File Note

Date	24 February 2009
Job No/ Name	STH2121 Naas Road Gateway Urban Design Masterplan - Traffic and Transport
Subject	Red Cow Development & Infrastructure Improvements Potential

Introduction

1. This File Note has been prepared by JMP Consultants Limited (JMP) to present the results of the options testing for various levels of development / infrastructure improvements to the west of the Red Cow junction, within the Naas Road Gateway Masterplan site. It assesses the benefits and disbenefits of each scenario by considering the potential traffic impact of each scenario; the physical implications of implementing the required infrastructure improvements; and also takes into account the relevant policy and design standard requirements.

Testing Scenarios

2. As requested by South Dublin County Council (SDCC), JMP has tested four different scenarios. These are:

- **Scenario 1: Existing Situation –**
    a. With the Monastery Road Bridge fully operational.
- **Scenario 2: Proposed Situation –**
    a. With the Monastery Road Bridge fully operational; plus
    b. Link road between the Red Cow Depot leading to an at-grade junction with the Belgard Road.
- **Scenario 3: Proposed Situation –**
    a. With the Monastery Road Bridge fully operational;
    b. Link road between the Red Cow Depot leading to an at-grade junction with the Belgard Road; plus
    c. An additional overbridge link only over N7 between Monastery Road Bridge and Newlands Cross.
- **Scenario 4: Proposed Situation –**
    a. With the Monastery Road Bridge fully operational;
    b. Link road between the Red Cow Depot leading to an at-grade junction with the Belgard Road;
    c. An additional overbridge link only over N7 between Monastery Road Bridge and Newlands Cross; plus
    d. A full dumbbell interchange (left in / left out on both sides and overbridge) between Monastery Road and Newlands Cross.

Traffic Assignment & Distribution

3. In order to determine the proportion of development traffic that would use each of the proposed accesses / egresses to from the site, reference is made to the original traffic distribution developed by JMP, using the Dublin Transportation Office (DTO) 2006 Census travel-to-work data.

4. The resident population travel-to-work data suggests that, for the DTO Zone to the southwest of the Red Cow junction (DTO Zone 42405) – the part of the overall Masterplan site being discussed within this File Note – that approximately 58% of travel-to-work trips are to the east (via the Naas Road east of Red Cow); 4% of trips are to the north (via the M50 northbound); 4% of trips are to the south (via the M50 southbound); 8% of trips are to the north-west (via the R113 Fonthill Road / Ninth Lock Road / through Clondalkin Village); 5% of trips are to the west (via the N7 Naas Road west); and 19% of trips are to the southwest (via the R113 Belgard Road). It should be noted that in addition to the 98% of travel-to-work trips which access / egress the DTO Zone (and therefore the site), 2% of trips remain internalised i.e. that the place of residence and place of work are both within this particular area of the site.

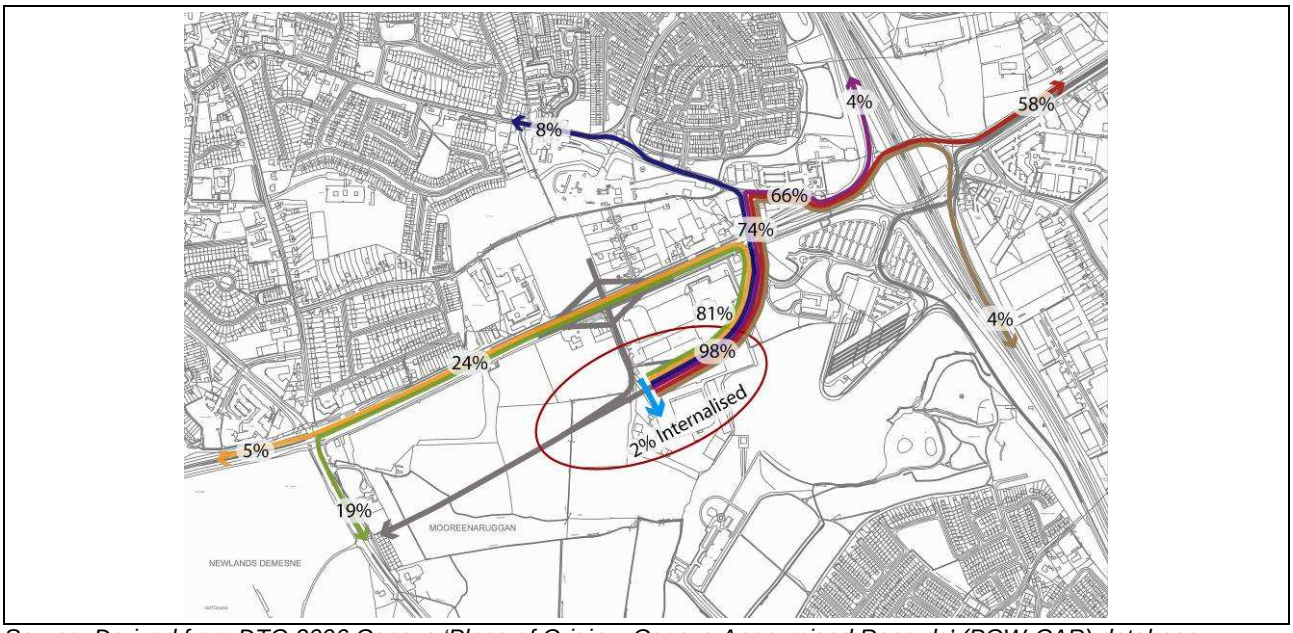
5. For each of the four scenarios put forward by SDCC, development-related traffic has been assigned and distributed onto the existing external highway network. This has been represented diagrammatically and is presented throughout the course of this File Note as **Figures 1** to **8** below. The various diagrams are also collated and included at **Appendix A** for information.

Scenario 1: Existing Situation

6. **Figures 1** and **2** below present the respective outbound and inbound distributions for the DTO Zone to the southwest of the Red Cow junction. This distribution applies to existing traffic that accesses / egresses this DTO Zone (as derived from the 2006 Census data); and therefore also applies to any traffic that accesses / egresses any existing development within the zone. This distribution is applicable to any existing development within the DTO Zone and also any future development that may take place.

