

Chapter 5

Alternatives Considered

This chapter describes the selection process which was undertaken and the design options that were considered. The main reasons for selecting the preferred option are outlined.

5.1 Legislative Requirements

Section 50 of the Roads Act states that an EIS shall contain:

“an outline of the main alternatives studied by the road authority concerned and an indication of the main reasons for its choice, taking into account the environmental effects”.

5.2 Background

The “Naas By-Pass Project Design Report 1978” referred to a route selection process for the Naas By-Pass which went back to routes selected in 1968 and which confirmed that the route selected in 1968 was in substance the line selected for the Naas By-Pass. The line of the Naas By-Pass was selected as it was the shortest and most economical.

Similarly, the route of the Newbridge Bypass was selected as the route was the most practical and economical (“Droichead Nua Bypass Design Report 1985”).

This report considers that the route chosen from the previous route selection processes remains valid today and the option of an alternative new greenfield alignment was dismissed due to the significant impacts this option would have on the environment in terms of land severance, noise, air pollution, visual amenity, ecology and economics.

An initial aim of the Scheme was that there be no requirement to acquire land outside the fence-line of the existing motorway. This was considered appropriate for the following reasons:

1. There is a very large median available within the bounds of the Scheme where sufficient space is available to construct the required carriageways;

The Naas By Pass Project Design Report, October 1978, written by M. J. Dunne noted in paragraph 6.14:

“if or when future requirements dictate that two extra lanes be provided on the By Pass they can be incorporated in the median and still leave an effective width of approximately 18 feet.”

The Droichead Nua By Pass Design Report, 1985, written by R. J. Burke also noted in paragraph 7.4

“Where it is proposed to provide for two future traffic lanes the median width is increased to 16.3 meters.”

2. The requirement for any land outside the boundary of the motorway would result in the requirement for a Compulsory Purchase Order (CPO) and

Motorway Order. This would result in an unnecessary and significant additional expense being incurred against the project; and

3. Following investigation it was concluded that the existing drainage network could be redesigned to accommodate any additional discharge that would result from the construction of the additional lanes. The new drainage system can be constructed within the existing system and any additional attenuation requirements can be provided within the existing land-take.

Following initial development of the proposed widening scheme it was concluded that it would be appropriate to seek to address the traffic delays at the existing Junction 10 Newhall Interchange as part of the widening scheme. This led to the requirement to prepare a Compulsory Purchase Order (CPO) and Motorway Order. That being the case it was then decided to utilise these orders to acquire sufficient lands to mitigate some existing flooding issues by constructing attenuation ponds to reduce the motorway discharge rates below that which currently exist.

5.3 Motorway Capacity Options Considered

The desire to minimise the requirement for land acquisition meant that alternative means of enhancing the capacity of the motorway within the existing motorway land-take had to be considered. The following options were considered and assessed:-

- Do Nothing Scenario;
- Hard Shoulder Running;
- Demand Management; and
- Construction of Additional Lane.

Do Nothing Scenario

In this scenario there would be no expenditure on the expansion or improvement of the road network within the scheme. The network would remain the same and no alterations would be carried out.

A consequence of this option is that the expected increase in traffic within the network would lead to an increase in the congestion that is being experienced at present, with the consequent increase in delay that users of the network would have to endure. Following on from this increase in delay, the road networks surrounding the Scheme network will experience an increase in traffic diverted from the motorway. This would have the knock on effect of increasing congestion in the towns of Naas and Newbridge, in particular, and the surrounding area in general.

Hard Shoulder Running

Hard shoulder running is a motorway improvement concept that has been put in place in many countries, but has yet to be used in Ireland. The hard shoulder, which isn't generally used, is used at times of higher traffic flows and, in situations where an incident has occurred.

Hard-shoulder running requires the provision of increased signage and traffic information to better inform the drivers and to better control the flow of traffic. This requires a significant increase in the number of sensors within the carriageway, and a significant increase in the amount of command and control equipment which would be required to feed that information to the drivers. Experience in the UK, in particular on the M42 in England, has shown that the provision of this additional equipment is

extremely expensive. The costs were estimated to be in the region of £5-6m per km, (approx €5.8m to €7.0m). Queries have also been raised about the long term safety of the use of hard shoulder running. Due to the high cost of the hard shoulder running, it is generally only considered in locations where space is restricted and land is at a premium.

As the name suggests, the main element of this option is that the hard shoulder becomes available for vehicles to travel on. The outcome of which is a number of benefits to the road users and to the road system including:

- More reliable journey times;
- Reduced Congestion;
- Enhanced information to drivers; and
- Quicker response time to incidents.

However, hard shoulder running requires a number of additional elements to be provided both on the carriageway and in the environs of the carriageway. These include:

- Driver Information Signs;
- Speed Limit Signals;
- Emergency Refuge Area;
- New Emergency Roadside Telephone;
- New Congestion and Incident Management Systems; and
- Strengthening of Hard Shoulder (where necessary).

