ATTACHMENT 8

TRAFFIC IMPACT ASSESSMENT

PROPOSED DEVELOPMENT AT CARRANSTOWN, CO. MEATH

TRAFFIC IMPACT ASSESSMENT

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APPENDICES

1.0 INTRODUCTION

1.1 On the 11th May 2000 Project Management Limited, Engineers and Project Managers, appointed Atkins McCarthy to carry out a Traffic Impact Assessment for the proposed development of a greenfield site at Carranstown, County Meath.

1.2 The Traffic Impact Assessment is part of the Environmental Impact Statement prepared by Project Management for the project, to meet the requirements of the current Local Government Planning and Development Regulations and of Meath County Council.

2.0 METHODOLOGY

2.1 A summary of the methodology for this Traffic Impact Assessment includes the following:

- Appraisal of the existing road network;
- Appraisal of existing (2000) traffic flows including the collation of previously recorded traffic count data and on-site peak period traffic counts;
- Appraisal of parking;
- Establish trip generation and distribution of traffic flows;
- Appraisal of future road network and predicted traffic flows;
- Assess traffic impact of proposed development;
- Identify avoidance, remedial or reductive measures;
- Define forecasting methods; and
- Identify construction traffic.

2.2 The Environmental Research Unit (E.R.U.) design guidelines RT180 have been used to define the limiting capacity of the local road network in terms of a particular level of service. Level of Service (LOS) represents an objective average journey speed, under ideal conditions, combined with satisfactory conditions for overtaking and driver operation.

2.3 The U.S. Highway Capacity Manual defines six levels of service ranging from Level of Service A, representing free flow conditions, to Level of Service F, representing breakdown flow. The National Roads Authority (N.R.A.) in their National Road Needs Study for the period 2000 to 2019 confirm that studies of international practice indicate that many countries design new primary road facilities with an objective Level of Service C (LOS C). Generally, Level of Service D (LOS D) equivalent to an average inter-urban journey speed of 80 kph, is regarded as a minimum acceptable standard.

2.4 The N.R.A. define Level of Service C and D as follows for two-lane roads:

Classification	*% Time Delay*	*Average Speed*	*Passing Conditions*	*Driving Conditions*
LOS C	≤ 60	84 kph	Platoon formation occurs with passing demand exceeding opportunity	Driver delay up to 60% due to slower vehicles
LOS D	≤ 75	80 kph	Passing extremely difficult with very high demand & limited opportunity. Platoon sizes of 5-10 vehicles	Driver delay up to 75%. Turning vehicles or roadside distractions cause major shockwaves in the traffic system.

2.5 The design capacities for undivided rural roads defined in RT180 for both LOS C and LOS D are a function of carriageway width and the percentage sight distance greater than 460 metres along the route.

2.6 The proposed new entrance junction to the proposed development has been designed in accordance with the E.R.U. design guidelines RT180 and RT181 and the requirements of Meath County Council.

2.7 The British Department of Transport computer software programme PICADY has been used to assess the proposed new entrance junction to the proposed development.

3.0 FORECASTING METHODS

3.1 PICADY (Priority Intersection Capacity and Delay) is a computer software programme for calculating estimates of the capacity of major/minor road junctions, where the minor road is controlled by a STOP or YIELD sign. The geometric details of the junction are supplied to the programme together with details of the traffic flows and turning movements. The programme analyses the junction in relation to the various traffic flows and calculates the capacity of each approach. The programme also calculates the average queue length on each approach and the average delay per vehicle. The average queue length may be displayed in graphical form. This programme is issued by the British Department of Transport.

4.0 DESCRIPTION OF DEVELOPMENT

4.1 The site for the proposed development is located at Carranstown, County Meath, approximately 3 kms Northeast of Duleek, as shown on Figure 1.

4.2 It is proposed to commence construction of the proposed development during 2002. The expected construction period is 24 months with a target completion date of 2004.

5.0 EXISTING ROAD NETWORK

5.1 The site for the proposed development is located on the north side of the R152 Regional Road between Drogheda and Duleek, as shown on Figure 1.

5.2 In the vicinity of the proposed development the R152 is a single carriageway road with a typical carriageway width of approximately 7.0 metres. The R152 extends from the N1 National Primary Route at Drogheda to the N2 National Primary Route south of Rathleigh. At the proposed development site the R152 is located within the 60 m.p.h. rural speed limit zone.

