Chapter 3 Need for the Proposed Road Development

3.1 Introduction

This chapter outlines the need for the proposed M7 Naas to Newbridge By-Pass Upgrade Scheme based on the deficiencies in the existing road network and identified future needs of the M7.

3.2 Overview of the Scheme

The Cork – Dublin – Belfast motorway is part of one of nine trans-European corridors, which will act as a backbone for transportation in Europe's single market. The core network is to be completed by 2030[1]. The national motorway system is the primary conduit for transportation of goods and services to large indigenous and foreign markets and facilitates the movement of goods, services and labour between national gateways and major employment centres. Motorways also are very important public transport corridors for public bus and coach services.

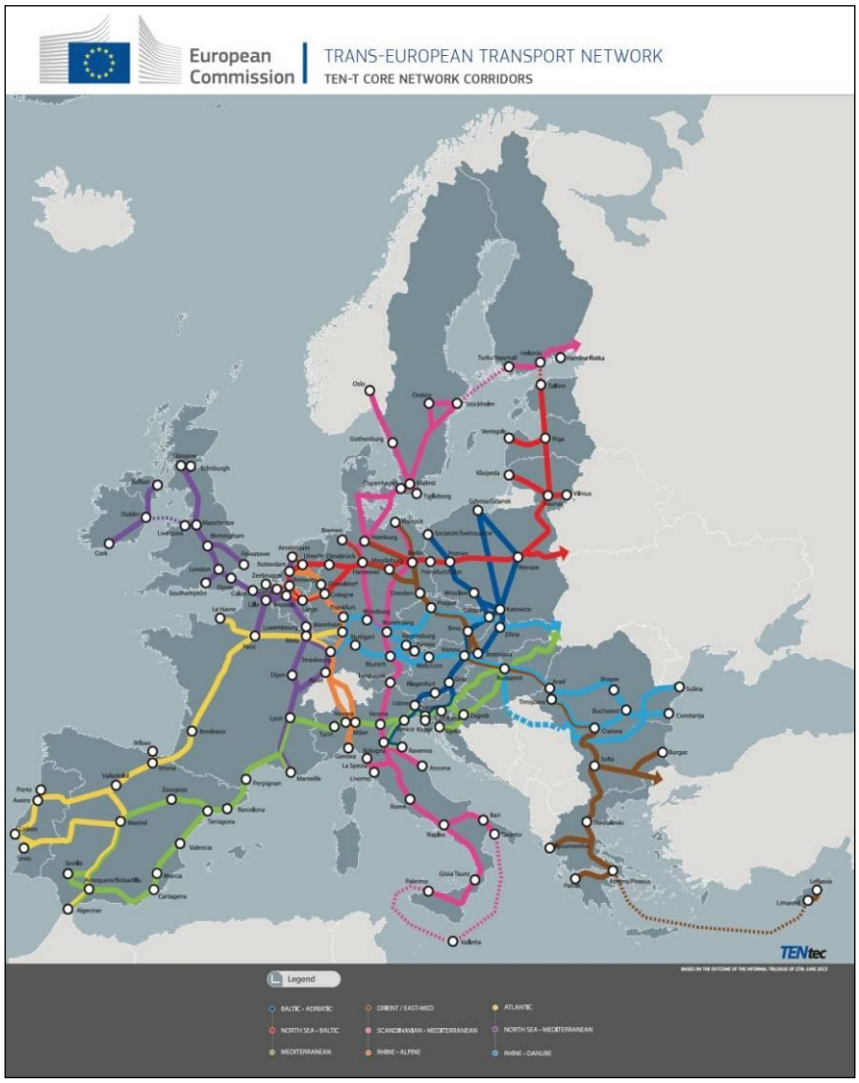

Plate 3.1: TEN-T Core Network Corridors

[1] EU Directive 2008/96/EC on Road Infrastructure Safety Management provides new legal requirements for the safety management of the Trans-European Road Network (TERN).

The completion of the M7/M8 Dublin to Cork motorway in May 2010 has resulted in the provision of continuous and uninterrupted dual carriageway or motorway links between Dublin and the three cities of Waterford, Cork and Limerick, other than the existing signalised Dunkettle Interchange in Cork and the signalised Newlands Cross junction in Dublin.

Permission has been granted and works have commenced for the improvement of the Newlands Cross junction into a free flow grade separated junction. Permission has also been granted for the improvement of the Dunkettle Interchange in Cork as a free flow grade separated junction. In Limerick the Shannon Tunnel has been completed. These developments on the arterial motorway network have enhanced connectivity between Dublin and the three southern gateways cities, Waterford, Cork and Limerick.

The M7 motorway, from its interchange with the M8 (Cork and Limerick) and M9 (Waterford) and extending from there towards the M50 in Dublin is one of the most important and busiest motorway routes in Ireland. With the increase in capacity and traffic movement on other parts of the motorway system, the restrictions in capacity that are evident on the subject section of motorway, between Junction 11 Great Connell and Junction 8 Johnstown, indicate a justification for works to provide for an improvement of capacity in the interests of service, safety[2], economy and environmental pollution.

The pressure of traffic northeast of the M7/M9 merge now requires an upgrade of that section of motorway extending from Junction 11 Great Connell to Junction 9 Maudlins at Naas north. The section of motorway from Maudlins to Newhall was opened to traffic in 1983 and no alterations to the carriageway capacity have been provided in the intervening 30 years. This section of motorway has now exceeded its predicted design life and requires improvement.

In the original design of this section of dual-carriageway, the grassed central reservation was reserved for future capacity enhancement purposes accommodating additional lanes. It is intended that the proposed development will be carried out substantially by use of this central reservation area along the main motorway carriageway alignment as originally intended.

The NRA has adopted a 20-year design horizon for national roads, as a basis for traffic capacity requirements.[3] The section of national road under consideration in this proposal has reached its capacity horizon and requires review. The section of the M7/N7 under consideration commences at Junction 8, Johnstown and extending to Junction 11, Great Connell, where the M9 merges with the M7, as shown in **Figure 1.1, EIS Volume 3**.

The proposed scheme involves widening 13km of the M7 motorway from 2 to 3 lanes between the merge of the M7 and M9, both dual two-lane motorways, and the commencement of the dual three-lane all purpose road at Junction 9 Maudlins. The scheme will also require some minor reconfiguration of the section of dual three-lane all purpose road between Junction 9, Maudlins and Junction 8, Johnstown, which currently includes the lane gain/lane drop as the road passes through the Maudlins interchange.

[2] Road Safety Authority – Road Safety Strategy 2013 – 2020; Engineering Measures, emphasises value for money road improvements that will enhance the safety of the road system as a whole, including national roads in the context of EU Directive 2008/96.
[3] Spatial Planning and National Road – Guidelines for Planning Authorities 2012

The scheme includes the closure of the existing motorway slip roads at Junction 10 Newhall and construction of a new interchange with the R445 Naas to Newbridge road where it crosses the M7 some 700m south of the existing interchange. The widened motorway will follow the alignment of the existing road both horizontally and vertically.