When the two parts of the Scheme were built, in the '80's and '90's, the original hard shoulder that was constructed was of a reduced-strength construction. However, in 2005, the Naas By-Pass element of the Scheme was reconstructed and the hard shoulder was strengthened and it is considered that this length would now be of sufficient strength to allow for continuous running of traffic.

Site investigation results and pavement strength testing indicate that a full reconstruction of the hard shoulder would need to be carried out on the Newbridge By-Pass element of the scheme to allow for hard shoulder running to take place. In addition a new lane would have to be constructed to allow for fulltime 2 lane running while the hard-shoulder is being strengthened.

The requirement to strengthen the hard shoulder and provide a temporary additional lane and provide, long term, the additional electronic equipment, monitoring and communication requirements are considered to be extremely expensive when compared to the construction of a permanent third lane in this circumstance. Furthermore question marks remain over the long term safety of the use of hard shoulder running. These safety concerns are in regards to the non-provision of a hardshoulder to allow for access for emergency vehicles in the event of an accident on the section of motorway.

Demand Management

Traffic Demand Management measures comprise of a set of policies with the objective of influencing the behaviour of individuals through voluntary reduction or restriction on private travel use and car ownership and the provision of travel alternatives. Through the implementation of these policies, the bodies responsible

for travel policy attempt to modify the modes of travel, the choice of mode and even the decision to travel. The reason for this is to encourage individuals to make their trips in off-peak times, travel by a different mode or to find another way of carrying out the trip purpose. When these types of measures are applied, they result in a more efficient transport system, improved environmental conditions and improvements in safety as well as revenue generation.

Traffic Demand Management can broadly be categorised as fiscal and non-fiscal measures. Non-fiscal measures that can be adopted include:

- Traffic calming;
- Access controls and restrictions;
- Parking management and control;
- Public transport improvements;
- Road space reductions;
- Urban traffic management;
- Traffic bans/restrictions;
- Travel awareness campaigns.

Fiscal measures that could be considered include:

- Parking charges;
- Workplace parking levies;
- Fuel taxes;
- Vehicle excise duty;
- Car ownership permits;
- Public transport subsidies;
- Priority measures for walking and cycling;
- Road-user charging.

For the most effective use of demand management a suite of TDM pricing and non-pricing measures should be considered as a bundle of measures to assist local authorities and road authorities to develop appropriate schemes that satisfy local objectives, solve the local transport problems and which are politically and publicly feasible. For demand management to be effective the type of measures utilised must not be influenced simply by the requirement to generate revenues but must be developed to best address the traffic management requirements.

A Demand Management option was not considered as there is no viable alternative route available for M7 traffic. While the requirement for a viable alternative route is not a legal requirement, it is considered prudent to provide an alternative for traffic which would not use the tolled section of motorway.

Construction of Additional Lane

Given the extremely wide medians that are present on both the Naas By-Pass and the Newbridge By-Pass, the option of constructing an additional lane in the median was considered. As set out in the design reports for both schemes, the provision of an additional lane in the median was originally envisaged and the original designers provided for this as part of the design.

The provision on the additional lane in the median means that no additional land outside the fenceline will be required for the construction of the new lane and also the ecosystem in the environs of the motorway has adapted to the motorway.

The increase in the carriageway area would allow for an increase in capacity on this section of roadway and would mean that no additional land would be required to be purchased. The benefit of this option over the other options is that the provision of the additional carriageway accommodates the projected increase in traffic over the coming years.

This option would require a redesign of the drainage system (to accommodate the additional runoff and an additional increase in rainfall of 20% as a result of global warming) and a rebuild of the hard shoulder on the Newbridge By-Pass to allow for two lanes of traffic during the construction phases.