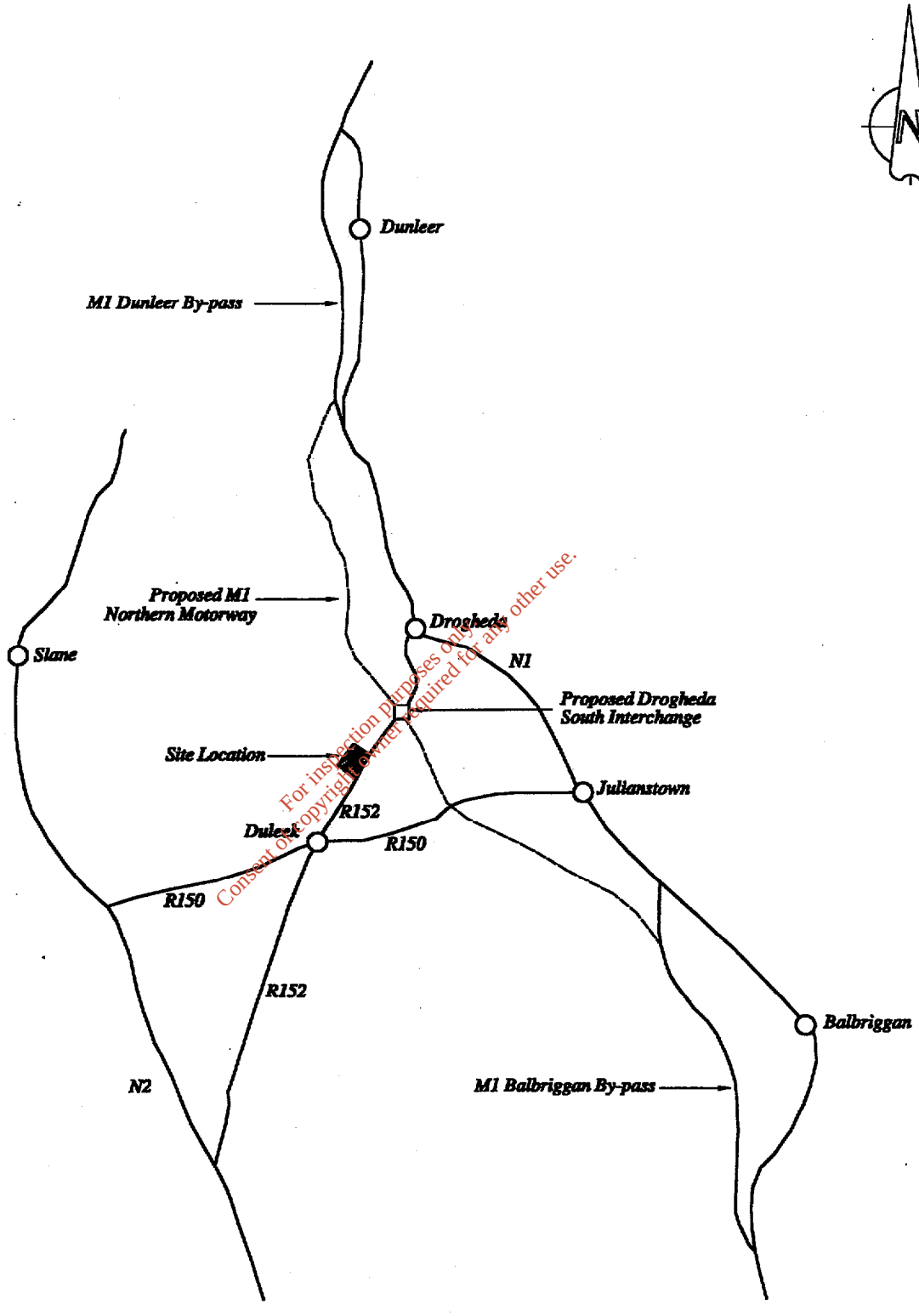
5.3 South west of the proposed development site the R152 forms a priority controlled junction with the R150 Regional Road on the east side of Duleek. The R150 provides a link from Duleek to the N1 at Julianstown and the N2 north of Balrath. West of Julianstown the R150 has a carriageway width of only approximately 4.0 metres at its narrowest location. West of Duleek, the R150 has a typical carriageway width of 5.5 metres.

5.4 The R152 forms a traffic signal controlled T- junction with the N1 in Drogheda and forms a priority controlled T-junction with the N2 south of Rathleigh. Partial left-turn deceleration and right turn speed change lanes are provided at the R152/N2 junction.

5.5 The R150 forms priority controlled T-junctions with both the N1 at Julianstown and the N2 north of Balrath. The R150/N1 junction at Julianstown in located within the 30 m.p.h. urban speed limit zone. There are no speed change lanes provided at the R150/N2 and R152/R150 junctions.

6.0 EXISTING (2000) TRAFFIC FLOWS

6.1 Morning and evening peak period traffic counts were carried out by Atkins McCarthy on Thursday 18th May 2000 on the R152 Regional Road at the proposed development site and on the R150 Regional Road west of Duleek. The traffic counts were carried out from 7.00 to 9.00 a.m. and from 4.30 to 6.30 p.m. Full details of the counts are provided in Appendix A. All traffic flows are expressed in passenger car units (p.c.u.'s) converted in accordance with the urban ratings devised by the U.K. Transport and Road Research Laboratory. On the basis of these ratings one heavy commercial vehicle is the equivalent of three passenger car units. This assumed h.c.v. rating is conservative relative to the rating recommended by the E.R.U. in RT180 of 1 h.c.v. = 2 p.c.u.'s.



SITE LOCATION *FIGURE*

6.2 The overall recorded morning and evening peak hour traffic flows occurred between 7.45 and 8.45 a.m. and 5.00 and 6.00 p.m. respectively. The evening peak hour represented the overall daily peak traffic hour.

6.3 The recorded two-way morning and evening peak hour traffic flows on the R152 adjacent to the proposed development site were 799 p.c.u.'s and 902 p.c.u.'s respectively. These recorded traffic flows are higher than those recorded for similar EIS for other proposed adjacent developments. The recorded proportion of heavy commercial vehicles on the R152 was 13% during the morning peak hour and 12% during the evening peak hour.

6.4 The recorded two-way morning and evening peak hour traffic flows on the R150 west of Duleek were 264 p.c.u.'s and 278 p.c.u.'s respectively. The recorded proportion of heavy commercial vehicles on the R150 was 18% during the morning peak hour and 16% during the evening peak hour.

6.5 Based on the latest available National Roads and Traffic Flow provided by the Environmental Research Unit (E.R.U.) it is estimated that the total two-way peak hour traffic flow on the N1 is of the order of 1,900 p.c.u.'s between Drogheda and Julianstown. The estimated total two-way peak hour traffic flow on the N2 between its junctions with the R150 and R152 is of the order of 1,000 p.c.u.'s.