3.3 Current Situation

The existing N7 from Rathcoole, County Dublin to the Maudlins Interchange at Naas Co. Kildare was recently upgraded from a two lane dual carriageway to a three lane dual carriageway complete with interchanges at key locations as part of the N7 Naas Road Widening Scheme (refer Plate 3.2). The road currently has a speed limit of 100kph and is classified as a national primary dual carriageway due to the remaining frontage access. While this section remains an all purpose road, it is in all other regards constructed to the same standards as would apply to a motorway. The upgrade works relieved congestion along this section of the N7 and works were completed in August 2006.

Plate 3.2: Existing N7

The next section of carriageway is the M7 Naas Bypass which extends from Maudlins Interchange north of Naas to Newhall Interchange south of Naas (refer Plate 3.3). The road has a speed limit of 120kph and is classified as a motorway.

This was the first section of motorway constructed in the country and was opened to traffic in 1983. Pavement improvement works were recently carried out on this section of motorway which had exceeded its predicted design life. The works were limited to pavement improvements and no alterations were made to the existing cross section.

Plate 3.3: M7 at Maudlins Interchange

The section between Junction 10, Newhall and Junction 11, Great Connell, was constructed as part of the Droichead Nua By-Pass Scheme as a dual two-lane motorway. This section of motorway was opened to traffic in 1994 and has not been subject to any major improvement since construction.

On the westbound carriageway congestion is particularly evident during the evening traffic peak with queues developing back as far as the Johnstown Interchange with traffic flow affected all the way back to Rathcoole and beyond. There is a lane drop at the Maudlins Interchange as the 3 lane N7 dual carriageway becomes the 2 lane M7 motorway, which creates a bottleneck during the evening peak.

Congestion is also evident at the Newhall Interchange at peak traffic hours. Congestion can lead to queuing on the westbound off ramp of the Interchange, which can at times, extend back onto the M7 carriageway hard shoulder raising serious safety concerns.

At peak times traffic speeds reduce along the full length of the M7 between the Johnstown and Great Connell Interchanges. Traffic congestion is significantly reduced west of the Great Connell Interchange as traffic splits between the M7 and the M9.

On the eastbound carriageway congestion is mainly evident in the morning peak both at the M7/M9 merge at the Great Connell Interchange as 4 lanes of traffic merge into 2 lanes and at the Newhall Interchange eastbound off ramp. Queuing on the off ramp of the Newhall Interchange can also extend back onto the M7 mainline hard shoulder, once again raising safety concerns. **Plate 3.4** shows the location of Great Connell, Newhall and Maudlins Interchanges.

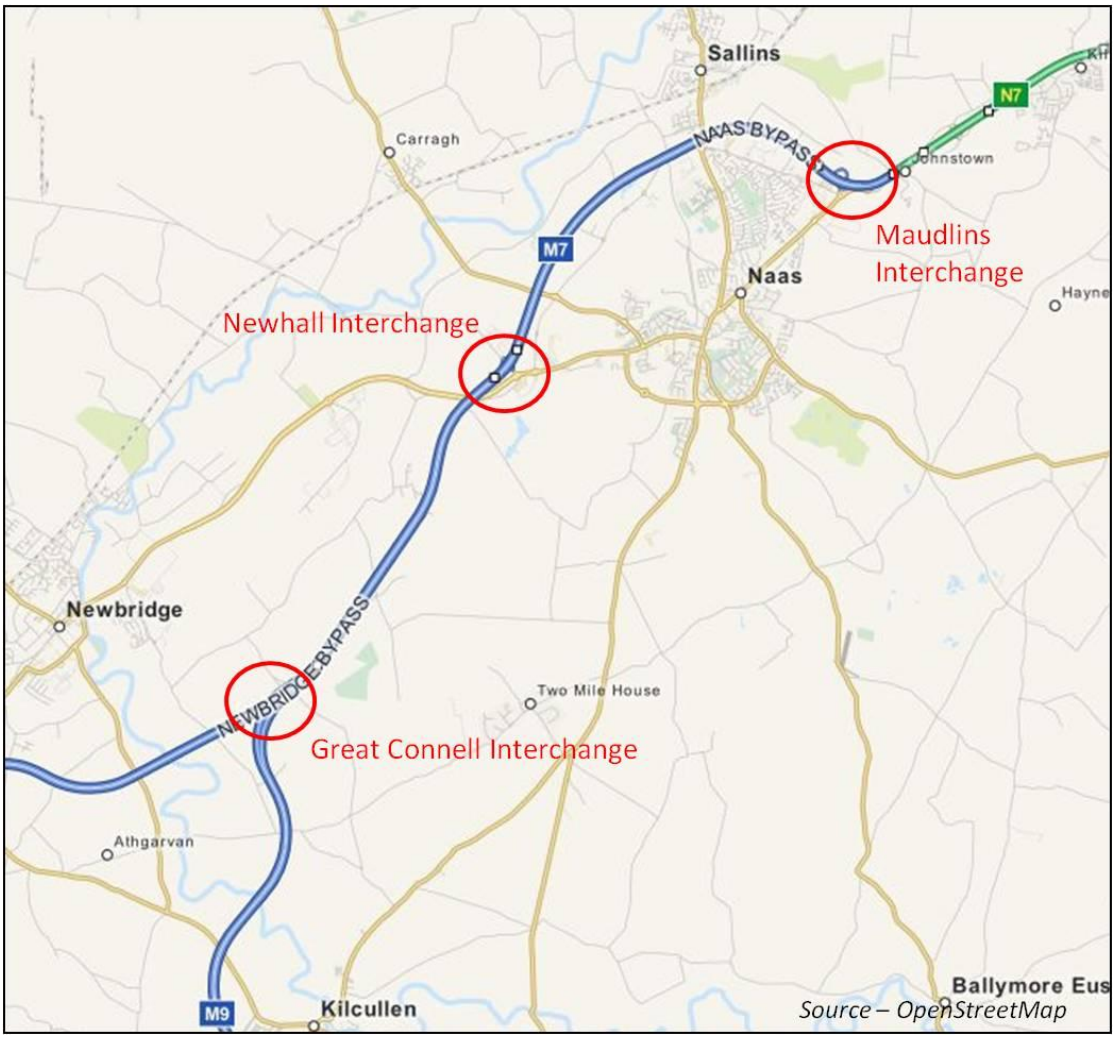

Plate 3.4: M7 Interchange Locations

The most appropriate and sustainable solution to remedy this congestion and to improve safety is to widen this section of road within the existing footprint of the M7 and address the local capacity problems at Junction 10 Newhall Interchange. Provision for carriageway enhancement was incorporated in the original dual-carriageway scheme with provision of a central grassed median to accommodate future lanes.

3.4 Addressing Current Issues and Deficiencies

This section identifies and describes the existing issues and deficiencies with the road network that the proposed scheme is intended to address.

As outlined above congestion on this section of the M7 is particularly evident during the morning (AM) peak and evening (PM) peak periods. During these peak periods, journey times increase along this section of the M7 and queuing on the Newhall Interchange exit ramps can occur. The queuing on the Newhall Interchange exit ramps can at times extend back onto the M7 carriageway hard shoulders, raising serious safety concerns.

