumed that all site infrastructure will be developed in a single construction phase. In practice however, it is highly likely that various construction projects may be progressed over a long period of time generally dictated by market forces. For the purposes of this robust traffic assessment, a singular construction period of less than twelve months is envisaged for each phase as this assumes a 'worst case' construction scenario from a traffic viewpoint.

The primary generators of traffic during construction will be construction staff and the delivery of construction materials. Construction materials are expected to be predominantly structural steel, cladding and concrete for the development of the biowaste facility building and leachate infrastructure. Based on our experience of similar projects, including the planning and development of the existing landfill facility and the planning and development of various waste treatment and waste handling facilities (examples incl. Ballynagran Landfill Wicklow, East Galway Landfill, MRF Millennium Business Park, MRF Cappagh Road, MRF Rathdrinagh, MRF Ballymount) it is estimated that no more than 25No. HGV trips per day would be required to cater for the delivery of these materials to the site during the most intensive construction period. This figure is considered to represent upper value or robust estimate of construction HGV traffic generation. Average construction HGV traffic generation is expected to be in the region of 15No. HGV trips per day.

Construction plant is expected to mainly consist of rigid body vehicles, 8-wheel tippers, ready-mix HGV and articulated vehicles.

The ongoing construction of new cells for the currently permitted landfill footprint at Knockharley has been granted planning permission under Planning Reg. Ref. PL01/5006. No additional cells are proposed to be constructed under the current application for the currently permitted footprint; nonetheless the traffic analysis acknowledges the likely traffic generation arising from the ongoing construction of these cells. In addition, the proposed dedicated IBA area included within this application will comprise of portal frame building and newly constructed cells, which will be constructed in the same manner as those within the currently permitted footprint.

New cells associated with currently permitted footprint must be constructed on average every 1 - 2 years. Construction usually occurs over approximately a 10-week period. Materials imported on site are primarily made up of liner, granular and drainage materials. Based upon the construction of previous landfill cells, the construction of new landfill cells associated with the permitted footprint is likely to result in an average daily traffic generation of 10No. HGV per day. No more than 10No. staff members are usually required to carry out the work; such staff could further generate some 15No. car/van trips per day. In practice, and from a sequencing and cost viewpoint, construction of new cells within the permitted footprint, construction of new cells associated with the dedicated IBA area and construction of the biowaste facility will be undertaken as one project.

Therefore, the only impact of including the construction of the new IBA cells will be a longer construction duration, which can be assumed to be approximately a further 8 weeks – thus, the average daily traffic generation of 10No. HGV per day is assumed but over a longer construction period of approximately 18 weeks.

Following discussions with the Applicant construction of new landfill cells (permitted area and IBA area) will be programmed so it is not concurrent with construction activities arising from the proposed facility building and leachate plant infrastructure development as such the years in which construction of these new elements are likely to occur does not take no account of traffic arising from the construction of further landfill cells. Traffic arising from construction of new landfill cells has not been included in the forecast construction traffic generation values since this work gives rise to a less intensive daily traffic generation typically carried out over an approximate 18-week period.

The objective of the traffic assessment is to analyse the impact arising from upper value or robust forecasts of traffic generation arising at the proposed development site. The traffic generation at the development is greatest when it is fully operational and that is therefore the scenario which is subject of detailed analysis. Traffic generation during the construction of site infrastructure is considerably less than when such infrastructure is completed, is fully operational and receiving materials. Lesser volumes of traffic arise during the construction period and it follows that such traffic is likely to have a lesser impact than operational traffic accordingly the traffic assessments do not include for a separate capacity analysis during the construction period. In all cases the HGV traffic generated by the operation of the proposed development exceeds that of the respective construction periods combined with existing landfill traffic generation, accordingly it follows that the traffic scenarios where the proposed development is operational represents a worst-case scenario typically associated with the upper values used in traffic impact studies.

The Applicant to comply with Local Authority policy on maintaining the roads serving the site clean of dirt and debris associated with the development of the site. An outline Construction Traffic Management Plan has been prepared as part of the outline Construction Environmental Management Plan (CEMP) provided in Appendix 2.1.

8.2.3 HGV Traffic Profile and Peak Hour HGV Generation

Based upon the HGV traffic profile shown in Figures 1 and 2 of Appendix 8.3, Appendix 8.4, Figure 1 shows the forecast average HGV assessment value traffic generation of the proposed development.

