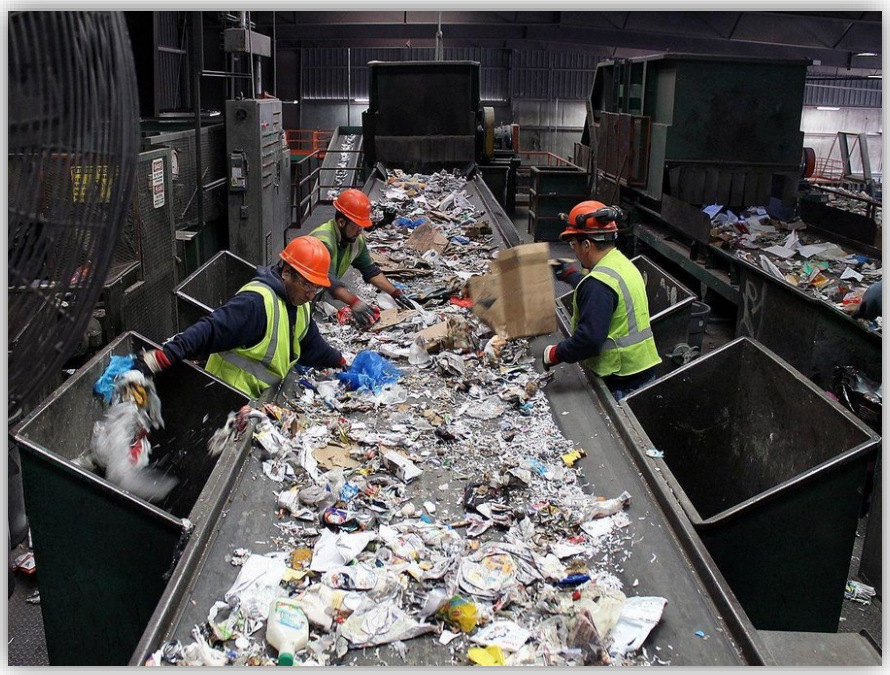
COUNTRYCLEAN RECYCLING LIMITED

Energy, Environment & Safety

Little Island Waste Recycling and Transfer Station

Little Island Recycling and Transfer Station



Proposed Development of a Recycling and Transfer Station at Courtstown Industrial Park, Little Island, Co Cork.

Environmental Impact Assessment

Volume II: Appendices

November 2018

ENVIRONMENT ISO 14001:2004 NSAI Certified

HEALTH & SAFETY OHSAS 18001:2007 NSAI Certified

QUALITY ISO 9001:2008 NSAI Certified

OES Consulting

Liber House
Tralee, Co. Kerry

Crescent Building, Northwood
Santry, Co. Dublin

Osborne Promenade
Warrenpoint, Co. Down

EIAR Volume II: Appendices

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Appendix 1.1
Scoping Responses

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Regional Inspectorate, Inniscarra
County Cork, Ireland

Cigireacht Réigiúnach, Inis Cara
Contae Chorcaí, Éire

T: +353 21 487 5540
F: +353 21 487 5545
E: info@epa.ie
W: www.epa.ie

LoCall: 1890 33 55 99



Mr. David Heelan,
OES Consulting
Anfield House
Baldonnell Business Park
Naas Road
Dublin 22

26th October 2017

Re: **Scoping Opinion under Article 5(2) of Directive 2014/52/EU (EIA Directive)**

Dear Mr. Heelan,

I refer to the scoping request for a waste recycling and transfer facility at Courtstown Industrial Park, Little Island, Co. Cork on behalf of John Garde, received by the Agency on the 29th June 2017. In accordance with the requirements of Article 5 (2) of Directive 2014/52/EU *on the assessment of the effects of certain public and private projects on the environment,* the Agency has consulted with the Planning Authority Cork County Council and the Health Services Executive in this instance. I attach copies of the responses received from both authorities.