The congestion is due to a number of factors, particularly relating to road capacity and interchange congestion, which are summarised as follows and addressed in more detail below:

- Annual Average Daily Traffic (AADT) flow on this section of the M7 exceeds the NRA guidance for a dual two lane motorway;
- Weekday morning and evening peak traffic flows are significantly higher than during other times of the day, which indicates a high commuting demand on this section of the M7;
- The high weekday morning and evening peak traffic flows exceed the practical capacity of a motorway lane, which leads to a reduction in speed and increased likelihood of accidents;
- Journey times increase during the weekday morning and evening peaks and delays are accentuated during the Friday evening peak in the westbound direction;
- The section of motorway operates at a poor level of service (Level E in a hierarchy of service A – F) (refer Section 3.4.3); and
- The likelihood of accidents increases due to the high density of traffic on the M7 and due to traffic queuing on the exit ramps of the Newhall Interchange.

3.4.1 Road Capacity

Annual Average Daily Traffic

Table 6/1 of the National Roads Authority (NRA) TD9/12 'Road Link Design' indicates that the Annual Average Daily Traffic (AADT) flow of a wide 2 lane motorway (D2M) operating at Level of Service (LOS) D should not exceed 55,500 AADT. The NRA Project Appraisal Guidelines (*PAG Unit 4: Definition of Alternatives)* suggests that the AADT flow outlined in NRA TD9/12 should only be treated as a guideline and not as a definitive means in the selection of carriageway type.

Notwithstanding this, the following AADT flows were recorded in 2009/2010 at 2 NRA permanent counters along the M7:

- M7 Lewistown M07-35 (Great Connell - Newhall Interchange) – 58,172 AADT (2010); and
- M7 Naas Bypass M07-36 (Newhall Interchange - Maudlins) – 60,374 AADT (2009).

At present, 24hr weekday flows on both sections of the M7 between the Great Connell and Maudlins Interchanges exceed the suggested AADT value of 55,500 for a LOS D (refer Section 3.4.3 and Table 3.3). Surveys carried out in April 2012 (24hr weekday) provide the following data:

- Great Connell to Newhall Interchange – 57,942 vehicles per day; and
- Newhall to Maudlins Interchange – 59,591 vehicles per day.

P-Factor

NRA*PAG Unit 16.2: Expansion of Short Period Traffic Counts,* discusses the daily profile of traffic and the concept of 'peaky' or 'flat' profiles. The unit states that *'In order to represent the 'Peakiness' of a traffic flow profile over a particular day, the concept of a 'p-factor' has been derived. The p-factor simply describes the scale of the reduction in flow between the AM Peak and the quietest period of the afternoon (the Inter-Peak), and from the Inter-Peak back up to the PM Peak'*. It is defined as follows:

p = a + b – 2c

Where:

p = the peakiness index
a = the maximum hourly proportion of traffic between 0:00 and 12:00 on a weekday
b = the maximum hourly proportion of traffic between 12:00 and 24:00 on a weekday
c = the minimum hourly proportion of traffic between 08:00 and 18:00 on a weekday

The 'p-factor' has been calculated as 0.102 for the M7 based on the daily traffic profile illustrated in **Plate 3.5**, below. PAG Unit 16.2 states that "the maximum p-factor is 1.0, in which case all traffic flow would occur during 2 individual peak hours of the day, separated by a cessation of all traffic during the afternoon.

The national mean p-factor taken from the NRA Permanent counters located throughout out the country was found to be 0.062. The p-factor for the M7 is well above the upper 85th percentile p-factor nationally (0.081) and would indicate a very 'peaky' traffic profile.

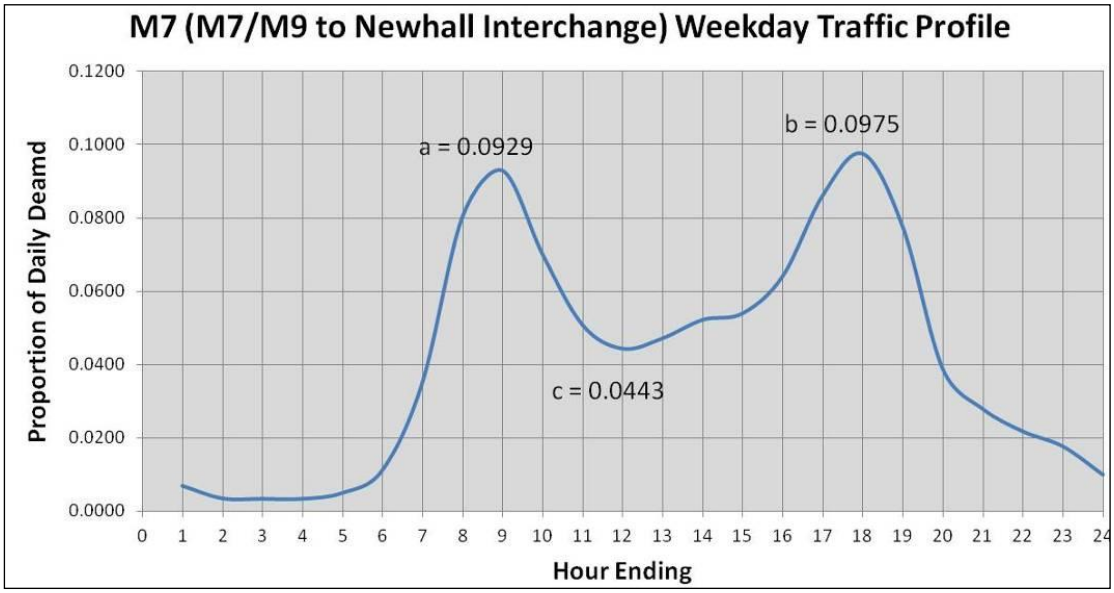

Plate 3.5: M7 Weekday Traffic Profile

Peak Hour Flows

The section of the M7 between the Great Connell Interchange and the Maudlins Interchange operates above capacity during the AM Peak Period (07:00 – 09:00) and PM Peak Period (16:00 – 19:00). AM and PM Peak hour flows taken from the surveys carried out in April 2012 are presented in Table 3.1. The table illustrates that during the Peak Hour flows of over 3500 Passenger Car Units (PCU) occur.

Table 3.1: 2012 M7 Peak Hour Flows (2 Lane)

M7 Section	Direction	AM Peak Hour (08:00 – 09:00) (PCU)*	PM Peak Hour (17:00 – 18:00) (PCU)*
Great Connell to Newhall	Eastbound	**3549**	2219
Newhall to Maudlins	Eastbound	**3658**	2312
Great Connell to Newhall	Westbound	2461	**4012**

M7 Section	Direction	AM Peak Hour (08:00 – 09:00) (PCU)*	PM Peak Hour (17:00 – 18:00) (PCU)*
Newhall to Maudlins	Westbound	2505	**3929**

**- Based on HGV PCU factor of 3*

Research presented in NRA Transport Research & Information Note *'A Study of Lane Capacity in the Greater Dublin Area' (Feb 2012)* has shown that the Practical Capacity (the point at which flow breakdown can start to occur) of an unmanaged lane has been measured to be between 1700 and 1800 PCU per hour.

Table 3.1 highlights that during the AM Peak Hour (eastbound) and PM Peak Hour (westbound) that flows are above this practical capacity. This reflects the observed queuing upstream during the Peak Hours.

3.4.2 Average Journey Time / Speeds

Journey Time Surveys

Journey time surveys undertaken in February and April 2012 along the 11.8km section of the M7 between the Johnstown Interchange and the Lewistown overbridge (1.5km northeast of the Great Connell Interchange) illustrate the average journey times and speeds during the Peak and Inter Peak hours. The results of these surveys are illustrated in Table 3.2.