6.6 The design capacity of the R152 is in the range 700 to 1,200 p.c.u.'s/hour two-way at Level of Service C (LOS C) and 1,300 to 1,500 p.c.u.'s/hour two-way at Level of Service D (LOS D) based on the design capacities for undivided rural roads set down in the E.R.U. design guidelines RT180. The design capacity of the R150 west of Duleek is in the range 575 to 950 p.c.u.'s/hour two-way at LOS C and 1,025 to 1,200 p.c.u.'s at LOS D.

6.7 Depending on the percentage sight distance greater than 460 metres along the existing route, the R152 may currently be operating in excess of capacity at LOS C but within capacity at LOS D. The R150 is currently operating within capacity at LOS C.

6.8 No significant queuing or delays were observed during the traffic surveys for vehicles turning in and out of adjoining developments or side roads in the vicinity of the proposed development site or at the R152/R150 junction.

7.0 CHARACTERISTICS OF THIS PROPOSAL

7.1 This proposal is for the construction of a waste incinerator, material recycling plant, community recycling park, bring bank, weighbridge, warehouse, pumphouse and tank, administration building, associated parking, landscaping, site works and new entrance at Carranstown, County Meath.

8.0 PARKING

8.1 The parking provisions of any development within the Meath County Council administrative area are required to be in accordance with the parking standards set down in the Draft County Development Plan 2000. These standards together with the parking requirements and proposed provision for the proposed development are as follows:

Development Type	**Floor Area (m^2)**	**Parking Standard**	**Spaces Required**	**Spaces Proposed**
Administration (offices)	350	1/25	14	28
Warehouse	900	1/100 1 h.c.v. space/ 1,000	9 1 h.c.v. space	9
Incinerator	11,500	---	---	8
Bring Bank	---	---	---	
Total:			**23 & 1 h.c.v. space**	**45 & 3 h.c.v. spaces**

8.2 The proposed parking provision exceeds the parking spaces required as defined by the Draft Meath County Development Plan 2000.

9.0 OPERATIONAL TRAFFIC GENERATION

9.1 It is envisaged that the facility would operate 24 hours per day. The facility would accept waste deliveries from 8.00 a.m. to 6.30 p.m. Monday to Friday and from 8.00 a.m. to 2.00 p.m. on Saturdays. There will be no traffic activities on Sundays or public holidays.

9.2 The proposed development would employ a total of 50 persons, of which 20 employees will work shift arrangements. Peak daily operational employment will be 34 employees of which 30 will work a standard working day. It is expected that all employees will travel to and from work by car with an average occupancy of 1.2 employees per car. On this basis, it is expected that employees will generate a total two-way daily traffic volume of 111 p.c.u.'s assuming that half of all employees also leave and return to the site during the working day. The expected two-way daily traffic volume generated by visitors is expected to be 20 p.c.u.'s.

9.3 It is envisaged that waste to energy activity at the proposed development will generate a total daily two-way traffic volume of 122 heavy commercial vehicles (h.c.v.'s), or 366 p.c.u.'s. The expected peak hourly two-way traffic volume is 15 h.c.v.'s or 45 p.c.u.'s. Industrial waste sorting activity at the proposed development is expected to generate a total daily two-way traffic volume of 22 h.c.v.'s or 66 p.c.u.'s. The expected peak hourly two-way traffic volume is 4 h.c.v's or 12 p.c.u.'s.

9.4 The generation rates for the waste to energy activity and industrial waste sorting activity are based on recorded experience at other existing similar developments including that currently operated by the Developers at Flanders, Belgium. Ash will be removed off site by the waste delivery trucks and no additional h.c.v. traffic will be generated by this activity.

9.5 It is envisaged that the proposed bring bank facility will ultimately generate a total daily two-way traffic volume of up to 134 cars after an initial growth period. The expected ultimate peak hourly traffic volume is 6 cars. Experience at other bring bank facilities indicates that peak activity occurs on Saturdays and during the weekday off-peak periods.

9.6 A summary of the predicted two-way traffic volumes generated by the proposed development both during the daily operational period and the peak hour period is as follows:

Predicted Two-Way Operational Traffic Volumes Generated by the Proposed Development

Activity	Daily Operational Period (two-way)	Operational Peak Hour (two-way)
Employees	111 cars	34 cars
Visitors	20 cars	1 car
Waste to Energy	122 h.c.v.'s	15 h.c.v.'s
Industrial Waste Sorting	22 h.c.v.'s	4 h.c.v.'s
Bring Bank	134 cars	6 cars

9.7 It is conservatively assumed that all traffic generated by the proposed development is new traffic to the surrounding local road network. All h.c.v. volumes generated by waste to energy and industrial waste sorting activity is in fact, existing traffic on the Northeast region road network that would become centralised with the provision of the proposed development.

9.8 The total predicted two-way traffic volumes generated by the proposed development during the daily operational period is 265 cars and 144 h.c.v.'s. This is equivalent to a total daily volume of 697 p.c.u.'s. During the peak hour the total predicted two-way traffic volume is 41 cars and 19 h.c.v.'s which is equivalent to a total of 98 p.c.u.'s.

10.0 TRAFFIC DISTRIBUTION

10.1 The developers envisage that approximately 64% of all h.c.v.'s generated by the waste to energy and waste sorting activities at the proposed development will travel to and from the proposed development via the R152 from north of the proposed development with the remaining 36% travelling via the R152 from south of the proposed development. Of this traffic it is also expected that 23% of all h.c.v.'s generated will also travel via the R150, west of Duleek.