7. It can be seen from **Figure 1** below that 58% of traffic is to the Naas Road (east of the Red Cow junction). As the only current point of access to the Red Cow lands is via the Monastery Road junction (the Monastery Road overbridge and roundabouts immediately to the north and south), all of this traffic must pass through this junction at some point. In addition, 4% of traffic is towards the M50 north and 4% of traffic is towards the M50 south. A further 8% of traffic heads northwest-bound through Clondalkin Village. Therefore, in total there is 74% of traffic passing over the Monastery Road overbridge, with a further 24% of traffic performing a left turn onto the N7 Naas Road westbound. Of this 24%, 5% continues west past Newlands Cross and 19% turns left onto Belgard Road, heading towards Tallaght and local destinations to the south.

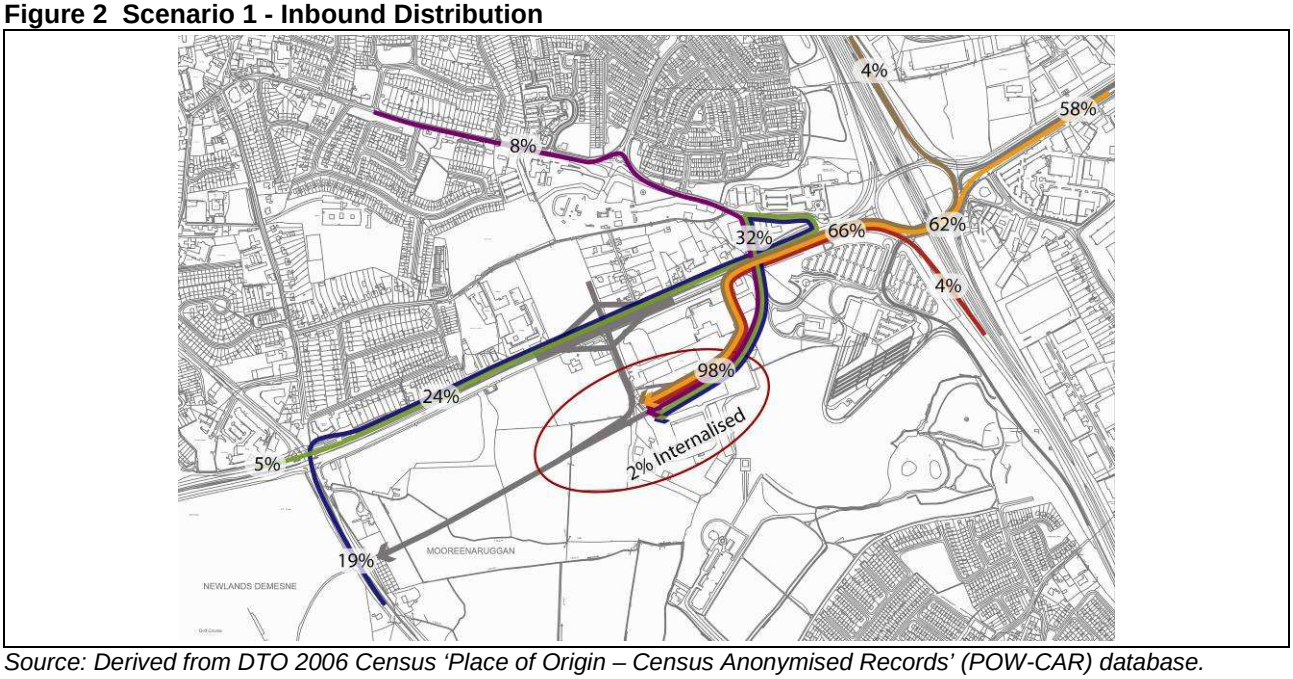
Figure 1 Scenario 1 - Outbound Distribution



Source: Derived from DTO 2006 Census 'Place of Origin – Census Anonymised Records' (POW-CAR) database.

8. **Figure 2** below shows the respective inbound distribution for the existing (base) situation. This applies to any existing development within this DTO Zone and also any future development. It can be seen from the figure below that a total of 24% of traffic originates from the west and south-west, performing a left turn off the N7 Naas Road (eastbound) at the Monastery Road junction, just west of Red Cow. A further 8% of traffic originates north-west of Clondalkin Village and heads towards the Monastery Road junction along Monastery Road itself. In addition to this, a total of 66% of traffic originates from the east (Naas Road east of the Red Cow junction / M50 north / M50 south) and performs a left turn manoeuvre just beneath the Red Cow overbridge. As with the outbound distribution, 2% of trips are internalised (i.e. their point of origin is within the same DTO Zone).

Figure 2 Scenario 1 - Inbound Distribution



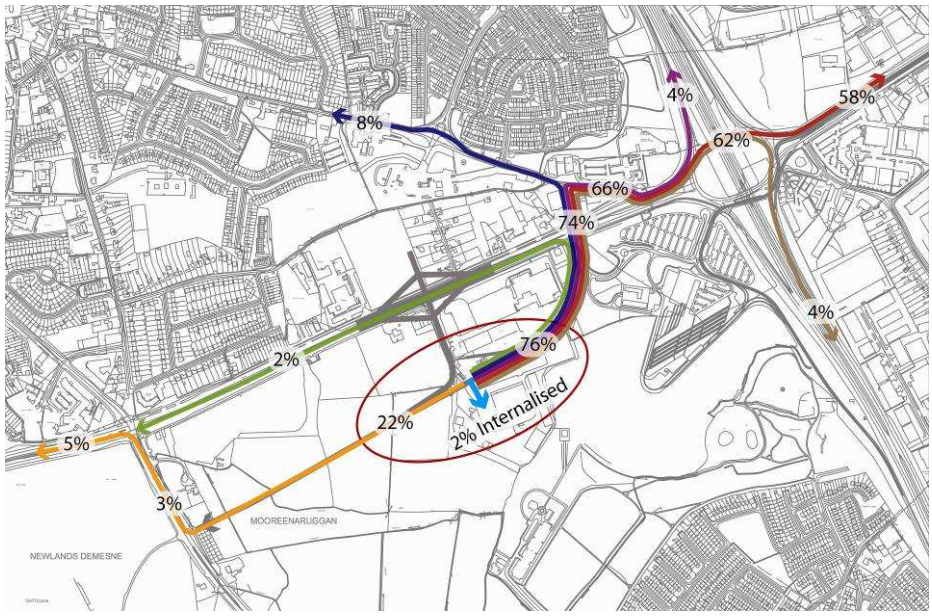
Source: Derived from DTO 2006 Census 'Place of Origin – Census Anonymised Records' (POW-CAR) database.

