

EIS APPENDICES

WASTE LICENCE APPPLICATION, MULLAGHCRONE, DONORE, CO. MEATH.





APPENDIX 5.1 Ecology Bibliography

Consent of copyright owner required for any other use.

Appendix 5.1 Bibliography

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APPENDIX 5.2 Criteria for assessing Site Evaluation

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APPENDIX 5.2 CRITERIA FOR ASSESSING SITE EVALUATION

RATING QUALIFYING CRITERIA

International Importance

- 'European Site' including Special Area of Conservation (SAC), Sile of Community Importance
- (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
- Proposed Special Protection Area (pSPA).
- Site that fulfills the criteria for designation as a 'European Site' (see Annex III of the Habitats
- Directive, as amended).
- Features essential to maintaining the coherence of the Natura 2000 Network.4
- Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
- Resident or regularly occurring populations (assessed to be important at the national level)s of
- the following:
- Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
- and/or
- Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
- Ramsar Site (Convention on Wellands of International Importance Especially Waterfowl
- Habitat 1971).
- World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
- Biosphere Reserve (UNESCO Man & The Biosphere Programme).
- Site hosting significant species populations under the Bonn Convention (Convention on the
- Conservation of Migratory Species of Wild Animals, 1979).
- Site hosting significant populations under the Berne Convention (Convention on the
- Conservation of European Wildlife and Natural Habitats, 1979).
- Biogenetic Reserve under the Council of Europe European Diploma Site under the Council of Europe.
- Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 988).6

National Importance

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.

 Refuge for Fauna and Flora protected under the Wildlife Acts.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA);
- Statutory Nature Reserve; Refuge for Fauna and Flora protected under the WildlifeAct; and/or
- a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level)7 of
- the following:
- Species protected under the Wildlife Acts; and/or
- Species listed on the relevant Red Data list.
- Site containing 'viable areas of the habitat types listed in Annex I of the Habitats Directive.

County Importance

- Area of Special Amenity.9
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level)of the following:
- Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
- Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
- Species protected under the Wildlife Acts; and/or
- Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive
- that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas of semi-natural habitats or natural
- heritage features identified in the National or Local BAP,11 if this has been prepared.



- Sites containing semi-natural habitat types with high biodiversity in a county context and a
- high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (Higher Value)

- Locally important populations of priority species or habitats or natural heritage features
- identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level)12 of
- the following:
- Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
- Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
- Species protected under the Wildlife Acts; and/or
- Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high
- degree of naturalness, or populations of species that are uncommon in the locality;
- Sites or features containing common or lower value habitats, including naturalised species that
- are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (Lower Value)

- Sites containing small areas of semi-natural habitat that are of some local importance for
- consent of copyright owner required for any office Sites or features containing non-native species that are of some importance in maintaining
- habitat links.



Roadstone Ltd. Mullaghcrone Quarry Waste Licence Application

Appropriate Assessment - Screening

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TOBIN CONSULTING ENGINEERS

















Appropriate Assessment - Screening

PROJECT: Mullaghcrone Quarry Waste Licence Application

CLIENT:

Read stone Ltd

Read stone Ltd

Read stone Ltd

Read stone Ltd

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COMPANY: TOBIN Consulting Engineers

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Blanchardstown Corporate Park

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DOCUMENT AMENDMENT RECORD

Client: Roadstone Ltd

Project: Mullaghcrone Quarry Waste Licence Application

Title: Appropriate Assessment - Screening



PROJECT NUMBER: 6222				DOCUMENT REF: Mullaghcrone AA					
В	FINAL	RM	22/04/14	JD	22/04/14	DG	22/04/1 4		
А	DRAFT	RM	28/03/14	JD	28/03/14	DG	31/03/1 4		
Revision	Description & Rationale	Originated	Date	Checked	Date	Authorised	Date		
	TOBIN Consulting Engineers								



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INTRODUCTION

This report details an Appropriate Assessment Screening Report for a proposed waste licence facility at Roadstone's Mullaghcrone Quarry, Donore Road, Drogehda, Co. Meath site. The screening for Appropriate Assessment is required to comply with Article 12 of the waste Management (Licensing) Regulations as outlined in the EPA's letter of 28 February 2014 - copy attached.

The report considers potential adverse effects alone and in-combination with other projects on relevant European Sites (Special Areas for Conservation and Special Protection Areas for Birds) which require consideration.

This report determines if effects (of waste management activities) are or could potentially affect European sites qualifying interests and their "favourable conservation status". The proposed Waste Licence area has acted as a waste permitted area for over 10 years.

The report was drafted by an experienced trained ecologist (>18 years experience) from TOBIN Consulting Engineers with input from hydro-geologists regarding potential hydrological pathways

to European sites.

1.1 LEGISLATIVE CONTEXT

The Appropriate Assessment process (AA) is fan assessment of the potential adverse or negative effects of a plan or project, in combination with other plans or projects, on a European Site (Natura 2000 site). These sites consist of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) and provide for the protection and long-term survival of Europe's most valuable and threatened species and habitats. Although not specifically required, it would be considered best practice to include Ramsar sites (classified under the Ramsar Convention 1971) in the assessment process.

The requirement of AA is outlined in Article 6(3) and 6(4) of the European Union Habitats Directive.

Article 6(3) of the Habitats Directive requires that:-

"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."



And Article 6(4) of the Habitats Directive requires that:-

"If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted."

1.2 GUIDANCE

This report has been carried out using the following guidance:

- Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government DEHLG (2009);
- EPA Ireland guidelines¹;
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg (EC 2000);
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg (EC 2001); and
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. Office for Official Publications of the European Communities, Luxembourg (EC 2007).

2 METHODOLOGY

There are four main stages in the AA process; the requirements for each depending on likely effects to Natura 2000 sites (SAC/ SPA).

Stage 1 –Screening - / Test of Significance - the process which identifies the likely impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant, if there is uncertainty regarding effects or no effects are likely; If no effects are determined based on reasoned

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¹ http://www.epa.ie/downloads/forms/lic/wwda



consideration and best scientific knowledge than the AA process is finalised at this stage subject to review from the consenting authority.

Stage Two: Appropriate Assessment - the consideration of the impact of the project or plan on the integrity of the Natura 2000 site, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts; and mitigation to rule out these impacts is required.

The Appropriate Assessment is informed by a Natura Impact Statement. This stage is required where uncertainty of effect or a potential impact has been defined which requires further procedures/ mitigation to remove uncertainty or a defined impact.

Stage Three: Assessment of Alternative Solutions – the process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site.

Stage Four: Assessment Where Adverse Impacts Remain - an assessment of compensatory measures where, in the light of an assessment of imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plants hould proceed.



3 SCREENING ASSESSMENT

Ecological impact assessment of potential impacts on Natura 2000 sites is conducted utilising a standard SOURCE-RECEPTOR-PATHWAY model, where, in order for an impact to be established all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism is sufficient to conclude that a potential effect is not of any relevance or significance. The primary information source for informing the screening assessment is the SLR Consulting Hydrogeological Assessment of the existing area (May 2009) and the Environmental Impact Statement (March 2011) submitted for the waste licence application at Mullaghcrone Quarry, Co Meath.

Source – No impact source is determined as the material on site is / will be inert stones and soil and building waste located at a significant distance from European sites or stream drainage features which could link this material to European sites. The site has acted as a waste permit area for over 10 years without impacting on the groundwater quality or surrounding environment. No groundwater de-watering occurs at the site. There are no surface water streams that connect the proposed Mullaghcrone Waste Licence application area to the River Boyne and Blackwater SAC/SPA (which is the only Natura 2000 site in the vicinity of the proposed application area). The proposed Mullaghcrone waste licence application area is not located within the surface water catchment of the River Boyne and Blackwater SAC/SPA. The site is located within the water catchment of the River Nanny, which is not as SAC/SPA.

Pathway – No pathway is identified. No significant surface water features exist on the site. Surface water that accumulates in the quarry is stored on site for the purpose of dust suppression. Groundwater flow is towards the Irish Cement Platin Quarry area to the southeast of the proposed waste licence area. All Platin Quarry groundwater is subject to IPPC licensing requirements under Reg No. P0030-04. The final discharge is to the River Nanny. The River Nanny eventually flows in the Irish Sea at Laytown, Co Meath, and discharges into the River Nanny Estuary and Shore SPA is located >11km downgradient of the proposed facility. The River Nanny Estuary and Shore SPA is designated for wintering birds.

Receptor – No linkages are identified to any European sites. All European Sites in the wider region were considered including potentially sensitive qualifying interests e.g. aquatic species (such as Atlantic Salmon) sensitive to water pollution. The River Boyne and Blackwater SAC / SPA exists to the north of the site and no *hydrological* link exists to the application area. The Duleek Commons proposed National Heritage Areas (non European site) was surveyed by the author and is currently not measurably affected by any quarrying activities such as dewatering. Given the qualifying interest of the River Nanny Estuary and Shore SPA (wintering birds),



there are no measureable adverse impacts immediately downgradient of the proposed facility; therefore, there are not potential impacts on the River Nanny Estuary and Shore SPA.

Based on the source-receptor-pathway model and the screening for appropriate assessment exercise, it is considered certain that no potential effects (alone and in-combination) will arise to Natura 2000 sites from any existing or proposed waste management activities (inert materials) at Mullaghcrone Quarry, Co Meath.

CONCLUSION 4

It is considered that no significant adverse effects (including alone and in-combination) will arise to Natura 2000 sites as a result the existing or proposed waste management activities (inert materials) at Mullaghcrone Quarry, Co Meath.

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Signed off by:

Mr. Roger Macnaughton

Senior Ecologist

APPENDIX 7.1 Groundwater monitoring results

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TEST REPORT

Client: Roadstone Wood Ltd

Fortunestown

Tallaght Dublin 24

FTAO: Colin Doyle

BHP Ref. No.: 96660

Order No.:

Date Received: 26/01/11 Date Completed: 09/02/11

Test Specification: Nil

Item :See below

Analysing Testing Consulting Calibrating



BHP New Road Thomondgate Limerick Ireland

Tel +353 61 455399 Fax + 353 61 455447 E Mail bhpcem2@bhp.ie

Test	Client Reference	Units	Results	Standard Reference	
	Borehole at Mullaghcrone (BH3)	use.			
рН	Borehole at Mullagherone (BH3) Eoringetian purases and for a consent of convince treduced for a convince treduc	other	7.15		
Electrical Conductivity	AH. 0	11		APHA-4500-H ⁺ -B	
S d'anna	as of for	μScm	466	APHA - 2510 - B	
Sodium	oposited .	mg/l	7.12	APHA - 3120 - B	
Potassium	2 Dintedir	mg/l	0.98	APHA - 3120 - B	
Calcium	citotilet.	mg/I	32.4	APHA - 3120 - B	
Magnesium	A SECONAL	mg/l	5.62	APHA - 3120 - B	
Chloride	gor it ide	mg/l	34.7	APHA - 4110 - B	
Sulphate (as SO ₄)	COBY	mg/l	54.1	APHA - 4110 - B	
Total Alkalinity (as CaCO ₃)	a di	mg/l	114	APHA - 2320 -B	
OrthoPhosphate (PO ₄)	a Oliseti	mg/l	0.03	APHA - 4110 - B	
Nitrate (as NO ₃)	C	mg/l	12.4	APHA - 4110 - B	
Nitrite (as NO ₂)		mg/l	< 0.05	APHA - 4110 - B	
Total Coliforms		cfu/100mls	4	APHA - 9223 - B	
Faecal Coliforms		cfu/100mls	None Found	APHA - 9223 - B	
Dissolved Oxygen		% O ₂	76.3	APHA - 4500-O-G	
Ammoniacal Nitrogen (as NH ₄ -N)		mg/l	0.08	APHA -4500- NH ₃ -D	

Additional information:

All methods are from Standard Methods for the Examination of Water and Wastewater 20th Edition.

For and on behalf of BHP laboratories :

Pat O'Sullivan

Issue Date: 09/02/2011

TEST REPORT

Client: Roadstone Wood Ltd

Fortunestown

Tallaght Dublin 24

FTAO: Colin Doyle

BHP Ref. No.: 96660

Order No.:

Date Received: 26/01/11 Date Completed: 09/02/11

Test Specification: Nil

Item :See below

Analysing Testing Consulting Calibrating

3412

BHP New Road Thomondgate Limerick Ireland

Tel +353 61 455399 Fax + 353 61 455447 E Mail bhpcem2@bhp.ie

Test	Client Reference	Units	Results	Standard Reference
	Borehole at Mullaghcrone (BH3)	se.		
		theil		
Iron	· • ·	mg/l	0.005	APHA - 3120 - E
Manganese	Odi or	mg/l	0.006	APHA - 3120 - E
Total Phosphorus (as P)	De red	mg/l	0.04	APHA - 4500 - F
Total Petroleum Hydrocarbons	Dut Edin		1	
>C ₆ -C ₄₀	ritor ner l'	mg/l	< 0.001	GC-FID
>C ₆ -C ₈	15 PECOM	mg/l	< 0.001	GC-FID
>C ₈ -C ₁₀	to Tright	mg/l	< 0.001	GC-FID
>C ₁₀ -C ₁₂	COS	mg/l	< 0.001	GC-FID
>C ₁₂ -C ₁₆	ator	mg/l	< 0.001	GC-FID
>C ₁₆ -C ₂₁	- Onser	mg/l	< 0.001	GC-FID
>C ₂₁ -C ₄₀	Borehole at Mullaghcrone (BH3) Borehole at Mullaghcrone (BH3) For inspection purposes only in the control of convenience to the convenience of t	mg/l	<0.001	GC-FID
Petroleum Range Organics		mg/l	<0.001	GC-FID
Diesel Range Organics		mg/l	< 0.001	GC-FID
BTEX Compounds		mg/l	< 0.001	GC-FID
Water Level (from top of casing)		M	>50	ISO 5667 - 11

Additional information:

All methods are from Standard Methods for the Examination of Water and Wastewater 20th Edition.

For and on behalf of BHP laboratories :

Pat O'Sullivan

Issue Date: 09/02/2011

TEST REPORT

Client: Roadstone Wood Ltd

Fortunestown

Tallaght Dublin 24

FTAO: Colin Doyle

BHP Ref. No.: 96660

Order No.:

Date Received: 26/01/11 Date Completed: 09/02/11

Test Specification: Nil

Item :See below

Analysing Testing Consulting Calibrating



BHP New Road Thomondgate Limerick Ireland

Tel +353 61 455399 Fax + 353 61 455447 E Mail bhpcem2@bhp.ie

Test	Client Reference	Units	Results	Standard Reference	
	Borehole at Mullaghcrone (BH3)	use.			
Cadmium	Borehole at Mullaghcrone (BH3) For inspection purposes only a service of the contribution of the contribu	other mg/l	<0.001	APHA - 312() - B	
Chromium	Off of S	mg/l	0.002	APHA - 3120 - B	
Copper	os edito	mg/l	< 0.001	APHA - 3120 - B	
Lead	Dury chile	mg/l	< 0.001	APHA - 3120 - B	
Mercury	ation residen	mg/l	< 0.0002	APHA - 3120 - B	
Nickel	or Second	mg/l	0.001	APHA - 3120 - B	
Zinc	gor it glit	mg/l	< 0.001	APHA - 3120 - B	
Arsenic	, cold	mg/l	< 0.001	APHA - 3120 - B	
Barium	at of	mg/l	0.006	APHA - 3120 - B	
Boron	a Otiset	mg/l	0.012	APHA - 3120 - B	
Selenium	C	mg/l	< 0.001	APHA - 3120 - B	
Silver		mg/l	< 0.001	APHA - 3120 - B	
Fluoride	11	mg/l	0.16	APHA - 4110 - B	
Total Cyanide		mg/l	< 0.001	APHA - 4500-CN - I	
Total Organic Carbon	1.00	mg/l	4.6	APHA - 5310 - C	
Phenol		mg/l	0.007	APHA- 5530- D	

Additional information:

All methods are from Standard Methods for the Examination of Water and Wastewater 20th Edition.