10.2 A similar distribution on the R152 is expected for traffic generated by visitors, employees and the bring bank at the proposed development on the basis of the distribution of urban centres within the Northeast region in Counties Meath, Louth, Cavan and Monaghan. A summary of the distribution of these urban centres is contained in Appendix B.

11.0 ACCESS TO SITE

11.1 Access to the proposed development would be via a new entrance on the R152.

12.0 PLAN YEAR (2004) TRAFFIC FLOWS

12.1 It is envisaged that the proposed development would be completed during 2004. Meath County Council in association with Louth County Council and Drogheda Corporation expect to commence construction of the M1 Northern Motorway (Gormanstown-Monasterboice) during 2001. The proposed motorway scheme will link the M1 Balbriggan Bypass scheme with the M1 Dunleer Bypass. It is expected that the proposed scheme will be constructed by 2004. The year 2004 therefore represents the Plan Year.

12.2 The horizontal alignment of the proposed motorway extends from the northern end of the Balbriggan Bypass in a north-west direction some 4 kms west of Julianstown and crosses the River Boyne about 3 kms west of Drogheda Town Centre to tie in with the Dunleer Bypass. The alignment traverses the R152 approximately 2 kms north of the proposed development site at the proposed Drogheda South Interchange.

12.3 The Drogheda South Interchange on the proposed Northern Motorway Scheme is a split type interchange on the Donore Road and the R152 Carranstown Road incorporating a new link road between the Donore Road and the R152. The proposed interchange will facilitate all traffic movements on and off the motorway. The scheme also includes the upgrading and realignment of the R152 Carranstown Road at the Drogheda South Interchange.

12.4 The Environmental Impact Statement (EIS) for the proposed M1 Northern Motorway scheme envisaged the following projected traffic flows:

- An Annual Average Daily Traffic (AADT) volume of 17,500 vehicles in 1999 and 35,800 vehicles in 2019 on the M1 Northern Motorway south of Drogheda South Interchange;
- An AADT volume of 13,800 vehicles in 1999 and 27,900 vehicles in 2019 on the M1 Northern Motorway north of Drogheda South Interchange;
- A reduction of 200 vehicles in the 1999 AADT volume on the R152 Carranstown Road between Drogheda South Interchange and Drogheda. There are no projected traffic flows for the R152 south of Drogheda South Interchange;
- An AADT volume of 5,500 vehicles in 1999 and 12,100 vehicles in 2019 on the existing N1 route between Drogheda and Julianstown with the proposed M1 Northern Motorway in place;
- An AADT volume of 4,900 vehicles in 1999 and 8,800 vehicles in 2019 on the existing N2 route between its junctions with the R150 and R152 with the proposed M1 Northern Motorway in place.

12.5 The EIS for the M1 Northern Motorway Scheme was completed in August 1995. The projected annual traffic growth rate of 4.0% on the N1 corridor and the annual car ownership growth rate of 2.3% detailed in the EIS have been exceeded in the period up to 1999.

12.6 Accordingly the predicted 1999 traffic volumes on the existing N1, N2 and proposed M1 Northern Motorway with the proposed motorway in place detailed in the EIS have been increased by a factor of 1.10. These estimated 1999 traffic volumes on the N1, N2 and M1 routes with the proposed M1 Northern Motorway in place and the recorded existing (2000) traffic flows on the R150 were factored to 2004 levels using an assumed annual average growth rate of 5%.

12.7 The Preliminary Design Report prepared by Meath County Council for Phase 2: Carranstown to Tullyallen of the M1 Northern Motorway Scheme indicated that a proportion of existing traffic on the R152 Carranstown Road uses the R152 and N2 roads as an alternative route to the existing N1 and expected that this traffic will transfer to the proposed M1 motorway when completed. The Preliminary Design Report envisaged a decrease of 30% from existing traffic levels on the R152 Carranstown Road, west of the proposed M1 motorway.

12.8 Pre-planning submission liaison with Meath County Council and a review of the planning file indicates that total additional peak hour two-way traffic flows on the R152 generated by adjacent proposed development during the evening peak hour could be of the order of up to 120 p.c.u.'s. The equivalent additional two-way traffic flow on the R150 west of Duleek could be of the order of up to 96 p.c.u.'s. Meath County Council have indicated that these developments include a proposed power station at Carranstown, a proposed Agri Park at Duleek and a proposed Industrial/Warehouse Technology Park at Duleek.

12.9 The predicted 2004 two-way peak hour traffic flows on the R152 were determined by factoring the recorded existing (2000) traffic flows to 2004 levels using an assumed annual average growth rate of 5%, reducing this volume by 30% on the basis of the expected completion of the M1 Northern Motorway and increasing this volume to account for the additional traffic flows generated by adjacent proposed development identified by Meath County Council.