9. The M50 Environmental Impact Statement (EIS) provides details of the proposed / ongoing upgrade works to the M50 motorway and junctions along its route, including to the Junction 9 Red Cow junction within the Masterplan site area. The M50 EIS includes a drawing which clearly illustrates the proposed junction layout, including upgrade / modification to the Monastery Road intersection with the N7 Naas Road and Red Cow junction itself. This drawing is included at **Appendix B** for information. The proposed upgrade works include a new Monastery Road overbridge linking the existing Monastery Road to the north of the N7 Naas Road, with the Red Cow Park & Ride (P&R) site to the south. There is a proposed unsignalised roundabout to the north and south of the new overbridge, which also provide connections to new slip roads connecting directly to the N7 mainline carriageway.
10. From the original validated 2005 DTO area-wide SATURN model of Greater Dublin, a traffic matrix for predicted 2009 / 2010 and 2024 / 2025 traffic flows has been produced. JMP has undertaken a series of junction capacity assessments using the SATURN traffic flow data, of the Monastery Road roundabout to the north of the overbridge, using ARCADY industry standard junction assessment software.
11. The junction capacity assessment indicates that in the existing situation (2009 base year) the arm to / from the Monastery Road overbridge operates at approximately 112% capacity (in the time segment 08:30 to 08:45 hours) – a Ratio to Flow Capacity (RFC) of 1.117. The recommended maximum RFC for the efficient operation of a junction is 0.85 to 0.90 RFC. The end queue for this arm is between 76 and 77 vehicles. Assuming an average vehicle length of 5m, this queue would be approximately 385m in length at its maximum. In the same time segment, the Monastery Road (west) arm operates at approximately 75% capacity – 0.749 RFC – with an associated queue of between 2 and 3 vehicles maximum.
12. It is therefore demonstrated by the above that, even with no additional traffic at this junction as a result of any new development, the Monastery Road roundabout to the north of the overbridge operates over its intended design capacity. Any development in Scenario 1 would result in this junction being pushed further over capacity and would increase further delay and queuing at this junction.

Scenario 2: Monastery Road plus Link to Belgard Road

13. **Figures 3** and **4** below illustrate that with the construction of the link road linking the Red Cow lands with the Belgard Road, all traffic headed southbound via Belgard Road towards Tallaght would use the new link road. In addition, it is assumed that 3% of the 5% of westbound traffic would choose to use the link road, as an alternative to the Monastery Road junction.
14. **Figure 3** below presents the outbound distribution for all traffic originating from the DTO Zone to the southwest of Red Cow. It can be seen that 22% of traffic will use the new link Road, with 19% of traffic turning left towards Belgard Road (south) and 3% of traffic turning right onto Belgard Road (north). A further 2% of traffic will head westbound on the N7 Naas Road via the existing Monastery Road junction. 8% of traffic will continue to head northwest-bound via Clondalkin Village and 66% will head eastbound; all of which will pass over the existing Monastery Road overbridge.

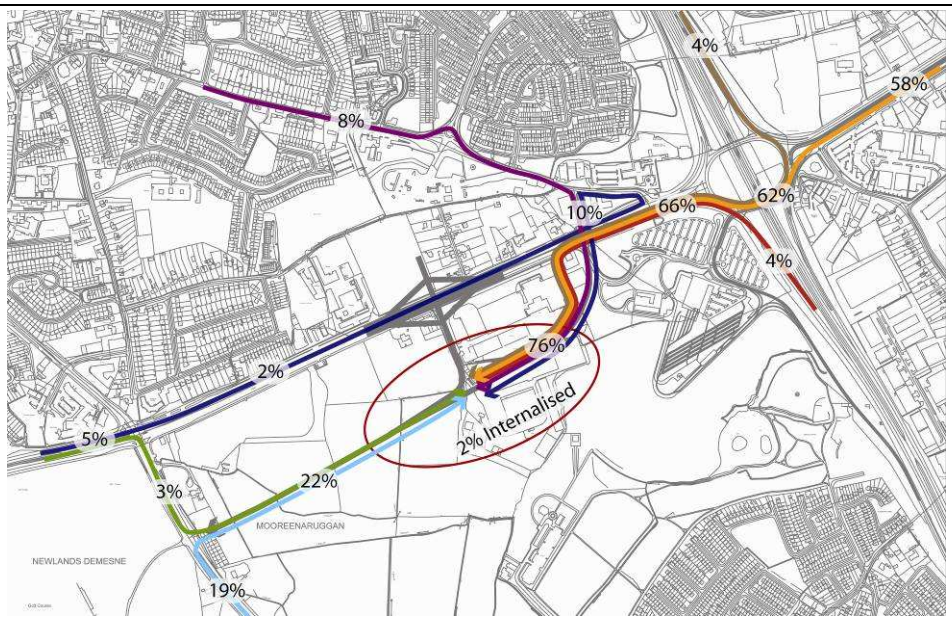
Figure 3 Scenario 2 - Outbound Distribution



Source: Derived from DTO 2006 Census 'Place of Origin – Census Anonymised Records' (POW-CAR) database.

15. **Figure 4** below presents the respective inbound distribution for all traffic arriving at the DTO Zone to the southwest of Red Cow. As above, 22% of traffic will arrive at the site via the new link road (19% of which will originate south of the Belgard Road and 5% will originate from the west). Of the 5% of traffic originating from the west, it is determined that 3% will use the new link road (by performing a right turn manoeuvre at Newlands Cross) and 2% will continue straight on, eastbound, and turn off at the existing Monastery Road junction. Therefore, this 2%, plus the 8% of traffic from the northwest (via Clondalkin Village), will use the Monastery Road overbridge. A total of 66% of traffic will arrive from the east (either from the Naas Road east of Red Cow, the M50 north or the M50 south). This traffic will turn left off the N7 Naas Road beneath the Monastery Road overbridge.