5.4 Junction 10 Newhall Interchange Capacity Enhancement Options

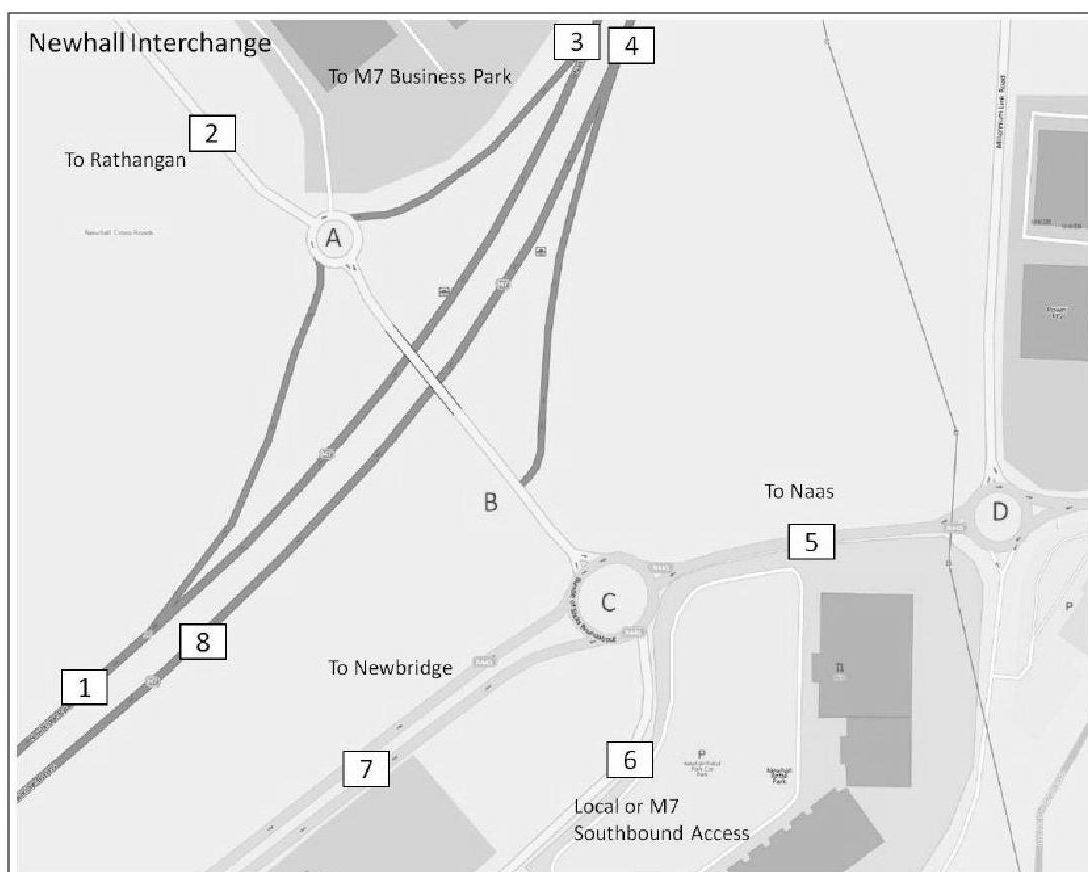


Plate 5.1: Existing Newhall Interchange and associated junctions

Newhall Interchange is one of the main access points for traffic accessing Naas South and Newbridge via the M7 motorway. Traffic currently experiences significant delays and queuing during both the AM and PM Peak hours, particularly on the M7 off-ramps.

With reference to Plate 5.1, above, the individual junctions which impact upon the operating of the interchange are as follows:

- Junction A – M7 Business Park (MBP) roundabout;

- Junction B – M7 Southbound Off-Ramp;
- Junction C – Bundle of Sticks (BOS) roundabout; and
- Junction D – B&Q roundabout.

Due to high traffic flows and the close proximity of these junctions to each other, queuing or blocking back from one arm of a junction can significantly impact upon the operation of another.

A summary of the micro-simulation assessment demonstrates that:

- The J10 Newhall Interchange is currently operating at capacity (2012 flows). Significant queuing occurs on both off-ramps during peak periods which impacts upon traffic on the mainline, leading to serious safety concerns;
- The limited capacity of the Newbridge Road (B&Q) Roundabout impacts upon the operation of the overall junction as queuing on the western arm of this junction impacts upon the operation of the Bundle of Sticks Roundabout;
- In the future these problems will be exacerbated as demand increases over time, regardless of the M7 widening scheme;

When the traffic modelling was considered and analysed, the operation of Newhall Interchange was found to be over capacity at the Design Year. As a consequence a number of different options were considered to upgrade the Interchange.

Each of the following options was assessed against the requirement to provide a safe solution that had sufficient capacity, minimised land take and maximised the use of existing infrastructure. In this way the assessment process undertaken indirectly addresses the requirement to minimise any adverse effect on the Natural Environment and on Human Beings.

The Newhall Interchange Capacity Enhancement Options are presented and considered below:

Option 1 -Signalisation of Existing Junction

In this option, the movement of traffic would be controlled by the installation of traffic signals. The timing of the traffic lights would be optimised to provide for the most efficient movement of traffic through the junction. This would require the installation of traffic signals and other traffic management methods to help increase the capacity of the junction as it stands as present. No additional land was required for this option and it was proposed to use the existing infrastructure.