13.0 LIKELY EFFECTS OF THIS PROPOSAL WHEN OPERATIONAL

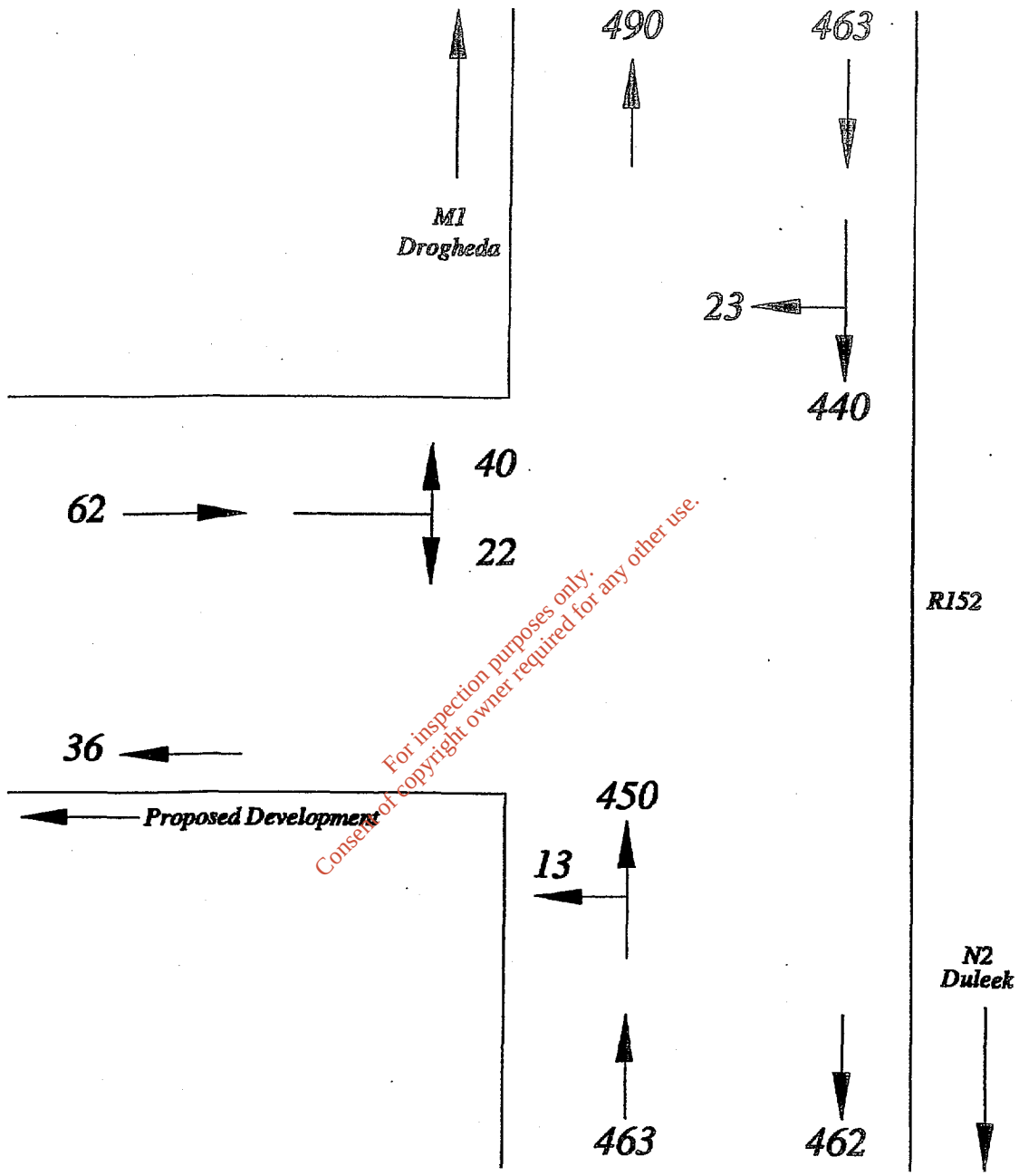
13.1 The predicted Plan Year (2004) peak hour two-way traffic flows on the surrounding local road network with and without the proposed development are as follows:

Route	Predicted 2004 Two-Way Peak Hour Traffic Flows (p.c.u.'s)	
	Without Development	*With Development when operational*
R152, north of Development	890	953 (+7.1%)
R152, south of Development	890	925 (+3.9%)
R150, west of Duleek	340	363 (+6.8%)
M1, north of Drogheda South Interchange	2,350	2,390 (+1.7%)
N2	650	670 (+3.0%)

13.2 During the Plan Year (2004) the proposed development when operational would result in an increase of up to 7.1% or 63 p.c.u.'s in two-way peak hour traffic flows on the R152, north of the proposed development and up to 3.9% or 35 p.c.u.'s on the R152, south of the proposed development. Peak hour two-way h.c.v.'s on the R152 north of the development would be up to 12 h.c.v.'s.

13.3 The proposed development would increase two-way peak hour traffic flows on the R150, west of Duleek, during the Plan Year (2004) by 6.8% or 23 p.c.u.'s. Peak hour two-way h.c.v.'s on the R150 would be 4 h.c.v.'s. The proposed development would result in an increase of 1.7%, or 40 p.c.u.'s, on the M1, north of the proposed Drogheda South Interchange and an increase of 3.0% or 20 p.c.u.'s on the N2.

13.4 The predicted Plan Year (2004) peak hour traffic flows on the R152 at the entrance to the proposed development with the development in place are shown on Figure 2.



PREDICTED PLAN YEAR (2004) PEAK HOUR TRAFFIC FLOWS
(P.C.U.'s) WITH THE PROPOSED DEVELOPMENT

FIGURE

13.5 During the Plan Year (2004) the R152 would operate within capacity at LOS D and possibly within capacity at LOS C depending on the percentage sight distance greater than 460 metres along the existing route both with and without the proposed development in place. The R150, west of Duleek would operate within capacity and LOS C both with and without the proposed development in place.

13.6 The proposed 2+2 lane M1 Northern Motorway has a design capacity of the order of 4,000 p.c.u.'s/hour two-way at LOS C and 4,600 p.c.u.'s/hour two-way at LOS D based on the design capacities set down in the E.R.U. design guidelines RT180. The existing N2 route has a design capacity in the range 800 to 1,350 p.c.u.'s/hour at LOS C and 1,450 to 1,700 at LOS D. Accordingly, both the M1 and N2 would operate within capacity at LOS C both with and without the proposed development in place.