For and on behalf of BHP laboratories :

Pat O'Sullivan

Issue Date: 09/02/2011



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Customer

Elaine Higgins

Irish Cement

Platin Works

Drogheda

Co Louth

Ireland

Customer PO Customer Ref 15/66421

GW1 Bi-annual 01/12/10

Lab Report Ref. No.

Date of Receipt

Date Testing Commenced

Received or Collected

Condition on Receipt

Date of Report

Sample Type

0090/507/04

02/12/2010

02/12/2010

Collected by Euro

Acceptable

15/12/2010

Groundwater

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Tech	on builder out of and	Result	Units	Acc.	
Ammonia (Ground Water)	114	Colorimetry		0.011	mg/L as N	UKAS	
Bicarbonate	102	Colorimetry		312.29	mg/L HCO3		
Cadmium (Ground Water)	177	ICPMS	A4.	<0.09	ug/L	UKAS	
Calcium (Ground water)	184	ICPMS	Oil) air.	103,80			
Chloride (Ground Water)	100	Colorimetry	-0ses ed te	29.24	mg/L	UKAS	
Cobalt (Ground Water)	177	ICPMS	OUT QUITE	0.04	ug/L	UKAS	
Copper (Ground Water)	177	ICPMS	on of tee	0.6	ug/L.	UKAS	
Hardness Total (Ground Water)	111	Colorimetry	WILL	296	mg/L CaCO3	UKAS	
Iron (Ground Water)	177	ICPMS TIST	O	10.4	ug/L	UKAS	
Lead (Ground Water)	177	ICPMS FOR THE		0.1	ug/L	UKAS	
Manganese (Ground Water)	177	ICPMS SON		2.2	ug/L	UKAS	
Nickel (Ground Water)	177	ICPMS		0.2	ug/L	UKAS	
Nitrate (Ground Water)	103	Colorimetry		4.750	mg/L as N	UKAS	
Nitrite (Ground Water)	118	Colorimetry		<0.002	mg/L as N	UKAS	
Potassium (Ground water)	184	ICPMS		5.33	mg/L	UKAS	
Sodium (Ground water)	184	ICPMS		16.85	mg/L	UKAS	
Jiphate (Ground Water)	119	Colorimetry		24.68	mg/L	UKAS	
Tin	177	ICPMS		<2.8	ug/L		

Signed : ___ LuQu

Katherine McQuillan - Technical Manager

Acc.: Accredited Parameters by ISO 17025:2005

Date : 15/12/10

All organic results are analysed as received and all results are corrected for dry weight at 104 C Results shall not be reproduced, except in full, without the approval of EURO environmental services Results contained in this report relate only to the samples tested

Page 1 of 1



services

Environmental Science & Management Water, Soil & Air Testing

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Customer Elaine Higgins

Irish Cement **Platin Works**

Drogheda Co Louth

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GW1 Bi-annual 01/12/10

Ireland

Customer PO

Customer Ref

Lab Report Ref. No.

Date of Receipt

Date Testing Commenced

Received or Collected

Condition on Receipt

Date of Report

Sample Type

0090/507/04

02/12/2010

02/12/2010

Collected by Euro

Acceptable

15/12/2010

Groundwater

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique Colorimetry ICPMS ICP	Result	Units	Acc.
Ammonia (Ground Water)	114	Colorimetry	√S [©] . 0.011	mg/L as N	UKAS
Bicarbonate	102	Colorimetry	mer 312.29		
Cadmium (Ground Water)	177	ICPMS	<0,09	ug/L	UKAS
Calcium (Ground water)	184	ICPMS	Off of at 103.80	mg/L	
Chloride (Ground Water)	100	Colorimetry	29.24	mg/L	UKAS
Cobalt (Ground Water)	177	ICPMS DUTY	0.04	ug/L	UKAS
Copper (Ground Water)	177	ICPMS GOT OF TO	0.6	ug/L	UKAS
Hardness Total (Ground Water)	111	Colorimetry Sociality	296	mg/L CaCO3	UKAS
Iron (Ground Water)	177	ICPMS HISTAL	10.4	ug/L	UKAS
Lead (Ground Water)	177	ICPMS COLUMN	0.1	ug/L	UKAS
Manganese (Ground Water)	177	ICPMS (CO)	2.2	ug/L	UKAS
Nickel (Ground Water)	177	ICPMS	0.2	ug/L	UKAS
Nitrate (Ground Water)	103	Colorimetry	4.750	mg/L as N	UKAS
Nitrite (Ground Water)	118	Colorimetry	<0.002	mg/L as N	UKAS
Potassium (Ground water)	184	ICPMS	5.33	mg/L	UKAS
Sodium (Ground water)	184	ICPMS	16.85	mg/L	UKAS
Jiphate (Ground Water)	119	Colorimetry	24.68	mg/L	UKAS
Tin	177	ICPMS	<2.8	ug/L	

Signed: ___ LuQu

Katherine McQuillan - Technical Manager

Acc.: Accredited Parameters by ISO 17025:2005

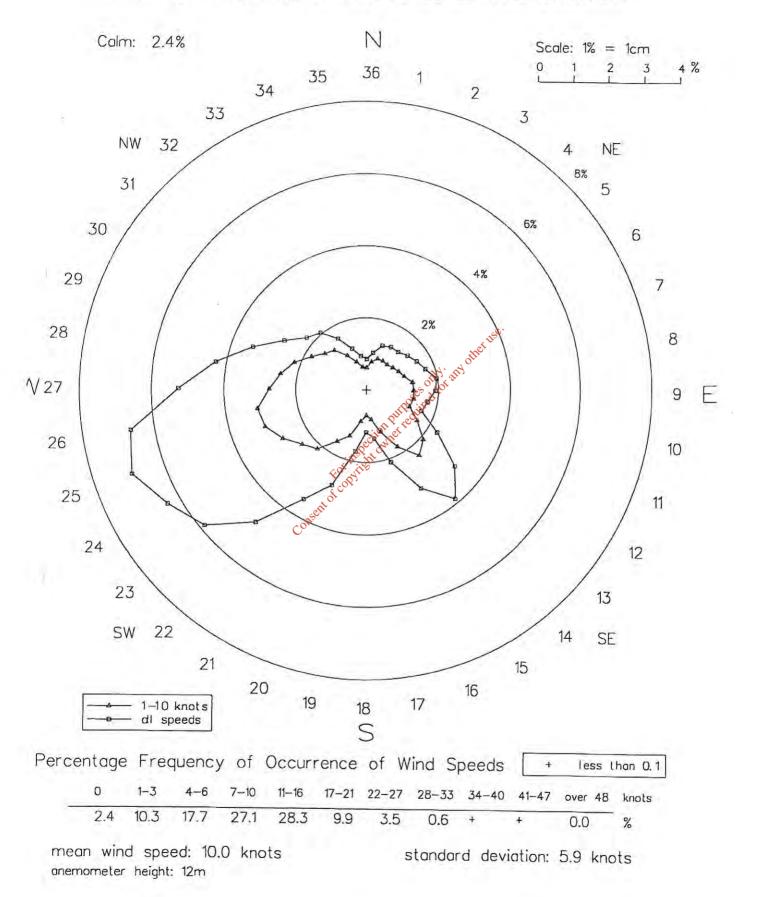
Date : 15/12/10

All organic results are analysed as received and all results are corrected for dry weight at 104 C Results shall not be reproduced, except in full, without the approval of EURO environmental services Results contained in this report relate only to the samples tested

APPENDIX 8.1 Dublin Airport Wind Rose Consent of copyright owner required for any other use.

DUBLIN AIRPORT 1970-1999

Percentage Frequency of Occurrence of Wind Directions



Meteorological Service, Glasnevin Hill, Dublin 9.

APPENDIX 11.1 Archaeological References

Consent of copyright owner required for any other use.

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APPENDIX 11.2 RMP sites Consent of copyright owner required for any other use.

Appendix 11.2 Sites in the study area listed in the Record of Monuments and Places listed in the Sites and Monuments Database

ME027-002--- Cruicerath Earthwork

Described in the Archaeological Survey of County Meath as earthwork situated on rock outcrop. Quarry to the west. High embankment with berm at base on east (diameter 29m northwest-south-east. Possible entrance at southeast. Moore 1987, No. 1132.

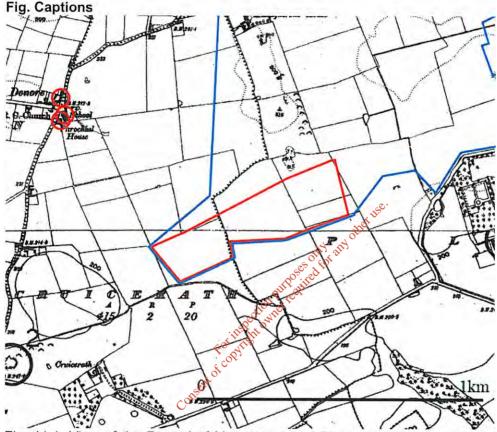


Fig. 11.1. View of the Record of Monuments and Places map for Co. Meath sheets 20 and 27 indicating the proposed application area (in red) situated within the Mullaghcrone quarry (blue line) and the full extent of the square study area. Protected structures are circled in red. There are no structures on the 1901-5 edition of the OS six inch map within 100m of the application area.



Fig. 11.2. Google Earth aerial image of the Mullaghcrone quarry with the development outline indicated in red. Note that most of the application area has been quarried removing the top and subsoil.

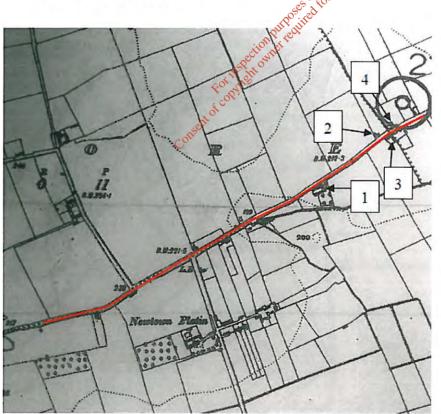


Fig. 11.3. The red line indicates the northern haul route from the quarry entrance to the M1 Rathmullan interchange superimposed on the 1909 OS map. Non-designated structures are numbered. Note the remaining structures indicated along the route have been levelled.



Fig. 11.4. View of structure 1 on Donore Road.



Fig. 11.5. View of structure 2 on Donore Road.



Fig. 11.6. View of structure 3 on Donore Road.



Fig. 11.7. View of structure 4 on Donore Road.



Fig. 11.8. Area 1 looking south-west across its length.



Fig. 11.9. Area 1 looking north-east across its length.



Fig. 11.10. Area 2 looking south-west.

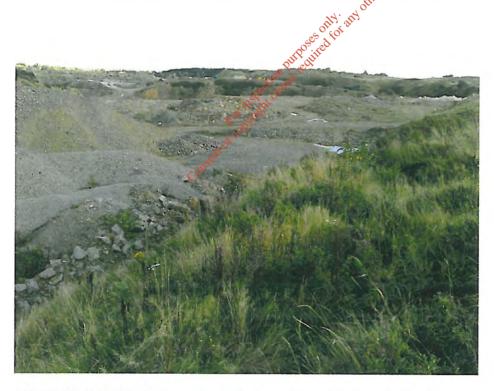


Fig. 11.11. Area 2 looking north-east across it length across its length.

APPENDIX 13.1 Traffic Survey Results

Consent of copyright owner required for any other use.

TRL VIEWER 3.1 AD W:\.. \Mullagncrone\Donore Road Access AM.vpo - Page 1

TRL LIMITED

(C) COPYRIGHT 2006

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

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Run with file: "W:\Projects\6222pp Readstone Wood Waste Permits\05 Design\01 Calculations\Traffie\Picady\Mullagherene\ cre Road Access AM.vpi" e on the-left) at 15:08:15 on Friday, 10 September 2010

RUN INFORMATION

RUN TITLE: Donore Road Quarry Access LOCATION: Mullaghcrone Quarry DATE: 10/09/10

CLIENT: Roadstone

ENUMERATOR: Brendan Ward [DUB 35LJ52J-BW]

JOB NUMBER: 6222 STATUS: DESCRIPTION:

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA

MAJOR ROAD (ARM C) -

Consent of copyright owner reduced for any other use.

MINOR ROAD (ARM B)

ARM A IS Donore Road East ARM B IS Quarry Access ARM C IS Donore Road West

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:

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I ARM I FLOW SCALE(%) I

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Demand set: Baseline 2010

TIME PERIOD BEGINS 08.15 AND ENDS 09.45

LENGTH OF TIME PERIOD - 90 MINUTES. LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

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TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

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FOR DEMAND SET Baseline 2010 AND FOR TIME PERIOD 1

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)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
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B-A	0.08	4.70	0.016		0.00	0.02	0.2		0.22
C-AB	0.02	6.97	0.002		0.00	0.00	0.0		0.14
C-A	1.58								
A B	0.11								
A-C	0.98								

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WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

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TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR DEMAND SET 2010 + gen AND FOR TIME PERIOD 1

TIM		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.1	5-08	.30		120 301 41	1	4.7-1.5	10 me t	cana acamanay	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	(1111)
В-	·C	0.01	5.68	0.002		0.00	0.00	0.0		0.18
B-	A	0.09	4.71	0.019		0.00	0.02	0.3		0.22
C	AB	0.02	6.96	0.002		0.00	0.00	0.0		0.14
C-	·A	1.58								
A-	В	0.13								
A-	C	0.98								

QUEUE FOR STR	EAM B C
TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0
09.30	0.0
09.45	0.0

QUEUE FOR STREAM B-A TIME SEGMENT NO. OF ENDING VEHICLES IN QUEUE

0.0 0.0 0.0 0.0 0.0 0.0 08.30 08.45 09.00 09.15 09.45

C'TUE FOR STREAM C-AB

Tale telepo	
TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0
09.30	0.0
09.45	0.0

Consent of copyright owner required for any other use.

TRL

```
I ARM I FLOW SCALE(%) I

I A I 100 I
I B I 100 I
I C I 100 I
```

Demand set: 2015 + gen

TIME PERIOD BEGINS 08.15 AND ENDS 09.45

LENGTH OF TIME PERIOD - 90 MINUTES. LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

	REACHED		FLOW STOPS FALLING		BEFORE PEAK					
I IS		4.4	FALLING	I	PEAK	I	OF PEAR	< I	PEAK	İ
7				-					-	
7										
	45.00	I	75.00	I	1.16	I	1.74	I	1.16	4
I	45.00	2	75.00	I	0.10	I	0.15	1	0.10	-
=	45.00	1	75.00	-	1.67	-	2.51	T	1.67	-
	1									

I		I			TU	JRNING PRO	OPORTIONS		I
I		I			TU	JRNING COL	JNTS (VEH,	(HR)	I
I		I			(PE	ERCENTAGE	OF H.V.S		I
I	7517	-	TROM !			NEW A T	2014 5 7	1511.0	-
1	TIME		FROM/	10	7	ARM A 1	ARM B I	ARM C	1.
I	08.15 = 09.45	I			I	I	DEGRIIONS UNIS (VEH. OF H.V.S) ARM B I 0.118 I 11.0 I (100.0) I 0.000 I 0.00 I (0.0) I (0.0) I		I
1		I	ARM	A	I	0.000 I	0.118 I	0.882	I
T.		I			I	0.0 I	11.0 I	82.0	I
_		I			I	(0.0)I	(100.0)I	(4.9	I
I		I			I	I	I		S
I		I	ARM	В	I	0.375 I	0.000 I	0.125	I
I		I			I	7.0 I	0.0 I	120	0
Ī		I			I	(100.0)I	(0.0)I	(100,00	I
Ī		I			I	I	I	COL TIPE	I
I		I	ARM	C	I	0.993 I	0.007 I	0000	I
I		I			1	133.0 I	1.0 I	0.0	I
I		I			I	(1,5)I	(100.0)	(0.0)	I
I		I			ī	I	Seli		4

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR DEMAND SET 2015 + gen AND FOR TIME PERIOD 1

I I I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
I	08.15-0	08.30		21016211						
Ι	B-C	0.01	5.68	0.002		0.00	0.00	0.0		0.18
Ι	B-A	0.09	4.69	0.019		0.00	0.02	0.3		0.22
I	C-AB	0.02	7.02	0.002		0.00	0.00	0.0		0.14
I	C-A	1.67								2.000
I	A-B	0.14								
I	A-C	1.03								
I										