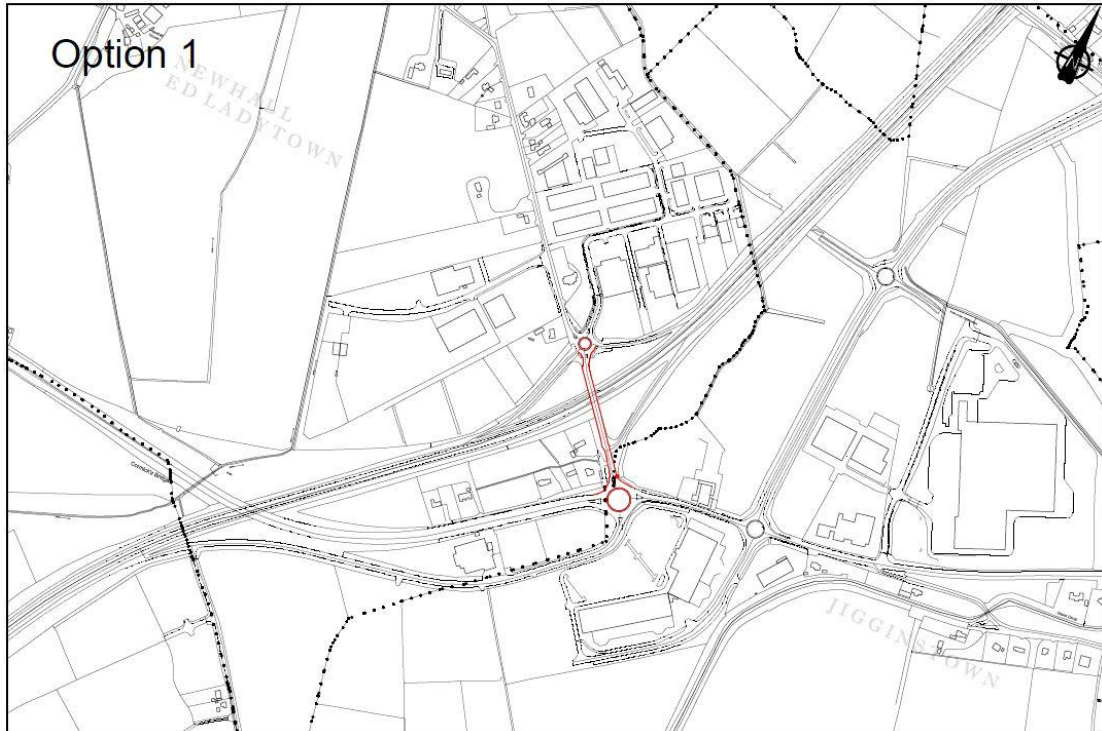


Plate 5.2: Option 1 – Traffic Signals

Option 2 - Increased Stacking within Existing Junction

In this option, it was proposed to maintain the infrastructure as it is at present. The means to increase capacity would be to mark an additional lane on the eastbound and the westbound off-ramps. This would be done within the existing boundary of the off-ramps and would only require the marking of the road to provide the additional lane.

On the westbound off-ramp, it would be proposed to provide additional storage on the mainline by the re-marking of the hard shoulder as a diverge lane in conjunction with the construction of an additional lane to the inside of the hard shoulder. No additional land was required for this option and it was proposed to use the existing infrastructure.