Table 3.2: Journey Time Survey Results (Average Time & Speed)

Direction	Average	AM Peak (08:00 – 09:00)	Inter Peak (10:00 – 16:00)	PM Peak (17:00 – 18:00)
Eastbound	Time	8min 20sec	7min 17sec	7min 17sec
	Speed	85kph	97kph	97kph
Westbound	Time	7mins 09sec	7mins 25sec	8min 30sec
	Speed	99kph	96kph	83kph

The table shows that during the AM Peak hour the average speed in the eastbound direction is approximately 85kph. During the PM Peak hour average speeds are no greater than 83kph in the westbound direction. It should be noted that these journey times are based on data collected between Monday and Thursday in order to establish average weekday journey times.

Journey reliability, particularly on the westbound carriageway can vary considerably. Journey times on a Friday during the PM Peak can be significantly higher than the average journey time outlined above due to a higher volume of westbound traffic.

3.4.3 Level of Service

The US Highway Capacity Manual (HCM) specifies a Level of Service (LOS) for a road as a quality measure describing operational conditions within a traffic stream. This is generally in terms of such service measures as speed and travel time, freedom to manoeuvre, traffic interruptions, and comfort and convenience. Six LOS are defined for various types of routes from A to F, with LOS A representing the best operating conditions and LOS F the worst.

The HCM specifies the density of traffic as an appropriate way of estimating the LOS of a road. The HCM density ranges for motorways and the corresponding LOS are outlined below:

Table 3.3: LOS Density Range (Motorway – PCU/km/Lane)

LOS	Density Range (pcu/km/lane)
A	0 - 7
B	>7 - 11
C	>11 - 16
D	>16 - 22
E	>22 - 28
F	>28

It is therefore possible to use the traffic relationship of speed, flow and vehicle density to express the LOS. The relevant relationship in this regard is:

$$C = Q/V$$

Where C = Vehicle Density (pcu/km/lane)
Q = Vehicle Flow (pcu/hr)
V = Vehicle Speed (kph)

The LOS along the M7 between the Great Connell and Maudlins Interchanges during the Peak Periods is presented in Table 3.4 based on the density of flow per hour in each lane. The assessment highlights that the network is operating above capacity (LOS E) during both the morning (eastbound) and evening peaks (westbound).

Table 3.4: LOS Density Range (Motorway – PCU/Hour/Lane)

M7 Section	Direction	Peak	Q (pcu/hr)*	V (kph)	C (pcu/km/ln)	LOS
Great Connell to Newhall	Eastbound	AM	3549	85kph	22	E
Newhall to Maudlins	Eastbound	AM	3658	85kph	23	E
Great Connell to Newhall	Westbound	PM	4012	83kph	27	E
Newhall to Maudlins	Westbound	PM	3929	83kph	26	E

**-Total flow is assumed to be split evenly between each lane*

It is an objective of the National Development Plan, to achieve as a minimum, a Level of Service C on all Major Inter Urban (MIU) routes. The M7 corridor is one of five MIU routes.

3.4.4 Safety

RSA Road Accident Database

The Road Safety Authority (RSA) maintains a database of Personal Injury Accident (PIA) collisions statistics. The database currently covers the 10 year period between 2002 and 2011. Accidents in this database are classified into 4 groups based on the severity (fatal, serious, minor and not injured) of the accident. **Plate 3.6**, below

illustrates the location and severity of accidents along the M7 between the Great Connell Interchange and the Maudlins Interchange (Naas North) between 2002 and 2011. Minor and Not Injured (Material Damage) accidents are grouped into one classification in **Plate 3.7**. **Plate 3.8** shows the location of 'Material Damage' collisions.

Table 3.5 summaries the PIA data based on severity of accidents. The table shows that over the 10 year period up to and including 2011 there were a total of 69 accidents along this section of the M7. The RSA database highlighted that the majority of these accidents were as a result of rear end shunts (38%).

Table 3.5: RSA M7 PIA Data (2002- 2011)

Accident Severity	Total Number of Accidents
Fatal	5
Serious	5
Minor	17
Not Injured (Material Damage)	42
Total	**69**

These accidents represent a significant cost to the economy. The high level of rear end shunts is a clear indication of traffic having to suddenly reduce speed as a result of congestion. The provision of a third lane will alleviate congestion along the route and reduce the number of incidents.

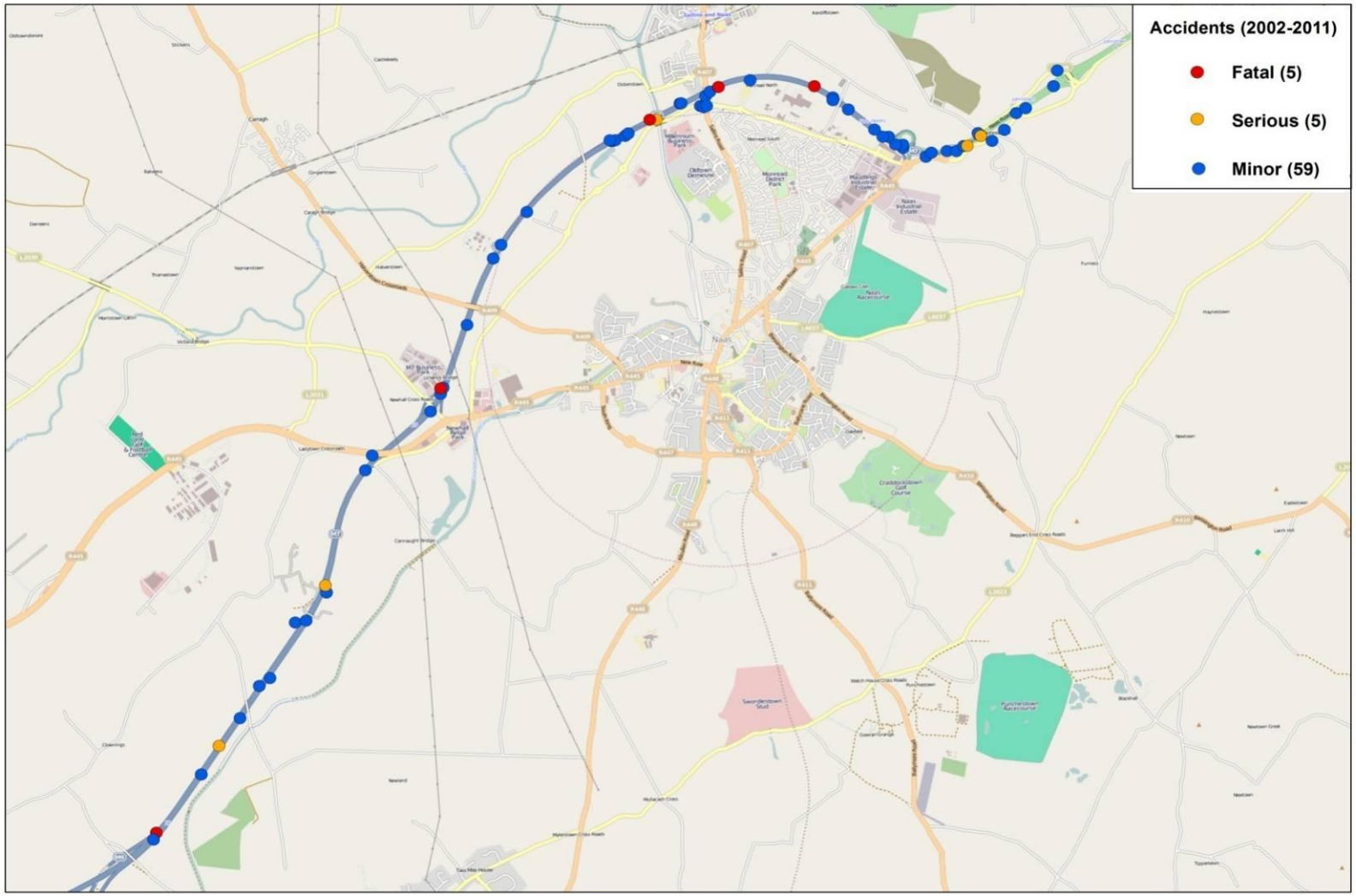

Plate 3.6: RSA M7 PIA Data (2002- 2011)