Appendix 8.4 Figure 1 shows that the development peak hour under the upper assessment value occurs between 11:00-12:00 hrs and includes some 21 HGV entering the site and 13 HGV departing.

The traffic generation forecast during the traditional commuter peak hour 08:00-09:00 hrs is 5 HGV entering the site and 7 HGV departing.

No HGV traffic is generated in the traditional evening commuter peak hour 17:00-18:00hrs.

8.2.4 LGV Traffic Generation

The proposed development will also generate LGV trips daily. LGV traffic will arise primarily from landfill a facility staff, construction staff, sundry visitors etc.

At the time of the May 2010 traffic surveys upon which base LGV profiles have been established, the existing landfill site employed some 10No. staff (8No. Operations/Management staff and 2No. Machine Operators). These staff members are based on site for the majority of any working day. The 2010 traffic count survey recorded a total of 15No. inbound and 14No. outbound LGV entering and exiting the site. These values tally with a typical traffic generation rate of 1.5 LGV trips per day for staff members.

Following the proposed development, it has been assumed that 10No. additional staff will be hired full time on site following the realisation of the extra activities associated with the proposed development. Each staff member is expected to generate 1.5 car/van trips per day. This allows for staff arriving on site in the morning and departing the site in the evening, together with trips at lunchtime and sundry private activities.

Based upon the survey data it is expected that there would be and average of 15 additional LGV trips per day associated with the day-to-day running of the site.

Based upon the HGV traffic profile shown in Figure 3 of Appendix 8.3, Figure 3 of Appendix 8.4 shows the forecast assessment value inbound and outbound LGV traffic generation of the proposed development.

During the development peak hour 11:00-12:00 hrs some 2 LGV enter the site whilst 3 LGV leave. The LGV traffic generation forecast during the traditional commuter peak hour 08:00-09:00 hrs is some 5 LGV entering the site and 5 LGV departing. In the evening commuter peak hour 5 LGV enter and 20 LGV depart.

8.2.5 Forecast Peak Hour Traffic Generation (HGV & LGV)

Development peak hour traffic flows have been calculated based upon the traffic flow patterns recorded at the existing landfill site access in the 2010 classified turning count surveys taken in concert with the 2016 weighbridge data. The peak hour for traffic at the existing landfill has been identified as 11:00hrs to 12:00 hrs. Table 8.6 provides a summary of the total daily traffic generation of the site for HGV and LGV with both existing average and proposed assessment values. In order to facilitate the determination of the potential incremental increase in traffic arising from the proposed development Table 8.6 also shows the recorded average traffic generation of the existing landfill based upon 2016 weighbridge data for HGVs.

Table 8-6: Daily Traffic Generation

Peak Hour	HGV		LGV		Total	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Assessment Value	78	78	35	35	113	113
Current 2016	48	48	20	20	68	68

Table 8.7 provides a summary of the total development and commuter peak hour traffic generation at the site for the forecast assessment traffic generation potential of the proposed development.

Table 8-7: Forecast Peak Hour Assessment Value Traffic Movements

Peak Hour	HGV		LGV		Total	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Morning Peak Hour 08:00-09:00hrs	4	7	5	5	9	12
Development Peak Hour 11:00-12:00hrs	21	13	2	3	23	16
Evening Peak Hour 17:00-18:00hrs	0	0	5	20	5	20

8.2.6 Distribution of Development Traffic at Site Access and to Greater Road Network

Existing distribution patterns for landfill related traffic are provided in Tables 8.2 and 8.3. As a result of the proposed development traffic distribution patterns are expected to reflect those of the May 2010 surveys when the site was receiving quantities of waste close to those permitted (132,000 tonnes).

For the purposes of the traffic assessment, save for the acceptance of IBA from Duleek and the R150, the traffic distribution is assumed unlikely to change appreciably from that established from the 2010 classified distribution turning count which is considered a reasonable assumption upon which to base the traffic analyses.

At the time of the 2010 traffic count survey a large proportion of traffic at the landfill had arisen from a nearby MRF located approximately 2.4km north of the application site access. Approximately 50% of inbound loads were pre-treated at this MRF. Under the current application, it is expected that in general the proposed development will result in a higher volume of stabilised waste arriving at the landfill.