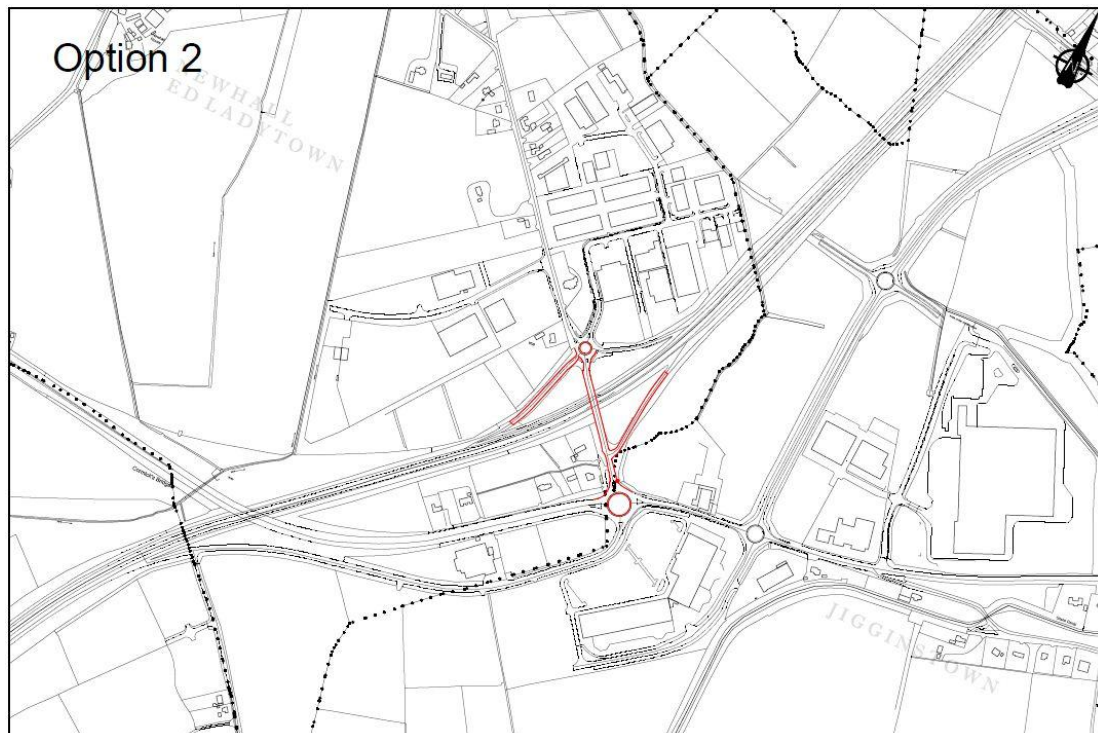


Plate 5.3: Option 2 – additional off/on ramp lanes

Option 3 - New Off Slips directly onto R445, Existing On Slips retained

In Option 3, two new roundabouts will be constructed to the southwest of the existing roundabout on the R445 to the east and west of the existing overbridge on the M7. The roundabout to the west of the bridge will accommodate the eastbound off-ramp and the roundabout to the east of the bridge will accommodate the westbound off-ramp. The existing on-ramps at the Newhall Interchange will remain as they are and will not be affected by the construction of the new roundabout. Additional land was required for this option and it was proposed to use the existing infrastructure.

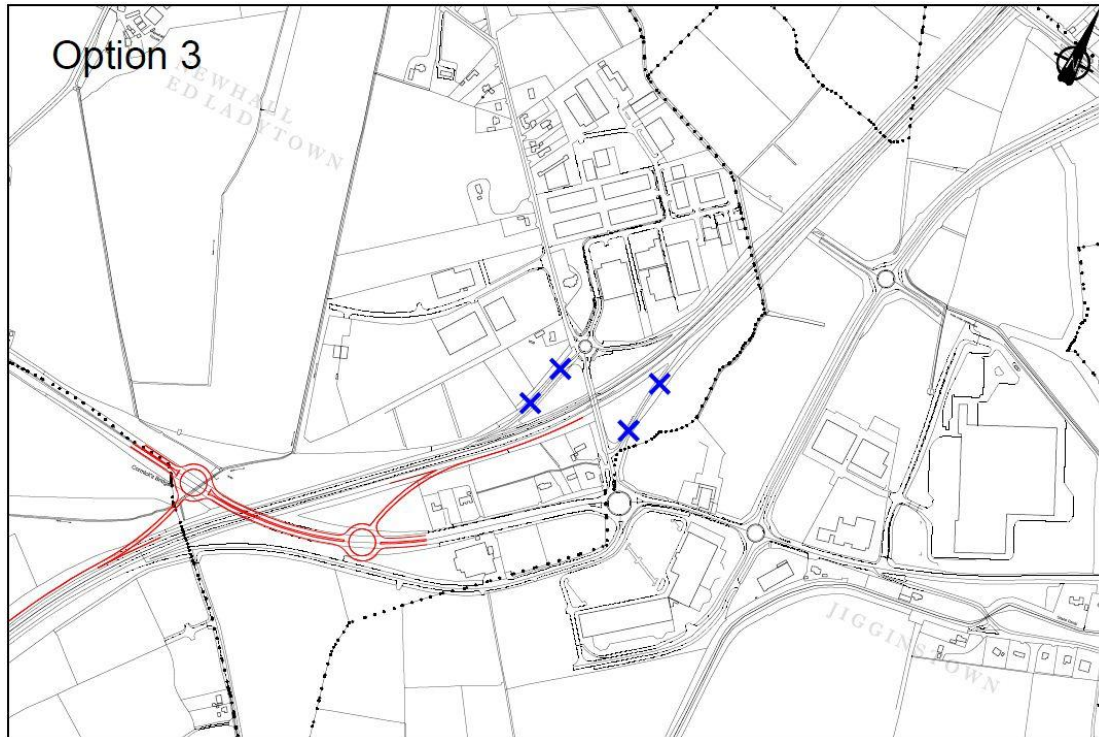


Plate 5.4: Option 3 - New Off Slips directly onto R445, Existing On Slips retained

Option 4 - New Eastbound Off Slip to R445 and Westbound Off Slip to Ring Road

In this option, the westbound off-ramp and the eastbound off-ramp are both closed. A new roundabout will be constructed to the west of the existing R445 overbridge. This will accommodate the eastbound off-ramp. The westbound off-ramp traffic will be accommodated with a dedicated off-ramp to the northeast of the existing Newhall Interchange and join an existing roundabout on the Naas Outer Ring Road. This traffic will then be distributed along the Naas Outer Ring Road. Additional land was required for this option and it was proposed to use the existing infrastructure.

The existing westbound on-ramp and the eastbound on-ramp will be maintained.

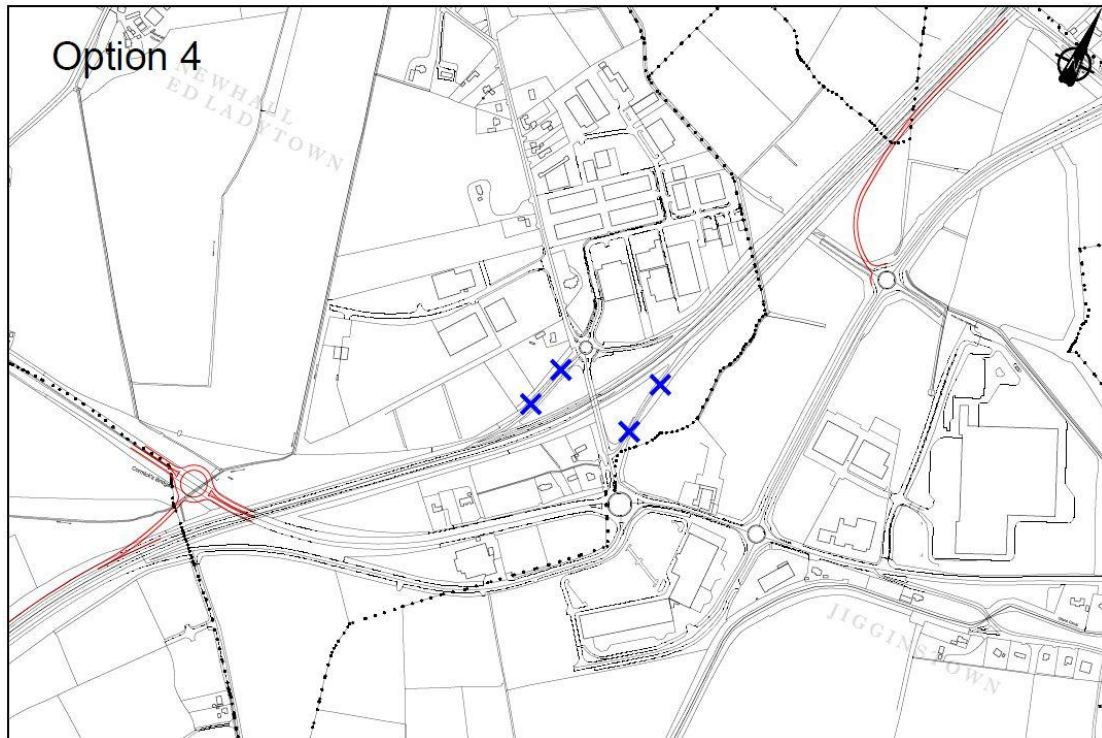


Plate 5.5: Option 4 - New Eastbound Off Slip to R445 and Westbound Off Slip to Ring Road

Option 5 - New Off Slips directly onto R445, Existing On Slips retained, plus additional new Eastbound On Slip from R445

In this option, the eastbound and westbound off-ramp are closed and the westbound and eastbound on-ramp remain open.

New roundabouts are constructed to the east and west of the existing overbridge on the existing R445. An additional eastbound on-ramp will join the motorway from the roundabout to be constructed to the west of the overbridge. The eastbound off-ramp will join the roundabout to the west of the existing R445 overbridge. The westbound off-ramp joins the roundabout to the east of the R445. The westbound on-ramp remains as it is. Additional land was required for this option and it was proposed to use the existing infrastructure to link the Motorway Network directly to the Regional road network and then to the Local Road Network.