Ι	TIME	DEMAND	CAPACITY		PEDESTRIAN	START	END	DELAY	GEOMETRIC DELAY	AVERAGE DELAY	17
I		(VEH/MIN)	(VEH/MIN)	CAPACITY	FLOW	QUEUE	QUEUE	(VEH.MIN/	(VEE.MIN/	PER ARRIVING	3
I				(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME SEGMENT)	TIME SEGMENT)	VEHICLE (MIN)	-
	8.30 0	8.45								1.575.47.47.47.40.000.00	-
	3-C	0.01	5.64	0.003		0.00	0.00	0.0		0.18	1
I	B-A	0.10	4.63	0.023		0.02	0.02	0.3		0.22	1
I	C-AB	0.02	7.24	0.003		0.00	0.00	0.0		0.14	-
I	C-A	1.99									
I	A-B	0.16									
I	A-C	1.23									1
I											-

VER/MIN (VER/MIN) CAPACITY	TIME	(VEH/MIN)	CAPACITY (VEH/MIN)		PEDESTRIAN FLOW (PEDS/MIN)	QUEUE	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
B A 0.13 4.56 0.028 0.00 0.00 0.00 DLIAY GEOMETRIC DELAY PER ARRIVING (VER.MIN) (VER.MIN) CAPACITY DEMAND (PEDS.MIN) (VEIS) (VEBS) TIME SEGMENT) TIME SEGMENT) VERICLE (MIN) PER ARRIVING CAPACITY DEMAND (PEDS.MIN) (VEIS) (VEBS) TIME SEGMENT) TIME SEGMENT) TIME DEMAND CAPACITY DEMAND (PEDS.MIN) (VEIS) (VEBS) TIME SEGMENT) TIME SEGMENT) VERICLE (MIN) VERICLE (MIN) VERICLE (MIN) (VER.MIN) (VER.MI			5 5 6	0.000		0.00	45 44 44			
Veh	B A C AE C A A B	0.13 0.03 2.43 0.20	4.56	0.028		0.02	0.03	0.4		0.23
VER/MIN (VER/MIN CAPACITY FLOW OUTDUE	TIME				PEDESTRIAN	START	END	DELAY	GEOMETRIC DELAY	AVERAGE DELAY
B-C 0.02 5.59 0.003 0.00 0.00 0.0 0.0 0.18 B-A 0.13 4.56 0.028 0.03 0.03 0.03 0.4 0.23 CAB 0.03 7.55 0.004 0.00 0.00 0.1 0.13 CAB 0.20 7.55 0.004 0.00 0.00 0.1 0.13 CAB 0.20 A-C 1.50 TIME DEMAND CAPACITY DEMAND/ (VEH/MIN) (VEH/MIN) CAPACITY FIOW OUGUE OUGUE (VEH,MIN/ (VEH,MIN/ VEH) (VEH,MIN/ VEH) (VEH,MIN/ VEH) (VEH,MIN/ VEH) 19.15-09.30 B-C 0.01 5.64 0.003 0.03 0.03 0.00 0.00 0.00 0.18 B-A 0.10 4.63 0.023 0.03 0.03 0.03 0.04 0.22 C-AB 0.02 7.24 0.003 0.00 0.00 0.00 0.0 0.14 TIME DEMAND CAPACITY DEMAND/ (RFC) (RFC) (RFC) (VEH/MIN/ VEH/MIN/ VEH	09 00-		(VEH/MIN)							PER ARRIVING VEHICLE (MIN)
B A 0.13 4.56 0.028 0.03 0.03 0.03 0.4 0.23 0.23 0.24 0.23 0.24 0.23 0.24 0.00 0.00 0.00 0.1 0.13 0.13 0.23 0.24 0.20 0.00 0.00 0.00 0.1 0.13 0.13 0.13 0.24 0.20 0.00 0.00 0.00 0.1 0.13 0.13 0.13 0.24 0.20 0.20 0.20 0.20 0.20 0.20 0.20			5.59	0.003		0.00	0.00	0.0		0 - 8
C AE				0.028				~ ~ ~		
A B 0.20 A C 1.50 TIME DEMAND CAPACITY DEMAND/ (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QU		27.00	7.55	0.004		0.00	0.00	0.1		
A-C 1.50 TIME DEMAND CAPACITY DEMAND/ (VEH/MIN) (ADPACITY FLOW OUDDE OUDER OUTER SEGMENT) 19.15-09.30 3-C 0.01 5.64 0.003 0.00 0.00 0.00 0.18 3-A 0.10 4.63 0.023 0.03 0.00 0.0 0.00 0.19 A-B 0.16 A-C 1.23 TIME DEMAND CAPACITY DEMAND/ (VEH/MIN) CAPACITY FLOW OUDDE O										
TIME DEMAND CAPACITY DEMAND/ (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUE	1.4	0.100								
Veh/Min Capacity Flow Ougue	A-C	1.30								
Veh/Min Capacity Flow Ougue						77779		et use.	-0-0-20-20-3-2-2	
A-B 0.16 A-C 1.23 TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING (PEDS/MIN) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) 9.30 09.45 B-C 0.01 5.67 0.002 0.00 0.00 0.0 0.18 B-A 0.09 4.69 0.019 0.02 0.02 0.3 0.22 C-AB 0.02 7.02 0.002 0.00 0.00 0.0 0.14 A-B 0.14		(VEH/MIN)		CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (WEH.MIN/ TOME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
A-B 0.16 A-C 1.23 TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING (PEDS/MIN) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) 9.30 09.45 B-C 0.01 5.67 0.002 0.00 0.00 0.0 0.18 B-A 0.09 4.69 0.019 0.02 0.02 0.3 0.22 C-AB 0.02 7.02 0.002 0.00 0.00 0.0 0.14 A-B 0.14							-0500	60	and a second	,
A-B 0.16 A-C 1.23 TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING (PEDS/MIN) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) 9.30 09.45 B-C 0.01 5.67 0.002 0.00 0.00 0.0 0.18 B-A 0.09 4.69 0.019 0.02 0.02 0.3 0.22 C-AB 0.02 7.02 0.002 0.00 0.00 0.0 0.14 A-B 0.14				0.003		0.00	046011	0.0		
A-B 0.16 A-C 1.23 TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END DELAY GEOMETRIC DELAY AVERAGE DELAY (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING (PEDS/MIN) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN) 9.30 09.45 B-C 0.01 5.67 0.002 0.00 0.00 0.0 0.18 B-A 0.09 4.69 0.019 0.02 0.02 0.3 0.22 C-AB 0.02 7.02 0.002 0.00 0.00 0.0 0.14 A-B 0.14	22 11 2 2			0.023		0.03	D. 681	0.4		
(VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING (RFC) (PEDS/MIN) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN. VEHICLE (MI	2 320	F. 2.750	1.24	0.003		0.00	3,0200	0.0		0.14
(VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING (RFC) (PEDS/MIN) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN. VEHICLE (MI						20°C	Zy,			
(VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING (RFC) (PEDS/MIN) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN. VEHICLE (MI	A-C					The thi				
(VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING (RFC) (PEDS/MIN) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN. VEHICLE (MI					Ŷ	CODALIS				
(VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (VEH.MIN/ (VEH.MIN/ PER ARRIVING (RFC) (PEDS/MIN) (VEHS) TIME SEGMENT) TIME SEGMENT) VEHICLE (MIN. VEHICLE (MI					onsent of					
9.30 09.45 B-C 0.01 5.67 0.002 0.00 0.00 0.0 0.18 B-A 0.09 4.69 0.019 0.02 0.02 0.3 0.22 C-AB 0.02 7.02 0.002 0.00 0.00 0.0 0.14 A-B 0.14	TIME			DEMAND/	PEDESTRIAN	START	END			AVERAGE DELAY
9.30 09.45 B-C 0.01 5.67 0.002 0.00 0.00 0.0 B-A 0.09 4.69 0.019 0.02 0.02 0.3 0.22 C-AB 0.02 7.02 0.002 0.00 0.0 0.0 0.14 C-A 1.66 A-B 0.14		(VEH/MIN)	(VEH/M_N)							
B-C 0.01 5.67 0.002 0.00 0.0 0.0 B-A 0.09 4.69 0.019 0.02 0.02 0.3 0.22 C-AB 0.02 7.02 0.002 0.00 0.0 0.0 0.14 C-A 1.66 A-B 0.14	9.30	09.45		(NE G)	(EPSS/MIN)	(APUS)	(APU2)	TIME SEGMENT)	I = ME SEGMENT)	VEHICLE (MIN)
B-A 0.09 4.69 0.019 0.02 0.02 0.3 0.22 0.4B 0.02 7.02 0.002 0.00 0.00 0.0 0.14 0.14 0.14 0.14 0.14			5.67	0.002		0.00	0.00	0 - 0		0 : 9
C-AB 0.02 7.02 0.002 0.00 0.00 0.0 C-A 1.66 A-B 0.14	B-A									
C-A 1.66 A-B 0.14		12 2 2 27	7.02	0.002		0.00				
A-C 2.03										
		1.03								

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

DUEUE FOR STREAM B-C

Soron rou our	Ditt.
TIME SEGMENT	NO, OF
ENDING	VEHICLES
	IN QUEUE
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0
09.30	0.0
09.45	0.0

TRL LIMITED

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

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Run with file: "W:\Projects\6222pp Roadstone Wood Waste Permits\05 Design\01 Calculations\Traffic\Picady\Mullaghcrene\ 52 Crossroads AM.vpi" e-on-the left) at 16:04:07 on Friday, 10 September 2010

For inspection buttons of the day other use.

RUN INFORMATION

RUN TITLE: R152 Crossroads LOCATION: Mullagherone Quarry DATE: 10/09/10 CLIENT: Roadstone ENUMERATOR: Brendan Ward [DUB-35LJ52J-BW]

JOB NUMBER: 6222 STATUS . DESCRIPTION:

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA

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

MINOR ROAD (ARM B)

ROAD (ARM D)

ARM A IS R152 North ARM B IS Gaffney Road ARM C IS R152 South ARM D IS Platin Road

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.

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I ARM I FLOW SCALE(%) I
            100
I B
            100
            100
            100
```

Demand set: Easoflow 2010

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MINUTES. LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

			I	NUMBER OF	MIN	UTES FROM :	STA	ART WHEN	I	RATE	OF	FLOW	(VE	(MIN)	I
I	ARM	1	I	FLOW STARTS	IT	OP OF PEAK	I	FLOW STOPS	I	BEFORE	I	AT TOP	I	AFTER	1
-			I	TO RISE	I	IS REACHED	I	FALLING	I	PEAK	Ι	OF PEAR	K I	PEAK	1
I	ARM	A	2	15.00	I	45.00	I	75.00	I	5.49	I	8.23	I	5.49	_ I
-	ARM	В	3	15.00	3	45.00	I	75.00	-	0.95	I	1.42	I	0.95	7
1	R.M	C	$\bar{\mathbf{I}}$	15.00	2	45.00	I	75.00	ī	5.61	I	8.42	I	5.61	I
	kM	D	I	15.00	I	45.00	I	75.00	I	0.61	I	0.92	I	0.61	ī

	I I		T		OPORTIONS UNIS (VEH OF H.V.S	/HR)	ARM Solid
TIME	I	FROM/TO	Ι	ARM A I	ARM B I	ARM C I	ARM SIDILO
07.45 - 09.15	Ξ		I	I	I	I	in postined I
	I	ARM A	I	0.000 I	0.066 I	0.902 I	
	7		2	0.0 I	29.0 I	396.0	14.0 I
	I		I	(0.0)I	(0.0)I	(7 B) I	7.1)I
	I		I	I	I	30,0	I
	I	ARM B	I	0.750 I	0.000 I	01000 I	0.250 I
	I		I	57.0 I	0.0 I	60,00 I	19.0 I
	I		I	(7.0)I	(0.0)I	I(0.090)	(0.0)I
	I		I	I	Ĭ.	I S	I
	I	ARM C	I	0.955 I	0.000		
	I		I	429.0 I	0,40 I	0.0 I	20.0 I
	I		I	(7.5)I			(20.0) I
	I		I	I	I	I	I
	I	ARM D	I	0.408 I	0.429 I	0.163 I	0.000 I
	I		I	20.0 =	21.0 I	8.0 I	0.0 I
	I		I	(5.0)]	(0.0)I	(50.0)I	(0.0)I
	I		I	I	I	I	I

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR DEMAND SET Baseflow 2010 AND FOR TIME PERIOD 1

	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	1 - Carrier 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
E (07.45-08	3.00								valiacan (riti)
I	B-ACD	0.95	5.66	0.169		0.00	0.20	2.8		0.21
	A BCD	0.28	12.90	0.022		0.00	0.03	0.4		0.08
	A-B	0.36								7.7.
	A-C	4.87								
	D-AB	0.39	9.05	0.043		0.00	0.04	0.6		0.12
	D-BC	0.23	5.97	0.038		0.00	0.04	0.6		0.17
	C-ABD	0.00	9.25	0.000		0.00	0.00	0.0		0.00
	C-D	0.25								
	C-A	5.38								

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QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

HH	STREAM	I	TOTAL	L	DEMAND	I	* QUEU		ING *	F F F F	* INCLUSIV * DE			I
-		Ī	(VEH)		(VEH/H)	I	(MIN)		(MIN/VEH)	1	(MIN)		(MIN/VEH)	I
1	B-ACD	I	104.6	I	69.7	I	26.3	1	0.25	2	26.3	1	0.25	I
-	A BCD	ī	35.3	I	23.5	I	3.5	-	0.10	2	3.5	1	0.10	I
-	A-B	7	38.8	I	25.9	I		-		-		I		I
Ξ	A-C	_	530.1	I	353.4	I		Ţ		I		-		T
I	D AB	=	42.4	I	28.3	I	5.3	Ι	0.12	I	5.3	I	0.12	7
I	D-BC	Ι	25.0	I	16.7	I	4.8	I	0.19	I	4.8	I	0.19	- 7
I	C-ABD	1	0.0	1	0.0	I	0.0	ī	0.00	I	0.0	I	0.00	I
Ι	C-D	I	27.5	I	18.4	I		I		I		T		T
ī	C - A	I	590.5	10	393.7	-		I		I		ī		I
Ι	ALL	I	1394.3	7	929.5	I	39.9	İ	0.03	I	39.9	Ť	0.03	-

- * 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

.SLOPES AND INTERCPET

B-C Stream

END OF JOB			
.SLOPES AND INTE	ERCPET		
(NB:Streams may	be combined, in which	ch case capacity	
will be adjusted	1)		14. 44 offic
B-C Stream			oses of for a
I Intercept For I Stream B-C		Slope For Opposing Stream A-B	I ton purequir
I 630.23	0.23	0.09	SI OWIT
D-A Stream		For the	I Retain but of the first of th
	Slope For Opposing Stream C-A	Slope For pposing Stream CDD	F 12
I 763.98	0.28	0.11	I I

		Slope For Opposing Stream A-C	Slope For Opposing Stream A-D		
I	482.67	0.21	0.21	0.21	0.21
: I		Slope For Opposing Stream A-B	Slope For Opposing Stream C-A		
1 + 1		0.08	0.13	0.30	0.11 I
D	C Stream				
		Slope For Opposing Stream C-A	Slope For Opposing Stream C-B	Slope For Opposing Stream B-C	
I	592.82	0.26	0.26	0.26	0.26 I

1	Slope For Opposing Stream C-D	Slope For Opposing Stream A-C	Slope For Opposing Stream A-D	Slope For OpposingI Stream B-A
I	0.10	0.16	0.37	0.13

C B Stream

RL	TRL VIEWER 3.1 A	D W:\ \Muilaghcrone\	R152 Crossroads AM.v	po Page ll
ream C-B	Stream A-C	Stream A-D		
704.26	0.26	0.37		
A-D Stream				
I Intercept For I Stream A-D	Slope For Opposing Stream C A	Sicpe For Opposing : Stream C-B		
704.26	0.26	0.37		
3-D Stream From	Left Hand Lane			
I Intercept For I Stream B-D	Stream A-C	Siope For Opposing Stream A-D	Slope For Opposing Stream A-B	Slope For Opposing Stream C-B
482,67	0,21	0.21	0.08	0.30
	Stream C-A		Slope For Opposing	Slope For Opposing
	0.13	0.13		
B-D Stream From	Right Hand Lane			
Intercept For Stream B-D	Slope For Opposing Stream A-C	Slope For Opposing Stream A-D	Slope For Opposing Stream A-B	Slope For Opposing
482.67	0.21	0,21	0.08 offer	0.30
I I	Slope For Opposing Stream C-A	Slope For Opposing Stream C-D	Slope Foot Opposing	Slope For Opposing
I	0.13	0.13	n Puricquit	
D-B Stream From	Left Hand Lane	Slope For Opposing Stream A-D 0.21 Slope For Opposing Stream C-D 0.13 Slope For Opposing Stream C-B 0.2687	dio wilet	
I Intercept For I Stream D B	Slope For Opposing Stream C-A	Slope For Opposing Stream C-B	Slope For Opposing Stream D-C	Stope For Opposing: Stream A-D
592.82	0,26	0.26ETT	0.10	0.37
 I I	Slope For Opposing Stream A-C	Slope For Opposing Stream A-B	Slope For Opposing	Slope For Opposing
1	0.16	0.16		
	Right Hand Lane			
	Stream C-A	Slope For Opposing Stream C B	Stope For Opposing	Stope For Opposing
592.82	0.26	0.26	0.10	0.37
 I I	Slope For Opposing Stream A-C	Slope For Opposing Stream A-B	Slope For Opposing	Slope For Opposing

TRAFFIC DEMAND DATA

		CAPACITY (VEH/MIN)		PEDESTRIAN FLOW (PEDS/MIN)	QUEUE	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELA PER ARRIVING VEHICLE (MIN
08.00-08 B ACD A-BCD A-B	0.15 0.37 0.42	5,21 13,29	0.222 0.028		0.21	0.28	4.0 0.5		0.25
A-C D AB D-BC C-ABD C-D C-A	5.78 0.47 0.29 0.00 0.31 6.43	8.37 5.28 8.97	0.056 0.056 0.000		0.05 0.04 0.00	0.06 0.06 0.00	0.9 0.8 0.0		0.13 0.20 0.00
	0.43								
	(VEH/MIN)	CAPACITY (VEH/MIN)	CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	QUEUE	END QUEUE (VEHS)	(VEH.MIN/	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELA PER ARRIVING VEHICLE (MIN
8.15-08 B-ACD A-BCD A B	1,41 0.52 0.51	4.68 13.83	0.302 0.038		0.28	0.42	6.0		0.30
A-C D-AB	7,02 0,58	7.73	0.075		0.06	0.08	1.2		0.14
D-BC C-ABD C-D C-A	0.36 0.00 0.39 7.87	4.72 8.59	0.076		0.06	80.0	1.2 0.0		0.23
							odly, any other rese.		
TIME	DEMAND	CAPACITY	DEMAND/	PEDESTRIAN	START	END&	offy and	GEOMETRIC DELAY	AVERAGE DELA
	(VEH/MIN)	(VEH/MIN)		FLOW (PEDS/MIN)	QUEUE (VEHS)	ENDO QUESE (MEHS)	(VEH.MIN/ TIME SEGMENT)	(VEH.MIN/	PER ARRIVING VEHICLE (MIN
8.30 08 B-ACD A-BCD A-B A-C	1.41 0.52 0.51 7.02	4.68 13.83	0.302		0.4211 0.4311 113011	0.08 0.08 0.00	6.4 0.8		0.31
D-AB D-BC	0.58	7.73	0.075	*	0.08	0.08	1.2		0.14
C-ABD C-D C-A	0.00 0.39 7.87	8.59	0.000	Consent of	0.00	0.00	0.0		0.00
						ģ:01001			-
TIME		CAPACITY (VEH/MIN)	CAPACITY		QUEUE	QUEUE	(VEH.MIN/	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELA PER ARRIVING VEHICLE (MIN
B-ACD A-BCD			0.222				4.6 0.5		0.25
A-B A-C	0.42 5.78	0.76	0.057		0.00	0.06	0.0		4 - 4
	0.31	8.36 5.28 8.97	0.056 0.056 0.000		0.08	0.06	0.9 0.9 0.0		0.13 0.20 0.00
TIME	DEMAND	CAPACITY (VEH/MIN)	DEMAND/	PEDESTRIAN FLOW	START	END	DELAY	GEOMETRIC DELAY	AVERAGE DELA
9.00-09	.15							(VEH.MIN/ TIME SEGMENT)	
70 0	0 35	5.59 12.89	0.173 0.022			0.21	3.3 0.4		0.22
2 22	4.87 0.39 0.25		0.045			0.05	0.7		0.12

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B ACD

TIME	SEGMENT	NO. OF
ENI	DING	VEHICLES
		IN QUEUE
08.	.00	0.2
08.		0.3
08.	.30	0.4
08.	.45	0.4
09.	.00	0.3
09.	.15	0.2

QUEUE FOR STREAM A-BCD

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.1
08.45	0.1
9.00	0.0
15	0.0

QUEUE FOR STREAM D-AB

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
08.00	0.0
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0,1
09.15	0.0

QUEUE FOR STREAM D BC

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
00.80	0.0
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0.1
09.15	0.0
- 47	

QUEUE FOR STREAM C-ABD

T	IME SEGMENT	NO. OF
	ENDING	VEHICLES
		IN QUEUE
	08.00	0.0
	08.15	0.0
	08.30	0.0
	08.45	0.0
	09.00	0.0
	09.15	0.0

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Consent of copyright owner required for any other use.

	-	-	-		
I	ARM	1	FLOW	SCALE(%)	I
3			30-20		-
Ξ	A	I		100	I
7	Б	I		100	I
Z	C	I		100	I
+	D	I		200	T

Demand set: 2015 + gen

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD 90 MINUTES. LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

2			2	NUM	BER OF	M	INUTE	SF	ROM :	STA	ART WHEN	I	RATE	OF	FL	OW (VEF	(MIM\	
-	ARM										FLOW STOPS								
ş			-	TO	RISE	I	IS		CHED		FALLING	I	PEAK	Ι	OF .	PEAR	(]	PEAK	
	ARM	A	T	1	5.00	I		45.		I	75.00		5.82	1	8	.74	I	5.82	5
	ARM	P	+	1	5.00	=		45.	00	Ξ	75.00	=	1.01	-	-	.52	Ξ	1.01	
	$\pm M$	C	ī	4	5.00	I		45.		I	75.00	=	5.96	I	8	.94	I	5.96	
	.M	D	I	1	5.00	Ť		45.	00	I	75.00	I	0.66	I	0	.99	I	0.66	

		I	I TURNING PROPORTIONS I TURNING COUNTS (VEH/HR) I (PERCENTAGE OF H.V.S)											
	TIME	I	FROM/TO	I	ARM A I	ARM B I	ARM C I	ARM JO	Tot and					
0	7.45 - 09.15	I		I	I	I	I	MP wife	1					
		I	ARM A	I	0.000 I	0.067 I	0.901 I	00 0032	I					
		I		I	0.0 I	31.0 I	420.0.0	15.0	I					
		I		I	(0.0)I	(0.0)I	(7.5) I	\$ 6.7)	Ī					
		I		I	I	I	30,0		I					
		I	ARM B	I	0.741 I	0.000 I	0,000 I	0.259	I					
		I		I	60.0 I	0.0 1	0.0 I	21.0	I					
		I		I	(6.7) [(0.0)]	(0.0%) I	(4.8)	I					
		I		I	I	ī	I		I					
		I	ARM C	I	0.954 I	0.000	0.000 I	0.046	I					
		I		I	455.0 I	0 6 I	0.0 I	22.0	I					
		I		7	(7.5) I	((O.O) I	(0.0)I	(22.7)	I					
		I		I	I	I	I		I					
		I	ARM D	I	0.396 I	0.434 I	0.170 I	0.000	I					
		I		I	21.0 I	23.0 I	9.0 I	0.0	I					
3		I		I	(4.8)I	(4.3)I	(55.6) I	(0.0)	I					
		I		I	I	I	I		I					

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR DEMAND SET 2015 + gen AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)			PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	
07.45	-08.00			AC 13115 A AD 17730			2 2710 2 G 21601161	TITLE GEOMETRY	VELLEUD (LILIV)	
B-A	CD 1.02	5.48	0.185		0.00	0.22	3.2		0.22	
A-B	CD 0.31	13.05	0.024		0.00	0.03	0.4		0.08	
A-B	0.38								4445	
A-C	5.15									
D-A	B 0.41	8.71	0.047		0.00	0.05	0.7		0.12	
D-B	0.25	5.59	0.045		0.00	0.05	0.7		0.19	
C-A	0.00 CE	9,16	0.000		0.00	0.00	0.0		0.00	
C-D	0.28								0.00	
C-A	5.71									
100										

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QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

11111	STREAM	4 F4 F4	TOTAL	C,	DEMAND	Ī	* QUEU			24 70	* INCLUSIV * DE		QUEUEING * Y *	I
-		1	(VEH)		(VEH/H)	I	(MIN)		(MIN/VEH)	ž	(MIN)		(MIN/VEH)	I
Í	B-ACD	Ī	111.5	Ĩ	74.3	1	30.2	I	0.27	I	30.2	I	0.27	I
I	A BCD	T	39.2	Ι	26.1	I	3.9	I	0.10	I	3.9	I	0.10	I
I	A-B	I	41.4	I	27.6	-		I		I		7		I
Ī	A-C	I	560.8	I	373.9	=		I		I		. 9		I
I	D-AB	I	45.3	I	30.2	7	6.0	=	0.13	I	6.0	T	0.13	1
I	D-BC	I	27.7	I	18.4	I	5.8	-	0.22	I	5.8	T	0.21	I
Ξ	C-ABD	I	0.0	-	0.0	I	0.0	I	0.00	I	0.0	I	0.00	I
_	C-D	I	30.3	1	20.2	I		=		1		ĭ		I
-	C-A	Ī	626.3	July.	417.5	I		Ι		Ϊ		Ι		1
I	ALL	Ţ	1482.4	T	988.3	Ī	45.5	I	0.03	I	45.9	I	0.03	Т

- * 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

Consent of copyright owner teating differ any other use.

[Printed at 16:04:15 on 10/09/2010]

EPA Export 23-06-2014:23:39:02

TRAFFIC DEMAND DATA

I ARM I FLOW SCALE(%) I TA 100 T TR 100 IC 100

Demand set: Baseline 2010

TIME PERIOD BEGINS 16.30 AND ENDS 18.00

LENGTH OF TIME PERIOD - 90 MINUTES. LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

-			I	NUM	BER OF	M	NUTE	SS F	ROM :	STA	ART WHEN	I	RATE	OF	FI	OW (VE	(MIM)	J
I	ARM	1	I	FLOW	STARTS	I	TOP	OF.	PEAK	I	FLOW STOPS	I	BEFORE	I	AT	TOP	=	AFTER	1
H)		I	TO	RISE	Ι	IS	REA	CHED	1	FALLING	1	PEAK	I	OF	PEAK	I	PEAK	1
Ι	ARM	A	I	1	5.00	I		45.	00	I	75.00	-	0.75	I	-	1.13	I	0.75	1
Ι	ARM	В	I	1	5.00	T		45.	00	I	75.00	3	0.08	I	(0.11	I	0.08	1
Ţ	ARM	C	I	1	5.00	I		45.	00	I	75.00	I	0.63	I	(0.94	I	0.63	J

							3500		
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)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-1 B-AC C-AB C-A A-B A-C	7.45 0.09 0.00 0.75 0.12 0.78	4.16 9.86	0.022		0.03	0.02	0.3		0.25 0.00
TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMANI, CAPACITY	PEDESTRIAN FLOW	START QUEUE	END OUEUE	DELAY (VEH.MIN/	GEOMETRIC DELAY (VEH.MIN/	AVERAGE DELAY PER ARRIVING
17,45-1 B-AC C-AB C-A	8.00 0.08 0.00 0.63	4.19 9.90	(RFC) 0.018 0.000	(PEDS/MIN)	0.02 0.00	0.02 0.00	TIME SEGMENT) 0.3 0.0	TIME SEGMENT)	VEHICLE (MIN) 0.24 0.00
A B	0.10								

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STR	EAM B-AC
TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.0
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0

QUEUE FOR STREAM C-AB

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.0
17.00	0.0
1.15	0.0
.30	0.0
17.45	0.0
18.00	0.0

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TRL

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I ARM I FLOW SCALE(%) I

I A I 100 I
I B I 100 I
I C I 100 I
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Demand set: 2010 + gen

TIME PERIOD BEGINS 16.30 AND ENDS 18.00

LENGTH OF TIME PERIOD - 90 MINUTES. LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

Ţ		T	NUMBER OF	MINUTE	ES FROM S	STA	ART WHEN	I	RATE	OF	FLOW (VE:	H/MIN)	-
I	ARM	I	FLOW STARTS	I TOP	OF PEAK	Ī	FLOW STOPS	I	BEFORE	I	AT TOP	I	AFTER	-
I		I	TO RISE	I IS	REACHED	Ĭ	FALLING	I	PEAK	I	OF PEAK	I	PEAK	-
+	ARM A	-	15.00	I	45.00	7	75.00	I	0.77	I	1.16	I	0.77	-
1	ARM B	1	15.00	I	45.00	T	75.00	I	0.10	I	0.15	I	0.10	I
-	ARM C	-	15.00	I	45.00	T	75.00	7	0.63	I	0.94	I	0.63	-

I I T		I			T	JRNING COL	OPORTIONS JNTS (VEH, OF H.V.S)	/HR)	I I I I I I I I I I I I I I I I I I I
Ī	IME	I	FROM	TO	I	ARM A I	ARM B I	ARM C	I
16.30	18.00	I			I		Ī		I
Ι		I	ARM	A	I	0.000 I	0.161 I	0.839	Ι
I		I			I	0.0 I	10.0 I	52.0	Ι
I		I			I	(0.0)I	(100.0)I	(0.0)	I
I		I			I	I	I		OD)
Ī		I	ARM	В	I	1.000 I	0.000 I	0.000	I
I		I			I	8.0 I	0.0 I	020	Q
I		I			I	(100.0)I	(0.0)I	(10.00)	1
I		I			I	I	I	COLALIS	I
T		I	ARM	C	I	1.000 I	0.000 I	60.000	I
		T			I	50.0 I	0.0 I	\$ 0.0	I
1)		I			I	(0.0)I	(0.0)	(0.0)	I
		I			-	I	SOI		I

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

T PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR DEMAND SET 2010 + gen AND FOR TIME PERIOD 1

I TI I	IME	DEMAND (VEH/MIN)	(VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.	.30-16	6.45						Carte Caracasta		, , , , , , , , , , , , , , , , ,
. E	B-AC	0.10	4.19	0.024		0.00	0.02	0.3		0.24
	C AB	0.00	9.89	0.000		0.00	0.00	0.0		0.00
	C-A	0.63								
I	A-B	0.13								
7	A-C	0.65								

11111	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
I	16.45-1	7.00								200700 30000000
7	B-AC	0.12	4.16	0.029		0.02	0.03	0.4		0.25
Ι	C-AB	0.00	9.85	0.000		0.00	0.00	0.0		0.00
Ι	C-A	0.75								4 1 7 7
I	A-B	0.15								
Ĩ	A-C	0.78								
Ī										

TR:

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

	STREAM	11) 11 1	TOTAL		DEMAND	I	* QUET			I,	* INCLUSIV * DE			11.11
T		Ī	(VEH)		(VEH/H)	3	(MIN)		(MIN/VEE)	I	(MIN)		(MIN/VEH)	
I	B-AC	I	11.0	I	7,3	÷	2.7	T	0.24	I	2.7	Ī	0.24	7
Ι	C-AB	I	0.0	I	0.0	-	0.0	I	0.00	I	0.0	I	0.00	3
I	C-A	I	68.8	I	45.9	I		I		7		Ι		7
5	A-B	I	13.8	I	9.2	I		1		-		I		- 3
-	A C	1	71.6	I	47.7	I		I		I		I		1
	ALL	1	165.2	I	110.1	I	2.7	I	0.02	I	2.7	I	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

PES AND INTERCEPT

(NB:Streams may be combined, in which case capacity

W.	ill be adjusted	d)			inet it	ç.	
I	Intercept For Stream B-C	Slope For Opposing Stream A-C	Slope For Opposin Stream A-B	g I I	as only any ou		
F # 1	668.61	0.26	0.10	1	on and purposes only any other us		
I	Intercept For Stream B-A	Slope For Opposing Stream A-C	Sidde for Opposin	9,00	Slope For Opposing Stream C-A	Slope For Oppos	sing!
I	518.82	0.24	0.09 dc		0.15	0,34	ī
T	Intercept For	Slope For Opposing	Signa For Opposin	~ T			
I	Stream C-B	Stream A-C	Stream A B	I			
I	666.62	0.26	0.26	I			

NB These values do not allow for any site specific corrections

TRAFFIC DEMAND DATA

TIME	(VEH/MIN)	CAPACITY (VEH/MIN)		PEDESTRIAN FLOW (PEDS/MIN)	QUEUE		DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELA PER ARRIVING VEHICLE (MIN
17.00-1 B AC C-AB C-A A-B A C	7.15 0.15 0.00 0.97 0.18 1.01	4.11 9.78	0.036 0.000		0.03	0.04	0.5		0.25
TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	QUEUE	END QUEUE		GEOMETRIC DELAY (VEH.MIN/	AVERAGE DELA: PER ARRIVING
17.15-1 B-AC C-AB C-A A B A-C	7.30 0.15 0.00 0.97 0.18 1.01	4.1± 9.78	0,036	(FEDS/VIIN)	0.04 0.00	0.04 0.00	0.5 0.0	TIME SEGMENT)	VEHICLE (MIN: 0.25 0.00
TIME 17.30-1	(VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAYIN/ (VEH MIN/ IIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAS PER ARRIVING VEHICLE (MIN)
B-AC C-AB C-A A-B A-C	0.22 0.00 0.79 0.15 0.82	4.15 9.84	0.029	PEDESTRIAN FLOW (PEDS/MIN) PEDESTRIAN FLOW (PEDS/MIN)	0.04 0.00	0.03 0.03 0.03 5. Dirlogit	of 0.5		0.25
				Ç ^c	opyright C				
TIME 17.45-18	(VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESIR TAN FLOR (PEDS)MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
B-AC C-AB C-A A-B A-C	0,10 0.00 0.67 0.13 0.69	4.18 9.88	0.024		0.03	0.02	0.4		0.25

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STR	EAM B-AC
TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.0
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0

QUEUE FOR STREAM C-AB

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
.45	0.0
00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0

TRL

TRL LIMITED

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

PICADY 5.0 ANALYSIS PROGRAM
RELEASE 3.0 (JUNE 2006)

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EMAIL: SoftwareBureau@trl.co.uk

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN INFORMATION

RUN TITLE: Donore Road Quarry Access LOCATION: Mullaghcrone Quarry

DATE: 10/09/10 CLIENT: Roadstone

ENUMERATOR: Brendan Ward [DUB-35LJ52J-BW]

JOB NUMBER: 6222

STATUS: DESCRIPTION:

,MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA

MAJOR ROAD (ARM C)

Conservation birds and complete the control of conservation birds and conservation birds ar

ARM A IS Platin Road South ARM B IS Quarry Access ARM C IS Platin Road 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.

EPA Export 23-06-2014:23:39:02

	1						
I		111111		T		OPORTIONS UNIS (VEH. OF H.V.S	
Ī	TIME	I	FROM/TO	1	ARM A I	ARM B I	ARM C I
+	07.45 - 09.15	I		2	1	I	I
<u>-</u>		I	A MAA	7	0.000 I	0.094 1	0.906 I
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Ī		Ĕ	ARM B	I	1.000 I	0.000 I	0.000 I
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=		- 2		-	(0.0)]	100	(0.0)]
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							4-14-1

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR DEMAND SET Baseline 2010 AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE	END QUEUE	DELANS (VEHAMIN/	GEOMETRIC DELAY (VEH.MIN/	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45 0	8.00		12.207	11 220/1111/	(+ 5110)	(* 11.0)	M. and and and and a	IIME SEGMENT)	ARUICTE (MIN)
B-AC	0.06	4.20	0.015		0.00	0.01	official 0.2		0.24
C-AB	0.00	9.93	0.000		0.00	0.000	0.0		0.00
C - A	0.55					120 is			0123
A-B	0.06					Difficulty			
A-C	0.60				Dection of	Mieric			
				Ŷ	or instight.				
TIME	DEMANE					- 5-5-7			
TIME									AVERAGE DELAY
	(ATTA STEM)	(ATTENDED							PER ARRIVING
08.00-08	3.15		1115 - 1	(= Phon (17 14)	(APUS)	(ATUS)	TIME SEGMENT)	TIME SEGMENT)	VEHICLE (MIN)
B-AC	0.07	4.18	0.018		0.01	0.02	0.3		0.24
C-AB	0.00	9.90	0.000			100 00 00 00			0.00
C-A	0.66				0.00	0.00	0.0		0.00
AB	0.07								
A-C	0.72								
							**********	end to any and all Education	
TIME				FLOW	QUEUE		DELAY (VEH.MIN/	GEOMETRIC DELAY (VEH.MIN/	AVERAGE DELAY PER ARRIVING
08.15-08	3.30		(111 0)	(LEDS/PILM)	(APHO)	(VED3)	IIME SEGMENI)	IIME SEGMENI)	VEHICLE (MIN)
B-AC		4.15	0.022		0.02	0.02	0.3		0.25
C- AB	0.00				0.00				0.00
C-A	0.81						0.0		0.00
A-B	0.09								
A = D									
A-C	0.88								
	0,88								
	DEMAND	CAPACITY		PEDESTRIAN	START	END	DELAY	GEOMETRIC DELAY	AVERAGE DELAY
A-C	DEMAND	CAPACITY (VEH/MIN)	CAPACITY	FLOW	QUEUE	QUEUE	(VEH.MIN/	(VEH.MIN/	PER ARRIVING
A-C	DEMAND (VEF/MIN)				QUEUE	QUEUE	(VEH.MIN/		
A-C TIME	DEMAND (VEH/MIN)	(VEH/MIN)	CAPACITY (RFC)	FLOW	QUEUE (VEHS)	QUEUE (VEHS)	(VEH.MIN/ TIME SEGMENT)	(VEH.MIN/	PER ARRIVING VEHICLE (MIN)
A-C TIME 08.30-08 B-AC	DEMAND (VEH/MIN) 3.45 0.09	(VEH/MIN) 4.15	CAPACITY (RFC)	FLOW	QUEUE (VEHS)	QUEUE (VEHS)	(VEH.MIN/ TIME SEGMENT) 0.3	(VEH.MIN/	PER ARRIVING VEHICLE (MIN) 0.25
A-C TIME 08.30-08 B-AC C-AB	DEMAND (VEH/MIN) 3.45 0.09 0.00	(VEH/MIN)	CAPACITY (RFC)	FLOW	QUEUE (VEHS)	QUEUE (VEHS)	(VEH.MIN/ TIME SEGMENT)	(VEH.MIN/	PER ARRIVING VEHICLE (MIN)
A-C TIME 08.30-08 B-AC C-AB C-A	DEMAND (VEF/MIN) 3.45 0.09 0.00 0.81	(VEH/MIN) 4.15	CAPACITY (RFC)	FLOW	QUEUE (VEHS)	QUEUE (VEHS)	(VEH.MIN/ TIME SEGMENT) 0.3	(VEH.MIN/	PER ARRIVING VEHICLE (MIN) 0.25
A-C TIME D8.30-08 B-AC C-AB	DEMAND (VEH/MIN) 3.45 0.09 0.00	(VEH/MIN) 4.15	CAPACITY (RFC)	FLOW	QUEUE (VEHS)	QUEUE (VEHS)	(VEH.MIN/ TIME SEGMENT) 0.3	(VEH.MIN/	PER ARRIVING VEHICLE (MIN) 0.25
	07.45-0 B-AC C-AB C-A A-B A-C TIME 08.00-0 B-AC C-AB C-A A B A-C	(VEH/MIN) 07.45 08.00 B-AC	(VEH/MIN) (VEH/MIN) 07.45-08.00 B-AC	(VEH/MIN) (VEH/MIN) CAPACITY (RFC) 07.45 08.00 B-AC	(VEH/MIN) (VEH/MIN) CAPACITY (RFC) (PEDS MIN) 08.00-08.15 B-AC 0.07 4.18 0.018 C-AB 0.00 9.90 0.000 C-A 0.66 A B 0.07 A-C 0.72 TIME DEMAND CAPACITY DEMAND/ (VEH/MIN) CAPACITY FLOW (RFC) (RFC) 08.15-08.30 B-AC 0.09 4.15 0.022 C-AB 0.00 9.85 0.000	(VEH/MIN) (VEH/MIN) CAPACITY (RFC) (PEDO MIN) (VEHS) 08.00-08.15 B-AC 0.07 4.18 0.018 0.01 C-AB 0.00 9.90 0.000 0.00 C-A 0.66 A B 0.07 A-C 0.72 TIME DEMAND CAPACITY DEMAND/ (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE (RFC) (RFC) (PEDS/MIN) (VEHS) 08.15-08.30 B-AC 0.09 4.15 0.022 0.02 C-AB 0.00 9.85 0.000 0.00	(VEH/MIN) (VEH/MIN) CAPACITY (RFC) (PEDSOMIN) (VEHS) (VEHS) 08.00-08.15 B-AC 0.07 4.18 0.018 0.01 0.02 C-AB 0.00 9.90 0.000 0.00 0.00 C-A 0.66 A B 0.07 A-C 0.72 TIME DEMAND CAPACITY DEMAND/ PEDESTRIAN START END (VEH/MIN) (VEH/MIN) CAPACITY FLOW QUEUE QUEUE (RFC) (PEDS/MIN) (VEHS) (VEHS) 08.15-08.30 B-AC 0.09 4.15 0.022 0.02 0.02 C-AB 0.00 9.85 0.000 0.00	(VEH/MIN) (VEH/MIN) CAPACITY (RFC) (PEDS/MIN) (VEHS) (VEHS) TIME SEGMENT) 07.45 08.00 B-AC	(VEH/MIN) (VEH/MIN) CAPACITY (PEDS MIN) (VEHS) TIME SEGMENT) TIME SEGMENT) 08.00-08.15 B-AC

TRI

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

4 1.1 1.4	STREAM	11111	TOTAL DEMAND		TOTAL DEMAND I					* QUEUEING * * DELAY *				JSIVE QUEUEING * * DELAY *			
7		7	(VEH)		(VEH/H)	I	(MIN)		(MIN/VEH)	I	(MIN)		(MIN/VEH)				
I	B-AC	I	6.9	I	4.6	7	1.7	1-1	0.24	I	1.7	I	0.24	1			
Ι	C-AB	I	0.0	I	0.0	I	0.0	I	0.00	I	0.0	I	0.00	I			
Ι	C-A	T	60.6	I	40.4	1		2		I		I		I			
Ī	A-B	I	6.9	+	4.6	2		Ι		T		I		-			
I	A-C	Ι	66.I	I	44.0	Ī		Ξ		I		I		I			
=	ALL	I	140.4	1	93.6	I	1.7	I	0.01	Ŧ	2.7	I	0.01	J			

- * 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

PES AND INTERCEPT

(NB:Streams may be combined, in which case capacity

vi 11	he	ad	justed	١
V	20	act	Justeu	1

W	ill be adjuste	d)		ne th	÷.	
		Slope For Opposing Stream A-C	Slope For Opposing Stream A-B	Ection burds to diverge lot any other in		
I	668.61	0.26	0.10	I purpositied		
I	Intercept For Stream B-A	Slope For Opposing Stream A-C	stope for opposing	of Slope For Opposing Stream C-A	Stope For Oppos	ing:
I	518.82	0.24	0.09 of cos-	0,15	0.34	
= 1			Course			
		Slope For Opposing Stream A-C	Slope For Opposing Stream A-B	I I		
I	666.62	0.26	0.26	Ī		

NB These values do not allow for any site specific corrections

TRAFFIC DEMAND DATA

TIME	(VEH/MIN)	CAPACITY (VEH/MIN)	CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	QUEUE	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15 0: B-AC C AB C A A-B A-C	0.13 0.00 0.81 0.13 0.88	4.15 9.83	0.031		0.03	0.03	0.5		0.25 0.00
71ME		CAPACITY (VEH/MIN)	CAPACITY	PECESTRIAN FLOW (PEDS/MIN)	QUEUE	QUEUE	DELAY (VER.MIN/ TIME SEGMENT)	GEGMETRIC DELAY (VER.MIN/ TIME SEGMENT)	AVERAGE LELA) PER ARRIVING VEHICLE (MIN)
B · AC C · AB C · A A · B A = C	0.13 0.00 0.81 0.13	4.15 9.83	0.000		0.03	0.03	0.5		0.25
TIME	(VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY SECOND TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
B AC C-AB C-A A-B A-C	0.10 0.00 0.66 0.10 0.72		0.025		0.03 0.00	0.03 0.00es on Phi Politi	of 0.4 0.0	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT) GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	0.25
				Ŷ	copyright				
TIME	(VEH/MIN)		DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDSOMIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
B AC C AB C A A-B A-C	0.09 0.00 0.55 0.09 0.60		0.021 0.000		0.03	0.02	0.3		0.24

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUE FOR S	TREAM C-AB
rime segmen	T NO. OF
ENDING	VEHICLES
	IN QUEUE
.00	0.0
	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

```
I ARM I FLOW SCALE(%) I
I A I 100 I
I B I 100 I
I C I 100 I
```

Demand set: 2015 + gen

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MINUTES. LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM FURNING COUNT DATA

I		Ξ	NUMBER OF	M	NUTES FR	OM STA	ART WHEN	T	RATE	OF	FLOW (VE:	H/MIN)	Í
-	ARM	I	FLOW STARIS	I	TOP OF P	EAK I	FLOW STOPS	I	BEFORE	π	AT TOP	I	AFTER	I
-		I	TO RISE	I	IS REAC	HED I	FALLING	I	PEAK	1	OF PEAK	1	PEAK	I
		77						-		-				-
			15.00	I	45.0	0 1	75.00	I	0.73	I	1.09	I	0.73	I
I	ARM B	=	15.00	4	45.0	0 =	75.00	I	0.09	T	0.13	-	0.09	è
*	ARM C	2	15.00	-	45.0		75.00							
-										÷.		22.		

		I		T	URNING CO	OPORTIONS UNTS (VEH, OF H.V.S	/HR)	I I	urdosesony, suyo
7	IME	I	FROM/TO	I	ARM A I	ARM B I	ARM C	I	. જ જ
07.45	09.15	I		I	I	I		I	off of all.
		I	ARM A	I	0.000 I	0.321 I	0.879	I	es you
		I		I	0.0 I	7.0 I	51.0	-	2003.200
		I		I	(0.0)I	(100.0)I	(0.0)	TÓ	ill'adil
		-		I	I	T		10	£ 2600
		T	ARM B	I	1.000 I	0.000 I	0.000	0.70	Ž,
		I		I	7.0 I	0.0 1	0.00	07	
		I		I	(100.0)I	(0.0)I	(B. 10	T	
		I		1	1	Ī	cot vite	T	
		I	ARM C	=	1.000 I	0.000 I	00000	7	
		T	000000	7	47.0 I	0.0 I	\$0.0	-	
		I		T	(0.0)I	(0.0)	0.0)	T	
		I		I	T	el	, 0.07	T	

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR DEMAND SET 2015 + gen AND FOR TIME PERIOD 1

TIME 07.45-0	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
B-AC	0.09	4.19	0.021		0.00	0.02	0.3		0.31
C-AB	0.00	9.91	0.000		0.00	0.02	5 9 5		0.24
C-A	0.59	2.02	0.000		0.00	0.00	0.0		0.00
A-B	0.09								
A-C	0.64								

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/	AVERAGE DELAY PER ARRIVING
	08.00-0	8.15		111107	(L DDD/MIN)	(12110)	(ADITO)	TIME SEGMENT)	TIME SEGMENT)	VEHICLE (MIN)
	3 AC	0.10	4.17	0.025		0.02	0.03	0,4		0.25
	C-AB	0.00	9.87	0.000		0.00	0.00	0.0		0.00
	C-A	0.70								0.00
	A-B	0.10								
	A-C	0.76								

TRL

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I	STREAM	I	TOTAL		DEMAND	Ī	* QUEU		ING * Y *	I	* INCLUSIV * DE			I
Ė		111	(VEH)		(VEH/H)	Ŧ	(NIN)		(MIN/VEH)	I	(MIN)		(MIN/VEH)	1
7	B-AC	I	9.6	1	6.4	Ī	2.3		0.24	-	2.3	Т	0.24	I
Ī	C-AB	I	0.0	-	0.0	I	0.0	=	0.00	-	0.0	I	0.00	Ī
-	CA	I	64.7	Ξ	43.1	I		I		1		I	22.3.373	I
T	A B	I	9.6	Ţ	6.4	7		I		I		I		I
Ι	A-C	1	70.2	I	46.8	I		I		I		I		I
Ι	ALL	1	154.2	I	102.8	I	2.3	ī	0.02	I	2.3	ī	0.02	I

END OF JOB

[Printed at 15:18:21 on 10/09/2010]

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^{*} 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.

ETRIC DATA

-	DATA ITEM	-	MINOR	ROAD	3	T
ī	TOTAL MAJOR ROAD CARRIAGEWAY WIDTH		(W)	7.40	М.	I
I	CENTRAL RESERVE WIDTH	I	(WCR)	0.00	Μ.	I
-		I				1
I	MAJOR ROAD RIGHT TURN - WIDTH	I	(WC-B)	2.20	M.	1
E.	- VISIBILITY	I	(VC B) 2	25.0	M.	. 7
	BLOCKS TRAFFIC	I		YES		I
		-				T
	MINOR ROAD - VISIBILITY TO LEFT	-	(VB-C)	30.0	М.	Ţ
	- VISIBILITY TO RIGHT	-	(VB-A)	25.0	М.	I
	- LANE 1 WIDTH		(WB-C)	=		Ī
	- LANE 2 WIDIE	I	(WB-A)	-		T
	- WIDTH AT 0 M FROM JUNC.	I	7	0.00	М.	Ī
	WIDTH AT 5 M FROM JUNC.	-		0.00		- 0
	- WIDTH AT 10 M FROM JUNG.	I	1			-
	- WIDTH AT 15 M FROM JUNC.					7
	- WIDTH AT 20 M FROM JUNC.					Ť
	LENGTH OF FLARED SECTION		DERIVED:			Ť

. PES AND INTERCEPT

(NE:Streams may be compined, in which case capacity

will be adjusted)

I	Intercept For Stream B-C		Slope For Opposing Stream A-B	stick purposes of or opposing	હે.	
I	588.44	0.21	0.08	Duposes of for a		
1	Intercept For Stream B A	Slope For Opposing Stream A-C	Slope For Opposing Stream A-B		Slope For Opposin Stream C-B	ıg I
Ţ	459.58	0.20	0.08 FORTY	0.13	0.28	I
		Slope For Opposing Stream A-C	Slope For Opposing Stream A-B	- I I		
I	704.26	0.26	0.26	I		

NB These values do not allow for any site specific corrections

TRAFFIC DEMAND DATA

Consent of copyright owner required for any other use.

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QULUE FOR STREAM B A
TIME SEGMENT
                    NO. OF
  ENDING
                 VEHICLES
                  IN QUEUE
  14.45
15.00
15.15
15.30
15.45
16.00
                       0.0
                       0.0
                       0.0
                       0.0
```

QUEUE FOR STREAM C-AB

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
19.15	0.0
15.00	0.0
15.15	0.0
15.30	0.0
15.45	0.0
16.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

	STREAM	I	TOTAL	DEMAND	I	* QUEUE		I	* INCLUSIV * DE			I
		-	(VEH)	(AEH\H)	I	(MIM)	(MIN/VEH)	I	(MIN)		(MIN/VEH)	I Tinge.
I	B-C	I	2.8	I 1.8	I	0.4 I	0.13	1	0.4	I	0.13	Te contract of the contract of
Ε,	BA	I	11.0	I 7.3	Ē	2.3 I	0.21	7	2.3	I	842103	I
I	C-AB	I	1.6	I 1.1	I	0.1 I	0.08	7	0.1	I	0008	I
I	C-A	I	178.7	I 119.1	I	I		I		I	es y to	I
-	A B	1	11.0	I 7.3	I	Ī		I		3	ses of for	I
Ī	A C	Ĩ	172.1	1 114.7	I	I		I	Ó	II	quired i	I
	ALL	I	377,1	25:.4	I	2.8 I	0.01	I	Special Syl	Į.	0.01	- I
								ERIO		RF.	STIL OUEU	EING AFTER THE END OF THE TIME PER
	THESE V	VIL	L ONLY	BE SIGNI	FIC	ANTLY DIF	FERENT IF	THE	RE IS A LA	RGE	QUEUE REMA	AINING AT THE END OF THE TIME PERI
	OF JO	מו										
IN.) UE JU	/=										

PES AND INTERCEPT

(NB:Streams may be combined, in which case capacity

will be adjusted)

1-0				
I	Intercept For	Slope For Opposing	Slope For Opposing	I
I	Stream B-C	Stream A-C	Stream A B	I
I	588.44	0.21	0.08	I
-				

I Intercept For	r Slope For Opposing	Slope For Opposing	Slope For Opposing	Slope For Opposing
I Stream B-A	Stream A-C	Stream A-B	Stream C-A	Stream C-B
459.58	0.20	0.08	0.13	0.28

I	Intercept For	Slope For Opposing	Slope For Opposing	I
2	Stream C-B	Stream A-C	Stream A-B	I
Ţ	704.26	0.26	0.26	I
-				

NB These values do not allow for any site specific corrections

1 31 1 3 1 4	CIME	(VEH/MIN)	CAPACITY (VEH/MIN)		PEDESTRIAN FLOW (PEDS/MIN)	QUEUE	QUEUE	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	14.45- B-C B A C-AB C-A A B A-C	0.03 0.13 0.02 1.95 0.13 1.87	7.45 4.80 12.36	0.004 0.028 0.001		0.00 0.02 0.00	0.00 0.03 0.00	0.1 0.4 0.0		0.13 0.21 0.08
I	TIME	DEMAND (VEH/MIN)			PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEES)	END QUEUE (VERS)	DELAY (VEH.MEN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
	B C B A C-AB C-A A-B A C	0.04 0.17 0.02 2.38 0.17 2.29	7.36 4.69 12.50	0.005 0.035 0.002		0.00 0.03 0.00	0.00 0.04 0.00	0.1 0.5 0.0		0.14 0.22 0.08
	TIME	DEMAND (VEH/MIN)		DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY C. (VEH.MIN) TIME SECONENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
	B-C B-A C-AB C-A A-B A-C	0.04 0.17 0.02 2.38 0.17 2.29	7.36 4.69 22.50	0.005 0.035 0.002	PEDESTRIAN FLOW (PEDS/MIN) PEDESTRIAN FLOW (PEDS/MIN)	0.00 0.04 0.00	0.01 0.04 0.00es	offor arto. 1 offor 0.5 0.0		0.14 0.22 0.08
					Ŷ	or inspirit		31 77 2233245	************	
	TIME 5.30-1	(VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDSOMIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
	B-C B-A C-AB C-A A-B A-C	0.03 0.13 0.02	7.45 4.80 12.36	0.004 0.028 0.001			0.00 0.03 0.00			0.13 0.21 0.08
		(VEH/MIN)	CAPACITY (VEH/MIN)	CAPACITY	FLOW	QUEUE	END QUEUE (VEHS)	(VEH.MIN/	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
	5.45-1 B-C B-A C-AB C-A A-B A-C	0.03	7,51 4,87 12,25	0.003 0.023 0.001		0.00 0.03 0.00	0.02	0.1 0.4 0.0		0.13 0.21 0.08

^{*}WARNING* NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I	STREAM	I	TOTAL		DEMAND	I	* QUEU			I	* INCLUSIV * DE		and the second second second second	1-1-1-1-1
E		I	(VEH)		(VEH/H)	Ī	(MIN)		(MIN/VEH)	=	(MIN)		(MIN/VEH)	1
I	B-C	ī.	2.8	I	1.8	Ξ	0.4	Ī	0.13	3	0.4	I	0.13	I
I	B-A	=	12.4	I	8.3	I	2.6	I	0.21	I	2.6	I	0.21	I
I	C-AB	I	1.6	I	1.1	=	0.1	I	0.08	=	0.1	I	0.08	I
I	C-A	I	178.7	I	119.1	=		+		2		+		I
Ī	A-B	I	12.4	I	8.3	T		I		+		I		I
Ι	A C	Ι	172.1	Ι	114.7	I		1		I		I		I
14	ALL	Ι	379.9	1	253.3	I	3.1	1-4	0.01	I	3.1	I	0.01	 I

- * 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.

El' OF JOB

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity

Wili	be	adjusted)
------	----	----------	---

Interce Stream		Slope For Opposing Stream A-C	Slope For Opposing Stream A-B	I	oses of for the
588	.44	0.21	0.08	I	Dury Chile

		Slope For Opposing	Slope For Opposing	Slope For Opposing	Slope For Oppos	ingI
I	Stream B A	Stream A-C	Stream A-B	Stream C-A	Stream C-B	I
I	459.58	0.20	0.08 nt of	0.13	0.28	I
	3		Consc			

I	Intercept For	Slope For Opposing	Slope For Opposing I
I	ream C-B	Stream A-C	Stream A-B I
-	12		
I	704.26	0.26	0.26

NB These values do not allow for any site specific corrections

TRAFFIC DEMAND DATA

EPA Export 23-06-2014:23:39:02

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QUEUE FOR STR	EAM B A
TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
14.45	0.0
15.00	0.0
15.15	0.0
15.30	0.0
15.45	0.0
16.00	0.0

QUEUE FOR STREAM C-AB

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
24.45	0.0
15.00	0.0
15.15	0.0
15.30	0.0
15.45	0.0
16.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

	I I	TOTAL	DEMAND	I	* QUEUE * DELA		I	* INCLUSIVE * DELA		I I
	I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	2	(MIN)	(MIN/VEH)	It like
B C	I	2.8	I 1.8	I	0.4 I	0.13	I	0.4 I	0.13	
B-A	I	12.4	I 8.3	I	2.7 I	0.21	I	0.4 I 2.7 I	25.50	Ī
C-AB	I	1.7	I 1.1	=	0.1 I	0.08	I	0 7 -	00008	Ī
C-A	I	188.3	I 125.5	I	I		I	I	262 9 6000	Ī
A-B	I	12.4	I 8.3	I	1.5		I	- O	3.10	I
A-C	ī	181.7	I 121.1	I	I		I	an Pill's	di	I
ALL	I	399.2	1 266.1	I	3,2 I	0.01	I	Decitor I	0.01	Ī
INCLUS:	IVE	DELAY :	INCLUDES	DE	LAY SUFFE	THE TIME PERED BY VEH	ICI	ES WHICH ARE	STILL QUE E QUEUE RE	UEING AFTER THE END OF THE TIME PERIC

[Printed at 15:11:31 on 10/09/2010]

I Intercept For Slope For Opposing Slope For Opposing I

Stream C-B

Stream C-A

I Stream A-D

TRL VIEWER 3.1 AD W:\.. \Mullaghcrone\R152 Crossroads PM.vpo Page 2

TRI

				7-
704.26	0.26	0.37	t	
B-D Stream From	m Left Hand Lane			
	Slope For Opposing Stream A-C	Slope For Opposing Stream A-D	Slope For Opposing Stream A-B	Slope For Opposing Stream C B
1 482.67	0.21	0.21	0.08	0.30
I	Slope For Opposing Stream C-A	Slope For Opposing Stream C-D	Slope For Opposing	Slope For Opposing
I 	0.13	0,13		
E D Stream From	n Right Hand Lane			
I Intercept For I Stream B-D	Slope For Opposing Stream A C	Slope For Opposing Stream A-D	Slope For Opposing Stream A-B	Slope For Opposing Stream C-B
I 482.67	0.21	0.21	0.08	0.30
Ī Ī	Slope For Opposing Stream C-A	Slope For Opposing Stream C-D	Stope For Opposing	Stope For Opposing
I	0.13	0.13		
D-B Stream From	ı Left Hand Lane		at V	ê.
I Intercept For I Stream D-B	Slope For Opposing Stream C-A	Slope For Opposing Stream C-B	Slope For Opposing Stream NYC ni	Slope For Opposing Stream A-D
592.82	0.26	0.26	10 11 0 10 10 10 10 10 10 10 10 10 10 10	0.37
I I	Slope For Opposing Stream A-C	Slope For Opposing Stream A-B	Stope For Opposing	Slope For Opposing
I	0.16	0.16	into of	
D-B Stream From	Right Hand Lane	at of copy.	Stope For Opposing Stope For Opposing Stope For Opposing	
I Intercept For I Stream D-B	Slope For Opposing Stream C-A	Slope For Opposing Stream C-B	Slope For Opposing Stream C-D	Slope For Opposing Stream A-D
592.82	0.26	0.26	0.10	0.37
-		Siope For Opposing Stream A-B	Slope For Opposing	Slope For Opposing
	0.16	0.16		

TRAFFIC DEMAND DATA

		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)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
26.45-17 B-ACD A BCD A-B	.00 0.81 0.29 1.12	5.31 14.07	0.152 0.021		0.13	0.18	2.6		0.22 0.07
A C D-AB	5.51 0.48	8.20	0.059		0.05	0.06	0.9		0.13
D-BC C ABD C-D C-A	0.35 0.03 0.39 6.66	6.00 14.27	0.059		0.05	0.06	0.9		0.18 0.07
TIME		CAPACITY (VEE/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)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
B-ACD A BCD A B	0.99 0.41 1.36	4.79 14.61	0.207 0.028		0.18	0.26	3.7 0.5		0.26 0.07
)A-C D-AB	6.71 0.60	7.58	0.079		0.06	0.08	1.2		0.14
D-BC C-ABD C-D C-A	0.43 0.04 0.48 8.15	5.39 14.85	0.080		0.06	0.09	1.2		0.20 0.07
							off, and other man		
							ally any or		
TIME		CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	OURDE!	DELAY (VEH.MIN/ TIME SEGMENT)	(AFE 2 14 7 14 A	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17 B-ACD A-BCD A-B	0.99 0.41 1.36	4.79 14.61	0.207		0.26if	0.26 40.04	3.9		0.26 0.07
A-C D-AB D-BC	6.71 0.60 0.43	7.58 5.39	0.079	Ŷ	80,08	0.08	1.3		0.14
C-ABD C-D C-A	0.04 0.48 8.15	14.85	0.003	FLOW (PEDS/MIN)	0.00	0.00	0.0		0.07
		CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW	START	END QUEUE	DELAY (VEH.MIN/	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17 B-ACD A-BCD A-B	0.81 0.29 1.12	5.31 14.07			0.26	0.18	2.9	in didimit,	0.22
A-C D-AB	5.51		0.059		0.08	0.06	1.0		0.13
D-BC C-ABD C-D C-A	0.35 0.03 0.39 6.66	6.00 14.27	0.059		0.09	0.06	0.0		0.18 0.07
TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING
17.45-18 B ACD A-BCD A-B	0.22	5.68 13.67	0.119				2.i 0.3		0.20 0.07
A-C	0.94 4.63 0.40 0.30	8,64 6.43	0.047		0.06	0.05 0.05	0.8		0.12 0.16
C-ABD C-D C-A	0.02 0.33 5.58	13.84	0.001		0.00	0.00	0.0		0.12 0.16 0.07

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-ACD

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.1
17.00	0.2
17.15	0.3
17.30	0.3
17.45	0.2
18.00	0.1

QUEUE FOR STREAM A-BCD

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.0
17.00	0.0
17.15	0.0
17.30	0.0
. 45	0.0
.00	0.0