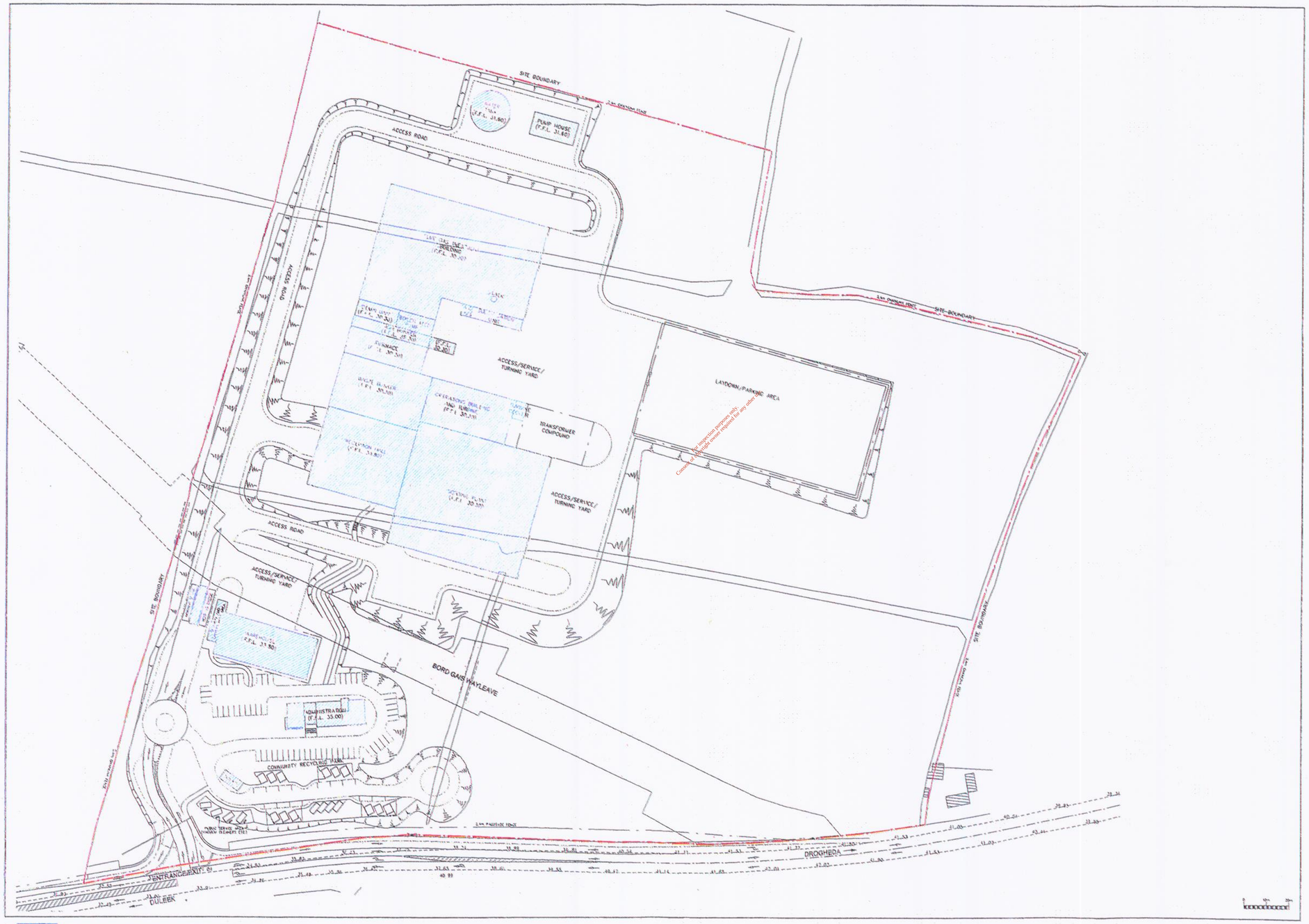
14.0 AVOIDANCE, REMEDIAL OR REDUCTIVE MEASURES

14.1 On the basis of the recommendations and warrants provided by the ERU in their design guidelines RT181 there are no requirements for speed change lanes on the R152 at the proposed priority controlled entrance to the proposed development. However, in order to enable vehicles entering and leaving the proposed development to adjust speed without interfering with other traffic, a dedicated climbing lane, deceleration lane and right-turn lane is proposed on the R152 at the priority controlled entrance to the proposed development.

14.2 The layout of the proposed entrance junction is shown at reduced 1:500 scale on Figure 3. The proposed entrance junction layout includes the following:

- A climbing lane incorporating a 3.0 metres wide lane for northbound traffic, immediately north of the proposed entrance along its site boundary;
- A deceleration lane of 150 metres in length incorporating a taper length of 50 metres and a 3.0 metres wide lane of 100 metres in length;
- A right-turn lane of 180 metres in length incorporating a 3.0 metres wide lane;
- 15.0 metres turning radii at the proposed entrance;
- A 2.0 metres wide footpath on the north side of the R152 locally at the proposed development; and
- A pedestrian refuge island at the proposed entrance.

14.3 The provision of the proposed climbing lane, speed change lanes and footpath would be achieved by widening the existing R152 road reservation on its north side along the boundary of the proposed development site and the adjoining site, south of the development site, where the necessary lands would be acquired by the developers.



PROPOSED ENTRANCE LAYOUT *FIGURE 3*

14.4 The design of the proposed entrance junction is in accordance with the minimum sight triangle dimensions at new priority controlled intersections required by the E.R.U. in RT181 for a rural regional undivided road with a 100 km/hour design speed (RRU100). The minimum sight distance required proposed new entrance along the R152 for an RRU100 road classification is 280 metres.