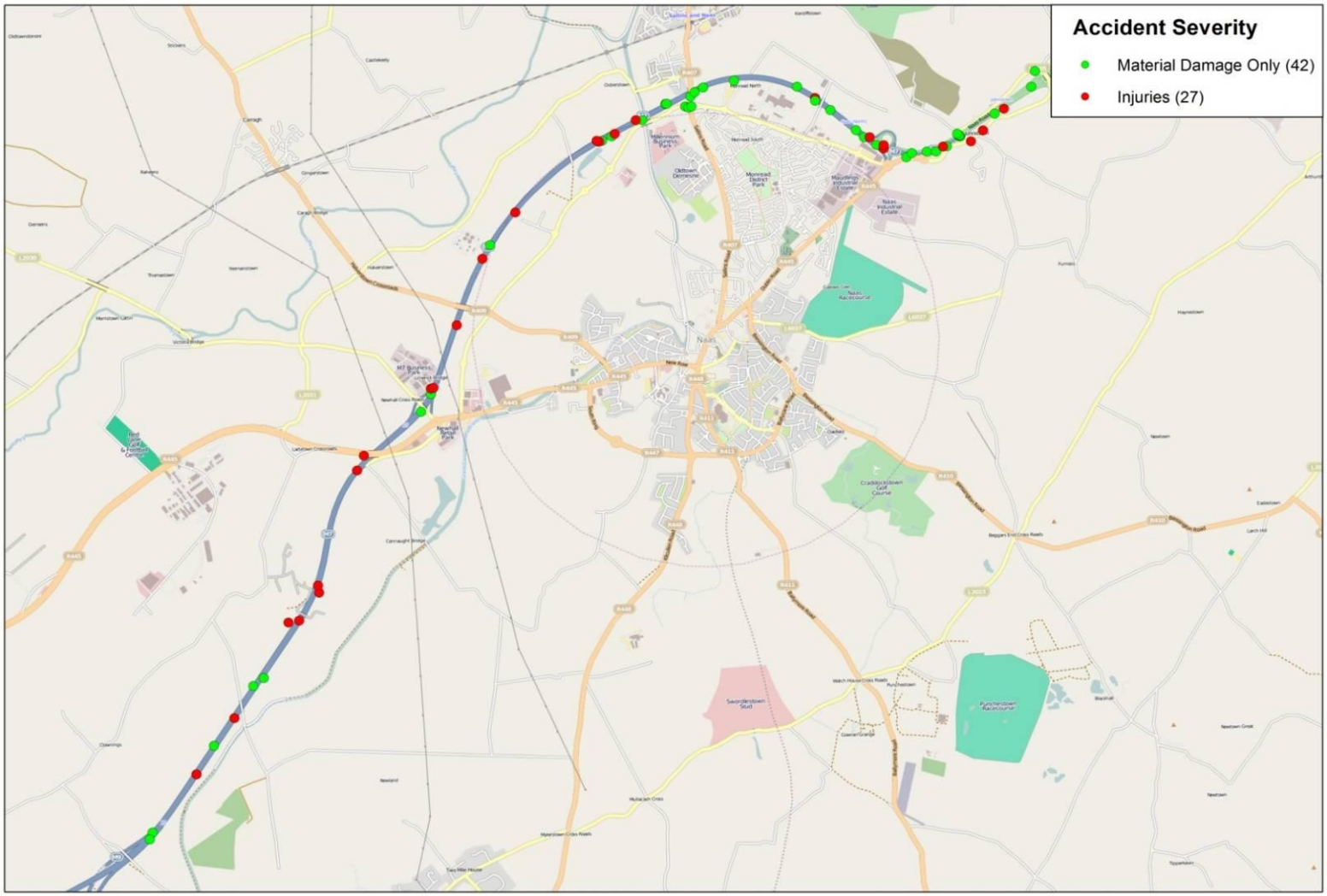

Plate 3.7: Material Damage (2002- 2011)