Having regard to the specific characteristics of the project, including location and technical capacity, and likely impact on the environment, the Agency is of the opinion that the scope and level of detail to be included in the environmental impact assessment report (EIAR) should as a minimum:

(i) identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of a project on each of the factors listed in Article 3 of the Directive 2014/52/EU;

(ii) address the matters raised in the responses received from the authorities detailed above;

(iii) if it is proposed that food, residual or other odour-forming waste is to be accepted, specify the measures to be taken to prevent odorous emissions arising at the facility. If there is to be an emission to point to air, relevant parameters, including odour, should be modelled in accordance with EPA guidance to ensure there will no exceedence of air quality standards and odour threshold values;

(iv) for waste activities that take place outdoors, specify the measures to be taken to prevent contamination of rainwater and to ensure contaminated stormwater is not discharged into the environment;

(v) the extent of groundwater or soil pollution beneath the facility, if any, should be identified and characterised as should historic and past activities at the site of the facility;

(vi) identify in detail the waste streams proposed to be accepted, the processes to be used in their processing and detailed capacity calculations that demonstrate the proposed facility and its equipment is of a sufficient size to handle the proposed volume of waste;

(vii) identify the nature of the licence that will be sought from the EPA, namely a waste or Industrial Emissions licence;

(viii) have regard to the requirements of the draft *Guidelines on the information to be contained in Environmental Impact Assessment Reports*, as appropriate;

(ix) have regard to the relevant topics contained in the EPA's *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)* September 2003 - Project Type 31;

(x) satisfy the requirements of Directive 2014/52/EU.

If you require any further information in relation to this matter, please contact Rachel Neeson at r.neeson@epa.ie.

Yours sincerely,

Rachel Neeson

_____

Ms. Rachel Neeson
Environmental Licensing Programme
Office of Environmental Sustainability

OPW
Oifig na nOibreacha Poiblí
The Office of Public Works

Ceann Oifig
Sráid Jonathan Swift
Baile Átha Troim
Co. na Mí
C15 NX36

Head Office
Jonathan Swift Street
Trim
Co Meath
C15 NX36

Fón/Phone: (0761) 10 6000
(046) 942 6000
Facs/Fax: (046) 948 1793
Íosghlao/LoCall 1890 213414
Suíomh gréasáin/website: www.opw.ie

Mr. David Heelan
Planning and Environmental Consultant
OES Consulting
Anfield House
Baldonnell Business Park
Naas Road
Dublin 22

OES CONSULTING
Project No.:-
RECEIVED
26 SEP 2017
Initials:-
Action By:-
Completed:-

Our Ref: 505-2017

Your Ref: 1297_01 Scoping

Re: Scoping for Waste Recycling and Transfer Facility at Courtstown Industrial Park, Little Island, Co. Cork

Dear Mr. Heelan,

I refer to your letter dated 28th June 2017 regarding the above which was sent to the Regional Engineer for consideration.

The following are the Office of Public Works comments/observations:

It is noted that the proposed development is at or near a hill top location, above an existing developed area. It is also noted that the development site includes a surface water drainage system discharging to an existing storm water system. Finally it is noted that there are areas considered to be at risk of pluvial flooding lower down the hill from the proposed development site, based on the Preliminary Flood Risk Assessment for Ireland, (see map at http://www.cfram.ie/pfra-pdfs/PFRA%20Integrated%20Map_39.pdf). In these circumstances it is appropriate that the issue of flood risk is properly considered and mitigated in this proposed development. Flood risk is an issue that might be considered as part of any of the following EIS topics listed in section 4.1 of the scoping document, i.e. Hydrology & Water, Population & Human Health, and/or Socio Economics. It is suggested that the drainage from the site is designed so that there is no increase in flood risk to the developed areas in the vicinity and at lower elevations, and also that the capacity of the existing drainage network is not exceeded. It may also be appropriate to limit run off from the proposed development to existing rates, as part of the measures to achieve proper mitigation of increase in flood risk arising from the development.

Yours sincerely,

Elaine Carolan

Elaine Carolan
Engineering Services Administration

26th September 2017

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Mr. David Heelan
OES Consulting
Anfield House
Baldonnel Business Park,
Naas Road
Dublin 22

Dáta | Date [Date]	Ár dTag | Our Ref. [Ref.]	Bhur dTag | Your Ref. [Ref.]
7 July 2017	**TII17-98177**	

Re: EIS Scoping relating to Waste Recycling & Transfer Facility at Courtstown Industrial Park, Little Island, Cork

Dear Mr. Heelan,

Transport Infrastructure Ireland (TII) wishes to advise that it is not in a position to engage directly with planning applicants in respect to proposed developments. TII will endeavour to consider and respond to planning applications referred to it given its status and duties as a statutory consultee under the Planning Acts. The approach to be adopted by TII in making such submissions or comments will seek to uphold official policy and guidelines as outlined in the Spatial Planning and National Roads Guidelines for Planning Authorities (DoECLG, 2012). Regard should also be had to other relevant guidance available at www.TII.ie.