QUEUE FOR STREAM D-AB

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.0
17.00	0.1
17.15	0.1
17.30	0.1
17.45	0.1
18.00	0.0

QUEUE FOR STREAM D-BC

TEME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.0
17.00	0.1
17.15	0.1
17.30	0.1
17.45	0.1
18.00	0.0

QUEUE FOR STREAM C-ABD

	A STATE OF THE STA
TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.0
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0

	118	-			
ā	нки	-	FLOW	SCALE(%)	I
2					-
-	A	4		100	I
I	B	I		100	T
1	C	I		100	I
I	D	I		100	-

Demand set: 2010 + gen

TIME PERIOD BEGINS 16.30 AND ENDS 18.00

LENGTH OF TIME PERIOD - 90 MINUTES. LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

-		I							ART WHEN						
-	ARM	I	FLOW	STARTS	II	TOP (OF PEAK	I	FLOW STOPS	I	BEFORE	I	AT TOP	I	AFTER
-		1	TO	RISE	*	IS I	REACHED	Ι	FALLING	I	PEAK	Ι	OF PEA	K I	PEAK
I	ARM A	I		15.00	ī		15.00	1	75.00	I	5.78	7	8.66	ī	5.78
	ARM E	-		15.00	I	1	15.00	I	75.00	3	0.69	$\bar{\mathcal{I}}$	2.03	7	0.69
	M C			15.00	I		5.00	I	75.00	Ī	5.91	3	8.87	I	5.91
1	M D	I		15.00	I	9	15.00	2	75.00	3	0.73	I	1.09	I	0.73

		I TURNING PROPORTIONS I TURNING COUNTS (VEH/HR) I (PERCENTAGE OF H.V.S) I FROM/TO I ARM A I ARM B I ARM C I ARM DOT I ARM A I 0.000 I 0.165 I 0.812 I 10.014 I I ARM A I 0.000 I 76.0 I 375.0 Km 11.0 I I (0.0) I (6.6) I (4.831 Km 0.0) I I I I I I I I I I I I I I I I I I I										
TIME	I	FROM/TO) I	ARM A I	ARM B I	ARM C I	ARM DOT					
16.30 - 18,00	I		I	I	I	I	Joseph J					
	I	ARM A	I	0.000 I	0.165 I	0.812 I	01.024 I					
	I		. =	0.0 I	76.0 I	375.0 K	1 0.14 C					
	I		3	(0.0)I	(6.6)I	(4.8-)1	APO 10.0 I					
	7		I	I	I	್ಯಾಂಟ್ ಕ್ರ	7, I					
	3	ARM B	I	0.564 I	0.000 I	0.0001	0.430 1					
	I		I	31.0 I	0.0 I	60° 000 I	24 0 T					
	I		I	(3.2) I	(0.0) I	1(0.0)1	(12.5)I					
	I		I	I	I	ξ U	I .					
	I	ARM C	I	0.941 [0.002 🗓	0.000 I	0.057 I					
	I		I	445.0 I	1.001	0.0 I	27.0 1					
	I		I	(3.4)I	I (000) I	(0.0)I	(25.9)I					
	3		I	I	I	1	Ī					
	-	ARM D	I	0.379 I		0.259 I	0.000 I					
	I		I	22.0 I	21.0 I	15.0 I	0.0 I					
	I		I	(4.5)I	(19.0)I	(20.0)I	(0.0)I					
	I		I	7	I	1	I					

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR DEMAND SET 2010 + gen AND FOR TIME PERIOD 1

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)	5
-	16.30-16	. 45			10.20.30.002.00	*******	3.7-11-1	7 - 7 - 7 - 7	TIM DEGREENT,	ADDITION (WIM)	9
I	B ACD	0.69	5.59	0.123		0.00	0.14	2.0		0.20	-
Ι	A-BCD	0.22	13.67	0.016		0.00	0.02	0.3		0.07	-
I	A-B	0.94								0.07	7
I	A-C	4.63									1
I	D AB	0.41	8.43	0.049		0.00	0.05	0.7		0.12	-
I	D BC	0.32	6.11	0.052		0.00	0.05	0.8		0.17	7
T	C-ABD	0.02	13.84	0.001		0.00	0.00	0.0		0.07	-
Ī	C-D	0.34								3.0	7
I	C-A	5.58									6
Ţ											7

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

							948844											
111111	STREAM	11111	TOTA	TOTAL DEMAND		TOTAL DEMAND			DEMAND I * QUEUEING * I * DELAY *				I * INCLUSIVE QUEUEING * I * DELAY *					
1		Ī	(VEH)		(VEH/H)	I	(MIN)	(MIN/VEH)	1	(MIN)		(MIN/VEH)						
Ţ	B-ACD	I	75.7	I	50.5	I	17.7 I	0.23	2	17.7	1	0.23						
I	A-BCD	I	27.7	I	18.5	I	2.4 I	0.09	7	2.4	-	0.09						
Ī	A B	I	102.5	I	68.3	I			Ī		=							
Ι	A-C	I	505.7	I	337.1	1			T		-							
	D-AB	I	45.4	I	30.2	I	6.2 3	0.14	I	6.2	-	0.14						
	D BC	I	34.5	I	23.0	ī	6.6 I	0.19	I	6.6	I	0.19						
	C ABD	-	2.6	7	1.7	I	0.2 =	0.07	Τ	0.2	Т	0.07						
1	C-D	-	37.1			I	I		I		T							
I	C-A	-	611.4		407.6	I	I		I		I							
I	ALL	I	1442.5	7	961.7	Ι	33.1 I	0.02	I	33.1	I	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

.SLOPES AND INTERCPET

B C Stream

. 5	SLOPES AND INT	ERCPET		
(N	NB:Streams may	be combined, in which	ch case capacity	, S
Wi	ill be adjuste	d)		other
В	C Stream			ses alta and
		Slope For Opposing Stream A C	Siope For Opposing Stream A-B	I supply of the state of the st
I	630.23	0.23	0.09	Story On It
D-	-A Stream		For Pi	To the field of th
		Slope For Opposing Stream C-A	Slope For Opposing Stream	Ī
I	763.98	0.28	0.11	I

B-A Stream

		Slope For Opposing Stream A-C	Slope For Opposing Stream A-D	Slope For Opposing Stream D-A	Slope For OpposingI Stream D-B I
I	482.67	0.21	0.21	0.21	0.21 I
1.141		Slope For Opposing Stream A-B	Slope For Opposing Stream C-A	Slope For Opposing Stream C-B	Slope For OpposingI Stream D-C I
I		0.08	0.13	0.30	0.11 I

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Ì	592.82	0.26	0.26	0.26	0.26 I

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0.16					1

TRAFFIC DEMAND DATA

			CAPACITY (VEH/MIN)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
2	16.45-17 B-ACD A BCD A-B	0.87 0.33 1.17	5.10 14.20	0.170 0.023		0.15	0.20 0.03	2.9		0.24
	A-C D AB	5.82	7.84	0.066		0.05	0.07	2.0		0.14
	D-BC	0.52	5.59	0.000		0.05	0.08	1.1		0.19
	C-ABD C-D	0.03	14.43	0,002		0.00	0.00	0.0		0.07
	C-A	0,42 7,06								
	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)		PEDESTRIAN FLOW	START QUEUE	END QUEUE	DELAY (VEH.MIN/	GEOMETRIC DELAY (VER.MIN/	AVERAGE DELA! PER ARRIVING
1	17.00-17	.15		(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME SEGMENT)	TIME SEGMENT)	VEHICLE (MIN)
	B ACD A-BCD A B	1.06 0.46 1.43	4.56 14.78	0.234		0.20	0.30	4.3 0.6		0.29 0.07
	A-C D-AB	7.08	7.16	0.089		0.07	0.10	1.4		0.15
	D-BC C-ABD	0.48	4.98	0.097		0.08	0.11	±.5		0.22
	C-D C A	0.51 8,64	13.04	0.003		0.00	20100			0.07
-		1000						off, on offering, officers,		
								all all		
	TIME	(VEH/MIN)	CAPACITY (VEH/MIN)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS) 0.30:10 0.00 11:1	ONE END	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELA PER ARRIVING VEHICLE (MIN
1	17.15 17 B-ACD	1.06	4.56	0.234		0.30	31,02130	4.5		0.29
	A-BCD A-B	0.46	14.78	0.031		0.02	20.04	0.6		0.07
	A-C	7.08			^	of itight				
	D-AB D-BC	0.64	7.16	0.089	~	0920	0.10	1.5		0.15 0.22
	C-ABD	0.04	15.04	0.003	at of	0.00	0.00	0.0		0.07
	C-D C-A	0.51 8.64			(PEDS/MIN)					
)				- 5.60 - 616					
		(VEH/MIN)	(VEH/MIN)	CAPACITY	FLOW	QUEUE	QUEUE	(VEH.MIN/	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	PER ARRIVING
1	17.30-17	.45 0.87						3.3		0.24
	A RCD	0.33 1.17 5.82	14.20	0.023		0.04	0.03	0.4		0.07
	D-AB	0.52	7.83 5.59	0.066		0.10	0.07	1.1		0.14 0.19
	C-ABD	0.03	14.43	0.002		0.00	0.00	0.0		0.07
	C-D C-A	0.42 7.06								
						START	END	DELAY	GEOMETRIC DELAY	AVERAGE DELA
1	7-45-18	(VEH/MIN)	(VEH/MIN)	CAPACITY (RFC)	FLOW (PEDS/MIN)	QUEUE (VEHS)	QUEUE (VEHS)	(VEH.MIN/ TIME SEGMENT)	(VEH.MIN/ TIME SEGMENT)	PER ARRIVING VEHICLE (MIN
	B-ACD	0.73 0.25 0.99	5.49 13.78							0.21
	D-AB	0,43	8.31	0.052		0.07	0.06	0.8		0.13
	D-BC C-ABD	0.33 0.02 0.35 5.91	6.04 13.98	0.055		0.00	0.06	0.0		0.18

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B ACD

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.2
17.00	0.2
17.15	0.3
17.30	0.3
17.45	0.2
18.00	0.2

QUEUE FOR STREAM A-BCD

1.
0
S
E

QUEUE FOR STREAM D-AB

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.1
17.00	0.1
17.15	0.1
17.30	0.1
17.45	0.1
18.00	0.1

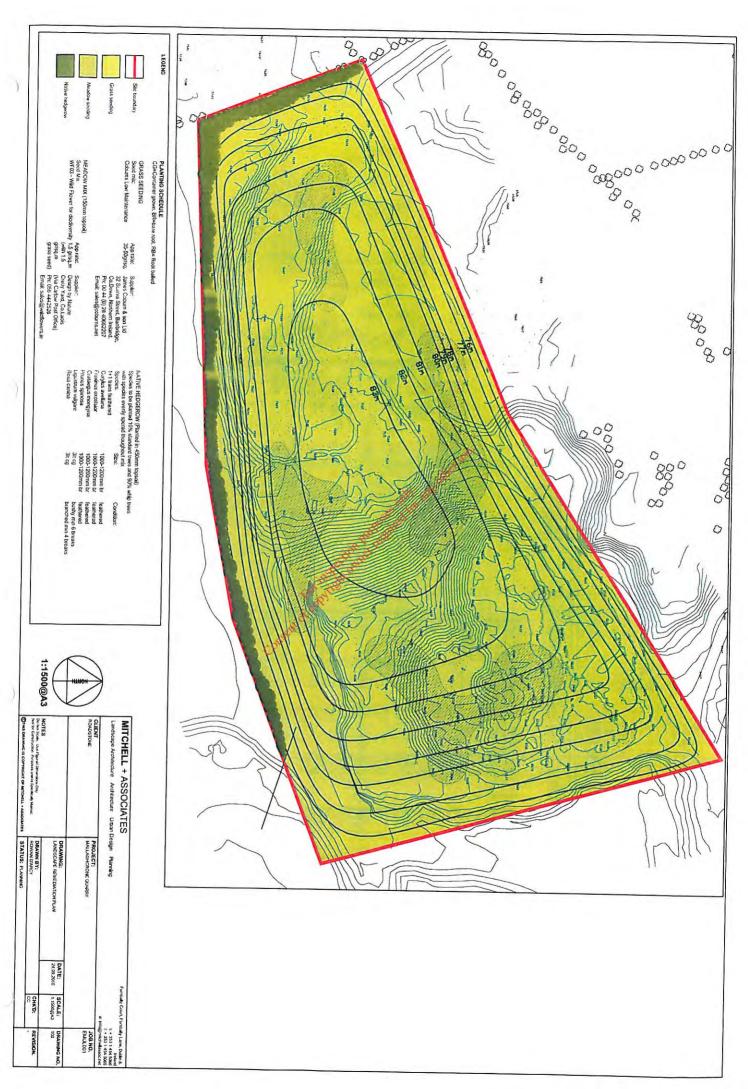
QUEUE FOR STREAM D-BC

TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.1
17.00	0.1
17.15	0.1
17.30	0.1
17.45	0.1
18.00	0.1
1.1	

QUEUE FOR STREAM C-ABD

	and the second second
TIME SEGMENT	NO. OF
ENDING	VEHICLES
	IN QUEUE
16.45	0.0
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0

APPENDIX 14.1 Landscaping restoration master plan and earthworks specification





View from north-western edge of application site looking south-east towards Platin Cement Plant

EMUL001 MULLAGHCRONE QUARRY Outline Landscape Specification Earth Works

Subsoil cultivations

Subsoil should be placed in layers not exceeding 150mm thick; consolidation of fill may be accomplished by the use of special compacting machinery or by running over it with the next load; filling by tipping over an exposed face is not recommended because of the difficulty of consolidation.

After completion of subsoil moving, the formation level should be graded with the box scraper to even, running contours and then, depending on the soil texture and degree of compaction, loosened with a subsoiler or ripper.

Subsoil levels

Subsoil levels shall be 200mm below the finished ground levels in all areas for grass seeding to allow for 250mm of topsoil to be placed so that 50mm of topsoil stands proud of all kerbs, paths, etc.

Subsoil levels shall be 400mm below the finished ground levels in all areas for shrub planting to allow for 450mm of topsoil to be placed so that 50mm of topsoil stands proud of all kerbs, paths, etc.

Subsoil levels shall be 550mm below the finished ground levels in all areas for shrub planting to allow for 600mm of topsoil to be placed so that 50mm of topsoil stands proud of all kerbs, paths, etc.

Subsoil levels in all areas for tree planting shall be 900mm below the finished ground levels to allow for 900mm of topsoil to be placed.

Topsoil

Topsoil shall be native topsoil as removed and stored.

All imported topsoil to be of medium texture, pH matching that of the native topsoil, stone content 10mm in size not greater than 5% by weight, and no stones greater than 40mm in any dimension, and shall conform to BS 3882:1965. Topsoil shall be a free draining sandy loam. Depth of topsoil to be as specified.

Topsoil shall be free of perennial weed roots, i.e. couch grass, sticks, sub soil or any waste, toxic, putrescent or foreign matter.

After spreading, the soil should be cultivated to crumb size to a condition suitable for blade grading. Large stones and unwanted material 75mm and over should be picked off and carted away. Areas should then be blade graded to true flowing contours.

As topsoiling proceeds all consolidated wheel tracks shall be forked over.

Final grading of the top 150mm is to be carried out to ensure a true specified level and slope to avoid dishing or other depressions where water may collect. The use of a heavy roller to roll out humps will not be permitted and any area that becomes unduly compacted during the grading operation shall be loosened by forking or harrowing.

Topsoil levels

All topsoil shall be placed and graded by the Main Contractor to the following levels:

grass seeding 250mm shrub / groundcover planting 450mm hedge planting 600mm

tree planting 1000mm x 1000mm x 900mm pit

Maintenance of topsoil stockpiles

Landscape Architecture Architecture Urban Design

EMUL001 MULLAGHCRONE QUARRY Outline Landscape Specification Soft Works

Damage

All trees and plants are to be adequately and carefully packed and protected to survive transport, whatever means, to the site, during loading, transit or unloading.

If in spite of these precautions roots, branches, or shoots suffer slight damage, they are to be carefully pruned.

If major damage has occurred, the plant or tree shall be rejected and replaced at the Landscape Contractor's own expense.