HGVs bringing stabilised waste to the site are considered more likely to arrive from the south. Given the proposal to import a larger proportion of IBA (c. 35% of maximum incoming tonnages) it is also likely that a larger proportion of HGV traffic will arrive from the south of the site access. For the purposes of the traffic analyses the established 2010 surveyed traffic distribution patterns (shown in Table 8.3) for the greater road network are considered a reasonable estimate of the likely future site traffic distribution locally at the site access.

Forecast future traffic distribution patterns at the site access are shown in Table 8.8 below whilst traffic on the greater road network is shown in Table 8.9 which makes allowance for a greater proportion of incoming IBA materials arising from the nearby Indaver incinerator at Carranstown, Duleek.

Table 8-8: Future Development Traffic Distribution (Site Access & Greater Network)

Location	HGV		LGV	
	To/From North	To/From South	To/From North	To/From South
At Site Access	5%	95%	41%	59%

In the case of development generated LGV, beyond the local road network catchment, these vehicles are expected to generally continue travelling on the N2 either north or south. It is acknowledged that some of this traffic will travel to/from the Navan and Duleek directions and perhaps locally. The daily volume of LGV traffic arising at the site is low in any case and is unlikely in and of itself to give rise to a significant impact upon the operation of local junctions. As can be appreciated, the local movements of staff would be likely to arise on the roads network in any case regardless of the current proposals. Comparing the surveyed figures in Table 8.3 to those in Table 8.9 it can be seen that it is forecast that there would be a potential increase in R150 traffic arising from the proposal to accept incinerator bottom ash material. Since a greater volume of development traffic originates from the south of the site (N2 and R150) it follows that there is a resultant proportional uplift in traffic from the south and thus a lesser percentage of the total traffic generation arises from the north.

Table 8-9: Distribution of Landfill Traffic (Greater Road Network)

Direction	To/From **N2 North**	To/From **N2 South**	To/From **R150**	To/From **R153**
%age	1%	86%	10%	3%

8.4 Summary of Potential Significant Effects of Development Traffic upon the Local Road Network

The corridor upon which development generated traffic will have the greatest impact is the N2 including O'Brien's Cross. NRA Project Management Guidelines 'Unit 16.2 Expansion Factors for Short Period Traffic Counts' can be used to derive a value for AADT from the weeklong ATC traffic surveys undertaken near and to the south of the site access. AADT values for the R150 at O'Briens Cross can be calculated from the Classified 12 hour Turning Count survey undertaken on Tuesday 6th September 2016. Factors are calculated using the NRA published traffic flow profiles provided in Unit 16.2 Annex A which are then used to convert the average hourly traffic flows recorded for each hour of the day over the week.

Using this method, the average daily two-way traffic flow on the N2 at the site access is calculated to be 8,276 vehicles in September 2016, based upon a week's data. Using a Monthly Flow Index value of 0/96 from 'Unit 16.2 Annex C' for September, the estimated AADT in 2016 on the N2 south of the site access is 8,621 vehicles. Using the corresponding factors for the 12 hour classified turning count at O'Briens Cross the AADT on R150 is estimated to be 2,905.

In order to provide an evaluation of the likely volume of development traffic arising on the local road network, we reference the site HGV traffic generation arising from the weighbridge records for 2016, which show an average traffic generation rate of 48 HGV per day, whilst the turning count data at the site access from 2010 shows that the current complement of staff traffic movements. Table 8.10 over provides a summary of the current and forecast future traffic flows on the receiving road network arising from the landfill. The figures are based upon the above estimated AADT values for the N2 and R150 which are the roads affected by the proposed development.

Forecast future year AADT is based upon NRA Project Management Guidelines 'Unit 5.5: Link-Based Traffic Growth Forecasting' medium growth rates which are as follows: 1.011 Cars (1.008 HGV) for the period 2006-2025 and 1.009 (1.001) thereafter.

Table 8-10: Development of Traffic relative to Local Road Network Traffic

Road Link	AADT			Potential Development Traffic Generation Daily Two-way Movements		
	2018	2019 Opening	2029 +10 Yrs	2016	Proposed Opening 2019	Opening + 10yrs 2029
N2 South of Site Access	AADT 8,812 HGV (11.6%) 1,022	AADT 8,909 HGV (11.6%) 1,033	AADT 9,860 HGV (11.6%) 1,144	95 HGV 40 LGV (1.56% of AADT) [Existing]	162 HGV (+67) 69 LGV (+30) (2.6% of AADT) [Existing +1.1%]	162 HGV (+67) 69 LGV (+30) (2.3% of AADT) [Existing +1.0%]
R150 Between N2 and Duleek	AADT 2,969 HGV (12.4%) 368	AADT 3,002 HGV (12.4%) 372	AADT 3,323 HGV (12.4%) 412	10 HGV 4 LGV (0.47% of AADT) [Existing]	16 HGV (+6) 7 LGV (+3) (0.77% of AADT) [Existing +0.3%]	16 HGV (+6) 7 LGV (+3) (0.7% of AADT) [Existing +0.3%]