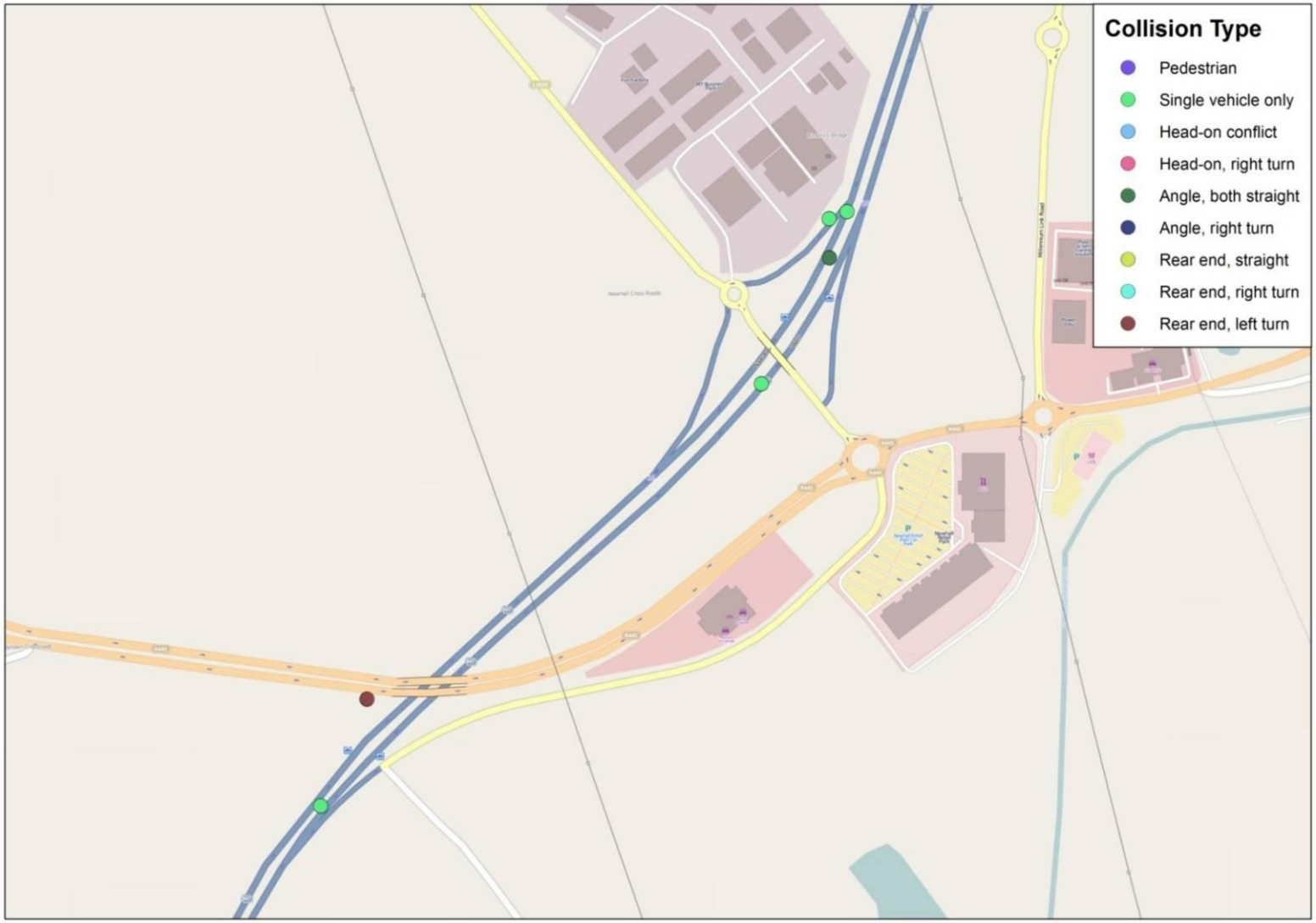

Plate 3.8: Newhall Interchange - Collision Types (2002 - 2011)

3.4.5 Interchange Congestion

Different levels of traffic congestion occur at Maudlins, Newhall and Great Connell Interchanges, each of which is discussed below.

Maudlins

At Maudlins Interchange congestion occurs on the westbound M7 carriageway as a result of the lane drop from three lanes on the N7 to two lanes on the M7. The proposed continuation of the third lane as far as the M7/M9 split at Great Connell will address this issue. The layout of the existing interchange is illustrated on **Plate 3.9**, below.

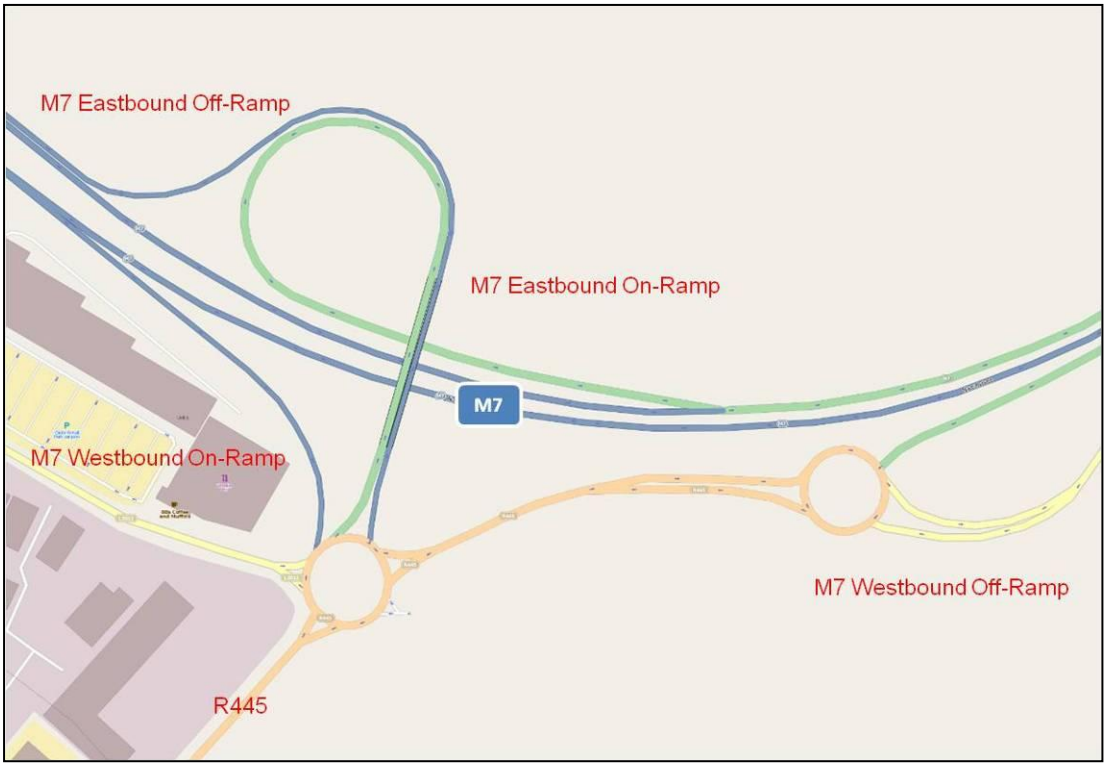

Plate 3.9: Layout of Maudlins Interchange

Congestion also occurs at the R445 Dublin Road roundabout that forms part of the Maudlins Interchange, however this does not affect the motorway itself. The congestion on the roundabout is caused by local road conflicts between traffic on the R445 and the heavy flows on the Monread Road.

Newhall

The Newhall Interchange is one of the main access points for traffic accessing Naas and Newbridge via the M7 motorway. Traffic currently experiences significant delays and queuing during both the AM and PM Peak hours. The layout of the existing interchange is illustrated on **Plate 3.10**.