Figure 4 Scenario 2 - Inbound Distribution



Source: Derived from DTO 2006 Census 'Place of Origin – Census Anonymised Records' (POW-CAR) database.

16. The following section of this File Note presents the results of the assessment of the existing and proposed Newlands Cross junctions; and also of a proposed new junction on Belgard Road to the south of Newlands Cross, which would provide a connection to the west of the Red Cow lands, facilitated by a new link road.

Newlands Cross Junction Upgrade

17. The Newlands Cross Environmental Impact Statement (EIS) provides an appraisal of the proposed upgrade works of the existing Newlands Cross junction. The N7 Naas Road is a dual 3 lane carriageway road providing east-west movements, connection the M50 motorway within the southwest of Dublin.

18. The Newlands Cross junction is currently an at-grade fully signalised four arm junction with the R113 Fonthill Road to the north and the R113 Belgard Road to the south. The proposals are to provide a grade separated interchange of the N7 Naas Road at the junction with the R113 Fonthill Road / Belgard Road in the form of a grade-separated flyover.

19. From the original validated 2005 DTO area-wide SATURN model of Greater Dublin, a traffic matrix for predicted 2009 / 2010 and 2024 / 2025 traffic flows has been produced. A series of junction capacity assessments have been undertaken by Arup, using LINSIG industry standard software, to assess the proposed operational capacity of the Newlands Cross junction before ('Do Minimum') and after ('Do Something') the upgrading of the junction to provide a flyover for east-west movements along the N7 Naas Road. The results of the Arup LINSIG junction capacity assessments are:

    - **2009 / 2010 Do Minimum** – Four of the eight links recorded a degree of saturation (DoS) in excess of 100%, with a fifth link at 98% in the AM peak. In the PM peak, the junction also operates beyond its design capacity; with the Naas Road (Westbound) Ahead link, in particular, recording a DoS well in excess of 100% and correspondingly long vehicle queue lengths.

    - **2009 / 2010 Do Something** – The junction operates well within capacity in the PM peak with all links recording DoS of less than 60%. In the AM Peak, three links record a DoS of between 94% - 99%, in excess of the desired limit of 90%, indicating that the overall junction is operating at its maximum design capacity. The existing road network is incapable of accommodating additional development traffic.

20. The 2025 assessments are based on flows extrapolated from the 2024 DTO model. By 2025 the model includes all assumptions based on elements of *Transport 21* including existing committed and future infrastructure and public transport improvements within Dublin.

    - **2024 / 2025 Do Minimum** – Almost all links record a degree of saturation (DoS) in excess of 100% in both the AM & PM peaks, indicating that the overall junction is operating well beyond its maximum design capacity, creating vehicle queue lengths in excess of a mile long on several links. The road network is incapable of accommodating additional development traffic in this scenario.

    - **2024 / 2025 Do Something** – The junction operates well within capacity in the PM peak with all links recording DoS of less than 70%. In the AM Peak, four links record a DoS of between 85% - 89%, within the desired limit of 90%, indicating that the overall junction is operating close to its design capacity, although with a small amount of available reserve capacity. The four links which demonstrate DoS of 85%> include the Fonthill Road links and Naas Road in both eastbound and westbound directions. The highest DoS along Belgard Road is recorded at 66.4% in the PM peak.

21. As a result, the Do something 2025 road network is capable of accommodating additional development traffic in this scenario. Further sensitivity testing to quantify exactly how

much additional development traffic can be distributed onto the R113 Belgard Road has been subsequently undertaken through the development of LINSIG models for a proposed four arm signalised junction situated approximately 200 metres to the south of the Newlands Cross Junction.

Proposed Access Junction to the south of the Newlands Cross Junction (N7/R113)

22. From the DTO SATURN model, 2024 traffic flows along the R113 Belgard Road were derived for the AM Peak hour, accounting for 668 northbound vehicle trips, and a further 1717 southbound vehicle trips.

23. The first test model included a nominal 10 vehicle trips accessing and egressing the eastern and western proposed site access roads. A trip distribution of 50% north/50% south has been apportioned.

24. Two further test scenarios have been developed with 100 arrivals & 100 departures into the site resulting in R113 Belgard Rd North ahead & left link reaching a DoS of 86.5%.

25. When 150 arrival & 150 departure vehicle trips were applied, the junction begins to reach its maximum design capacity with the proposed access arm of the junction experiencing a DoS of 95.7%, and a vehicle queue length of 8 vehicles. The junction reports a practical reserve capacity of -6.3%, indicating that the overall junction is operating beyond its designed capacity.

Summary

26. The results of the junction modelling demonstrate that additional vehicle trips associated with proposed development cannot be added to the road network unless the grade separated junction improvement works at the Newlands Cross junction have been completed.

27. As has been demonstrated, the implementation of a new link road providing a new access / egress to / from the Belgard Road would result in an unacceptable level of traffic right-turning from the N7 (from the west) onto Belgard Road, and then left-turning into the site. This would cause the Newlands Cross junction (either the existing at-grade junction or proposed grade-separated junction) to operate in excess of its original design capacity, and therefore operate at an unacceptable level.

28. The results also identify that only once the net benefits of the *Transport 21* package of highway infrastructure and public transport improvement in 2025 are achieved can additional development traffic be apportioned onto the road network at the R113 Belgard Road junction. The exact quantum and distribution of development traffic that can be apportioned in the 2025 do something scenario will need to be further investigated.