Since traffic is assumed in the NRA forecasts only to grow it follows that the proposed development is likely to have the greatest direct impact upon the local road network in the Opening Year 2019, during which development traffic could constitute an average of 2.6% of overall N2 daily traffic flows between the site access and O'Briens Cross with values dropping to the south due to a proportion of development traffic using the R150.

These figures represent an incremental increase over the traffic generation of the existing development in the order of 1.1%. These figures which are shown in the box brackets in Table 8.10 are not significant in the context of the overall carrying capacity of the strategic N2 National Primary Road.

The road link which is expected to carry the most development traffic is the portion of the N2 between the site access and Balrath Cross. The figures show that the proposed development is unlikely to give rise directly to a significant increase in the number of vehicles using the regional and local roads in the vicinity of the site. While some IBA material from the Indaver incinerator at Duleek is currently accepted at the landfill, there is expected to be an increase in the number of vehicles transporting IBA from that facility, however it can be appreciated that this traffic is already on the network in any case and is not directly generated by the landfill site, as all IBA generated at Duleek is consigned for management at a number of facilities, of which Knockharley Landfill is one.

The forecast percentage incremental increases in traffic arising as a direct result of the development are considered to be within typical daily fluctuations in traffic volumes on the roads network. Furthermore, the forecast increases are significantly below the threshold of 10% in uncongested areas set out in the NRA's Traffic and Transport Assessment Guidelines as requiring detailed traffic modelling assessments of junction performance.

In the context of the standard of access provided at the existing landfill it can be concluded that the potential incremental increase in traffic generation arising at the existing site are highly unlikely to compromise the capacity or the level of service provided by the existing local or strategic roads network serving the site. In summary, the impact of the traffic arising from the proposed development of the site will not give rise to significant impact upon the capacity and operational efficiency of the receiving road network principally the N2.

8.4.1 Performance of Landfill Access

Tables 8.6 and 8.7 provide a summary of the forecast traffic generation of the site for the various traffic peaks. In the morning and evening when N2 commuter traffic is heaviest the traffic generation of the proposed development is low. Conversely during the peak hour at the development, the flows along the N2 are lower than at peak times.

DMRB TD41-42 (Superseded) Figure 2/2 provides a guide to the relative major/minor road flows which can be accommodated at various junctions. Figure 2/2 shows that existing site access infrastructure can accommodate many multiples of the forecast traffic flow to the site. It follows that the site access will operate well within capacity for the foreseeable life of the development. Given the configuration of the existing landfill access with ghost island right turn lane and auxiliary left turn lane it is not considered necessary to undertake detailed computer modelling analyses (PICADY or similar) of the capacity of the access.

It is unsurprising that the landfill access would have a significant level of reserve capacity even after implementation of the proposed development. The existing site access junction was designed in accordance with the NRA: Design Manual for Roads and Bridges. Such junctions are designed to accommodate significantly more traffic than the site could reasonably be expected to generate. The proposed access has the capacity to accommodate over 10 times forecast traffic flow to and from the site. The right and left turning lanes at the site access aid in reducing to a minimum potential delay to following traffic and this helps to maintain the carrying capacity of the national road. The potential additional traffic arising at the development site will have no significant effect upon the operation of the existing site access junction.

8.5 Road Safety Review

The objective of this section is to consider road safety implications of the proposed development through analysing collision data and investigating whether any safety hazards exist in the vicinity of the site.

8.5.1 NRA Consultation

Under a previous pre-planning consultation relating to planning at the existing landfill site in 2010, the NRA had issued a letter to the then Applicant suggesting scoping issues which should be included in the EIS.

Given that the roads infrastructure parameters have not changed materially since then it is assumed that the NRA suggested scoping issues are relevant in the context of the current application using the same existing site access and generating traffic with similar characteristics. The following bulleted points are those NRA scoping issues pertaining to road and traffic issues; each is addressed.

- The Applicant should consult with the National Roads Design Office/Local Authority with regard to the future routing of the Leinster Orbital Route.