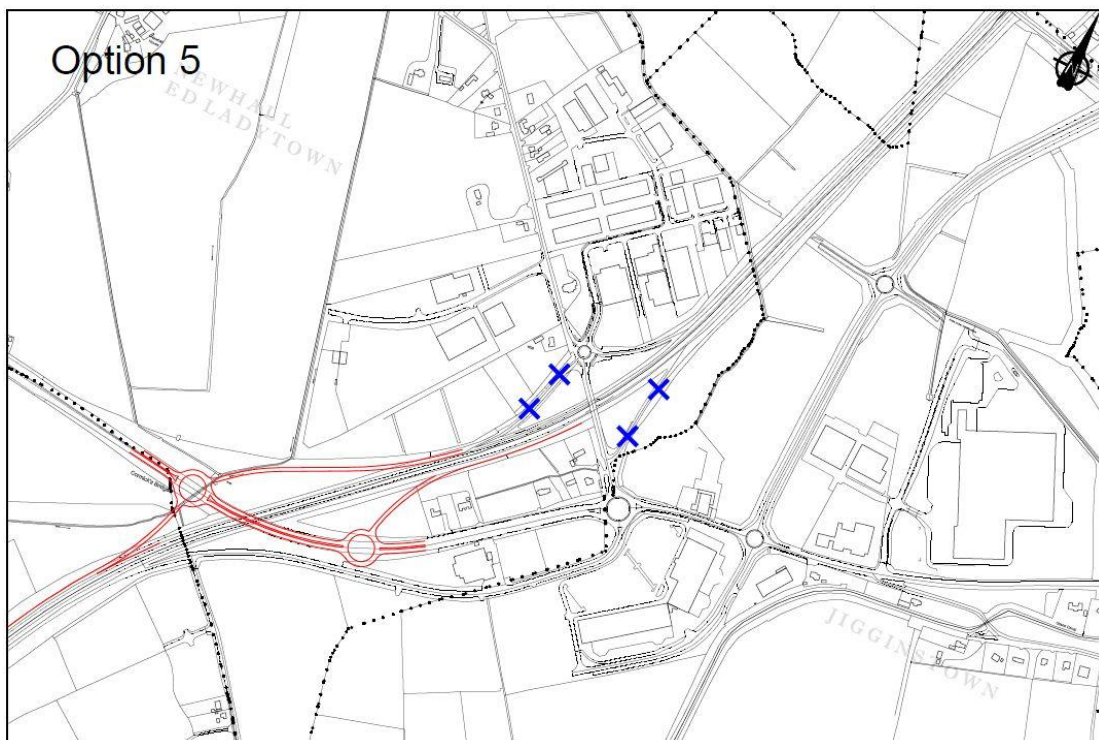


Plate 5.6: Option 5 - New Off Slips directly onto R445, Existing On Slips retained, plus additional new Eastbound On Slip from R445

Option 5a - New Eastbound On and Off Slips from R445, Existing Westbound On and Off Slips and Existing Eastbound On Slip retained

In this option, the existing westbound and eastbound on-ramps remain open, as does the existing westbound off-ramp.

There will be a new roundabout constructed to the west of the existing R445 overbridge. A new eastbound off-ramp and eastbound on-ramp will be constructed from this roundabout. Additional land was required for this option and it was proposed to use the existing infrastructure.

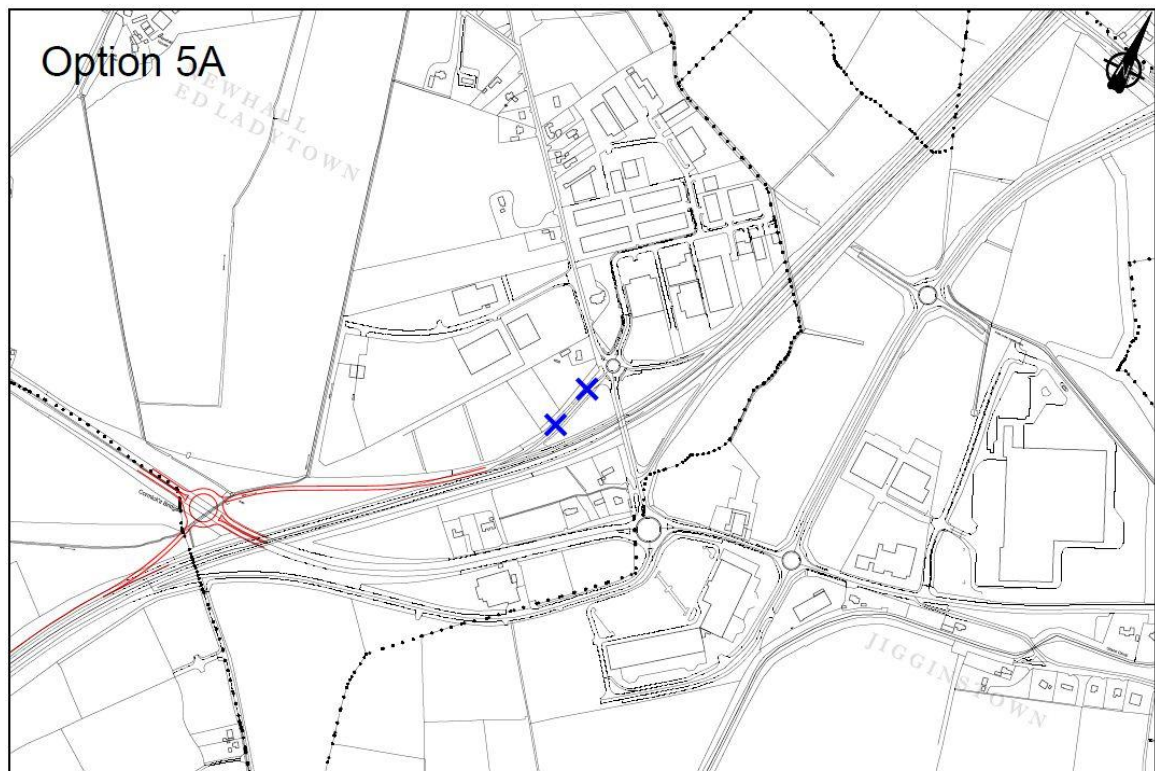


Plate 5.7: Option 5a - New Eastbound On and Off Slips from R445, Existing Westbound On and Off Slips and Existing Eastbound On Slip retained

The eastbound on ramp in options 5 and 5a is shown as remaining open. However, there are sight distance deficiencies from the mainline carriageway to the on-ramp which have raised safety concerns about the retention of the ramp.

Option 6 - New All movement junction at R445, Existing Slips closed

In this option, the existing westbound on- and off-ramp and the eastbound on- and off-ramp would be closed. The proposed Newhall interchange would be constructed to the southwest of the existing Newhall Interchange. Roundabouts would be constructed to the east and west of the existing R445 overbridge. The new on- and off-ramps, both eastbound and westbound, are constructed to join to these roundabouts. Additional land was required for this option and it was proposed to use the existing infrastructure to link the Motorway Network directly to the Regional road network and then to the Local Road Network.

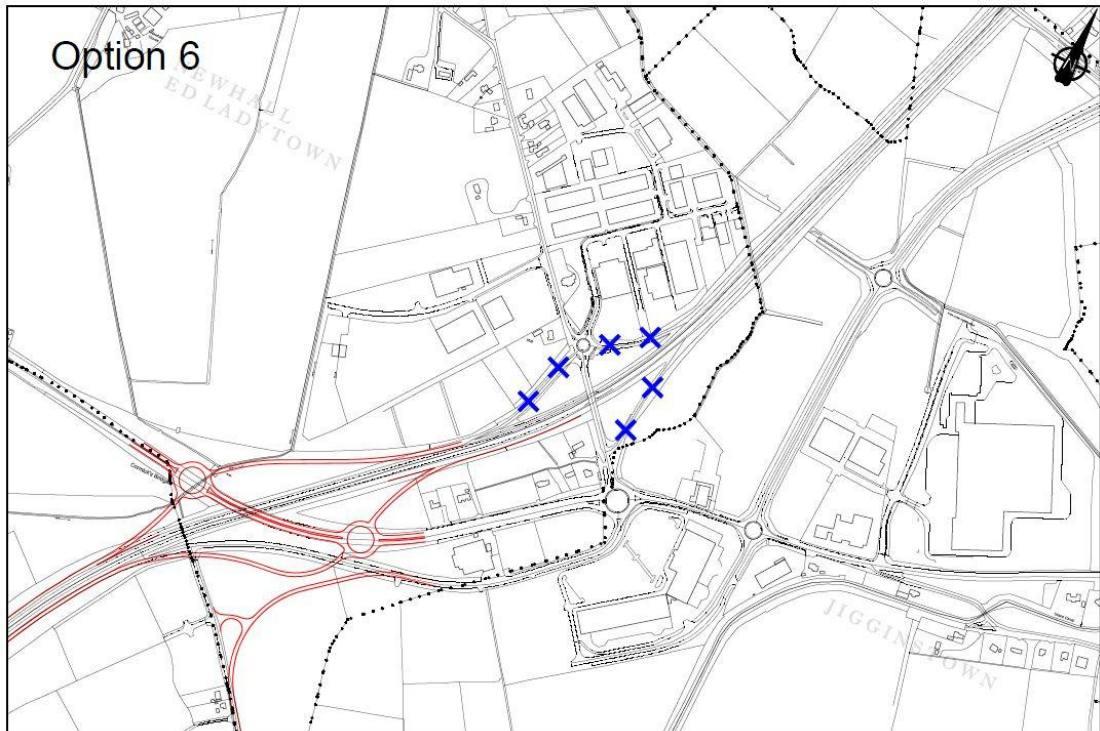


Plate 5.8: Option 6 - New All movement junction at R445, Existing Slips closed

5.5 Selection of Preferred Options

5.5.1 Motorway Mainline Capacity Enhancement

The do nothing scenario has only negative impacts in terms of predicted congestion for all road users in the area. From an environmental point of view, the status quo, with regard traffic congestion, etc, will continue with this option and there will be no improvement.

The hard shoulder running option requires the strengthening of the hard shoulder, widening into the median, provision of an additional traffic lane and significant additional long term inputs and costs with regard to the necessary electronic equipment and monitoring required. The environmental impacts of this option would be an overall minor improvement in the environment, as the water draining from the carriageway will be attenuated and treated to improve the quality of the water before discharge. The economic cost of the additional hardware, road signage, electronics and ongoing operational costs required to allow for the efficient running of the scheme would mean that the cost of this would make it more expensive than just the construction of the additional lane.

Construction of the Additional Lane was selected as the preferred option as it is possible to construct the additional lane within the very large median available and as the provision of a widened carriageway best meets the future traffic needs of the M7. As with the hard shoulder running, the environmental impacts for this option are not significant and result in an overall minor improvement as the water draining from the carriageway will be attenuated and treated to improve the quality of the water before discharge.

5.5.2 Junction 10 Interchange Capacity Enhancement

Each of the options described in section 5.4 above were modelled to determine how the revised traffic patterns would interact with the junctions on the surrounding network. In Options 1 and 2, traffic was found to continue to queue back onto the motorway raising serious safety concerns. Of the other options it was determined that the most efficient was Option 6, the full replacement junction directly onto the R445.

Each of the options which included the retention of the Newhall Interchange in the current location were discounted as there were significant safety concerns regarding the available sight distance on the eastbound on-ramp at the current location and a lot of development has taken place adjacent to the existing on-ramp.

For the options where the construction of the Newhall Interchange at a new location was considered, the improvement in the capacity of the junction was found to be significant. By using the existing infrastructure the amount of landtake in each option was limited until an option that delivered a safe and efficient solution was found.