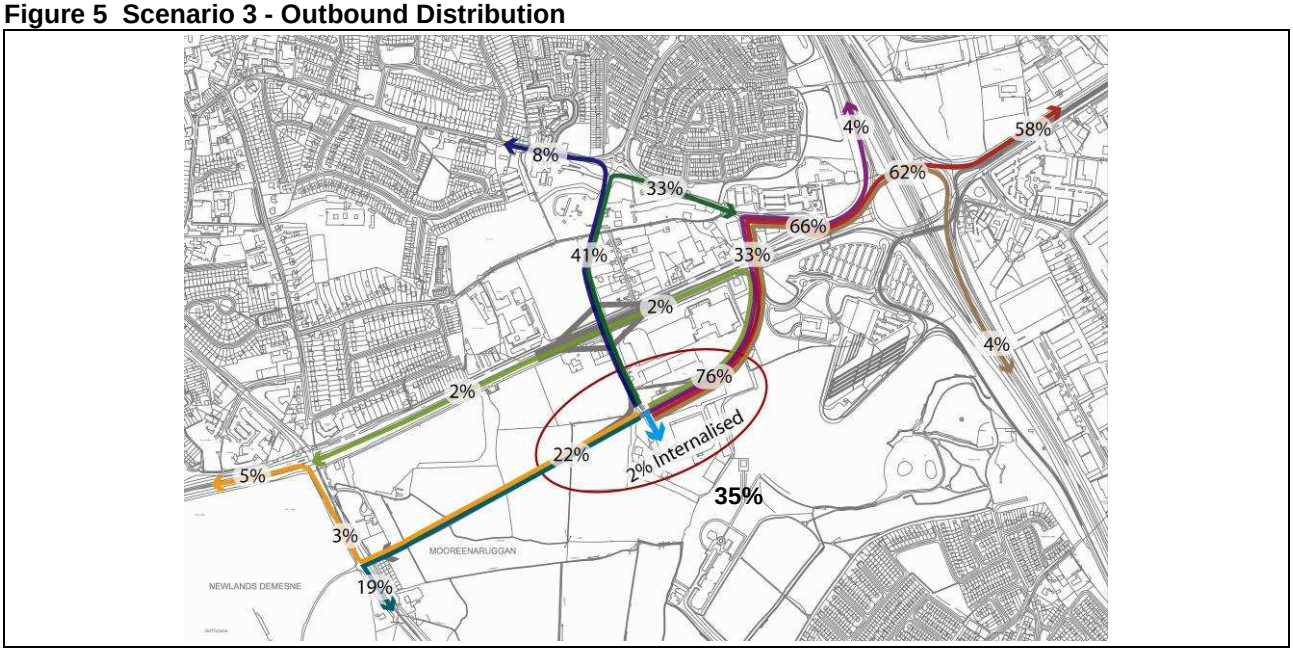
Scenario 3: Monastery Road, Link Road & New Overbridge

29. **Figures 5** and **6** below illustrate that with the construction of the N7 overbridge, half of the eastbound traffic will use the new overbridge (33% of the total) and half of the eastbound traffic will continue to use the existing Monastery Road overbridge and junction (33% of the total). Traffic to / from Clondalkin Village and the north-west will no longer have to travel via the Monastery Road overbridge, providing additional capacity at this bridge and the roundabouts to either side of it.

30. **Figure 5** below clearly demonstrates that in order for traffic to head eastbound, the preferred route remains via the existing Monastery Road junction rather than via the Newlands Cross junction (irrespective of the proposed grade-separation of Newlands Cross). 19% of traffic will continue to head southwest-bound via the Belgard Road (all of which will use the link road), 5% of traffic will head westbound via the N7 Naas Road, 8% will head northwest-bound via Clondalkin Village and the new overbridge, and the

remaining 66% will head either eastbound (over the Red Cow junction and towards Dublin city centre via the Naas Road) or either north or south on the M50.

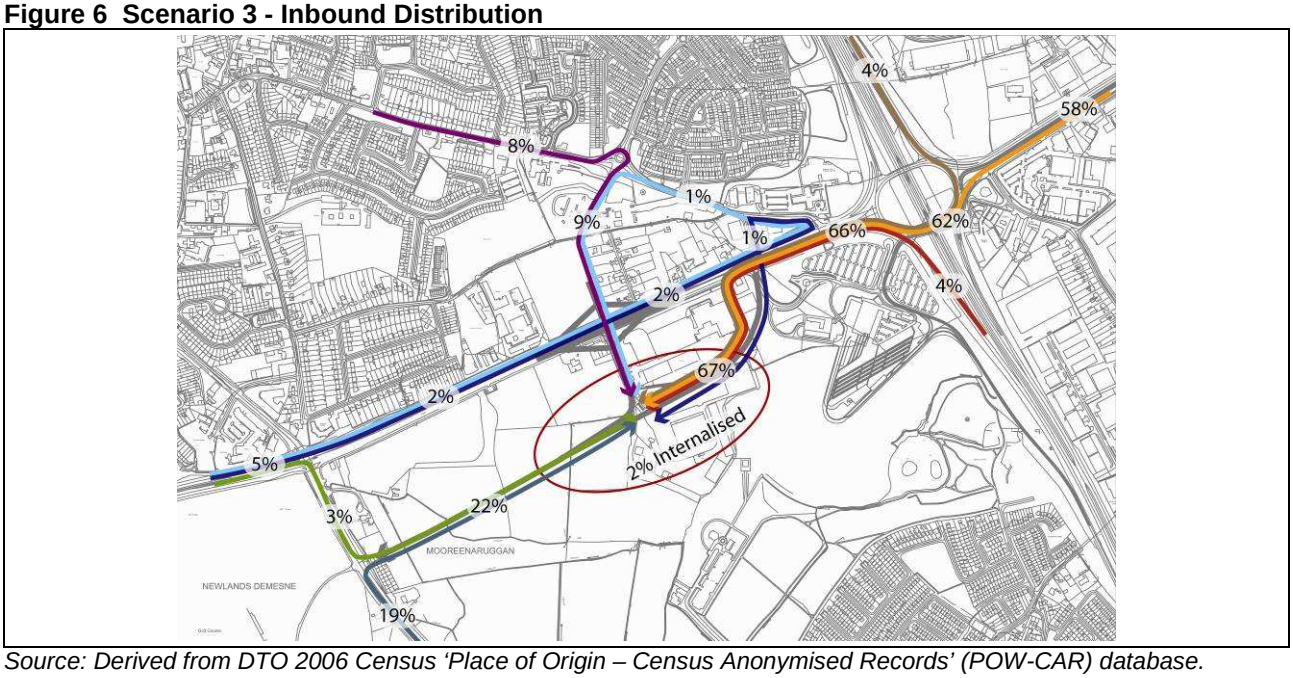
Figure 5 Scenario 3 - Outbound Distribution



Source: Derived from DTO 2006 Census 'Place of Origin – Census Anonymised Records' (POW-CAR) database.