Having reviewed the Leinster Orbital Route Feasibility Study, which was prepared by the Roughan & O'Donovan – Faber Maunsell Alliance in 2007, Map R1 shows the proposed route corridor between Drogheda and Navan. The proposed route corridor runs through the existing Landfill site however there is no reference to the Landfill site within the Feasibility Report.

In 2010 Trafficwise Ltd. contacted Mr. Nigel O'Neill a Senior Project Manager of the NRA Strategic Planning Division, Mr. Stephen Smith of Meath County Council's Infrastructure Division and Ms Fiona Redmond of Meath County Council's Planning Division. In liaising with Mr. Nigel O'Neill of the NRA we were directed to discuss particulars of the scheme with the Planning and/or Transport Department of Meath County Council, as this is the Planning Authority for the scheme. Correspondence was issued to both the Planning and Infrastructure Divisions of Meath County Council; but no reply was received. Informal discussions with Local Authority Officials nonetheless confirmed that the Route Corridor shown in the Feasibility Study Report was indicative at any rate and that it was reasonable to assume that the development of the future Leinster Orbital Route alignment would reasonably be expected to avoid the existing Landfill site.

- The NRA would be concerned if the proposed development resulted in any significant impacts on the N2.

The traffic assessment results provided in this section of the EIS clearly show that when measured against NRA traffic flow thresholds and when the access capacity is evaluated against NRA standard graphs the proposed development is extremely unlikely to have an adverse impact upon the capacity or level of service of the existing local or strategic road network. The existing ghost island site access junction together with auxiliary deceleration and left turning lane has been designed and constructed wholly in accordance with the NRA Design Manual for Roads and Bridges. The turning lanes are not warranted on capacity grounds and are provided to increase safety and to preserve the capacity and mainline flow of traffic in the vicinity of the access.

- A Traffic and Transport Assessment should be carried out.

This section of the EIS is a Traffic and Transport Assessment as defined by the NRA and is compliant with the methodology set out in the current NRA Traffic and Transport Assessment Guidelines (May 2014).

- Consult the NRA HD 19/09 to determine if a Road Safety Audit is required.

The existing site access was designed and constructed in accordance with the NRA Design Manual for Roads and Bridges and also underwent the full Roads Safety Audit procedure from feasibility stage to post construction Stage 3 auditing.

The remit of a Road Safety Audit as defined by the NRA in HD19 covers permanent physical alteration to the road network and does not cover intensification of use; accordingly, in the case of the proposed development a further Road Safety Audit is not required.

This is confirmed by the An Bord Pleanála Inspectors Report relating to a previous appeal of a separate planning application proposed at the subject site (PL 17.PA0009). The Inspector in that case states the following as part of her Assessment relating to Road and Traffic matters:

> *"Reference was made to paragraph 1.2 of the NRA DMRB HD 19, which defines a Road Safety Audit. It was observed that since the site access is not a new piece of infrastructure and does not involve new works, it was concluded that there was no subject matter for such an audit on the site access junction with the N2, as required by the NRA.*

The junction was designed and constructed in accordance with DMRB TD 42 'Geometric Design of Major/Minor Priority Junctions' and supervised during construction by Meath County Council. It was confirmed that the junction was the subject of a Road Safety Audit during the design process, details of which lie on the parent application file to the planning authority. It would appear reasonable to conclude on the basis of the forgoing that since the audit procedure essentially investigates the potential safety hazards of the design of roads prior to construction, or a proposed permanent change to a road layout, that a road safety audit is not warranted in the case of the existing junction".

8.5.2 TII Consultation

TII were consulted in relation to the current proposals. By letter dated 10th November 2016 and 29th March 2018 (Response Ref. TII16-95955 & TII18-101318) general guidance on the recommended EIAR scoping was provided in a bullet point format which is commented upon below.

- Consultations should be had with the relevant Local Authority/National Roads Design Office with regard to locations of existing and future national roads schemes; Leinster Orbital Route (LOR).

Section 8.5.1 above documents previous relevant consultation regarding LOR.

- The Authority would be specifically concerned as to the potential significant impacts the development would have on any national roads (and junctions with national roads) in the proximity of the proposed development; N2.
- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads.

The Authority's Traffic and Transport Assessment Guidelines (2014) should be referred to in this regard. The scheme promoter is also advised to have regard to Section 2.2 of the TTA Guidelines which addresses requirements for sub-threshold TTA.

This section of the EIAR is a Traffic and Transport Assessment. The volume of new traffic generated by the proposed development does not meet the appropriate thresholds and is therefore prepared under sub-threshold criteria in that it will result in a relatively modest intensification of use of an existing access on the national road network.

The traffic analyses show that the potential impact of the proposed development is unlikely to be significant on the adjoining national road or junctions thereupon:

- The developer, in conducting Environmental Impact Assessment, should have regard to TII Publications (formerly NRA DMRB and NRA Manual of Contract Documents for Road Works).
- The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required.
- In the interest of maintaining the safety and standard of the national road network, the EIS should identify the methods/techniques proposed for any works traversing/in proximity to the national road network.

The proposed development involves no modifications whatsoever to the layout and geometry of the road network or the development access on the N2. All works are internal to the site which is served by an access road of some 800m length and thus well removed from the N2. The development access already exists and was designed in accordance with the former NRA DMRB standard and complies with the corresponding current TII standard renumbered from the NRA DMRB but for the most part unchanged in terms of technical requirements. The design and construction of the existing access from the N2 was subject to a Road Safety Audit to the satisfaction of the relevant authority as follows, Stage 1 at planning application, Stage 2 prior to construction and Stage 3 post construction. Since there is no proposed permanent alteration to the road network there is no subject matter in the current proposal that might warrant a Road Safety Audit.

- In relation to haul route identification, the applicant/developer should clearly identify any haul routes proposed (construction and operation) and fully assess the network to be traversed. Separate structure approvals/permits, and other licences may be required in connection with the proposed haul route and all structures on the haul route should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal load proposed.

The haul routes are clearly identified in this section of the EIAR and principally involve the N2, R153 and R150 which have been the haul routes that have served the existing development for in excess of a decade. No abnormal loads are proposed.

8.5.3 Collision Analysis

The Road Safety Authority (RSA) currently provides collision data on the website www.rsa.ie. That online data covers the period from 2005 to 2013 and is map based and searchable. Previously, the RSA had provided accident history data directly upon request. Trafficwise Ltd. obtained traffic collision data in 2010 for a section of the N2 in the vicinity of the site. The data included a section of the N2 measuring approximately 4km in length, extending from the N2/R150 (O'Briens Cross) crossroad junction northward to the Rathdrinagh Crossroad junction.

The data provided by the RSA in 2010 contains all fatal, serious and minor injury accidents from 1990 up to and including the then most recently published 2008 data. A copy of the collision reports together with a map showing the location of each collision is provided in Appendix 8.5. The RSA data showed no collisions had been recorded at the existing site access since the opening of the Landfill in December 2004 up to the end of 2008. The data shows that some six collisions occurred on the N2 within 1km of the site access location prior to its opening.

Of the six recorded collisions within 1km of the site access, 2No were classified as 'minor injury'; 2No were classified as 'serious injury'; and 2No resulted in fatalities. Four out of the six recorded collisions occurred during the day when lighting conditions and visibility was reported as good. Conditions were recorded as icy or frosty for three collisions; wet for two collisions; and dry for one collision.

Two out of the six collisions involved two separate cars colliding with each other; two involved a single car losing control and veering into the verge and hitting a wall/gate; one involved a car attempting to overtake; and one involved a car taking action to avoid an oncoming car. Of the 2No fatal collisions, one involved a single vehicle crashing into a wall/gate along the roadside boundary approximately 1km to the north of the site access (NRA Ref.: 1991-142).

This collision occurred during the daytime when weather conditions were dry. The second recorded fatal collision involved a car losing control in icy conditions to the south of the site access (NRA Ref.: 1992-376). This collision involved two vehicles and occurred during the daytime.

The data shows a total of 30No collisions were recorded on the N2 between the Rathdrinagh Cross Roads and the N2/R150 Cross Roads between 1990 and 2008.

A total of four collisions have been recorded on the N2 between the Rathdrinagh and N2/R150 Cross Roads since the landfill opened in December 2004. None of these collisions involved HGV or Refuse Lorries, which might have been generated by the landfill. Two of the four collisions occurred in the vicinity of the Rathdrinagh Cross Roads; with the other two at the N2/R150 Cross Roads. There were two collisions in 2005; one in 2006; and one in 2007.

Collision data pertaining specifically to HGV has been analysed. Six out of the 30No collisions between 1999 and 2008 involved HGV. Three of these collisions occurred at the N2/R150 Cross Roads; two at the Rathdrinagh Cross Roads; and one was recorded on the straight stretch of road between these two junctions. A single HGV collision was recorded in the years 1990; 1991; 1992; 1993; and two HGV collisions were recorded in 2001. Five of these collisions resulted in serious injury; whilst one resulted in minor injury and one in death.

The accident/collision assessment for 1999 to 2008 clearly shows that no accidents occurred at the existing site access.

The current data on the RSA website covers the period 2005 to 2014 and shows a cluster of 5 minor accidents in and around O'Briens Cross with two serious accidents, one in 2006 involving a single vehicle and one in 2014. The data also shows a serious injury collision in 2010 at the intersection of the CR384 County Road with the N2 again a single vehicle accident.

The data shows one minor accident in the vicinity of the site access and suggests it involved a single car travelling on a Monday evening. This accident is miss-reported in that the speed limit for the N2 road is stated in the report as 30kph.

The available accident data since the landfill opened in 2004 does not show any accidents involving turning vehicles at the existing site access junction. Since the opening of the facility there has been no local increase in accidents involving HGV either at or on the approaches to the site access. None of the accidents on the RSA database involved traffic generated by the site.

8.6 Mitigation Measures

No mitigation measures are required to facilitate the proposed development, save for a commitment to adhere to the existing HGV routing arrangements.

Significant roads infrastructure both within and serving the site was provided as part of the original landfill development. The existing infrastructure serving the site is provided with features (auxiliary turning lanes) designed to increase road safety and to preserve the mainline flow of traffic and to preserve the carrying capacity of the road. This section of the EIAR demonstrates that the existing infrastructure is satisfactory for the proposed intensified use. Reserve capacity at the existing site access is likely to be in the region of 90% over the life of the development.

Since the opening of the landfill development in 2004, the opening of the N2 Realignment Scheme/Ashbourne Bypass further reduces traffic impact and the need for mitigation measures since it provides a high standard connection from the landfill to the M50 motorway and the Dublin Region. This route to the site is relatively free of vulnerable road users and does not pass through any villages or towns.

8.7 Residual Impacts after Mitigation

There will be no residual impacts on traffic and transportation in relation to the proposed development.

8.8 Conclusion & Summary

From a road safety and accessibility point of view, the Knockharley Landfill site is considered to have a number of benefits. The primary benefit is that it is located adjacent to the national primary strategic road network, which will continue to accommodate all traffic coming to and from the site. Strategic infrastructure is appropriately accessed by the Strategic Road Network.

The existing site access geometry includes a ghost island right turn lane and nearside auxiliary turning lane which provide for the safe and efficient movement of development generated traffic with minimal disruption to N2 mainline flow. The site access has been designed in accordance with the requirements of the NRA and this design in turn has been confirmed satisfactory by the relevant planning authorities through the NRA Road Safety Audit process at the initial design stage, at the detailed design stage and again after construction.

The proposed development peak hour is not expected to correspond with the recorded network peak hours on the N2 and adjoining regional roads and this reduces the potential for conflict with commuter based traffic and impacts upon the efficiency of the wider road network. The traffic assessment shows that the impact or effect of traffic arising at the proposed development upon the capacity and operation of the receiving road network will not be significant. Save for at the site access it is unlikely that the additional traffic forecast as arising from the development will be perceptible to existing road users.

The proposal at the site will result in very modest increases in traffic flows relative to the strategic road network serving the existing site. The effect of such additional traffic from the proposed development on the operation of the existing receiving road network will accordingly not to be significant. The existing development access has not resulted in increased hazard on the adjoining national road. Given the safety record of the existing access, it is reasonable to conclude that the potential intensification in vehicular use is unlikely in itself to create a significant traffic hazard.

8.9 References

Chartered Institution of Highways & Transportation (CIHT) document '*Guidelines for Traffic Impact Assessment*' (September 1994)

Design Manual for Roads and Bridges (DMRB):TD42 '*Geometric Design of Major/Minor Priority Junctions*'

Meath County Development Plan 2013-2019

NRA Project Management Guidelines 'Unit 5.5: Link-Based Traffic Growth Forecasting'

NRA Project Management Guidelines 'Unit 16.2 Expansion Factors for Short Period Traffic Counts'

National Roads Authority (NRA) '*Traffic and Transport Assessment Guidelines*' (May 2014).