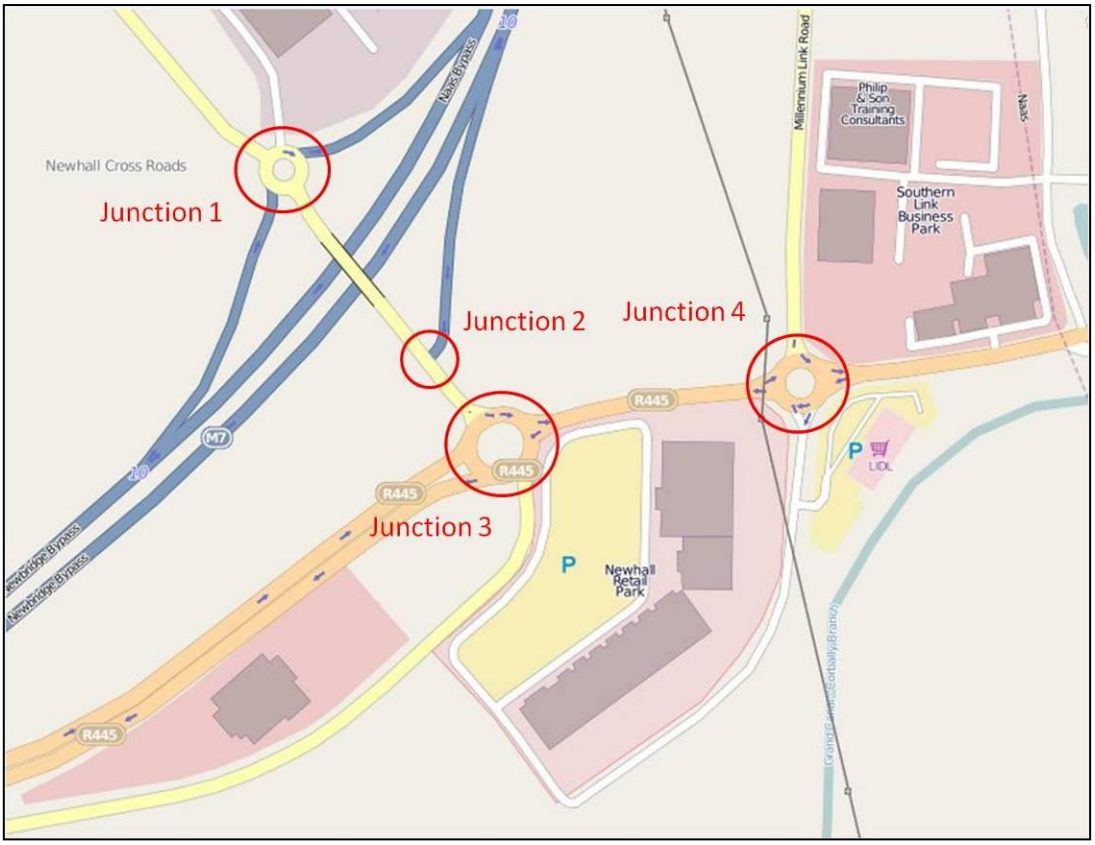

Plate 3.10: Existing Layout of Newhall Interchange

At peak times traffic on the eastbound and westbound off-ramps of the Interchange queues back onto the M7 mainline hard shoulders, leading to flow breakdown on the M7 mainline carriageway and raising safety concerns. The individual junctions that impact upon the operating of the interchange are as follows:

- Junction 1 – M7 Business Park (MBP) Roundabout;
- Junction 2 – M7 Westbound Off-Ramp;
- Junction 3 – Bundle of Sticks (BOS) Roundabout; and
- Junction 4 – B&Q Roundabout.

Due to high traffic flows and the close proximity of the junctions which make up the interchange, queuing or blocking back from one arm of a junction can impact upon another junction, which leads to queuing on the M7 off-ramps and on the hard shoulders approaching these slip roads. This represents a significant safety concern in addition to the resultant delays.

A plot of collision types (2002-2011) at the Newhall Interchange is illustrated in **Plate 3.8**, previously.

The separate proposal for a new Osberstown Interchange and Sallins Bypass, if delivered, would provide some short term relief of this current congestion. However traffic modelling has shown that some queuing on the slip roads would remain and as traffic levels increase this quickly extends back onto the motorway again.

The proposal to close the existing Newhall interchange and construct a new interchange slightly further south where the R445 dual carriageway crosses over the

M7 will significantly increase the capacity of the junction and ensures that congestion on the local road network does not affect the motorway.

Great Connell

During the AM Peak Period (07:00 – 09:00) over 1000 vehicles per hour from the M9 (Arm 3) merge with over 2000 M7 (Arm 2) vehicles at the Great Connell interchange, leading to flow breakdown and safety concerns. A number of accidents (mainly rear end shunts) at the location have occurred over the past number of years which is reflective of the sudden braking due to merging and weaving traffic. **Plate 3.11** shows the collision types at the Great Connell Interchange over the period 2002-2011.

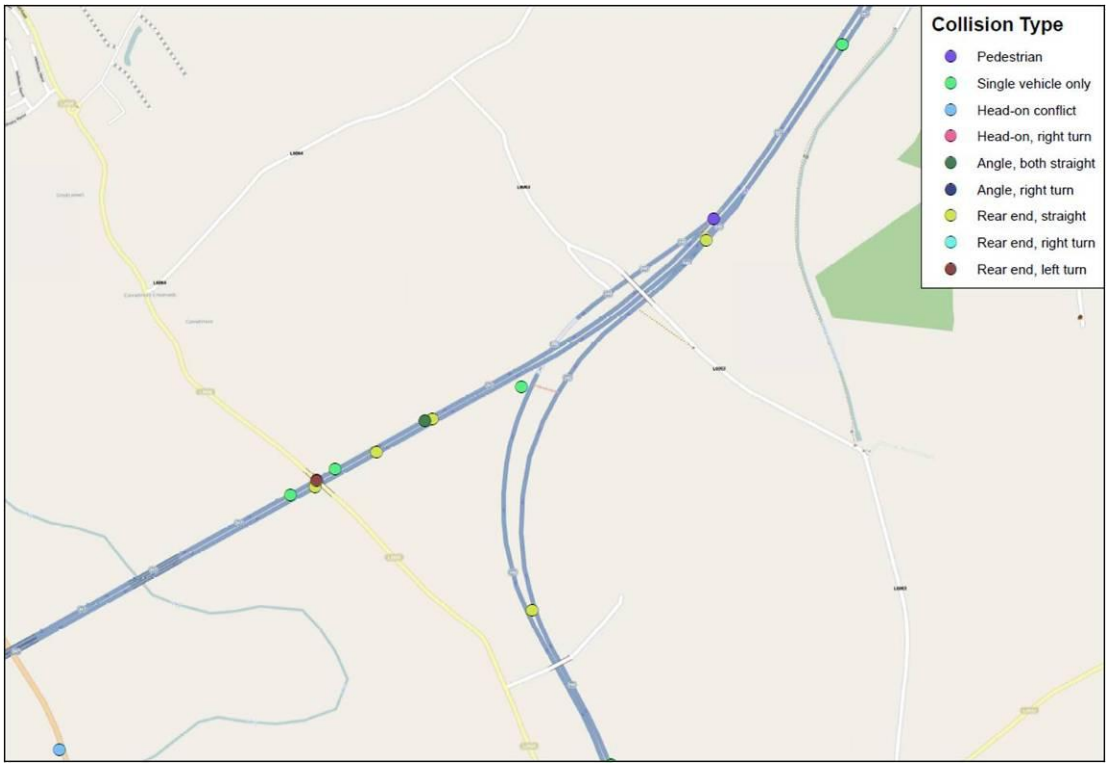

Plate 3.11: Great Connell Interchange - Collision Types (2002 - 2011)

Recent improvement works have introduced a ghost island merge at this location in an effort to spread the merge manoeuvres and improve safety, but this only represents a short term measure and does not address the fundamental capacity constraint.

The proposed widening of the M7 to three lanes will provide the required additional capacity (lane gain) at this location in the eastbound direction, and will allow traffic from the M9 to access the M7 safely and reduce flow breakdown at this location.

3.4.6 Summary

The M7 between the Great Connell and the Maudlins Interchanges is currently operating at capacity (LOS E) during the morning and evening peaks. Any disruption to the traffic stream, such as vehicles merging from an on-ramp or weaving between lanes can establish a disruption wave (shockwave) that propagates throughout the upstream traffic flow causing queuing and delays and increasing the likelihood of rear end shunts.

Capacity issues at Maudlins and Great Connell interchanges are directly related to the lack of capacity on the mainline, while problems with queuing at the off ramps of the Newhall interchange result from the interaction between the motorway interchange and congestion on the immediately adjoining local road junctions.

The congestion and safety issues highlighted at the M7 Newhall Interchange during the peak hours are significant and need addressing as conditions are likely to deteriorate further as traffic flow increases over time. The primary need for the scheme is to provide a road link that can provide the required capacity to cater for the anticipated future year flows and to improve safety along this section of the M7.