31. **Figure 6** below identifies that of the 5% of traffic originating from the west, 3% of this will right-turn at Newlands Cross and 2% will continue straight on, eastbound, on the N7 Naas Road. This traffic will then perform a left turn manoeuvre at the Monastery Road junction; with 1% of it passing over the existing Monastery Road overbridge and 1% using the new overbridge in the vicinity of the SIAC site. This 1% using the new overbridge will be joined by the 8% of traffic arriving from the northwest and passing through Clondalkin Village. 66% of traffic (from the east and the M50) will turn off the N7 Naas Road beneath the existing Monastery Road overbridge. As with all scenarios, 2% of travel-to-work trips remain internalised (i.e. the point of origin and destination is within this particular DTO Zone, to the southwest of Red Cow).

Figure 6 Scenario 3 - Inbound Distribution



Source: Derived from DTO 2006 Census 'Place of Origin – Census Anonymised Records' (POW-CAR) database.

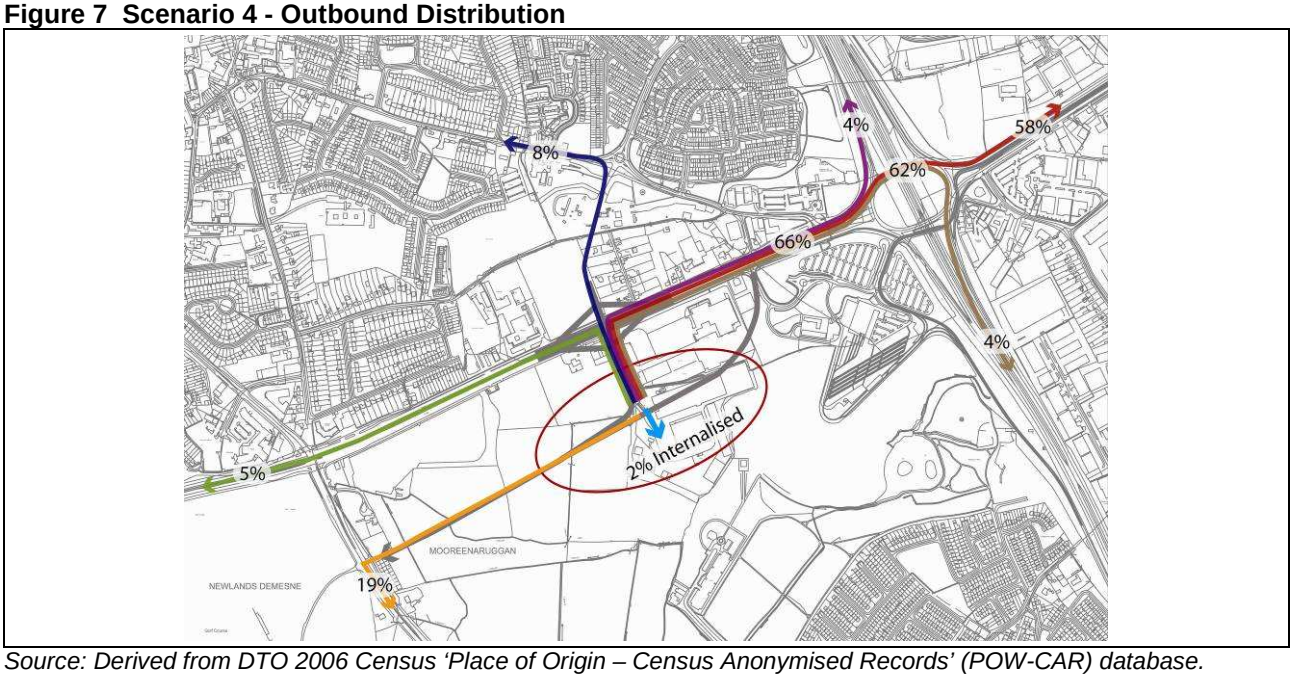
32. Should a new link road be provided over the N7 mainline carriageway in the form of an overbridge, linking the Red Cow lands and Monastery Road via the SIAC site to the north, it is expected that some traffic that currently uses the Monastery Road overbridge, to the east, would divert and use the new link road overbridge instead. This would undoubtedly improve the operational performance of the Monastery Road roundabouts (north and south of the Monastery Road overbridge) by removing some of the traffic to / from the north-west and Clondalkin Village from the Monastery Road junction / P&R vicinity. However, the potential for a roundabout to the north of the new overbridge link road, linking it with Monastery Road, is limited; and furthermore all traffic would be routed through Clondalkin Village which currently only caters for local traffic.

Scenario 4: Monastery Road, Link Road & New N7 Junction

33. **Figures 7** and **8** below illustrate that, with the inclusion of slip roads connecting the N7 overbridge (between the SIAC / Monastery Road roundabout and the Red Cow lands) with the N7 mainline beneath, the majority of traffic would choose to use this as a more favourable route to / from the site. This distribution is assuming that the slip roads on the new junction are accessible from all directions (which given engineering constraints would not be possible in reality).

34. **Figure 7** below illustrates that the 19% of traffic destined towards the southwest via the Belgard Road will use the propose western link road. Of the 5% of traffic that is headed westbound (via the N7 Naas Road), all of it will use the proposed grade-separated junction between Newlands Cross and Red Cow. As with Scenario 3, the 8% of traffic headed towards the northwest, via Clondalkin Village, will leave the site via the proposed new overbridge. It is expected that all of the eastbound and M50-bound traffic (a total of 66%) will use the new dumbbell interchange in preference to the existing Monastery Road junction.