Defects Liability Period

The Landscape Contractor shall be responsible for any plants that fail to take during the first full growing season (12 months) from date of completion.

Protection

The Landscape Contractor shall provide adequate temporary protection to the whole of his work and shall include temporary coverings, planked barrow runs and all other measures for protecting the work from damage.

The Landscape Contractor shall also protect from damage all existing roadways, kerbs, services and other completed works on site.

Any work damaged or soiled by weather, traffic or other causes due to inadequate temporary protection shall be removed and made good at the cost of the Landscape Contractor. The form of protection is left to the discretion of the Landscape Contractor.

Programme of Operation

The Landscape Contractor shall execute his works in conformity with a programme to be agreed with the Landscape Architect and shall include in his estimate for working within an agreed time limit.

No individual areas will be handed over unless there is an agreed sectional completion. The Landscape Contractor shall allow for keeping individual areas adequately maintained until the whole has been completed.

Site Inspection

Prior to the submission of tenders to the Landscape Architects, the Landscape Contractor is expected to visit the site and familiarise himself with the nature of the existing roads and pathways, the soil conditions, slope gradients, any hazards and other matters affecting the works. No extra charges will be made for any mounderstandings, or incorrect information or any of these points, or on grounds of insufficient description or lack of information will be allowed.

Setting Out

The Landscape Contractor will be responsible for checking all schedules and drawings by the Landscape Architect. In the event of any discrepancies being found between such schedules and drawings, or if the Landscape Contractor considers that additional detail drawings are required, the Landscape Contractor shall report such discrepancy in writing at least ten days before the works are to be executed.

The right is reserved to adjust the exact position of trees and specimen shrubs after they have been set out on site.

Any trees which are planted without approval of the setting out may be required to be re planted at the Landscape Contractor's expense.

Supervision and Contractor's Staff

The Landscape Contractor shall ensure full and adequate supervision of the site during the duration of the works.

The Landscape Contractor shall at all times during the Contract period employ sufficient persons of appropriate abilities, skills, care, and experience as are required for the proper performance of the Services in accordance with the Contract and shall ensure that a sufficient reserve of persons is

Passenger cover in relation to seating capacity of cab.

Cover for towing including trailers where applicable.

Loading and unloading risks both on and beyond public thoroughfares.

Health and Safety

The Landscape Contractors shall at their own cost arrange for the safe keeping during and after delivery to works of all manures, plants and equipment necessary to complete the job in hand. All oil and petrol containers must be kept in suitable sheds and the Landscape Contractor shall observe all regulation regarding the storage of poisonous and/or inflammable liquids.

The Landscape Contractor shall in performing the Services adopt safe methods of work in order to protect the health and safety of his own employees, the employees of the Employer and of all other persons, including members of the

public and shall comply with the requirements of the Health and Safety at Work Act 1974, The Management of Health and Safety Regulations 1992, Control Of Substances Hazardous to Health (COSHH) Regulations 1988 and 1994, and of the Road Traffic Act 1988 and of any other Acts, Regulations, Orders or any European Directive pertaining to the health and safety of employed persons.

The Landscape Contractor shall at the time of submitting his Tender provide to the Employer a written copy of his health and safety working procedures relating to the performance of the Contract.

The Landscape Contractor shall review his Health and Safety policy and safe working procedures as often as may be necessary and in the light of changing legislation or working practices or the introduction of new Work Equipment and shall notify the Supervising Officer in writing of any such revisions. The Supervising Officer may require the Landscape Contractor to amend its health and safety policy and safe working procedures to comply with any change in legislation or working practices or required as a result of the introduction of new Work Equipment.

Equal Opportunities Policy

The Landscape Contractor shall keep his equal opportunities policy in force for the duration of the Contract to comply with statutory obligations. Any findings of unlawful discrimination against the Landscape Contractor during the three years prior to the commencement of the Contract shall be reported to the Employer, together with details of the steps taken to avoid repetition.

Waiver

Failure by the Employer at any time to enforce the provisions of the Contract or to require performance by the Landscape Contractor of any of the provisions of the Contract shall not be construed as a waiver of any such provision and shall not affect the validity of the Contract or any part thereof or the right of the Employer to enforce any provision in accordance with its terms.

Acceptance

Payment will be made to the Landscape Contractor following certification of completed works by the Landscape Architect. There shall be no sectional handover unless previously agreed. In appropriate circumstances and where the contract involves the application of a defects liability period following practical completion of landscape works, there shall be a retention amounting to 5% of the total contract price, which shall be released when defects have been made good at the end of the defects liability period.

Default in provision of the service

Without prejudice to any other powers of the Employer, if the Landscape Contractor, for whatever reason fails to provide or perform the Services in whole or in part completely in accordance with the terms of the Contract then without prejudice to any remedy contained herein the Employer may by his own or other workmen provide and perform such Services or part thereof in which the Landscape Contractor has made default. The costs and charges incurred by the

Care must be taken to ensure that bare roots are protected from physical damage and desiccation at all times. All bare roots must be covered within two hours of lifting.

Bundling

Whip planting must be in bundles of the same species and size, all shoots must face in the same direction so that roots and shoots are not in contact, and must be of equal numbers. Bundles are to be securely tied with supple material which will not, by its nature or tension, cause damage to the plants.

Labelling

Each individual plant, bundle, bag, or lot of one species shall be labelled with a securely attached label, clearly indicating the plant name, grade and quantity.

Grass Seed

Grass seed shall conform to the requirements of British Standard 4428:1969 and subsequent amendments, and to the European communities (seed and fodder plants) regulations 1976. The Landscape Contractor shall supply, with each seed mixture, a certificate stating the composition, purity, germination, year of collection and country of origin.

The germination capacity of each constituent of the mixture should be not less than 80%, and the purity of the mixture not less than 90%.

Total weed seed content should not be more than 0.5% and the total content of other crop seeds should not be more than 1%. These minimum figures shall be for the current 14 month period of annual tests.

The seed is to be thoroughly re-mixed before sowing to avoid patchiness on the ground and is to be 'Coburns Urban Parks mix' or similar approved, sown at a rate of 35 - 50g per square metre. (James Coburn + Sons Ltd., 32 Scarva Street, Banbridge, Co. Down BT32 3DD Telephone: 08 - 018206 - 62207 Fax: 08 018206 - 27250)

Wild Flower Seed

Wild Flora Mix is to be 'Coburn's Light's of mix' or similar approved as supplied by Coburn's, seed merchants. Grass seed shall conform to the requirements of British Standard 4428:1969 and subsequent amendments, and to the European communities (seed and fodder plants) regulations 1976.

The seed is to be thoroughly re-mixed before sowing to avoid patchiness on the ground. The seed can be bulked up with sand to ease distribution, lightly raked or rolled in with a ringed roller, taking care not to bury the smaller seeds.

The seed is to be sown at a rate of 5gms per square metre.

Container grown Shrubs, Groundcovers, Climbers and Herbaceous Plants

Shrubs shall be bushy, well established nursery stock with a good fibrous root system. They shall be container grown, true to size, name and description as scheduled. Shrubs shall conform to the appropriate British Standards.

Plants shall not be pot bound, nor with roots deformed or restricted.

Bare root material will only be accepted where specified.

Herbaceous plants shall be supplied as well rooted clumps, showing several healthy buds, and grown in pots, pots shall be appropriate to the size of the plant supplied, minimum size 0.5litres (80mm square or 90mm diameter).

Whips and Transplants

All plant material must comply in all respects with the current edition of BS 3936 Parts 1, 4, and 5.

Tree Anchors, Stakes, Guys, etc.

All trees other than semimature trees and whips trees shall be supplied and fitted with one tree stake per tree.

Tree stakes shall be peeled poles of oak, sweet chestnut, pine or douglas fir, or tanalised larch. All stakes shall be preserved with water borne copper chrome arsenic to IS 131, to a net dry salt retention of 5.3kg per cubic metre of timber.

Stakes shall be supplied as sizes specified.

They shall be at least 1.8 metres long unless otherwise specified, with a minimum diameter of 75 mm at both butts.

Stakes shall be driven prior to planting with a drive all, wooden maul or cast iron mell, not with a sledge hammer.

Trees shall be tied to each stake with a purpose made tie and spacer, the tie to be overlapped and thrice nailed to the stake. Tree ties shall be rubber or PVC or proprietary fabric laminate composition, and shall be durable enough to hold the tree secure in all weather conditions for a period of three years.

They shall be flexible enough to allow for proper tightening of the tie.

Tree ties shall be 25mm -40mm wide depending on tree size. They shall be fitted with a simple collar spacer to prevent charring, and with a buckle for adjustment.

All Semimature trees shall be supplied and fitted with anchoring system: "Platipus root anchoring system kit" (as by Duckbill Anchors Ltd., Perrywood Business Park, Honeycrock Lane, Salfords, Nr. Redhill, Surrey, England, RH1 5DZ Tel: 01737 762300).

Mulch

Mulch shall be graded bark chippings from coniterous trees, particles 25 - 75mm, free of fine material, dust or wood.

Mulch will be rejected if in the Landscape Architect's opinion it is likely to be wind blown.

The Contractor should arrange to have an on site sample (or samples) inspected by the Landscape Architect prior to spreading. Spreading without the approval of sample is at the Contractor's own risk.

Approved chemicals

All chemicals used shall be non-toxic to human beings, birds and animals under normal use, and chemicals which are not agriculturally approved shall not be used.

The use of the following herbicides is acceptable:

Roundup

Basta

Tritox (only after 2nd cut)

Casoron G

Kerb Flo

The use of the following fertilizers is acceptable:

Fisons PS5: grass areas

Osmocote Plus- fertiliser N:P:K 15:9:11 plus trace elements: Shrub areas

Enmag - 4:19:10 + 7.5%: Tree planting

The Landscape Contractor may only use alternative formulations and manufacturers with prior approval by the Landscape Architect.

WORKMANSHIP

Site Clearance

Remove and dispose of off-site any rubbish still occurring in topsoiled areas, including weeds, old masonry and rubble, metal, wood, and stones, excavating as necessary to permit the specified depth of final cultivations.

All scrub areas shall be grubbed and all existing plants of same shall be removed and disposed of including all root systems unless otherwise specified.

Before topsoiling, remove all stones over 75mm in diameter. Dig out any areas polluted by oil or chemicals and make up with clean soil. Break up the formation under any areas liable to ponding of rainwater, so that they drain.

Topsoil shall be moved and spread only in dry weather. No work to topsoil shall be carried out when it is waterlogged, or if it's moisture content is conducive to structural deterioration. minimise compaction of topsoil and subsoil when spreading, running machinery over the surface as little as possible.

Cultivation Generally

The aim of cultivation is to produce a well-drained and textured soil suitable for plant growth. All areas to be planted, or seeded shall be cultivated to a minimum depth of 450mm or deeper if specified. Areas where obvious compaction has occurred shall be ripped. Stones above 75mm longest dimension shall be removed from the top 100mm layer of shrub planting areas.

Final preparation - Seeding Areas

One week before seeding, Fisons PS5 or similar approved pre-seeding fertiliser shall be spread at a rate of 70g per square metre and incorporated in the surface layer. The soil shall be firmed and raked to a fine tilth suitable for seeding.

Final preparation - Wild flower seeding Areas

The soil shall be firmed and raked to a fine tilth suitable for seeding. No fertilisers shall be used on areas for wildflower seeding.

Final Preparation - Shrub planting areas

Coarse clean moist compost or approved peat substitute shall be forked in at a rate of 5kg per square metre and incorporated to a depth of 200mm.

Controlled release fertiliser N:P:K 15:9:11 plus trace elements - Osmocote plus or similar approved shall be applied at specified rates and raked into the top 50mm layer.

The surface shall be raked to a tilth suitable for planting.

Final Preparation Whip planting areas

Coarse clean moist compost or approved peat substitute shall be forked in at a rate of 5kg per square metre and incorporated to a depth of 200mm.

An approved fertiliser shall be spread at a rate of 70g per square metre and raked into the top 50mm layer.

The surface shall be raked to a tilth suitable for planting.

Planting Season

Forestry transplants and feathered trees other than evergreens will be planted between November and march inclusive. Evergreens will be planted in October or in April/May. Planting shall normally be carried out during the period 1st October to 31 March in suitable

weather,

Grass areas shall only be accepted as reaching practical completion when germination has proved satisfactory and all weeds have been removed.

No payment for re-seeding shall be made to the landscaping Sub-Contractor if the seed fails due to any cause whatsoever. He shall be required to make good the soiling and repeat the seeding until a good sward is obtained.

Bulbs / Corms

Bulbs/Corms shall be planted in a random pattern and allowed to naturalise. Avoid planting in straight lines. To plant, take out core in grass/shrub area, placing bulb/corm at base of hole ensuring no space is left under bulb. Hole must be wide enough to allow for base of bulb/corm to be placed directly on soil. Replace core and firm flush.

Shrubs

All shrubs shall be pit planted in precise locations as shown in plans. Pits shall be excavated 150mm wider in all directions than the natural root spread of the plant, and the bottom of the pit must be well forked to improve drainage.

Back filling of all pits shall be with soil and compost or an approved peat substitute in the ratio of 4:1.

All plastic and non-degradeable wrappings and containers shall be removed before planting. Make four vertical cuts with a sharp knife on the quadrants through the edge of container grown rootballs to sever girdling roots.

Whip Planting

All whips shall be notch planted in staggered pattern. Whip trees shall be planted randomly with no more than 5 plants of the same species planted in groups. Blocks of similar species are not to be planted. Pits shall be excavated 150mm wider in all directions than the natural root spread of the plant.

Tree Planting

Planting pits for trees in undisturbed ground will be backfilled with excavated material. Tree pits in mounds or other made up ground shall be backfilled with topsoil.

All tree pits for all trees other than semimature trees shall be excavated 200mm wider in all directions than the natural root spread, or rootball, and the base forked to improve drainage. Stakes shall be positioned before backfilling.

Topsoil backfill shall be mixed with peat substitute in the ratio of 4:1.

60g Enmag or similar approved slow release fertiliser shall be incorporated.

The backfill shall be settled and well firmed around the roots avoiding air pockets.

All semimature tree pits shall be excavated 500mm wider than the natural root rootball, and 150mm deeper to allow for 250mm of backfill mix, tamped firm to 150mm. In all semimature tree pits an additional depth of 150mm should be dug to allow for a 150mm gravel layer at the bottom of the pit to aid in drainage.

Sides of tree pit shall be ripped and loosened to ensure a good bond with the backfill and to avoid root girdling.

All semimature tree pits shall be backfilled with mix consisting of: 10 parts native topsoil and 5 parts sharp sand. 60g Enmag or similar approved slow release fertiliser shall be incorporated. Backfilling shall be firmly tamped every 150-200mm and when pit is half full the backfill shall be flooded for further settlement. After excess water has drained further soil shall be added, tamped, and a final watering shall be given just before the final 75mm of backfill added.

The backfill shall be settled and well firmed around the roots avoiding air pockets.

All trees shall be well watered after planting.

symptoms to develop before carrying out any cultivations. Apply to manufacturers recommendations. Apply 'Roundup' to kill existing grass preseeding, and weeds germinating in topsoil.

If germinating weed grasses are less than 100mm high and broad leaved weeds have not produced full-sized keaves, do not apply 'Roundup'. Apply 'Basta' @ recommended rates, 4 to 7 days before cultivating.

<u>Basta</u> - by Hoechst Ltd. 3 - 7.5litre/Ha. Do not apply when rain is forecast within six hours. Apply to manufacturers recommendations.

'Actrilawn 10' - by May + Baker Ltd., 11litre/Ha. Shall be used in accordance with manufacturer's instructions. Apply 'Actrilawn' when grasses have reached the two leaf stage or beyond, and when seedlings have emerged and have reached cotyledon or two leaf stage (approx. 4 weeks after sowing). Do not mow grass within 7 days of treatment.

<u>Casoron G</u> - Granular weedkiller to be applied 5.6-22.5 kg/1000sq.m. Shall be used in accordance with manufacturer's instructions.

<u>Kerb Flo</u> - weedkiller to be applied 3.75 - 4.25litre/Ha. Shall be used in accordance with manufacturer's instructions.