14.5 The proposed new entrance junction on the R152 was analysed for the predicted Plan Year (2004) peak hour traffic flows with the proposed development in place using the computer software programme PICADY for priority controlled junctions. Details of the programme are given in section 3.0. Full details of the analysis are provided in Appendix C. The results are summarised as follows:

Proposed R152/Development Entrance Junction

2004 Peak Hour with Development	The junction would operate within capacity with a highest Ratio of Flow to Capacity (RFC) of 0.08. Highest average delays per vehicle would be 9 seconds. No significant queuing would occur for turning vehicles.

14.6 The internal entrance road layout at the proposed development provides for up to three inbound lanes on the approach to the weighbridge. This will facilitate a queue length of up to 12 h.c.v.'s on the inbound approach to the weighbridge within the proposed site and without restricting access to the bring bank or administration building. Maximum inbound queues at the weighbridge are expected to be of the order of up to six h.c.v.'s during peak activity.

15.0 CONSTRUCTION TRAFFIC

15.1 The expected construction period is 24 months with a target completion date of 2004.

15.2 Peak construction employment on-site is expected to be of the order of up to 300 personnel. Assuming that all employees travel to and from work by vehicle at an average occupancy rate of 1.2 persons per vehicle it is expected that the total two-way peak traffic flows generated by construction employees would be of the order of 250 p.c.u.'s. This would result in an increase of 160 p.c.u.'s in two-way traffic flows on the R152 during the peak construction traffic hour assuming the same 64:36 north:south distribution on the R152 as traffic generated by operational employees. During peak construction it is envisaged that the majority of construction employees will work from 7.00 a.m. to 7.00 p.m. Accordingly, the predicted two-way peak traffic flows generated by construction employees will occur before the morning peak hour and after the evening peak hour.

15.3 Two-way peak construction deliveries are expected to be of the order of 100 h.c.v.'s per day, or 300 p.c.u.'s, with a total two-way peak hour volume of 42 p.c.u.'s. This would result in an increase of up to 29 p.c.u.'s in two-way peak hour traffic flows on the R152 during peak construction assuming a 70:30 north:south distribution on the R152 for peak construction deliveries.

This represents an increase in the peak hourly traffic on the R152 of 189 p.c.u.'s (21%) giving a total plan year predicted flow of 1079 p.c.u.'s. This flow is within the capacity of the road at LOSD.

15.4 Hardstand parking areas will be provided within the site for all construction parking. All necessary construction warning signs and vehicle wheel wash facilities will be provided prior to the commencement of construction. Site offices and compounds will be located within the site confines.

16.0 ADJACENT PROPOSED DEVELOPMENT

16.1 A planning submission for a proposed power station at Carranstown, County Meath is currently being considered by An Bord Pleanala.

16.2 The site for the proposed power station is located south of the R152 immediately north and adjacent to the proposed development. The entrance layout proposed for the proposed power station is shown on Figure 3 and does not conflict with the proposed development entrance layout.

16.3 A review of the Traffic Impact Assessment for the proposed power station indicates the following:

- Traffic flows generated during the operational period are not considered to be significant;
- Two-way traffic flows to and from the site generated during peak construction activity are expected to be up to 506 p.c.u.'s during the peak construction generation hour from 7.00 to 8.00 a.m.

16.4 Should the peak construction activity periods and peak generation hours of both the proposed development and the proposed power station coincide it would result in an increase in two-way traffic flows of the order of 378 p.c.u.'s on the R152 during the peak construction generation hour. However, these peak construction activity periods are not expected to coincide. The peak construction generation hour is not expected to coincide with either the morning or evening peak hours on the surrounding local road network.

This represents an increase of 42% over the predicted 2004 flows. The total traffic would in that case be 1268 p.c.u.'s, which is within the capacity of the road at LOSD.

In the unlikely event that the peak construction activity for both developments should coincide, Indaver Ireland will implement a range of mitigation measures. These will include the provision of buses from population centres for site workers, provision of cycle parking and showering facilities for locally based workers, restriction of h.c.v. deliveries during peak hours, and staggering the arrival and departure times of site workers.

16.5 Meath County Council have also recently granted planning permission for a proposed Industrial/Warehouse/Technology Park and outline planning permission for a proposed Agri Park at Duleek.

16.6 The total additional peak hour traffic flows generated by these proposed developments on the local road network are detailed in section 12.8.

16.7 It is envisaged that construction of both the Industrial/Warehouse/Technology Park and Agri Park will be completed prior to the peak construction period of this proposed development.

APPENDIX A

RECORDED 2000 TRAFFIC FLOWS

TIME PERIOD	R152 at Proposed Site				R150 West of Duleek		
	Northbound PCUs	Southbound PCUs	Total PCUs		Eastbound PCUs	Westbound PCUs	Total PCUs
07:00 - 07:15	69	121	190		39	26	65
07:15 - 07:30	62	124	186		41	27	68
07:30 - 07:45	72	99	171		37	26	63
07:45 - 08:00	114	129	243		42	33	75
08:00 - 08:15	75	116	191		38	29	67
08:15 - 08:30	77	107	184		34	27	61
08:30- 08:45	92	89	181		31	30	61
08:45 - 09:00	78	74	152		27	29	56
16:30 - 16:45	90	68	158		32	21	53
16:45 - 17:00	92	106	198		34	29	63
17:00 - 17:15	120	115	235		37	31	68
17:15 - 17:30	109	121	230		32	35	67
17:30 - 17:45	117	114	231		41	38	79
17:45 - 18:00	109	97	206		33	31	64
18:00 - 18:15	105	115	220		28	36	64
18:15 - 18:30	124	87	211		37	29	66
Total Morning Peak Hour (07:45 - 08:45):	358	441	799		145	119	264
Total Evening Peak Hour (17:00 - 18:00):	455	447	902		143	135	278