The issuing of this correspondence is provided as best practice guidance only and does not prejudice TII's statutory right to make any observations, requests for further information, objections or appeals following the examination of any valid planning application referred.

With respect to Environmental Impact Statement (EIS) scoping issues, the recommendations indicated below provide only general guidance for the preparation of EIS, which may affect the national roads network.

The developer should have regard, *inter alia*, to the following;

- Consultations should be had with the relevant local authority/National Roads Design Office with regard to locations of existing and future national road schemes, including the N8 Dunkettle Interchange Upgrade scheme.
- TII would be specifically concerned as to potential significant impacts the development would have on the national road network (and junctions with national roads) in the proximity of the proposed development.
- The developer should assess visual impacts from existing national roads,

Bonneagar Iompair Éireann
Ionad Ghnó Gheata na Páirce
Sráid Gheata na Páirce
Baile Átha Cliath 8
D08 DK10

Transport Infrastructure Ireland
Parkgate Business Centre
Parkgate Street
Dublin 8
D08 DK10

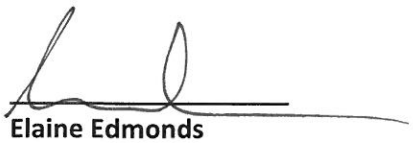
info@tii.ie
www.tii.ie
+353 (0)1 646 3600
+353 (0)1 646 3601

- The developer should have regard to any EIS and all conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should in particular have regard to any potential cumulative impacts,
- The developer, in conducting Environmental Impact Assessment, should have regard to TII Publications (formerly DMRB and the Manual of Contract Documents for Road Works),
- The developer, in conducting Environmental Impact Assessment, should have regard to TII's Environmental Assessment and Construction Guidelines, including the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (National Roads Authority, 2006),
- The EIS should consider the Environmental Noise Regulations 2006 (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* (1st Rev., National Roads Authority, 2004)),
- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment (TTA) be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. TII's TTA Guidelines (2014) should be referred to in relation to proposed development with potential impacts on the national road network. The scheme promoter is also advised to have regard to Section 2.2 of the NRA/TII TTA Guidelines which addresses requirements for sub-threshold TTA,
- The designers are asked to consult TII Publications to determine whether a road safety audit is required,
- In the interests of maintaining the safety and standard of the national road network, the EIS should identify the methods/techniques proposed for any works traversing/in proximity to the national road network,
- In relation to haul route identification, the applicant/developer should clearly identify haul routes proposed and fully assess the network to be traversed. Separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal load proposed.

Notwithstanding, any of the above, the developer should be aware that this list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practise.

I hope that the above comments are of use in your EIS preparation.

Yours sincerely,



Elaine Edmonds
Land Use Planner

Appendix 5.1

Methods Used in Evaluation of Biodiversity Value and Assessment of Impacts

Appendix 5.1

Methods Used in Evaluation of Biodiversity Value and Assessment of Impacts

Table A1: Criteria used in assessing the ecological importance of sites
[Source: Guidelines for Assessment of Ecological Impacts of National Road Schemes (2009)]

Ecological Valuation Scheme(NRA 2009)
International Importance: 'European Site' including Special Area of Conservation (SAC), Site 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. 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) 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 Wetlands 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 1988).
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. National Park. Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. Resident or regularly occurring populations (assessed to be important at the national level) 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. Area subject to a Tree Preservation Order.

Ecological Valuation Scheme(NRA 2009)
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 fulfill 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, 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) 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 wildlife; Sites or features containing non-native species that are of some importance in maintaining habitat links.

Notes: SAC = Special Area of Conservation; SPA = Special Protection Area; NHA = Natural Heritage Area; BAP = Biodiversity Action Plan (these have been published for many local authority areas)

Table A2: Criteria for assessing impact type

Impact type	Criteria
Positive impact:	A change is likely to improve the ecological feature in terms of its ecological value.
Neutral	No effect.
Negative impact:	The change is likely to adversely affect the ecological value of the feature.

Table A3: Criteria for assessing impact magnitude

Impact magnitude	**Definition**
No change:	No discernible change in the ecology of the affected feature.
Imperceptible Impact:	A change in the ecology of the affected site, the consequences of which are strictly limited to within the development boundaries.
Minor Impact:	A change in the ecology of the affected site which has noticeable ecological consequences outside the development boundary, but these consequences are not considered to significantly affect the distribution or abundance of species or habitats of conservation importance.
Moderate Impact:	A change in the ecology of the affected site which has noticeable ecological consequences outside the development boundary. These consequences are considered to significantly affect the distribution and/or abundance of species or habitats of conservation importance.
Substantial Impact:	A change in the ecology of the affected site which has noticeable ecological consequences outside the development boundary. These consequences are considered to significantly affect species or habitats of high conservation importance and to potentially affect the overall viability of those species or habitats in the wider area.
Major Impact:	A change in the ecology of the affected site which has noticeable ecological consequences outside the development boundary. These consequences are considered to be such that the overall viability of species or habitats of high conservation importance in the wider area is under a very high degree of threat (negative impact) or is likely to increase markedly (positive impact).

Appendix 5.2

Appropriate Assessment Screening Report

WASTE TRANSFER STATION AT COURTSTOWN INDUSTRIAL ESTATE, LITTLE ISLAND, CO. CORK

HABITATS DIRECTIVE SCREENING REPORT

Prepared for:

OES Consulting

November 2018

By

Dr. Patrick Crushell, C Ecol, MCIEEM
Wetland Surveys Ireland Ltd.
Bell Height
Kenmare
Co Kerry
T: + 353 86 8510292
E: patrick@crushell.com
www.WetlandSurveysIreland.com

Document Control Sheet

Client	OES Consulting
Project Title	Waste Transfer Station, Little Island
Document Title	Habitats Directive Screening Report
Project Number	WS0492
Document No.	LittleIsland_AA_003

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Wetland Surveys Ireland					

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APPENDIX I: Proposed Site Layout.

APPENDIX II: Completed Appropriate Screening matrices summarising the outcome of AA Screening process.

1 INTRODUCTION

Wetland Surveys Ireland Ltd. were commissioned by OES Consulting to determine the potential impacts, if any, of developing a waste transfer, recycling station and associated ancillaries at Courtstown Industrial Estate, Little Island, Co. Cork, on sites designated as European conservation areas known as Natura 2000 sites (hereafter referred to as European sites).

The nearest European sites to the proposed development site are the Great Island Channel cSAC (NPWS site code: 001058) and the Cork Harbour SPA (NPWS Site Code: 004030) located just approximately 0.4km south-east of the proposed waste transfer site. These two European sites are largely overlapping designations covering the same geographic area. The aim of this assessment is to determine the appropriateness, or otherwise of the proposed development in the context of the conservation objectives of relevant European sites.

This Habitats Directive Screening Report (AA) was prepared by Dr Patrick Crushell and Mr. Brendan Kirwan, Ecologists with Wetland Surveys Ireland Ltd. Dr. Crushell (BSc Applied Ecology; MSc Environmental Resource Management, PhD Environmental Sciences, CEcol, MCIEEM) received an honors degree in Applied Ecology from UCC, a Masters degree in Environmental Resource Management from UCD and defended his PhD at Wageningen University, the Netherlands. He is a Chartered Ecologist and full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). Dr Crushell has been working in the area of nature conservation and ecological impact assessment for the past sixteen years. Projects that he has been involved in include wetland inventory surveys; evaluation of proposed designated sites; restoration and management of peatland habitats; baseline ecological surveys and impact assessments of various development proposals including road, quarries, wind-farms, waste facilities, arterial drainage schemes, and residential developments; during and post-construction ecological monitoring.