3.5 Scope, Constraints and Interfaces

3.5.1 Scope of the Project

The scheme is intended to address the needs of traffic on the major inter-urban network between Dublin and Limerick, Cork and Waterford and extends from the current lane drop from dual 3 lane to dual 2 lane at Maudlins interchange to the M7/M9 merge at Great Connell interchange.

Re-location of the current Newhall Interchange to the R445 is included as part of the scheme to address congestion and safety concerns associated with traffic queuing on the M7. It is anticipated that this re-configuration of the Newhall Interchange will require some local re-configuration of the pedestrian and cycle facilities on the local road network, creating the opportunity to provide local enhancements for non motorised users.

3.5.2 Constraints

Due to the nature of the scheme (online widening) there are a number of constraints that need to be highlighted.

Structures

There are nine major bridge structures crossing the carriageway along this section of the M7. Not all of these structures have central supports – the Maudlins Interchange is an example of a clear span structure.

NRA TD 27/11 requires that maintained headroom should be 5.03m beneath each of the structures in question. This headroom has to be provided over the full pavement width (carriageway, hard shoulder and/or hard strip), over the full verge and over the full central reserve width, unless protected by a safety fence.

Where safety barriers are provided the headroom will have to be measured as per the NRA DMRB which requires the measurement to be taken at the back of the working width of the crash barrier.

The M7 passes over one major watercourse along the section under consideration, a spur from the Grand Canal, the Corbally Branch, which runs north-south from Naas Town Centre. The location of culverts channelling other minor watercourses also needs to be considered.

There are no major roads passing under this section of the M7 however the carriageway passes over a local road/tow-path adjacent to the canal.

Gantry Locations

There are gantries located along the existing alignment including full and half-span structures. A full survey of gantry locations, foundations and clearances and any associated services/ducting will be undertaken at detailed design stage.

3.5.3 Interfaces

At present the existing M7 two lane motorway connects to the recently completed N7 three lane dual carriageway (N7 Naas Road Widening Naas Scheme) at the Maudlins Interchange (Naas North). The reduction in capacity (lane drop) that is experienced by drivers in the westbound direction at this Interchange has a significant impact on flow breakdown in the PM Peak. The widening of the M7 to 3 lanes will alleviate this issue providing a continuity of experience to drivers.

Issues can also occur at the Great Connell interchange where eastbound traffic from the M9 merges with traffic on the M7 mainline. The addition capacity (lane gain) at this location in the eastbound direction will allow traffic from the M9 access the M7 safely and reduce flow breakdown at this location. Other than the addition of a third lane on the M7 north of the Great Connell interchange, and the consequent amendments to the merge and diverge arrangements, the existing configuration will be maintained at this location.

3.6 Scheme Objectives

3.6.1 Overview

The objectives of the proposed scheme are outlined below under each of the multiple criteria outlined by the Department of Transport in their report 'Guidelines on a Common Appraisal Framework for Transport Projects and Programmes (June 2009)'. The multi-criteria headings are as follows:

- Economy;
- Safety;
- Environment;
- Accessibility & Social Inclusion; an
- Integration.

3.6.2 Economy

Both the M7 Newhall Interchange and M7 mainline carriageway are operating above capacity during the AM Peak Period (eastbound) and PM Peak Period (westbound) under current traffic flows. Congestion is likely to increase as traffic grows over time and the existing delays along the M7 mainline and through the Newhall Interchange will be exacerbated. The M7 is a key national corridor and delays to traffic have a negative impact upon the economy. It is an objective of the scheme to generate positive economic benefits to businesses and consumers by:

- Reducing journey times;
- Reducing accident costs; and
- Improving journey time reliability.

3.6.3 Safety

The assessment of collisions along this section of the M7 highlighted a high number of accidents which are attributed to rear end shunts (38%). These types of collisions

reflect the congested road network, whereby the impact of vehicles weaving and merging/diverging lead to flow breakdown and sudden braking. It is an objective of the scheme:

- To comply with EU Directive 2008/96/EC on Road Infrastructure Safety Management of the TERN;
- To reduce the frequency of collisions along this section of the M7; and
- To reduce the severity of accidents along this section of the M7.

3.6.4 Environment

Vehicles queuing on the Newhall Interchange off-ramps and the high level of braking and accelerating due to flow breakdown along the mainline section of the M7 has an environmental impact on air quality and noise. It is an objective of the scheme:

- To reduce CO_2 and particulate emissions through a reduction in fuel consumption and;
- To reduce the level of noise associated with turbulent traffic flow

3.6.5 Accessibility and Social Inclusion

The scheme will improve road based public transport at both a local, regional and national level, by removing congestion along this section of the corridor. The scheme will achieve the objectives of the National Development Plan, the National Spatial Strategy, the Regional Planning Guidelines for the Greater Dublin Area and the County and Town Development Plans to generally improve quality of life and improve accessibility to work, education and other activities. It is an objective of the scheme:

- To improve road based public transport journey time and journey time reliability;
- To better facilitate cyclists and pedestrians at the Newhall Interchange and
- To achieve the objectives of national and local planning policy.

3.6.6 Integration

The proposed scheme is intended to integrate with the recent investments in the N7 Naas Road Widening Scheme, the current Newlands Cross Upgrade and the Major Inter Urban (MIU) corridors, namely the M7, M8 and M9.

The scheme will form part of the strategy to provide a consistent quality road link between the M50 and Cork as part of the Trans-European Transport Network (TEN-T) core road network. The N7/M7 and M8 corridors between Dublin and Cork form part of the North Sea – Mediterranean Corridor transport network of the TEN-T.

3.7 Conclusions

The Cork – Dublin – Belfast motorway is part of one of nine trans-European corridors, which will act as a backbone for transportation in Europe's single market. The core network is to be completed by 2030.

EU Directive 2008/96/EC on Road Infrastructure Safety Management provides new legal requirements for the safety management of the Trans-European Road Network (TERN).

The Road Safety Authority – Road Safety Strategy 2013 – 2020; Engineering Measures, emphasises value for money road improvements that will enhance the

safety of the road system as a whole, including national roads in the context of EU Directive 2008/96.

The M7 motorway, from its interchange with the M8 (Cork and Limerick) and M9 (Waterford) and extending from there towards the M50 in Dublin is one of the most important and busiest motorway routes in Ireland. With the increase in capacity and traffic movement on other parts of the motorway system, the restrictions in capacity that are evident on the subject section of motorway indicate a justification for works to provide for an improvement of capacity in the interests of service, safety, economy and environmental pollution.

The pressure of traffic northeast of the M7/M9 merge at the Great Connell interchange causes congestion and remediation requires an upgrade of that section of motorway extending from Junction 11 Great Connell to Junction 9 Maudlins at Naas North. The congestion is due to a number of factors, particularly relating to road and interchange capacity.

The congestion and safety issues highlighted at the M7 Newhall Interchange during the peak hours are significant and need addressing as conditions are likely to deteriorate further as traffic flow increases over time.

The primary need for the scheme is to provide a road network link that can provide the required capacity to cater for the anticipated future year flows and to improve safety along this section of the M7.

The most appropriate and sustainable solution to remedy this congestion and to improve safety is to widen this section of road within the existing footprint of the M7 and address the local capacity problems at the Newhall interchange.

The benefits of the proposed scheme in terms of economy, safety, environment, accessibility and social inclusion and integration will be significantly positive and long-term.