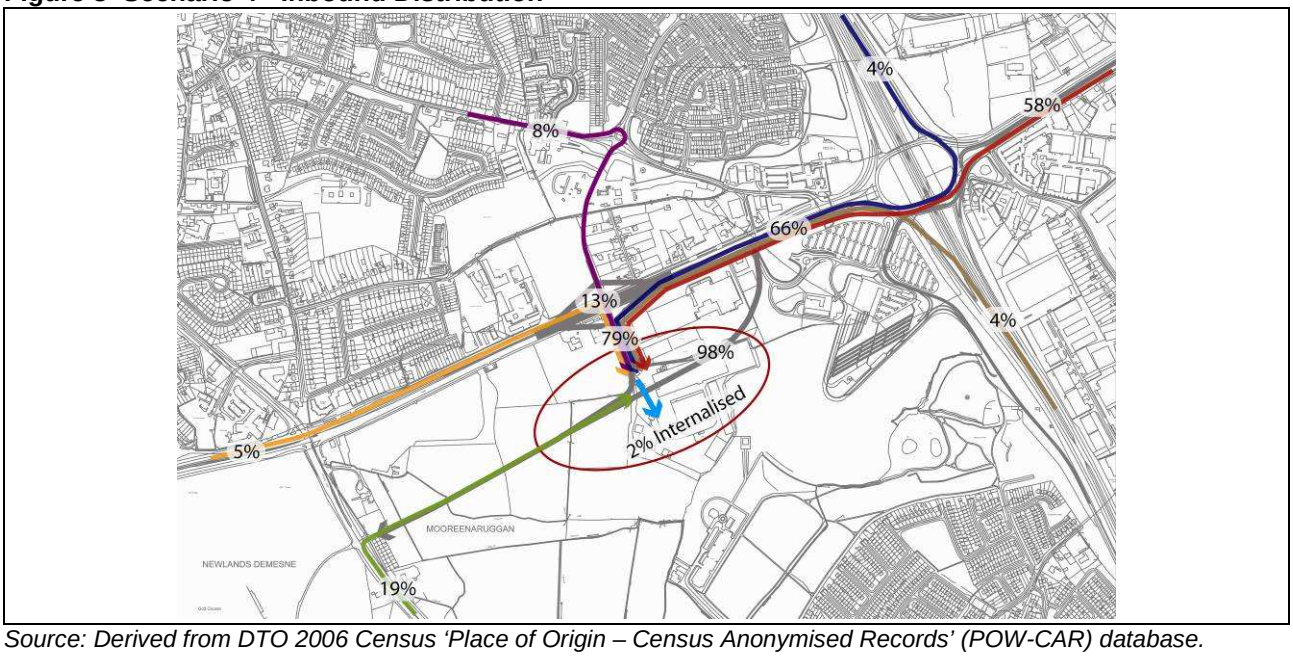
Figure 7 Scenario 4 - Outbound Distribution



Source: Derived from DTO 2006 Census 'Place of Origin – Census Anonymised Records' (POW-CAR) database.

35. **Figure 8** below illustrates that, similarly to Figure 7 above, all of the traffic originating from the southwest via the Belgard Road (from the south) will utilise the proposed western link road across the Red Cow lands. It is expected that the 5% of traffic originating from the west will utilise the proposed new grade-separated interchange mid-way between Newlands Cross and Red Cow; and also that the 8% of traffic originating from the northwest will enter the site via the associated overbridge. It is expected that all traffic from the Naas Road (east of the Red Cow junction) and from the M50 will use the new grade-separated junction in preference to the existing Monastery Road junction.

Figure 8 Scenario 4 - Inbound Distribution



Source: Derived from DTO 2006 Census 'Place of Origin – Census Anonymised Records' (POW-CAR) database.

36. It is considered that, whilst a new access onto the N7 would alleviate some of the pressure on the Monastery Road junction and also on a new junction on the Belgard

Road; and notwithstanding the National Roads Authority's (NRA's) policy objection to the creation of new accesses onto the Strategic Road Network (SRN); it is not considered feasible in engineering terms to construct a new grade-separated junction on the N7 Naas Road between Red Cow and Newlands Cross. The design / engineering issues are illustrated in the drawing included at **Appendix C** for information.

Reviewing Monastery Road Junction Against Design Standards

Design Standards

37. JMP has reviewed the proposed Red Cow junction (and how it interacts with the proposed Newlands Cross junction) against current design standards – The Highways Agency TD 42/95 'Geometric Design of Major/Minor Priority Junctions', published in January 1995; and the *Design Manual for Roads and Bridges* (DMRB) Volume 6: 'Road Geometry', Section 2: 'Junctions', Part 1, TD 22/06: 'Layout for Grade Separated Junction', published in February 2006.

Weaving Length Between Slip Lanes

38. With regards to the existing / proposed slip roads on the N7 Naas Road, the weaving length between the end of the eastbound merge, from the proposed Newlands Cross grade-separated junction; and the start of the eastbound diverge, towards the existing Monastery Road junction as part of the Red Cow junction; is 120m. On the westbound side, the distance from the end of the existing westbound merge, from the existing Monastery Road junction, and the start of the westbound diverge, towards the proposed Newlands Cross junction, is 125m.

39. According to the design standards, the minimum weaving length should be 250m. It can therefore be seen that the distance between the two junctions, notwithstanding any proposals for a new access / egress directly onto the Naas Road, is substantially below standard. Given the merge lengths provided are approximately half of minimum standards, this is considered to constitute a safety issue; increasing traffic flows on these slips would exacerbate this problem.

40. The introduction of an intermediate junction, with further merging movements, upon an already substandard section of road could not be achieved without further exacerbating safety problems.

Radii on Slip Lanes

41. JMP has also reviewed the design of the Monastery Road slip lanes against current design standards, including the radius of the curve on the slip lanes and also the volume of traffic that is expected to use the slip lanes. The design standards require that the radius of the diverging taper of a slip lane, for main road with a design speed of 85kph, should be a minimum of 20m. The radius of the southern (westbound) slip lanes for the Monastery Road junction, with a radius of 24.37m, therefore meet the design standards and are considered sufficient.

42. For design speeds of 85kph, the minimum taper length should be 75m with a 1:12 nose ratio. The actual length of the slips on the southern (westbound) side is 73.2m, which may not therefore be sufficient.