APPENDIX B

DISTRIBUTION OF URBAN CENTRES IN NORTHEAST REGION

Table 1

Towns in North East	Population	Estimated percentage of total waste
Drogheda	25,282	20.8%
Dundalk	30,195	24.8%
Navan	12,810	10.5%
Cavan	5,623	4.6%
Monaghan	5,842	4.8%
Duleek	1,731	1.4%
Carranstown	200	0.2%
Bailieborough	1,529	1.3%
Kingscourt	1,190	1.0%
Coothill	1,822	1.5%
Belturbet	1,248	1.0%
Ardee	3,791	3.1%
Ashbourne	4,999	4.1%
Laytown	3,678	3.0%
Kells	3,542	2.9%
Dunboyne	3,080	2.5%
Dunshaughlin	2,139	1.8%
Trim	4,405	3.6%
Carrickmacross	3,617	3.0%
Castleblaney	2,808	2.3%
Clones	2,170	1.8%

APPENDIX C

PICADY JUNCTION ANALYSIS

TRANSPORT RESEARCH LABORATORY

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

VPICADY/4 ANALYSIS PROGRAM
RELEASE 2.0 (DEC 1996)

FOR SALES AND DISTRIBUTION INFORMATION,
PROGRAM ADVICE AND MAINTENANCE CONTACT:
TRL LTD
TEL: CROWTHORNE (01344) 770018, FAX: 770864

RUN TITLE
****
R152/Proposed Entrance 2004 Peak Hour

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

MAJOR ROAD (ARM C) ---------- MAJOR ROAD (ARM A)

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MINOR ROAD (ARM B)

ARM A IS R152 SOUTH
ARM B IS PROPOSED ENTRANCE
ARM C IS R152 NORTH

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

.GEOMETRIC DATA

DATA ITEM		MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	10.50 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	3.00 M.
- VISIBILITY	(VC-B)	250.0 M.
- BLOCKS TRAFFIC		NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	250.0 M.
- VISIBILITY TO RIGHT	(VB-A)	250.0 M.
- LANE 1 WIDTH	(WB-C)	3.50 M.
- LANE 2 WIDTH	(WB-A)	0.00 M.
- LENGTH OF FLARED SECTION		15 VEHS

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 17.00 AND ENDS 18.00

LENGTH OF TIME PERIOD - 60 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE INPUT DIRECTLY.

TIME	FROM/TO	TURNING PROPORTIONS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
17.00 - 17.15	ARM A	0.000 (0.0)	0.100 (32.0)	0.900 (12.0)
	ARM B	0.400 (32.0)	0.000 (0.0)	0.600 (32.0)
	ARM C	0.900 (12.0)	0.100 (32.0)	0.000 (0.0)
17.15 - 17.30	ARM A	0.000 (0.0)	0.100 (32.0)	0.900 (12.0)
	ARM B	0.400 (32.0)	0.000 (0.0)	0.600 (32.0)
	ARM C	0.900 (12.0)	0.100 (32.0)	0.000 (0.0)
17.30 - 17.45	ARM A	0.000 (0.0)	0.100 (32.0)	0.900 (12.0)
	ARM B	0.400 (32.0)	0.000 (0.0)	0.600 (32.0)
	ARM C	0.900 (12.0)	0.100 (32.0)	0.000 (0.0)

TIME	FROM/TO	TURNING PROPORTIONS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
17.45 - 18.00	ARM A	0.000	0.100	0.900

		(0.0)	(32.0)	(12.0)
	ARM B	0.400	0.000	0.600
		(32.0)	(0.0)	(32.0)
	ARM C	0.900	0.100	0.000
		(12.0)	(32.0)	(0.0)

THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS

THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.00-17.15								
B-AC	0.63	8.01	0.079		0.0	0.1	1.2	
C-A	5.80							
C-B	0.65	8.57	0.075		0.0	0.1	1.2	
A-B	0.62							
A-C	5.56							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.129	0.012	0.018	0.005	0.007
C-B	0.113	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.15-17.30								
B-AC	0.63	8.01	0.079		0.1	0.1	1.3	
C-A	5.80							
C-B	0.65	8.57	0.075		0.1	0.1	1.2	
A-B	0.62							
A-C	5.56							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)

	B-AC	0.128	0.012	0.018	0.005	0.007
	C-B	0.113	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.30-17.45								
B-AC	0.63	8.01	0.079		0.1	0.1	1.3	
C-A	5.80							
C-B	0.65	8.57	0.075		0.1	0.1	1.2	
A-B	0.62							
A-C	5.56							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.128	0.012	0.018	0.005	0.007
C-B	0.113	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
B-AC	1.75	7.40	0.236		0.1	0.3	4.4	
C-A	7.45							
C-B	0.83	8.15	0.102		0.1	0.1	1.6	
A-B	0.82							
A-C	7.36							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.114	0.015	0.018	0.005	0.006
C-B	0.108	0.012		0.009	

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES

	IN QUEUE
17.15	0.1
17.30	0.1
17.45	0.1
18.00	0.3

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.15	0.1
17.30	0.1
17.45	0.1
18.00	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	54.6	54.6	8.1	0.15	8.1	0.15
C-A	373.0	373.0				
C-B	41.4	41.4	5.2	0.13	5.2	0.13
A-B	40.1	40.1				
A-C	360.7	360.7				
ALL	869.8	869.8	13.4	0.02	13.4	0.02

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .

* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.

* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB