7. Roads and Traffic

7.1 Introduction

This section of the EIS identifies and evaluates the likely significant impacts of the traffic generated by the proposed Ringaskiddy Resource Recovery Centre, both during its construction and operational phases.

This section describes the existing traffic situation in the area surrounding the site and provides a description of the local road network. Existing traffic levels are quantified and existing facilities for public transport, cyclists and pedestrians are described.

Brief details of the proposed development are provided and the trip generation and distribution methodologies are explained. The impact of the generated traffic on the local road network is assessed and mitigation measures which Indaver intend to include in their development proposals are investigated where necessary.

It is clear from the extensive consultations which Indaver have carried out with both the local community and the statutory authorities that traffic congestion on the main N28 approaches to Ringaskiddy and to the site, and how this congestion should be managed during the peak hours, is a major concern.

Indaver welcomes the recent announcement of the inclusion of the N28 upgrade and the pending implementation of the proposed improvements to the Dunkettle Interchange as part of the Government Capital Budget to 2021 announced recently, although these are not necessary for this project. While these road upgrades will facilitate the free flow of all strategic traffic when complete, Indaver also recognise that peak hour capacity on this strategic route will require ongoing management into the future to ensure that the corridor continues to have capacity at critical periods.

Accordingly the minimisation of commuting traffic during the morning and evening peak periods will continue to be an overriding prerogative of the road authorities and strategic road users as indicated in consultations with the road authority in relation to the N40 demand management study currently being undertaken.

Consequently, Indaver has approached the design, construction and operation of the resource recovery centre on the principle of minimising traffic at peak periods through the implementation of a HGV booking system, and the arrangement of operational personnel shifts and visitor traffic so that the facility generates minimal traffic on the local road network during the peak traffic periods once operational. These initiatives are similar to those developed at the Port of Cork as part of their approach to management of traffic flow at peak times. Furthermore, a robust staff Mobility Management Plan, will ensure that there are no staff movements to or from the facility for two-hour periods in the morning and evening by car, while HGV movements will also be reduced to a minimum level during these times.

In addition Indaver will arrange construction contracts such that all construction travel to and from the site will be controlled and managed and will not be

permitted to access the site during the peak traffic periods, except in situations of emergency.

Indaver is aware of the concern expressed by the community at the consultations in relation to the provision of enhanced active mode travel facilities including improved footpaths, cycle facilities and controlled safe road crossing points. Indaver understands that the local authority are developing proposals for the provision of improved cycle facilities as part of the Cork Cycle Network, improvements to the junction at Shannon Park and also a pedestrian crossing facility in the village of Ringaskiddy.

In this regard and as referenced elsewhere in this EIS, the Indaver facility in Meath contributes to a Community Gain Fund as part of the planning conditions of that facility, This fund, which is managed independently by a representative group including local authority and community representatives has contributed to footpath improvements, enhanced public lighting and other related safety features and community and sports projects in the Duleek area.

7.2 Methodology

The methodology used to carry out the transport assessment can be summarised as follows:

- Step 1 – Assess the existing traffic situation
- Step 2 – Define the traffic flows underpinning the assessment
- Step 3 – Define the traffic generation effects of the proposed development
- Step 4 – Assess the impact of the traffic generated on the local road network
- Step 5 – Identify mitigation measures to form part of the development proposals
- Step 6 – Identify residual impacts which remain present after mitigation is considered.

These steps are described in greater detail below.

Step 1 assesses the existing traffic situation:

- Existing traffic operations in the Ringaskiddy area have been observed, particularly at junctions.
- 18-hour traffic counts (06:00-00:00) were undertaken on all relevant roads and junctions on Thursday October 16th 2014, and form the basis of subsequent analysis. The validity of the counts was verified by a repeat program of traffic counts, carried out on Tuesday November 10th 2015.

Step 2 defines the assessment base case figures:

- An opening year for the proposed development of 2020 is assumed, and therefore the peak construction period is assumed to occur in 2019.
- Background traffic growth rates were obtained from the 'NRA Project Appraisal Guidelines (2011)' for the Cork City and County area; these growth rates were used to increase 2014 traffic levels to the future years for analysis – a construction year of 2019, an opening year of 2020 and future years of 2025 and 2035.

- In addition to growth of background traffic, which will ensure that other potential developments in the Ringaskiddy area are accounted for, a specific additional allowance was included in the assessment for the Port of Cork expansion proposals at their Ringaskiddy site, based on traffic flow information contained in the relevant submitted planning documentation.

Step 3 defines the traffic generation characteristics of the proposed development:

- An appraisal of the traffic generation during the construction phase is undertaken, split into three categories: heavy goods vehicles (HGV) traffic, workforce traffic and general site traffic. This includes for construction of the facility itself, and any ancillary construction processes which may occur in tandem, such as the proposed L2545 road upgrade on the local road network adjacent to the site, for example.
- An assessment of the traffic generation during the operational phase is also undertaken, split into two categories: HGV traffic generated by the proposed resource recovery centre, and car traffic generated by the workers commuting to the site and by visitors to the site.
- Both the construction and operational phase traffic are distributed onto the road network in accordance with expected origins and destinations.

Step 4 assesses the impact of the traffic generated by the proposed development on the local road network:

- All traffic flows are converted from vehicles to passenger car units (PCUs). A PCU is a common unit used in traffic modelling to ensure that larger vehicles such as HGVs are proportionally represented when compared with general traffic. When converting vehicles to PCU, a factor of 1.0 is used for cars, while a factor of 2.3 is used for HGVs. This ensures that the impact of HGVs on sensitive junctions is correctly examined during the traffic modelling process.
- Whilst there are distinct morning and evening peak hours on the local road network (07:30-08:30 and 16:30-17:30 respectively), these morning and evening peak hours are accompanied by warm-up and cool-down periods where traffic increases to the peak hour and decreases thereafter. Observations on-site and discussions with the local authority have indicated that therefore there are two-hour morning and evening periods (from 07:00-09:00 and from 16:00-18:00) where traffic conditions on the local road network are such that the network is sensitive to congestion and delay due to its volatility.
- There are three distinct times associated with this traffic assessment; firstly, there are the existing morning and evening peak hours on the network (07:30-08:30 and 16:30-17:30), secondly the morning and evening peak hours at the site during the construction phase (06:00-07:00 and 18:00-19:00), and finally the operational morning, afternoon and evening peak hours at the development itself once opened (06:00-07:00, 14:00-15:00 and 18:00-19:00).
- The actual numerical and relative percentage increases in traffic on all relevant roads during the morning (AM) and evening (PM) construction peak periods associated with the proposed development (in the 2019 construction year) are assessed and reported.

- The actual numerical and relative percentage increases in traffic on all relevant roads during the AM and PM network peaks and the development peak when the proposed development would become operational (opening year 2020) are assessed and reported.
- Subsequent future year scenarios, both 5 and 15 years post-opening (2025 and 2035) are also included for assessment and reporting.
- The impacts on junction capacity at all relevant junctions of the traffic generated during both the construction phase and the operational phases are assessed and reported.
- The junction capacity assessments were carried out using industry-standard assessment software ARCADY and PICADY, for roundabouts and priority junctions, respectively.

Step 5 identifies mitigation measures to be included within the development proposals that would serve to reduce the impact of traffic generated by the proposed development.

The sixth and final step is to identify any net residual impacts associated with traffic generated by the proposed development, taking into account the mitigation measures considered in Step 5.

7.3 Receiving Environment

7.3.1 General

Ringaskiddy is situated on a peninsula to the south east of Cork City. The area is characterised by a number of major industrial facilities, some small residential areas, the Port of Cork, a deep-water berth, the headquarters of the Irish Naval Service and the National Maritime College of Ireland. The site of the proposed resource recovery centre is shown in relation to the local road network in **Figure 7.1**.

In recent years the Ringaskiddy area has experienced moderate, but steady levels of industrial growth, with some further growth likely in the future, including a significant expansion of operations at the Port of Cork. Historically, the increase in industrial growth has in the past led to a significant increase in traffic within the Ringaskiddy area.

7.3.2 Existing Road Network

The N28 national primary route links Ringaskiddy to Cork City and beyond. It is the major route into and out of Ringaskiddy and has been designed to accommodate high volumes of traffic, serving the ferry port and the various industrial developments in the area. The roadway, however, does experience congestion during peak periods.

The R613 links Ringaskiddy with Carrigaline and gives access to a number of industrial facilities along its route. However, certain sections of the R613, particularly between Coolmore and Carrigaline are narrow with substandard alignment in parts, reducing heavy goods vehicle (HGV) accessibility.

The R610 links the Ringaskiddy area with the residential areas of Passage West and Monkstown, and the cross-river ferry to Cobh and Great Island.

7.3.3 Existing Junctions

Road network congestion and capacity in urban and industrialised areas is generally associated with the junctions on the road network. The following junctions were examined during the morning, afternoon and evening peak periods to assess their present operational capacity. The locations of the junctions can be seen in **Figure 7.2.**

1. Shannon Park Roundabout
2. Raffeen Bridge Junction
3. Shanbally Junctions (Shanbally Roundabout and adjacent T-Junction)
4. Barnahely Road Junction (N28/R613)
5. Ferry Port Access
6. Proposed Indaver Site Access

The above junctions were analysed using Junctions 9, the suite of computer applications designed by the Transport Research Laboratory (TRL) in the UK. Within Junctions 9, the PICADY module is used to model priority controlled junctions and the ARCADY module is used to model roundabouts. The assessments were carried out using Year 2014 traffic flow information as the base year for a number of time periods, as set out in Table **7.1** below.

Table 7.1 – Assessment Scenarios for Modelling

Scenario	Construction Peaks /Operational Peaks			Existing Network Peaks	
	06:00 - 07:00	14:00– 15:00	18:00– 19:00	07:30– 08:30	16:30– 17:30
2014 Base Year	□	□	□	□	□
2019 Construction Year	□		□		
2020 Opening Year	□	□	□	□	□
2025 Opening Year + 5	□	□	□	□	□
2035 Opening Year + 15	□	□	□	□	□

The results of the above analysis of the existing traffic scenario are shown in **Appendix 7.1.**

7.3.4 Traffic Characteristics on N28 Road Network

Traffic flow on the N28 between the Shannon Park roundabout and the proposed Indaver site is quite tidal in nature. Heavy traffic flows arrive from Cork to Ringaskiddy in the morning peak, with heavy returning flows from Ringaskiddy to Cork and Carrigaline in the evening peak. In addition, there is a large Carrigaline-Cork traffic movement in the AM peak and a converse Cork-Carrigaline movement in the PM peak.

During the morning and evening peaks, in some instances on the local road network, these heavy flows are not in conflict – for example the heavy Cork-Ringaskiddy and Carrigaline-Cork flows in the AM peak do not conflict at the Shannon Park roundabout. In other instances, however, there are large flows of traffic in direct conflict, which can lead to queuing and delay – for example in the PM peak the heavy Ringaskiddy-Cork and Cork-Carrigaline flows are in direct conflict at the Shannon Park roundabout, leading to queuing and delay developing frequently over the evening peak period.

The two most critical junctions on the local road network are the roundabouts at Shannon Park and Shanbally. As outlined below, there have been numerous upgrades proposed at these junctions in recent years, intended to improve junction performance in the interim while the M28 upgrade was in a state of stasis. However, these localised improvement works have yet to progress to implementation. Despite the inclusion of the M28 upgrade in the recent Capital Investment Program, nevertheless some form of junction improvements are still necessary at Shannon Park and Shanbally roundabouts in the interim.

7.3.5 Shannon Park Roundabout

This large roundabout junction links the N28, the major route serving Ringaskiddy, with the R611 Carrigaline Road. The roundabout provides two-lane entries on all approaches with some queuing experienced on approach, particularly from the Ringaskiddy direction during the evening peak period.

It is noteworthy that at present there are pending proposals to undertake some minor improvements at this junction to improve capacity via some localised widening, the provision of two circulating lanes and the signalisation of the roundabout, as well as a potential left-slip lane from Cork to Ringaskiddy. However, the timeframe for delivery of this junction upgrade is currently unknown.

7.3.6 Raffeen Bridge Junction

This is a priority junction connecting the R610 with the N28. On the R610, another priority junction is located roughly 50m to the north of the Raffeen Bridge N28/R610 junction. This junction links the R610 with a minor local road. The local road provides an alternative route for traffic from the Douglas area to Ringaskiddy, avoiding any queues on the N28 and at the Shannon Park Roundabout.

At the Raffeen Bridge Junction, the N28 has dedicated “left-turn in” and “right-turn in” lanes, allowing vehicles access to Raffeen Bridge without disrupting through-traffic. Additionally, a left-turn filter lane allows traffic exiting from Raffeen Bridge to merge with eastbound N28 traffic.

7.3.7 Shanbally Roundabout and adjacent T-Junction

These junctions operate as two separate junctions. The first junction is a priority controlled T-junction linking the N28 to Raffeen and the second junction is a roundabout junction providing a link via the L2492 between the N28 and the R613 at Coolmore Crossroads.

The roundabout at Shanbally, which is approximately 25m to the east of the priority junction experiences congestion in peak conditions, with slow-moving queues of eastbound traffic often extending back for a considerable distance in the morning peak period.

The priority junction exacerbates congestion problems with commuters from Monkstown and Passage West using the junction to access the N28 at the adjacent T-junction, avoiding traffic queues on the N28 between the Raffeen Bridge Junction and the Shanbally Roundabout. In the morning peak period, heavy traffic flow through the roundabout affords little or no opportunity for traffic to exit via the adjacent T-junction to the N28, leading to queuing and delay.

A ghost island arrangement on the N28 at the priority junction in Shanbally allows for the storage of two right-turning vehicles without disrupting westbound traffic. Visibility from the minor arm of the priority junction from Raffeen is also below standard.

Due to the location of the central circular island, the roundabout junction also suffers from pronounced entry deflection on the N28 approach from Ringaskiddy which impacts vehicle speeds entering the junction (particularly HGVs), while conversely, the lack of entry deflection on the N28 approach from the west leads to higher entry speeds.

As with the Shannon Park Roundabout, an upgrade for this junction was developed and proposed in 2011, involving the conversion of the junction to a signalised T-junction and the installation of a pedestrian crossing to serve the primary school located on the south side of the junction. However, this junction upgrade scheme has not yet progressed through to implementation.

7.3.8 Barnahely Road Junction (N28/R613)

This priority junction links two heavily trafficked routes in the area and is located to the west of Ringaskiddy Village. Problems are caused by high volumes of traffic and the proximity of the nearby Deep Water Berth access road which has a high proportion of HGV traffic and steep approach gradients.

The R613 flares on its approach to the junction to allow two vehicles to queue at the stop line. The width of the N28 allows vehicles waiting to turn right on the R613 to queue without disrupting eastbound traffic.

7.3.9 Ferry Port Access

This is a five-arm priority junction of the N28, the Ferry Port access road and local roads to the Loughbeg area. The N28 continues north from this junction into to the Port. Beyond the Ferry Port junction the road continues eastwards as a local road the L2545 to the Naval Base, via the eastern part of Ringaskiddy and Haulbowline Bridge. The Ferry Port access arm of the junction flares to allow two vehicles to wait at the stop line. The width of the N28 at this point allows right turning vehicles to queue without disrupting through traffic. The Ferry Port junction does not experience congestion during peak periods.

7.3.10 Existing Provision of Alternative Modes of Transport

The proposed Indaver site is currently served by the Bus Éireann Cork City number 223 Service. The number 223 service departs the City Centre from the South Mall and makes numerous stops along its route, including in Douglas, Rochestown, Passage West, Monkstown and Shanbally Village, with the terminus at the National Maritime College of Ireland adjacent to the proposed facility. There are 4 scheduled services in the AM Peak which arrive at the site before 9 AM. Scheduled travel time to the Indaver site from the South Mall is approximately 55 minutes in the AM peak, and the return journey in the PM Peak is approximately 55 minutes.

7.3.11 Walking and Cycling

There is a footpath along the northern side of the L2545 adjacent to the proposed development. There are footpaths located on both sides of the road through Ringaskiddy village. There are no dedicated cycle facilities in the local area.

7.4 Proposed Road Infrastructure Upgrades

There are a number of major infrastructural projects planned for the Cork region, which are at varying levels of progress. The most significant of these are the M28 Motorway Upgrade Scheme and the Dunkettle Interchange Upgrade Scheme.

7.4.1 M28 Cork to Ringaskiddy Motorway Scheme

The N28 Cork-Ringaskiddy route lies on the strategic TEN-T European Network of corridors which provide connectivity to key strategic areas, such as the Port of Cork site at Ringaskiddy. As a result, it is proposed to upgrade the N28 from its junction with the N40 at the Bloomfield Interchange to its terminus in Ringaskiddy Village. The upgraded M28 scheme will significantly enhance the level of accessibility to the Ringaskiddy area and will remove a substantial amount of traffic from the existing road network in the area, bypassing numerous settlements such as Ringaskiddy Village itself, Shanbally Village and the Shannonpark Roundabout, for example.

The motorway scheme is currently at design stage, and is expected to progress to the planning stage in early 2016. The upgrade scheme has been included in the recent Government Capital Investment Programme, which covers infrastructural projects in the period to 2021. It is envisaged that the scheme may be delivered by 2023 (the EIS recently submitted by the Port of Cork assumed that the M28 motorway scheme would be in place by 2023), however at this time the scheme has not received planning permission and therefore there is no certainty to this delivery date.

As part of this assessment, in order to ensure a robust, ‘worst-case’ scenario, the M28 upgrade scheme has not been included for in the future year analysis scenarios.

Post-construction, it is anticipated that the M28 scheme will provide significant relief to the local road network in the vicinity of the site, and will allow staff and

delivery vehicles to avoid travelling through the numerous local settlements along the route.

7.4.2 Dunkettle Interchange Upgrade Scheme

It is proposed to upgrade the Dunkettle Interchange to achieve full free-flow for traffic through the interchange. This will significantly improve the performance of the interchange, and in the wider area it will also improve traffic flow through the Jack Lynch Tunnel from the south via the N40. The scheme was granted planning permission in 2013. As with the M28 upgrade, the scheme has been included in the recent Government Capital Investment Programme. However, similar to the M28 upgrade scheme, the Dunkettle Interchange upgrade scheme has not been included in this assessment in order to ensure a robust, 'worst-case' scenario is considered.

7.5 Base Year Traffic Flows

7.5.1 Passenger Car Unit Conversion

For the purpose of this assessment, traffic flows obtained through junction vehicle counts have been converted to Passenger Car Units in accordance with the guidance set out in the Transport for London Traffic Modelling Guidelines.

In order to better reflect the composition of the traffic flow and the numerous vehicle types contained therein, traffic modelling software regularly utilises a common unit, known as a passenger car unit (PCU) in order to convert different types of traffic to a common, single type. Various vehicle classification types are assigned a conversion factor to enable them to be collectively assessed. For example, larger vehicles such as buses, coaches and HGVs have a disproportionately higher impact on a road network than a single passenger car, motorcycle or even bicycle.

Where traffic passes through sensitive locations, such as small villages or problematic junctions, converting larger vehicles to PCUs can ensure that the potential impacts associated with traffic flows can be correctly appraised during the traffic modelling process.

Table 7.2 below illustrates the PCU conversion factors adopted for this assessment.

Table 7.2 – PCU Conversion Factors (TFL Traffic Modelling Guidelines)

Vehicle Type	PCU Value
Pedal Cycle	0.2
Motor Cycle	0.4
Passenger Car	1.0
Light Goods Vehicle (LGV)	1.0
Heavy Goods Vehicle (HGV)	2.3
Bus/Coach	2.0

A conversion factor of 2.3 is appropriate for HGV traffic – note that in some instances this factor can be reduced to 2.0, or increased to 2.5 or 3.0, depending

on the classification of HGV vehicle expected to serve a particular development. However, in the case of the resource recovery centre, HGV traffic serving the development will likely be a mixture of both larger articulated trucks and smaller household refuse collection vehicles – as such a PCU conversion factor of 2.3 is appropriate.

7.5.2 Existing Traffic Levels

An 18-hour (06:00-24:00) traffic count was undertaken at all of the junctions listed in Section 7.3.3 above on Thursday, 16th October 2014, on a typical working day, during school term time.

The traffic surveys on the local road network identified a morning peak hour of 07:30-08:30, and an evening peak hour of 16:30-17:30. However, these peak periods typically extend beyond a single hour, and it is more appropriate to acknowledge a two-hour morning peak period from 07:00-09:00 and a two-hour evening peak period from 16:00-18:00.

The peak hour link counts on the surrounding road network can be seen in **Table 7.3** below. The locations of the junction counts can be seen in **Figure 7.2.** Note that traffic flows are presented in PCUs.

Additional traffic surveys were undertaken at the aforementioned junctions on Tuesday 10th November 2015, for an 18-hour period, during school term. The results of these updated traffic surveys showed that the flows recorded in 2015 at a number of locations on the N28 between Shannon Park Roundabout and Ringaskiddy Village were slightly lower than those recorded in 2014. As a result, the 2014 surveys were sufficiently robust to be retained for analysis purposes.

Table 7.3 – Existing Two-Way Link Flows – Year 2014

Roadway	Construction Peaks/ Operational Peaks			Existing Network Peaks	
	06:00–07:00	14:00–15:00	18:00–19:00	07:30–08:30	16:30–17:30
N28–North of Shannonpark	844	1761	2295	2388	2606
R611-South of Shannonpark	489	1561	1757	1593	2086
N28 - East of Shannonpark	512	884	1079	1583	1212
R610 – North of N28	41	352	429	607	661
N28 (East of Raffeen Bridge)	489	727	973	1346	1351
Raffeen Rd – North of N28	19	57	95	490	165
N28 (East of Shanbally)	460	505	799	1460	1094
L2492 Shanbally Link Rd	80	184	224	426	329
R613 Barnahely Rd-South of N28	108	222	265	400	367
N28 - (West of Ferry Port)	263	262	439	752	512
N28 (East of Ferry Port)	34	148	76	290	235
Loughbeg Rd-South of N28	222	79	340	442	247

*All traffic flows in Passenger Car Units (PCUs) per hour

Five time periods have been determined as having the most significant impact by traffic generated by the proposed development. These five time periods are as follows (note that the Construction AM and PM peak periods and the Operational AM and PM peak periods are coincidental):

- Construction AM Peak (06:00 – 07:00)
- Construction PM Peak (18:00 – 19:00)
- Operational AM Peak (06:00 – 07:00)
- Operational Afternoon Peak (14:00 – 15:00)
- Operational PM Peak (18:00 – 19:00)
- N28 Network Existing AM Peak (07:30-08:30)
- N28 Network Existing PM Peak (16:30-17:30)

It can be seen that the network AM and PM peaks (07:30-08:30 and 16:30-17:30) are the busiest time periods for traffic accessing the Ringaskiddy area. **Table 7.3** also shows that the 14:00-15:00 period, which will be the inter-peak period for construction traffic, experiences reduced levels of traffic flow on the N28, with traffic as much as 65% lower than during the network AM and PM peak periods.

It is therefore proposed to reduce construction-related traffic to zero, and to restrict operational waste acceptance and staff arrivals/departures at the facility in the AM and PM periods (from 07:00-09:00 and 16:00-18:00 respectively) in order to minimise the impact on the N28 road network in the Ringaskiddy area during these times and instead to avail of the prevailing carrying capacity on the road network during the inter-peak periods.

Figure 7.3 shows a profile of traffic flows over the 18-hour period of the 2014 traffic surveys at all sites (except Haulbowline Bridge) – this figure shows the total flows at each junction (on all arms). It can be seen that across the local road network, there are distinct peaks in traffic flows at around 07:30 and 16:30.

Figure 7.3 also highlights the five assessment time periods outlined above. It can be seen that the proposed Operational peak periods (06:00-07:00, 14:00-15:00 and 18:00-19:00) are coincidental with reduced traffic flows across the study area compared to the existing network AM and PM peak periods (07:30-08:30 and 16:30-17:30).

Figure 7.4 shows the same traffic flow profiles, but also highlights the proposed hours in the morning and evening when restrictions are proposed for traffic accessing and exiting the proposed facility. It can be seen in **Figure 7.4** that the restriction periods (07:00-09:00 and 16:00-18:00) are coincidental with the morning and evening peaks on the network (07:30-08:30 and 16:30-17:30), but also allow for a time period either side of the peaks to account for the increase and decrease in traffic flows either side of the peak hours.

7.5.3 Assessment Years

It is anticipated that the proposed resource recovery centre will be fully operational by 2020 with the peak construction period therefore occurring in 2019. Background traffic levels for 2014 have been forecasted to 2019, 2020, 2025 and 2035 by applying the following growth rates:

- For 2014-2019 – light vehicles increased by 6.7%, heavy vehicles increased by 4.6%
- For 2014-2020 – light vehicles increased by 8.1%, heavy vehicles increased by 5.5%
- For 2014-2025 – light vehicles increased by 15.3%, heavy vehicles increased by 10.4%
- For 2014-2035 – light vehicles increased by 28.6%, heavy vehicles increased by 11.5%

These growth rates have been established using the guidelines in the '*NRA Project Appraisal Guidelines (2011), Unit 5.5 – Link-Based Traffic Growth Forecasting*', and by utilising the specific growth rates therein for the Cork City and County area. The guidelines present Low, Medium and High growth rates for the Cork City and County area.

In light of the economic decline in recent years, and the resultant stagnation in the construction sector, it is not likely that the high-growth scenario would be realised in the Ringaskiddy area in the coming years, in particular given the approach to demand management being adopted on the N28 and the N40 by Cork County Council and Transport Infrastructure Ireland (formerly the National Roads Authority).

A 'Medium-Growth' scenario was therefore assumed for the Ringaskiddy area in the coming years, and this is considered to allow for all committed and likely future development in the area, with the exception of the Port of Cork re-development works at Ringaskiddy, which is a development of strategic significance and warranting of special consideration.

The estimated 2019 and 2020 traffic flows on the local road network without the proposed development can be seen in **Table 7.4** and **Table 7.5.**

Table 7.4 – Base Traffic Flows, 2019 Construction Year

Roadway	Construction Peaks/Operational Peaks			Existing Network Peaks	
	06:00 - 07:00	14:00– 15:00	18:00– 19:00	07:30– 08:30	16:30– 17:30
N28–North of Shannonpark	970	2140	2523	2806	3046
R611-South of Shannonpark	520	1661	1874	1697	2222
N28 - East of Shannonpark	617	1207	1226	1948	1561
R610 – North of N28	44	375	458	647	704
N28 (East of Raffeen Bridge)	594	1039	1114	1695	1709
Raffeen Rd – North of N28	20	60	100	516	174
N28 (East of Shanbally)	555	797	898	1797	1420
L2492 Shanbally Link Rd	84	193	241	448	347
R613 Barnahely Rd-South of N28	115	236	282	426	391
N28 - (West of Ferry Port)	352	546	544	1064	815
N28 (East of Ferry Port)	109	425	157	571	520
Loughbeg Rd-South of N28	237	84	363	472	263

*All traffic flows in Passenger Car Units (PCUs) per hour

Table 7.5 – Base Traffic Flows, 2020 Opening Year

Roadway	Construction Peaks/Operational Peaks			Existing Network Peaks	
	06:00 - 07:00	14:00– 15:00	18:00– 19:00	07:30– 08:30	16:30– 17:30
N28–North of Shannonpark	982	2163	2554	2838	3082
R611-South of Shannonpark	527	1682	1898	1719	2251
N28 - East of Shannonpark	624	1218	1241	1969	1577
R610 – North of N28	45	380	464	655	713
N28 (East of Raffeen Bridge)	600	1048	1127	1713	1727
Raffeen Rd – North of N28	20	61	101	523	176
N28 (East of Shanbally)	561	803	909	1817	1435
L2492 Shanbally Link Rd	85	196	244	454	351
R613 Barnahely Rd-South of N28	116	239	286	431	396
N28 - (West of Ferry Port)	356	550	550	1074	822
N28 (East of Ferry Port)	109	427	158	575	523
Loughbeg Rd-South of N28	240	85	367	478	267

*All traffic flows in Passenger Car Units (PCU's) per hour

7.6 Other Developments in the Vicinity

Existing traffic levels were forecast from 2014 to 2019, 2020, 2025 and 2035 using medium growth rates from the NRA Project Appraisal Guidelines. Applying this growth to traffic flows on the local road network will account for additional development which may occur in the Ringaskiddy area over this time period. However, a specific allowance has been made within this assessment for the Port of Cork re-development works at Ringaskiddy, which is considered to be a strategic development and therefore warrants specific inclusion.

There are a number of schemes and infrastructural works in various states of progress in the Ringaskiddy area at present, as detailed below.

7.6.1 Proposed Junction Upgrades at Shannon Park and Shanbally Roundabouts

Proposals have been developed by the Cork Roads Design Office to upgrade both roundabout junctions at Shannon Park and Shanbally to provide signalised junctions. However, both of these projects have yet to progress through the planning stage, and their delivery is not certain; therefore no allowance has been made in this assessment for these junction upgrades.

7.6.2 Other proposed developments

There are a number of developments in the Ringaskiddy area that are either under construction at present, or expected to commence construction in the near future. The construction and operation of these proposed developments are considered to fall within the increase in traffic flows associated with the Medium-Growth scenario applied to existing traffic flows in the area. These developments include:

- Haulbowline East Tip Remedial Works
- Spike Island Master Plan
- Shanbally Waste Treatment Plant
- UCC Beaufort Maritime Research Facility
- Irish Marine and Energy Resource Cluster (IMERC) Campus
- Hammond Lane Metal Recovery Facility
- Novartis Ringaskiddy Wind Turbine Construction

7.6.3 Brittany Ferries Cruise Ships

The Brittany Ferry cruise ship service operates between April and September/October. The ferry service typically arrives at 07:00 on Saturday mornings and departs at 16:00 on the same day. Weekend flows on the local road network are significantly reduced from typical weekday flows, and therefore the resultant increase in traffic flow associated with the ferry on a Saturday is not considered to be part of a worst-case scenario during a standard week day.

In addition, from April to October, cruise ships occasionally dock at Ringaskiddy when the Cobh cruise ship berth is occupied. These cruise ships can in theory

arrive any day of the week. Usually these ships arrive circa 09.00 and depart circa 17.00 or arrive around midday and depart in the late evening. However, due to the irregular nature of this type of occurrence, it is not included within this assessment.

7.6.4 Port of Cork Ringaskiddy Port Redevelopment

The Port of Cork was granted permission in May 2015 for redevelopment of the existing port facilities in Ringaskiddy. The redevelopment works are expected to comprise three distinct phases, as follows:

- Phase 1 – an increase in LoLo, general cargo and trade cars
- Phase 2 – an increase in bulk operations
- Phase 3 – an increase in RoRo operations

The EIS documentation submitted as part of the planning application indicate an estimated Opening Year of 2018 for the re-development works. The documentation also indicates that the Port of Cork propose that Phase 3 of the redevelopment will not become operational until the M28 upgrade scheme has been completed.

In the grant of planning permission, An Bord Pleanála imposed a condition that Phase 3 of the redevelopment would not be permitted to proceed until after the M28 and Dunkettle Interchange upgrade schemes are both completed.

For the purpose of this assessment, it has been assumed that Phases 1 and 2 of the Port redevelopment works are completed and operational in 2018, and therefore are in place in the 2019 construction year and 2020 opening year (and subsequent future years). Construction of the Port of Cork expansion does not overlap with construction at the resource recovery centre, which will be at its most intensive in 2019.

The M28 and Dunkettle Interchange upgrade schemes have not been included in this assessment in order to ensure a robust, worst-case scenario. Therefore Phase 3 of the Port of Cork Ringaskiddy Redevelopment has not been included in the 2025 and 2035 future years. In the event of these major road infrastructure schemes progressing, the existing traffic flows on the local road network in the Ringaskiddy area would significantly reduce, and as such the potential impacts of the proposed Indaver development in the area would not be as pronounced.

Table 8.8 (Ringaskiddy Daily Traffic Generation Figures for 2018 and 2033) of the Port of Cork EIS documentation indicates the following traffic flow increases associated with Phases 1 and 2 of the proposed expansion, and have therefore been included as part of this assessment:

- A daily increase of 591 heavy vehicles
- A daily increase of 184 light vehicles

7.7 Characteristics of Proposed Development

As indicated in Section 7.1, the proposed resource recovery centre is located on a site to the east of Ringaskiddy Village. In terms of traffic generation, aside from the traffic generation during the construction stage, the key operational element of the development is the resource recovery centre.

The traffic impact appraisal has been undertaken by examining both the construction traffic (traffic generated by the workforce and processes involved in the construction period) and the operational traffic (traffic generated by the processes involved in the operation of the facility once complete). The expected level of traffic generated by both the construction and the operational aspects of the development are detailed below.

7.7.1 Construction Traffic

Traffic will firstly be generated during the construction phase of the development. Throughout the construction phase, three types of construction traffic will access the site.

- HGV traffic
- Workforce traffic
- General site traffic

Typical working hours during the construction phase will be:

Start	Finish	
0600	2000	Monday – Friday
0700	1300	Saturday

In order to minimise the potential impact of traffic flows during the construction stage, it is proposed to schedule HGV, workforce and general site traffic in such a manner to ensure no vehicles arrive or depart the proposed development site during the 07:00-09:00 and 16:00-18:00 periods.

7.7.2 HGV Traffic

The construction stage of the development will involve a significant number of HGV movements. Estimates of the anticipated HGV construction traffic volumes indicate that a maximum of 11 heavy goods vehicles per hour will access the site during the day time shift with smaller volumes expected during the night shift.

7.7.3 Workforce Traffic

The construction period will also generate demand in terms of construction workforce access. Throughout the construction period there will be some variation in the number of workers or size of the workforce on site. However, a maximum of approximately 320 construction workers will be employed on site, with around 250 workers working a daytime shift and 70 working a night shift.

To determine the trips generated during construction it is assumed, that 95% of the workforce will travel by car and there will be car occupancy of 1.15. These

assumptions are applied to the 250 workers arriving for the day shift and also to the 70 workers leaving after the night shift.

Due to the nature of the construction stage of the development, not all workers will arrive or depart simultaneously in the morning/evening as there will be some natural variation in activity throughout a typical day. For the purpose of this assessment, the following arrival and departure profile for the construction workers has been assumed:

- 100% of the daytime construction workers arrive before 07:00
- 100% of the night-time construction workers leave before 07:00
- 25% of the daytime construction workers leave between 12:00-14:00, with 75% of these leaving before 13:00 and 25% arriving back before 13:00.
- 40% of the daytime construction workers leave between 18:00-19:00
- 60% of the daytime construction workers leave after 19:00
- 100% of the night shift construction workers arrive after 18:00.

7.7.4 General Site Traffic

The construction stage will also generate general site traffic in addition to HGV movements and workforce traffic. This general site traffic accounts for visitors and general service vehicles to the site. The general site traffic is estimated at up to 32 vehicles (in and out) per hour between 06:00 - 19:00 with a fall-off to 6 vehicles (in and out) per hour during the night shift. As with the workforce traffic, no general site traffic will be permitted to or from the site during the 2-hour restriction periods in the morning and evening.

7.7.5 L2545 Road Upgrade

It is expected that the L2545 road upgrade works will take place in advance of the main construction works on site. However, for the purpose of this assessment, it is assumed that the road and road drainage upgrade will occur concurrently with the main facility construction. While the L2545 road upgrade works will fluctuate throughout a typical day, it is estimated that a maximum of 24 HGVs (two-way) per hour may occur during normal working hours.

7.7.6 Total Construction Traffic

The projected volume of traffic generated during the construction phase of the development can be seen in **Table 7.6** and **Table 7.7** below. For clarity, **Table 7.6** presents the daily profile of arrivals in vehicles, while **Table 7.7** converts these flows to PCUs.

It can be seen from **Table 7.6** and **Table 7.7** below that no vehicles will arrive or depart the proposed development site during the morning and evening peak periods (07:00-09:00 and 16:00-18:00) during the construction process. It can be seen in the subsequent tables that the morning and evening two-hour peak periods (shown in grey) contain no additional traffic flows associated with construction works at the resource recovery centre.

Table 7.6 – Projected Volumes of Construction Traffic (Vehicles Per Hour)

	Construction		Road Raising Works		Workforce Traffic		General Site Traffic		Traffic Generation		
	HGV Movements		HGV Movements		Car Movements		Car & LV Movements		ALL		
	In	Out	In	Out	In	Out	In	Out	In	Out	Total
0600-0700	10	10	1	1	207	58	14	14	231	83	314
0700-0800	0	0	0	0	0	0	0	0	0	0	0
0800-0900	0	0	0	0	0	0	0	0	0	0	0
0900-1000	11	11	12	12	0	0	16	16	39	39	78
1000-1100	10	10	10	10	0	0	14	14	34	34	68
1100-1200	10	10	8	8	0	0	14	14	32	32	64
1200-1300	10	10	2	2	39	13	14	14	65	39	103
1300-1400	10	10	3	3	13	39	14	14	40	66	105
1400-1500	10	10	8	8	0	0	14	14	32	32	64
1500-1600	11	11	6	6	0	0	16	16	33	33	66
1600-1700	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0
1800-1900	10	10	0	0	58	83	14	14	82	106	188
1900-2000	2	2	0	0	0	124	3	3	5	129	134
2000-2100	2	2	0	0	0	0	3	3	5	5	10
TOTAL/DAY	95	95	50	50	316	316	136	136	597	597	1,194

*All traffic flows in Vehicles per hour

Table 7.7 – Projected Volumes of Construction Traffic (PCUs Per Hour)

	Construction		Road Raising Works		Workforce Traffic		General Site Traffic		Traffic Generation		
	HGV Movements		HGV Movements		Car Movements		Car & LV Movements		ALL		
	In	Out	In	Out	In	Out	In	Out	In	Out	Total
0600-0700	23	23	2	2	207	58	14	14	245	97	342
0700-0800	0	0	0	0	0	0	0	0	0	0	0
0800-0900	0	0	0	0	0	0	0	0	0	0	0
0900-1000	26	26	28	28	0	0	16	16	69	69	139
1000-1100	23	23	23	23	0	0	14	14	60	60	119
1100-1200	23	23	18	18	0	0	14	14	55	55	110
1200-1300	23	23	5	5	39	13	14	14	80	54	134
1300-1400	23	23	7	7	13	39	14	14	56	82	139
1400-1500	23	23	18	18	0	0	14	14	55	55	110
1500-1600	26	26	14	14	0	0	16	16	56	56	111
1600-1700	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0
1800-1900	23	23	0	0	58	83	14	14	94	119	214
1900-2000	5	5	0	0	0	124	3	3	8	132	139
2000-2100	5	5	0	0	0	0	3	3	8	8	15
TOTAL/DAY	219	219	115	115	316	316	136	136	785	785	1,571

*All traffic flows in Passenger Car Units (PCUs) per hour

7.7.7 Earthworks

The above tables were used to analyse the impact of the construction traffic on the local road network during peak periods. However, it is recognised that the earthworks element of the construction will introduce some additional heavy goods vehicles to the area, and a separate analysis of this is presented.

Before work can commence on the main construction phase of the development, a projected net quantity of ~114,000 tonnes of soil will be excavated and removed from the site. This excludes the quantity which will be re-used to raise the levels in the western field. This figure also excludes the quantity of material which will be removed to facilitate the L2545 upgrade as this will occur before the earthworks phase commences (See Section 7.7.5 above).

In addition, ~42,000 tonnes of fill material is expected to be imported to construct the main retaining structures at the same time. This figure excludes the quantity of import material required for the L2545 upgrade (See Section 7.7.5 above). This figure also excludes the quantity of shingle required for the coastal protection works as this will occur at the end of the construction period (See Section 7.7.8 below).

It is anticipated that the excavation of materials and the import of fill materials will occur simultaneously for a period of 6 weeks. After this, the import of materials

will cease, and the excavation works are expected to continue for a further 7 weeks.

It is therefore estimated that the entire excavation and import processes will be carried out over a 16-week period. This equates to 17 truckloads per hour for the first 6 weeks when both processes are occurring at the same time, and then will equate to 9 trucks per hour for the remaining 7 weeks. These figures are based on the following assumptions:

- 20 tonnes per truck
- 48 hours per week – 6 days, 8-hours per day (note this allows for no trucks during the 07:00-09:00 and 16:00-18:00 periods)

The bulk excavation works and construction of the retaining structures will be undertaken in advance of the main construction phase and will not be as labour intensive. Therefore, the bulk excavation and construction of the retaining structures will have less of an impact on the local traffic network than the main construction phase, the impact of which is assessed is included in this chapter.

7.7.8 Placing of Sacrificial Material on the Beach

The placing of sacrificial material on the beach will be undertaken towards the end of the main construction phase over a 6-day period. The quantity of sacrificial material is expected to be 1,100m^3. It will require 83 truckloads in total, equivalent to an average of 3 trucks per hour. However, the phasing of this will be programmed so as to not occur in tandem with either earthworks or construction phases, and is therefore not included in the main assessment.

7.7.9 Electricity substation building, compound and grid connection

As discussed in Section 4.5.10, the electricity import/export substation and compound within the Indaver site will be located east of the main entrance to the resource recovery centre.

The resource recovery centre will be connected to the national electrical grid via the 38kV electrical substation (Lough Beg substation) adjacent to the eastern boundary of the Hammond Lane facility. The grid connection will be made by running underground cables from the ESB side of the Indaver electricity compound to the Lough Beg substation. The works required within Lough Beg substation lands will be carried out by ESB Networks.

The grid connection within Lough Beg substation lands will require the excavation of one or two short trenches (approximately 5m in length) – the exact connection method will be decided by ESB Networks.

It is likely that this process may occur in parallel with the construction phase of the resource recovery centre itself. The traffic impact of these works will be very low, and will not be recurring due to the short-term nature of the works in question. As a result, these works have not been included as part of this Traffic Impact Assessment. Due to the layout of the facility, there will be no requirement to divert the existing 38 kV lines which traverse the site.

7.7.10 Operational Traffic Generation

The proposed development will generate two types of operational traffic. Heavy goods vehicle (HGV) traffic will be generated by the operation of the facility. Car traffic will be generated by workers commuting to the site and by visitors to the site.

As outlined above, the construction-related traffic (the arrivals and departures of staff and construction vehicles) has been arranged in order to ensure no arrivals or departures will be during the morning and evening local network peak periods. However, from an operational and logistic perspective, it is not financially feasible to reduce deliveries of waste materials to the site entirely during these hours.

Instead, in order to minimise the impact of operational traffic on the local road network during the morning and evening network peaks, it is proposed to control the arrivals and departures of waste delivery vehicles to and from the site during the two-hour network peak period in the morning (07:00-09:00) and the evening (16:00-18:00). Further details of the proposed restriction to waste delivery vehicles is outlined in Section 7.11 (Mitigation Measures) below.

7.7.11 HGV Generation

The estimated volume of HGV traffic generated by the proposed development was based on anticipated volumes of waste coming into the facility. The facility will accept waste for 50 weeks per year, for 5.5 days per week and 14 hours per day (from 06:00-20:00).

Information obtained from the Indaver Meath facility which also treats similar waste streams to those proposed for Ringaskiddy, established that peak hour traffic at the site was around 16% of total daily traffic. This occurs at 08:00, when the facility opens.

Discussions with waste collection operators in the Cork area indicate that there is a preference to avoid the AM and PM peak periods due to prevailing traffic congestion on the network and the resultant delay to vehicles travelling to and from the facility. These waste collection operators have indicated that an opening time of 06:00 would be preferable in terms of delivering waste in the morning period ahead of the local peak period, whilst extending the opening hours to 20:00 also allows operators to avoid the evening peak period.

The facility is expected to generate a total of 71 HGVs to the site over the course of the 14-hour day, i.e. a total of 142 two-way HGV movements over the entire day.

It is noted from past experience at other facilities that waste deliveries are not uniform and the waste processing procedure does not operate at a continuous rate; peaks and troughs tend to occur throughout the year. Based on monthly variations at the Dublin Port Waste Transfer Station, for example, it was established that the peak usage of the facility was 13% greater than the average usage. The traffic generated through HGV movements (71) has been increased by 13% to account for the peaks in the arrival of vehicles, resulting in an increase to 80 vehicles (i.e. 160 two-way HGV movements) per day.

As outlined above, it is planned to manage HGV movements so that the vast majority of vehicles will arrive to and/or depart from the facility outside of the

Ringaskiddy morning and evening peak periods (07:00-09:00 and 16:00-18:00) by extending the hours that waste will be accepted at the facility. The number of HGV vehicles that arrive and depart during the peak periods will be capped at 3 arrivals and 3 departures per hour.

7.7.12 Commuters/Site Visitors

A total of 63 staff will be employed on site once the facility is in operation. **Table 7.8** below classifies the staff and indicates their expected working hours:

Table 7.8 – Staff Numbers and Working Hours

Staff Type	Number of Staff	Hours of Operation
Administration Staff		
Customer Logistics/Tech Support	8	06:45-14:45
Sales	8	09:30-18:00
Other	5	09:30-18:00
Resource Recovery Centre Staff		
Shift Pattern 1	5	06:00-14:00
Shift Pattern 2	5	07:00-15:30
Shift Pattern 3	5	14:00-22:00
Shift Pattern 4	5	22:00-06:00
Tipping Hall & Crane Staff – A	2	06:00-13:00
Tipping Hall & Crane Staff – B	2	13:00-20:00
Maintenance, Warehouse & Plant Logistics - A	5	06:45-14:45
Maintenance, Warehouse & Plant Logistics - B	5	09:30-18:00
Security – A	1	06:00-13:00
Security - B	1	13:00-20:00
Management	6	09:30-18:00
TOTAL	63	

Note that administration staff in **Table 7.8** above will be transferred from the existing Indaver Administration facility at the Kinsale Road Industrial Park to the proposed resource recovery centre.

In addition to the above traffic flows, it has also been assumed that 1 delivery/visitor vehicle will arrive and depart the site per hour between 08:00-18:00.

In the event that staff require a temporary amendment to their working hours, they will be permitted to travel to and from the facility in the restriction periods, providing they do so only by public transport, walking or cycling.

7.7.13 Total Operational Traffic

The projected volume of traffic generated during the operational phase of the development can be seen in **Table 7.9** below, in vehicles per hour. **Table 7.10** shows the estimated flows in PCUs per hour. Note that in the subsequent tables, the morning and evening two-hour peak periods (highlighted in grey) show minimal additional traffic associated with the resource recovery centre, and that there will be not traffic movements associated with the operational workforce during these times.

Table 7.9 – Projected Volumes of Operational Traffic (Vehicles per Hour)

	HGV Movements		Workforce Traffic		Visitor/Delivery Traffic		Total Traffic Generation		
	In	Out	In	Out	In	Out	In	Out	Total
0600-0700	11	11	18	5	0	0	29	16	45
0700-0800	3	3	0	0	0	0	3	3	6
0800-0900	3	3	0	0	1	1	4	4	8
0900-1000	8	8	24	0	1	1	33	9	42
1000-1100	6	6	0	0	1	1	7	7	15
1100-1200	7	7	0	0	1	1	8	8	16
1200-1300	9	9	3	0	1	1	13	10	23
1300-1400	8	8	5	3	1	1	14	12	26
1400-1500	7	7	0	18	1	1	8	26	34
1500-1600	6	6	0	5	1	1	7	12	18
1600-1700	3	3	0	0	1	1	4	4	8
1700-1800	3	3	0	0	1	1	4	4	8
1800-1900	2	2	0	24	0	0	2	26	29
1900-2000	2	2	0	0	0	0	2	2	5
2000-2100	0	0	0	3	0	0	0	3	3
2100-2200	0	0	5	0	0	0	5	0	5
2200-2300	0	0	0	5	0	0	0	5	5
2300-0000	0	0	0	0	0	0	0	0	0
TOTAL	80	80	63	63	10	10	153	153	306

*All traffic flows in Vehicles per hour
Note: there will be no workforce traffic during the morning and evening peak periods.

Table 7.10 – Projected Volumes of Operational Traffic (PCUs per Hour)

	HGV Movements		Workforce Traffic		Visitor/Delivery Traffic		Total Traffic Generation		
	In	Out	In	Out	In	Out	In	Out	Total
0600-0700	26	26	18	5	0	0	44	31	75
0700-0800	7	7	0	0	0	0	7	7	15
0800-0900	7	7	0	0	1	1	8	8	17
0900-1000	18	18	24	0	1	1	43	19	63
1000-1100	15	15	0	0	1	1	16	16	32
1100-1200	17	17	0	0	1	1	18	18	35
1200-1300	20	20	3	0	1	1	24	21	46
1300-1400	18	18	5	3	1	1	24	22	47
1400-1500	17	17	0	18	1	1	18	36	53
1500-1600	13	13	0	5	1	1	14	19	33
1600-1700	7	7	0	0	1	1	8	8	17
1700-1800	7	7	0	0	1	1	8	8	17
1800-1900	6	6	0	24	0	0	6	30	35
1900-2000	6	6	0	0	0	0	6	6	11
2000-2100	0	0	0	3	0	0	0	3	3
2100-2200	0	0	5	0	0	0	5	0	5
2200-2300	0	0	0	5	0	0	0	5	5
2300-0000	0	0	0	0	0	0	0	0	0
TOTAL	185	185	63	63	10	10	258	258	515

*All traffic flows in Passenger Car Units (PCUs) per hour

Note: There will be no workforce traffic during the morning and evening peak periods.

From the table above it can be seen that the morning, afternoon and evening peak levels of development traffic is at 06:00-07:00, 14:00-15:00 and 18:00-19:00, respectively. These peak periods are outside of the general Ringaskiddy area road network peak periods, which are from 07:30-08:30 and 16:30-17:30, respectively.

7.8 Traffic Distribution

7.8.1 General

The generated traffic from the proposed development has been distributed through the road network based on expected origins of both construction/waste delivery vehicles and workforce staff origins. **Table 7.11** shows the estimated trip distribution profile for the proposed development. It has been assumed that the same arrival/distribution profile presented in **Table 7.11** below will apply to vehicles travelling to and from the site during the construction phase and the operational phase.

Table 7.11 – Traffic Distribution – Indaver

Roadway	Percentage HGVs To/From	Percentage Staff To/From
N28 – North of Shannon Park	80%	60%
R611 – South of Shannon Park	15%	20%
R610 – North of N28	2%	5%
Raffeen Rd – North of N28	0%	5%
R613 Barnahely Rd – South of N28	3%	10%
TOTAL	**100%**	**100%**

7.9 Traffic Assignment

7.9.1 General

The projected levels of construction and operational traffic generated by the proposed development were assigned to the local road network in accordance with the trip distribution detailed above. **Table 7.12** below shows the projected construction traffic (two-way) assigned to the local road network in 2019. **Table 7.13** shows the projected operational traffic (two-way) assigned to the local road network in 2020, 2025 and 2035.

Table 7.12 – Projected Distribution of Traffic – Construction Phase, 2019 (PCUs per Hour)

Roadway	Construction Peaks	
	06:00-7:00	18:00- 19:00
N28–North of Shannonpark	215	137
R611-South of Shannonpark	66	41
N28 - East of Shannonpark	281	178
R610 – North of N28	16	9
N28 (East of Raffeen Bridge)	297	187
Raffeen Rd – North of N28	15	9
N28 (East of Shanbally)	311	195
L2492 Shanbally Link Rd	0	0
R613 Barnahely Rd-South of N28	31	18
N28 - (West of Ferry Port)	342	214
N28 (East of Ferry Port)	342	214
Loughbeg Rd-South of N28	0	0

*All traffic flows in Passenger Car Units (PCUs) per hour

Table 7.13 – Projected Distribution of Traffic – Operational Phase, 2020, 2025 and 2035 (PCUs per Hour)

Roadway	Operational Peaks			Existing Network Peaks	
	06:00-07:00	14:00-15:00	18:00-19:00	07:30-08:30	16:30-17:30
N28–North of Shannonpark	55	39	23	12	14
R611-South of Shannonpark	12	9	7	2	2
N28 - East of Shannonpark	67	48	30	15	16
R610 – North of N28	2	2	2	0	0
N28 (East of Raffeen Bridge)	70	49	31	16	16
Raffeen Rd – North of N28	1	1	1	0	0
N28 (East of Shanbally)	71	50	32	16	16
L2492 Shanbally Link Rd	0	0	0	0	0
R613 Barnahely Rd-South of N28	4	3	3	0	0
N28 - (West of Ferry Port)	75	53	36	16	16
N28 (East of Ferry Port)	75	53	36	16	16
Loughbeg Rd-South of N28	0	0	0	0	0

*All traffic flows in Passenger Car Units (PCUs) per hour

The total projected levels of traffic on the local road network, following the addition of the proposed development traffic, can be seen in **Table 7.14** and **Table 7.15** below.

Table 7.14 – Projected Total Traffic – Construction Phase, 2019 (PCUs per Hour)

Roadway	Construction Peaks	
	06:00-7:00	18:00- 19:00
N28–North of Shannonpark	1185	2660
R611-South of Shannonpark	586	1915
N28 - East of Shannonpark	898	1404
R610 – North of N28	60	467
N28 (East of Raffeen Bridge)	891	1301
Raffeen Rd – North of N28	35	109
N28 (East of Shanbally)	866	1093
L2492 Shanbally Link Rd	84	241
R613 Barnahely Rd-South of N28	146	300
N28 - (West of Ferry Port)	694	758
N28 (East of Ferry Port)	451	371
Loughbeg Rd-South of N28	237	363

*All traffic flows in Passenger Car Units (PCUs) per hour

Table 7.15 – Projected Total Traffic – Operational Phase, 2020, 2025 and 2035 (PCUs per Hour)

Roadway	Operational Peaks			Existing Network Peaks	
	06:00-07:00	14:00-15:00	18:00-19:00	07:30-08:30	16:30-17:30
N28–North of Shannonpark	1037	2202	2577	2850	3096
R611-South of Shannonpark	539	1691	1905	1721	2253
N28 - East of Shannonpark	691	1266	1271	1984	1593
R610 – North of N28	47	382	466	655	713
N28 (East of Raffeen Bridge)	670	1097	1158	1729	1743
Raffeen Rd – North of N28	21	62	102	523	176
N28 (East of Shanbally)	632	853	941	1833	1451
L2492 Shanbally Link Rd	85	196	244	454	351
R613 Barnahely Rd-South of N28	120	242	289	431	396
N28 - (West of Ferry Port)	431	603	586	1090	838
N28 (East of Ferry Port)	184	480	194	591	539
Loughbeg Rd-South of N28	240	85	367	478	267

*All traffic flows in Passenger Car Units (PCUs) per hour

7.10 Evaluation of Impacts

7.10.1 General

The impact of traffic generated on the local road network has been assessed by comparing the projected future traffic volumes with and without the construction of the proposed development. In addition, the effect of the generated traffic on the junctions in the immediate vicinity of the proposed development was examined.

7.10.2 Construction Traffic

The projected increase in traffic during the construction stage of the resource recovery centre can be seen in **Table 7.16**. The table includes Year 2019 projected flows both with and without the proposed construction traffic.

Table 7.16 – Projected Traffic Increases – Construction Stage, 2019

Roadway	Year 2019 - 06:00-07:00			Year 2019 - 18:00-19:00		
	Without	With	% Change	Without	With	% Change
N28–North of Shannonpark	970	1185	22%	2523	2660	5%
R611-South of Shannonpark	520	586	13%	1874	1915	2%
N28 - East of Shannonpark	617	898	46%	1226	1404	15%
R610 – North of N28	44	60	36%	458	467	2%
N28 - East of Raffeen Bridge	594	891	50%	1114	1301	17%
Raffeen Rd – North of N28	20	35	75%	100	109	9%
N28 (East of Shanbally)	555	866	56%	898	1093	22%
Shanbally Link Rd	84	84	0%	241	241	0%
Barnahely Rd-South of N28	115	146	27%	282	300	6%
N28 - (West of Ferry Port)	352	694	97%	544	758	39%
N28 (East of Ferry Port)	37	379	935%	81	295	265%
Loughbeg Rd-South of N28	237	237	0%	363	363	0%

*All traffic flows in Passenger Car Units (PCUs) per hour

From the above appraisal, it can be seen that by scheduling the morning construction peak hour to coincide with the lower traffic flows between 06:00 - 07:00, the higher traffic flows which occur later are avoided, and there is therefore no resultant impact on the local road network during the morning and evening peak periods.

The results above show that there are large proportional increases in traffic flow for the morning construction peak. However this is due to the background traffic being so low at this time. It should also be noted that the base traffic numbers adjacent to the proposed site entrance are extremely low at this time, which explains the high percentage increase in traffic on the N28, East of the Ferry Terminal access junction for example.

7.10.3 Operational Traffic

The peak period of generated traffic from the proposed development does not correspond with the Ringaskiddy road network peaks. The proposed development traffic peak occurs in the 14:00-15:00 hour, while the Ringaskiddy road network peaks occur in the 07:30-08:30 hour and 16:30-17:30 hour, respectively. To ensure a robust analysis is undertaken, the traffic assessment has been based on the following scenarios:

- AM Operational Peak (06:00 – 07:00)
- AM Network Peak (07:30 – 08:30)
- Afternoon Operational Peak (14:00 – 15:00)
- PM Network Peak (16:30 – 17:30)
- PM Operational Peak (18:00 – 19:00)

The projected increase in traffic during the operational stage can be seen in **Table 7.17**, **Table 7.18** and **Table 7.19** for the 2020 Operational Peak hours at

the facility, and **Table 7.20** and **Table 7.21** for the 2020 Network Peak hours. The tables include Opening Year 2020 flows both with and without the operation of the resource recovery centre.

Table 7.17 – Project Traffic Flows – 06:00-07:00 Operational AM Peak – Opening Year 2020

Road	Operational - 06:00-07:00		
	Without	With	% Change
N28–North of Shannonpark	982	1037	6%
R611-South of Shannonpark	527	539	2%
N28 - East of Shannonpark	624	691	11%
R610 – North of N28	45	47	4%
N28 - East of Raffeen Bridge	600	670	12%
Raffeen Rd – North of N28	20	21	5%
N28 (East of Shanbally)	561	632	13%
Shanbally Link Rd	85	85	0%
Barnahely Rd-South of N28	116	120	3%
N28 - (West of Ferry Port)	356	431	21%
N28 (East of Ferry Port)	37	112	203%
Loughbeg Rd-South of N28	240	240	0%

*All traffic flows in Passenger Car Units (PCUs) per hour

From the above table, it can be seen that the proposed development when operational will have minimal impact on the local road network west of the Barnahely Junction during the Operational AM Peak period.

Table 7.18 – Project Traffic Flows - Operational Afternoon Development Peak – Opening Year 2020

Road	Operational – 14:00-15:00		
	Without	With	% Change
N28–North of Shannonpark	2163	2202	2%
R611-South of Shannonpark	1682	1691	1%
N28 - East of Shannonpark	1218	1266	4%
R610 – North of N28	380	382	1%
N28 - East of Raffeen Bridge	1048	1097	5%
Raffeen Rd – North of N28	61	62	2%
N28 (East of Shanbally)	803	853	6%
Shanbally Link Rd	196	196	0%
Barnahely Rd-South of N28	239	242	1%
N28 - (West of Ferry Port)	550	603	10%
N28 (East of Ferry Port)	159	212	33%
Loughbeg Rd-South of N28	85	85	0%

*All traffic flows in Passenger Car Units (PCUs) per hour

From the above analysis, it can be seen that during the Operational Afternoon Peak period, the relative impact on the local road network is minimal. However, it should be noted that the traffic surveys show that during this time period the local road network is not congested.

Table 7.19 – Project Traffic Flows - Operational PM Peak – Opening Year 2020

Road	Operational – 18:00-19:00		
	Without	With	% Change
N28–North of Shannonpark	2554	2577	1%
R611-South of Shannonpark	1898	1905	0%
N28 - East of Shannonpark	1241	1271	2%
R610 – North of N28	464	466	0%
N28 - East of Raffeen Bridge	1127	1158	3%
Raffeen Rd – North of N28	101	102	1%
N28 (East of Shanbally)	909	941	4%
Shanbally Link Rd	244	244	0%
Barnahely Rd-South of N28	286	289	1%
N28 - (West of Ferry Port)	550	586	7%
N28 (East of Ferry Port)	82	118	44%
Loughbeg Rd-South of N28	367	367	0%

*All traffic flows in Passenger Car Units (PCUs) per hour

The above analysis shows that the proposed development will have minimal impact on the local road network during the Operational PM Peak period other than east of the Ferry port junction, which is lightly trafficked.

Table 7.20 – Project Traffic Flows – Network AM Peak – Opening Year 2020

Road	Network – 07:30-08:30		
	Without	With	% Change
N28–North of Shannonpark	2838	2850	0%
R611-South of Shannonpark	1719	1721	0%
N28 - East of Shannonpark	1969	1984	1%
R610 – North of N28	655	655	0%
N28 - East of Raffeen Bridge	1713	1729	1%
Raffeen Rd – North of N28	523	523	0%
N28 (East of Shanbally)	1817	1833	1%
Shanbally Link Rd	454	454	0%
Barnahely Rd-South of N28	431	431	0%
N28 - (West of Ferry Port)	1074	1090	1%
N28 (East of Ferry Port)	313	329	5%
Loughbeg Rd-South of N28	478	478	0%

*All traffic flows in Passenger Car Units (PCUs) per hour

The above analysis shows that the proposed development will have little or no impact on the local road network during the Network AM Peak period. This is due to the restrictions on waste acceptance and the scheduling of staff working hours outside of the Network AM Peak. The greatest increase is on the link east of the Ferry Port Junction – an increase of 16 PCUs per hour. This link is lightly trafficked in the AM peak.

Table 7.21 – Project Traffic Flows – Network PM Peak – Opening Year 2020

Road	Network – 16:30-17:30		
	Without	With	% Change
N28–North of Shannonpark	3082	3096	0%
R611-South of Shannonpark	2251	2253	0%
N28 - East of Shannonpark	1577	1593	1%
R610 – North of N28	713	713	0%
N28 - East of Raffeen Bridge	1727	1743	1%
Raffeen Rd – North of N28	176	176	0%
N28 (East of Shanbally)	1435	1451	1%
Shanbally Link Rd	351	351	0%
Barnahely Rd-South of N28	396	396	0%
N28 - (West of Ferry Port)	822	838	2%
N28 (East of Ferry Port)	253	269	6%
Loughbeg Rd-South of N28	267	267	0%

*All traffic flows in Passenger Car Units (PCUs) per hour

The above analysis shows that the proposed development will have little or no impact on the local road network during the Network PM Peak period, similar to the Network AM Peak. The greatest increase is on the link east of the Ferry Port Junction – an increase of 16 PCUs per hour. This link is lightly trafficked in the PM peak.

7.10.4 Projected Junction Operation

In urbanised and industrialised areas, it is recognized that it is the capacity of the junctions on the road links rather than the road links themselves which determine the capacity of the road network. The following junctions were assessed both with and without traffic from the proposed development. These assessments were carried out to measure the impact of the generated traffic on the local road network. The locations of all junctions assessed are shown in **Figure 7.2**.

- Junction 1 Shannon Park Roundabout
- Junction 2 Raffeen Bridge Junction
- Junction 3 Shanbally Roundabout
- Junction 4 Barnahely Junction (N18/R613)
- Junction 5 Ferry Port Access Junction
- Junction 6 Proposed Indaver Entrance

The impact of the generated traffic on the local junctions has been assessed using Junctions 9, and by using the ARCADY and PICADY modules contained in the software. These computer applications determine the projected operation of the junctions based on a number of geometric parameters and traffic flow conditions.

Each junction has been assessed based on the following scenarios outlined in **Table 7.22.**

Table 7.22 – Assessment Scenarios for Modelling

Scenario	Construction Peaks / Operational Peaks			Existing Network Peaks	
	06:00 - 07:00	14:00 - 15:00	18:00 - 19:00	07:30 - 08:30	16:30 - 17:30
2014 Base Year	□	□	□	□	□
2019 Construction Year	□		□		
2020 Opening Year	□	□	□	□	□
2025 Opening Year + 5	□	□	□	□	□
2035 Opening Year + 15	□	□	□	□	□

The results of the junction assessments are provided in **Appendix 7.1**, and are briefly summarised for each junction below.

7.10.5 Shannon Park Roundabout

In the 2014 base year, the Shannon Park Roundabout experiences queuing and delay in the morning network peak period (07:30-08:30) on the approach from Cork, and in the evening network peak period (16:30-17:30) on the approach from Ringaskiddy. During the 18:00-19:00 period, the junction is approaching 75-80% capacity on certain arms.

During the 06:00-07:00 and 14:00-15:00 periods, the junction has significant residual capacity on all arms.

It is expected that the junction improvements developed by Cork County Council for the junction will significantly improve the performance of the junction during the morning and evening peak periods. However, for the purpose of this assessment no allowance was made for these proposed improvements outlined earlier in this report.

It is however expected that in future years, the queuing and delay observed at the junction in the AM and PM peak periods will continue and increase in line with background traffic growth, and that improvements will be required in the interim ahead of delivery of the full M28 upgrade regardless of whether or not the resource recovery centre is implemented.

By 2019, background traffic growth at the junction, and the addition of Phases 1 and 2 of the Port of Cork re-development results in the junction approaching 90% capacity in the 18:00-19:00 evening period. The scheduling of construction working hours means that all construction-related traffic is concentrated outside of the 07:00-09:00 and 16:00-18:00 periods, which ensures that the traffic flows

associated with the construction of the facility have a reduced impact on the junction at these peak times.

Consequently, the addition of the proposed construction traffic, in the relevant morning and evening peak periods (06:00-07:00 and 18:00-19:00), results in a minor impact in the 06:00-07:00 morning period, and a moderate impact on the operation of the junction in the 18:00-19:00 evening period. This additional traffic associated with the construction phase is temporary only.

In 2020, 2025 and 2035, the operational traffic associated with the facility has a minor impact at the junction. The proposed opening hours of 06:00-20:00 allows the morning and evening operational peaks to occur outside of the network AM and PM peaks, and the proposed restrictions on waste acceptance at the facility in the network AM and PM peaks ensure that the impacts associated with the facility at these times are minimal.

As with the base year and 2019 construction year scenarios, it is likely that background traffic growth at the junction will result in the need for junction improvements, regardless of whether or not the resource recovery centre is in place. The impact of the facility itself on the Shannon Park Roundabout, however, is minor.

7.10.6 Raffeen Bridge Junction

During the 2014 base year, the Raffeen Bridge junction is seen to perform satisfactorily, with minimal queuing or delay during the peak periods. In the 07:30-08:30 period, the minor arm from Raheen is approaching 60% capacity due to heavy mainline N28 flow.

During the 2019 construction year and the operational assessment years of 2020, 2025, the junction is again seen to operate satisfactorily. However it is noteworthy that by 2035 traffic queues and delay are seen to develop on the Monkstown/Raffeen approach on the minor arm in the network AM peak period, primarily due to the increase in mainline traffic on the N28 itself regardless of whether or not the resource recovery centre is in place.

However, the scheduling of operational hours at the proposed facility ensures that the impact of the development during these times is minimal, while in the hours outside of the morning and evening peaks the junction is seen to perform well.

7.10.7 Shanbally Roundabout

In the 2014 Base Year, the Shanbally Roundabout experiences heavy eastbound traffic flow in the AM network peak (07:30-08:30). However due to the tidal nature of the traffic, with little or no opposing traffic, the junction does not break down. Instead the eastbound traffic forms a continuous slow-moving platoon of vehicles through the junction – this slow-moving platoon can lead to queuing and associated delay in the AM network peak.

During the PM network peak (16:30-17:30), the opposite occurs – the returning traffic heading to Cork and Carrigaline approaches the junction – this time however from the west and south due to the locations of the various industrial developments along the N28 and south in Curraghbinny.

Again, due to the tidal nature of the traffic flow, the returning westbound traffic flow faces little to no opposing traffic at the roundabout, which can lead to some minor queuing and delay on the approach arm from the south (Marian Terrace) as this traffic yields to westbound flow.

For traffic approaching from the east, any queuing or delay is due to the roundabout geometry itself, with excessive entry deflection and approach gradients serving to slow vehicles as they pass through the junction.

In the 2019 construction year and operational assessment years of 2020, 2025 and 2035, the issues with eastbound traffic flow in the morning AM network peak and the evening PM network peak are exacerbated due to traffic growth and the introduction of Phases 1 and 2 of the Port of Cork re-development. However, the proposed development will not be seen to adversely affect the performance of the junction in these network peak periods due to the proposed restrictions on waste acceptance.

The operational assessment times (06:00-07:00, 14:00-15:00 and 18:00-19:00) at the facility, when the majority of the traffic flow to and from the site will occur, are coincidental with sufficient capacity reserves at the junction, and as such the development has minimal impact on the operation of the junction during these times.

At the adjacent T-junction from Raffeen Road, in the 2014 base year queuing and delay is common during the AM network peak period, due to the heavy traffic flow eastbound on the N28 entering the roundabout. In future years, in the absence of the planned N28 upgrade this queuing and delay is expected to continue with traffic growth.

The proposed facility is not seen to impact upon the performance of this T-junction, due to the scheduling of opening hours and the operational peak periods outside of the AM network peak.

As with Shannon Park Roundabout, it is likely that improvements will be required at this junction in the interim ahead of delivery of the M28 upgrade scheme.

7.10.8 Barnahely Junction (N28-R613)

In the 2014 base year, the Barnahely Road junction of the N28 and R613 has sufficient capacity to accommodate the prevailing traffic flows. During the morning and evening network peaks, the available capacity at the junction is reduced, however it is still seen to perform well. Outside of the network AM and PM peaks, however, there is substantial residual capacity at the junction.

During the 2019 construction year, the junction has sufficient capacity to accommodate the additional traffic flows associated with the construction of the facility. The scheduling of construction activity outside of the morning and evening network peak periods ensures that the construction peak periods occur when there is substantial capacity available at the junction.

Similarly, in the 2020, 2025 and 2035 assessment years, the junction is seen to be capable of accommodating the projected operational traffic flows.

7.10.9 Ferry Port Junction

In the 2014 base year, the Ferry Port junction is very lightly trafficked outside of specific peak times, and as such has significant residual capacity.

Similarly, in the 2019 construction year, the junction has sufficient capacity to accommodate the projected traffic flows associated with the construction of the facility.

In the 2020, 2025 and 2035 assessment years, the junction is also seen to have sufficient capacity to accommodate the projected traffic flows associated with the facility.

7.10.10 Proposed Entrance to Ringaskiddy Resource Recovery Centre

During the construction of the facility in 2019, the proposed site access at the site has sufficient capacity to accommodate the projected traffic flows associated with the construction of the facility.

Similarly, in the 2020, 2025 and 2035 assessment years, the junction has sufficient capacity to accommodate the projected traffic flows associated with the facility.

7.11 Mitigation Measures

As part of the design process for the proposed development, a number of mitigation measures were included to control the impact of the generated traffic on the local road network.

7.11.1 Indaver Staff Mobility Management Plan

Indaver has prepared a Mobility Management Plan (MMP) for staff employed at the facility, which is intended to reduce the amount of single-occupancy car trips to and from the site. Note that for the purpose of this assessment, no reductions in single-occupancy car trips have been assumed to result from the implementation of the mobility management plan.

This MMP will be reviewed and revised on an annual basis. The review will comprise the undertaking of staff travel-to-work surveys and the review of targets set in the MMP. In the longer term, this MMP will remain part of company policy in order to ensure that the longer term capacity of the N28 and upgraded M28 are still considered.

The Indaver Staff Mobility Management Plan is included in **Appendix 7.2**.

7.11.2 Staff Operational Hours

As outlined in this assessment, Indaver has structured staff working hours in order to ensure that arrivals and departures will occur outside of the AM and PM network peak periods. This will ensure that the traffic flows associated with staff movements at the site will occur during hours where there will be sufficient

reserve capacity on the local road network to accommodate the projected increase in traffic.

Similarly, during the construction stage in 2019, restrictions on arrivals and departures have been proposed which will ensure that no vehicles (construction staff and HGV's) will arrive or depart the site during the AM and PM network peaks. Instead, these movements will occur during hours with sufficient reserve capacity on the local road network.

7.11.3 Indaver HGV Mobility Management Plan

The recent strategic development proposals submitted by the Port of Cork for an expansion of their facility at Ringaskiddy include a Freight Mobility Management Plan, developed to assist the Port in managing and controlling the flow of traffic to and from Ringaskiddy during peak hours. The Port's approach includes a number of key elements, as outlined in Section 8.7.1 of the Traffic & Transportation chapter of the EIS documentation submitted as part of their planning application:

- Development and use of a booking system to manage freight arrivals and departures
- Controlling and optimising gate operations to regulate HGV flow
- Extended operating hours to allow the Port to operate outside of the AM and PM peaks, and
- The use of IT solutions to disseminate information to hauliers regarding port operations and traffic conditions

Through the above measures, it is stated that the number of arrivals and departures can be controlled and reduced to an acceptable level.

The principle of mobility management is key in the Ringaskiddy area, where there are peak periods that experience high traffic flow, and corresponding inter-peak periods with significant spare capacity on the road network. Though the Port of Cork has completely different operational requirements to an incinerator with energy recovery, Indaver recognise the need for a similar approach to Mobility Management of HGV traffic.

In a similar manner to systems already in use at its Meath facility, Indaver proposes to implement a mobility management plan for HGVs. This will include a dedicated Waste Planner who manages the SAP delivery booking system, control of gate operations at the site entrance, extended operating hours to allow customers to avoid the morning and evening peak periods on the local road network, and a web-text service to disseminate information to customers. This will optimise the volume of waste delivery HGV traffic travelling to and from the site on the road network over the course of the whole day, allowing for traffic arrivals to be controlled and scheduled during peak periods.

The above measures will allow Indaver to control the arrival and departure of HGVs in the 07:00-09:00 and 16:00-18:00 peak periods and reduce HGV trips to and from the resource recovery centre during these times to a minimal level.

It is noteworthy that regardless of traffic conditions in the Ringaskiddy area, Indaver must have control over the delivery of waste material, including advanced notification of the type of waste material to be delivered, and the date of delivery. This is due to the need to control the calorific value (CV) of the mix of waste

accepted at the facility at any one time. Consequently, Indaver already adopt a robust approach to the advance planning of the acceptance of waste at specific times.

Adopting this system will ensure that the impact of HGV traffic flows associated with the facility will be minimised during peak periods, and that truck queuing in and out of the facility will be nominal. The HGV mobility management plan covers all stages of delivery, from pre-arrival, through to arrival and presence on-site, and departure. The system works as follows:

- Step 1 – The Indaver Waste Planner uses the booking system to create a high-level waste delivery plan.
- Step 2 – A week in advance, the waste planner in consultation with clients, creates a sales order for each delivery. This includes information about the customer, the waste type and the allocated delivery slot.
- Step 3 – The waste delivery arrives at the facility – note that drivers cannot enter the facility without checking in with the gate-keeper and receipt of a swipe card.
- Step 4 – The gate-keeper matches the delivery in question with the relevant sales order, the booking system records the arrival time and vehicle registration number, the driver receives a swipe card and a delivery docket.
- Step 5 – The driver swipes the card at the weighbridge, recording the entry weight and time, and the driver enters the site.
- Step 6 – The driver proceeds to the waiting zone outside the tipping hall, hands in the delivery docket, and proceeds to a tipping gate when instructed to do so.
- Step 7 – After tipping, the driver returns to the weighbridge.
- Step 8 – The driver swipes his card at the weighbridge, recording the exit weight and time, completing the delivery. An automatic record of the delivery is printed at the gatehouse.
- Step 9 – The driver parks outside the gatehouse, returns his swipe card to the gatekeeper and received the printed delivery record. The driver then leaves.

At restriction periods, the number of available slots at the facility will be restricted in order to control the arrival of vehicles at the site. Turnaround time at the facility is approximately 25 minutes.

In addition to the proposed HGV Mobility Management Plan, the proposed extended operating hours of 06:00-20:00 will allow hauliers to schedule their deliveries to the proposed facility outside of the prevailing AM and PM network peak hours. Discussions with operators has suggested a strong preference for the proposed extended operating hours at the site, allowing these clients to schedule their deliveries outside of peak traffic times.

Indaver already employ a dedicated Waste Planner for the Meath facility who maintains communications with customers as part of their role; Indaver also already uses a web-text service for the Meath facility, to disseminate general announcements. Indaver proposes to have a dedicated Waste Planner and associated communications tools including a web-text service in Cork to allow hauliers and other customers to communicate with the Indaver Waste Planning

Department quickly and efficiently regarding operations at the facility and prevailing road and traffic conditions.

The booking system allows Indaver to keep records of all arrivals and departures at the facility, and can generate records for review by the local authority in order to demonstrate the efficacy of the proposed Mobility Management Plan, including arrival, entry and departure times, turnaround times and longer-term delivery trends.

Figure 7.3 shows a screenshot of the existing online planning tool in operation at the Meath facility. A step-by-step process flowchart of the HGV Mobility Management Plan is included in **Appendix 7.3**.

7.11.4 Construction Traffic Management Plan

Indaver will appoint a construction management team for the duration of the construction phase. The team will supervise the construction of the project, including monitoring the performance of the contractors to ensure that all of the proposed construction phase mitigation measures are implemented and that construction impacts and nuisance are minimised. Indaver will liaise with neighbours and the general community during the construction phase to ensure that any disturbance is kept to a minimum.

A Construction Traffic Management Plan will be prepared by the appointed main contractor prior to construction commencing. The Construction Traffic Management Plan will comprise all of the construction traffic mitigation measures which are set out in this EIS and any additional measures which are required by the conditions attached to the Board's decision. The Construction Traffic Management Plan will also include any specific requirements of Cork County Council during the construction phase including any monitoring and reporting requirements. This Plan will be submitted to and agreed with Cork County Council prior to construction commencement.

7.12 Residual Impacts

Regardless of whether or not the resource recovery centre proceeds, there are ongoing capacity issues on the local road network at a number of key junctions, particularly at Shannon Park and Shanbally roundabouts. The majority of the issues at these junctions are associated with the morning and evening network peak periods (07:30-08:30 and 16:30-17:30), with the Shannon Park Roundabout also quite busy in the early portion of 18:00-19:00 period (although less so than the two periods mentioned above).

The introduction of the resource recovery centre has a moderate impact during the construction phase in the 18:00-19:00 evening period. This impact is temporary in nature as it is associated with construction activity at the site. Post-opening, the facility has minimal impact on the local road network.

Indaver have committed to scheduling construction traffic during the construction phase, and operational traffic in 2020 (and beyond) so as to have a minimal amount of traffic flow to and from the site in two-hour periods in the morning and evening, thereby avoiding the peak periods outlined above in the morning and evening, and instead availing of the capacity on the local road network outside of these times.

As part of this assessment, no allowance has been made for the construction of the M28 upgrade scheme, recently announced in the Government Capital Investment Programme (note that this scheme has not yet received planning permission). It is likely that the M28 upgrade will significantly improve the operation of Shannon Park and Shanbally roundabouts by removing strategic traffic flows from these junctions.

In the interim, Cork County Council have developed improvement proposals for both Shannon Park and Shanbally roundabouts, which, if implemented will improve the performance of both junctions, particularly at Shannon Park roundabout.

7.13 References

Transport Infrastructure Ireland (TII) (2011) *Project Appraisal Guidelines, Unit 5.5: Link-Based Traffic Forecasting, Table 5.5.1: National Traffic Growth Forecasts: Annual Growth Factors,* TII, Dublin, Ireland

European Commission – Transport – Infrastructure – TEN-T – Connecting Europe – Core Network

Transport for London (2010) *Traffic Modelling Guidelines,* Transport for London, UK