43. It is noted that on the westbound diverge slip on the N7, beneath the Monastery Road overbridge, a separate turning lane is provided. Where a separate lane is provided, a minimum radius of 25m for a design speed of 8kph should be used. The design layout allows for a radius of 26.14m and therefore meets the standards.

44. The merging length of the merge lane should be 90m for 85kph design speed. The merge lane has been designed to 115m, which would be appropriate for design speeds up to

100kph. The initial width of the merge taper should be 3.5m. The taper has been designed at 6.1m, which meets the minimum design standards.

Merge & Diverge Flows on Slip Lanes

45. JMP has reviewed the merge and diverge capacities against current design standards. However, it should be noted that these are theoretical capacities as the calculations assume that the merge / diverge distances are provided to design standards.

46. For the northern (eastbound) side of the Naas Road, the mainstream traffic flow is 4,044 vehicles per hour (vph). The merge flow (the amount of traffic merging onto the mainline carriageway) is 548vph. The theoretical spare capacity on the layout for merge flow is 45.75vph. This is sufficient for expected traffic flows without any additional development on the Red Cow lands.

47. At the point of the eastbound diverge, the mainstream flow is 5,165vph. The diverge flow is 1,121vph. Using this layout, there is theorised spare capacity for a further 66vph for diverge flow or 210vph for mainstream flow. JMP has reviewed the merge and diverge flows / capacities and it is noted that the capacities are theoretical, assuming the merge distances were to standards.

48. For the southern (westbound) side of the Naas Road, the mainstream traffic flow is 3,942vph. The merge flow is 372vph. There is theoretical spare capacity of approximately 750vph for merge flow or 253vph for mainstream flow.

49. At the point of the westbound diverge, the mainstream flow is 4,592vph. The diverge flow is 650vph. The theoretical spare capacity is 537.5vph for diverge flow or 250vph for mainstream flow.

Considered Variables

50. It is considered that there is not an interim solution possible, between Scenarios 2 and 3, whereby additional lanes could be added to the existing Monastery Road Bridge. Indeed, it is not considered feasible to add additional lanes to the existing Monastery Road overbridge. This is a new bridge which has recently been put in place as part of the NRA's M50 upgrade works; the structure of the bridge does not appear to allow for additional lanes to be added on either side. In order to accommodate additional lanes and therefore a greater volume of traffic, it would be necessary to replace the existing Monastery Road overbridge with a wider bridge. This would clearly have significant cost implications.

51. Furthermore, in order to be able to accommodate additional traffic, both the roundabouts to the north and the south of the overbridge would need to be significantly upgraded. Land acquisition would most likely be required to enable any upgrade to take place. As has been demonstrated by the ARCADY junction assessment, as reported within this File Note, the roundabout to the north of the overbridge is expected to operate above capacity. Increasing the capacity of the overbridge itself would not alleviate this overcapacity issue on the roundabout.

52. As has been discussed in **Paragraph 36** above, notwithstanding the NRA's policy objection to the creation of new accesses onto the SRN; it is not considered feasible in engineering terms to construct a new grade-separated junction on the N7 Naas Road between Red Cow and Newlands Cross. These issues are illustrated in the drawing included at Appendix C for information.

53. In light of the options testing which has been reported within this File Note, it is considered appropriate for a level of development equal to the existing quantum of development to take place within the site to the southwest of the Red Cow junction. The NRA has stated their aspiration for no net increase in vehicular traffic on the SRN. Given the limited level of existing development on the Red Cow lands, and its limited accessibility and

connectivity to other areas, it is considered that any new development at Red Cow will have a net impact on the SRN.

54. The junctions that have been tested and reported within this File Note – namely the Monastery Road and Newlands Cross junctions – operate in excess of their operational capacity in the base year of 2009. Even in the future year of 2024, they are still expected to operate in excess of their operational capacity.

55. Until such time as the benefits from *Transport 21* can be felt, it is not considered possible to develop the lands to the southwest of the Red Cow junction. This consideration is based on the fact that the existing junctions are already operating in excess of their operational capacity, and any further development in the vicinity of the Monastery Road junction would exacerbate these problems. It is also based on the conclusion that the construction of a new grade-separated junction between Newlands Cross and Red Cow is not considered feasible in engineering terms. This is notwithstanding the NRA's aspiration for no net impact on the SRN or its policy objective of no new accesses onto the N7 Naas Road.

Summary & Conclusions

56. In summary, it can be seen that in order to assess the potential impacts of each of the four scenarios put forward by SDCC, JMP has considered the potential traffic impacts of each scenario, the physical implications of implementing the required infrastructure improvements, and has also taken into account the relevant policy and design standard requirements.

57. Based upon the original traffic distribution developed by JMP, using the DTO 2006 Census travel-to-work data, JMP has undertaken a traffic assignment and distribution exercise specific to the DTO Zone located to the south-west of the Red Cow junction; the area under consideration within this File Note. This has been represented diagrammatically throughout this File Note and also included as an appendix.

58. It is considered that any development taking place in Scenario 1 would result in the existing Monastery Road junction being pushed further over capacity than it currently is, which would result in further delay and queuing at this junction. With regards to Scenario 2, as has been demonstrated, the implementation of a new link road providing a new access / egress to / from the Belgard Round would result in an unacceptable level of traffic right-turning from the N7 (from the west) onto Belgard Road, and then left-turning into the Red Cow lands. This would cause the Newlands Cross junction (either the existing at-grade junction or proposed grade-separated junction) to operate in excess of its original design capacity, and therefore operate at an unacceptable level. It is concluded that only once the net benefits of the *Transport 21* package or highway and public transport improvements in 2025 are achieved can additional development traffic be apportioned onto the road network at the R113 Belgard Road junction.

59. JMP has undertaken a review of the design of the Monastery Road slip lanes against current design standards. From this review, it can be seen that aspects of the design are below standard. The distance between the Monastery Road and Newlands Cross slip lanes is below standard. Therefore, it is not possible to accommodate any new access / egress with suitable length slip lanes between the Red Cow and Newlands Cross junctions.

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