Brendan Kirwan (BSc Wildlife Biology, ACIEEM) received an honors degree (BSc) in Wildlife Biology from IT Tralee. He is an Associate Member of the Chartered Institute of Ecology and Environmental Management (ACIEEM). He has experience in the field of ecological assessment and environmental management since graduating in 2012. Since joining Wetland Surveys Ireland four years ago, he has undertaken a wide range of baseline ecology surveys and contributed to impact assessments of various development proposals, in particular within the wind energy and electrical infrastructure sectors.

1.1 STATUTORY CONTEXT

The applicable legislation governing Appropriate Assessment in Ireland is the Habitats Directive, the Planning and Development Acts 2000-2015, the Planning and Development Regulations

2001-2015 and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

This Habitats Directive Screening Report has been prepared in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (European Commission 2002), the European Commission Guidance Managing Natura 2000 Sites (European Commission 2000), and with reference to the Department of the Environment and Heritage and Local Government guidance on Appropriate Assessment (AA) of plans and projects in Ireland (DEHLG 2009) and the recently published EU Commission guidance on Wind Energy and Natura 2000 (European Commission 2010).

The EU Habitats Directive (92/43/EEC) provides the framework for legal for habitats and species of European importance. The directive provides the legislative means to establish a network of sites (known as the Natura 2000 network) throughout the EU with the objective of conserving habitats and species deemed to be of Community interest. These sites include Special Areas of Conservation (SAC's) designated under the Habitats Directive and Special Protection Areas (SPA's) designated under the Birds Directive (formally known as the Conservation of Wild Birds Directive 79/409/EEC).

Article 6 (3) and 6(4) of the habitats directive lays down the procedure to be followed when planning new developments that might affect a Natura 2000 site. This stepwise procedure requires that a plan or project having a likely significant negative effect on a Natura 2000 site undergoes an 'Appropriate Assessment' to study these effects in detail and to see how they relate to the site's conservation objectives.

Depending on the findings of the Appropriate Assessment, the competent authority agrees to the plan or project as it stands if it has ascertained that it will not adversely affect the integrity of the site concerned.

However, should this assessment have ascertained that there will be an adverse effect it may require one or more of the following, depending on the degree of impact:

- specific mitigation measures are introduced to remove the negative effects;
- certain conditions are respected during the construction, operational or decommissioning phases of the project, again to remove the likelihood of negative effects or to reduce them to an insignificant level where they no longer affect the integrity of the site;
- feasible alternatives are explored instead.

In exceptional circumstances, a plan or project may still be allowed to go ahead under certain conditions, in spite of being assessed as having negative effects on the site provided the

procedural safeguards laid down in the Habitats Directive are followed. This may be possible, for instance, if the plan or project is considered to be of overriding public interest and there are no alternatives available. In such cases, compensation measures will need to be implemented to ensure that the overall coherence of the Natura 2000 network is protected.

2 METHODOLOGY

This Habitats Directive Screening Report has been prepared in accordance with the following guidance:

- *Appropriate Assessment of Plans and Projects in Ireland.* Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government, 2009.
- *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*. European Commission Environment DG, 2002.
- *Managing Natura 2000 sites: The Provisions of Article 6 of the Habitats Directive 92/43/EEC.* European Commission, 2000.

There are up to four successive stages involved in the Appropriate Assessment process (European Commission 2002). The outcome at each stage determines whether the next stage in the process is required. The following describes each of the four stages:

Stage 1 – Screening

This is the first stage in the process and is carried out to determine the necessity for a more detailed Stage 2 Appropriate Assessment where potential impacts on European sites are deemed to be of significance. The following steps are involved in the Stage 1 Screening:

- Description of the project and site characteristics (existing environment)
- Identification and description of Natura sites that could potentially be affected
- Identification and description of potential impacts
- Assessment of potential impacts
- Exclusion of sites where no significant impacts are foreseen

Stage 2 – Appropriate Assessment

This stage involves the consideration of the impact on the integrity of the European site of the project, 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. If adequate mitigation is proposed to ensure no significant adverse impacts on European sites, then the process may end at this stage. However, if the likelihood of significant impacts remains, then the process must proceed to Stage 3.

Stage 3 – Assessment of Alternatives

The process which examines alternative ways of achieving the objectives of the plan or project that may avoid adverse impacts on the integrity of the European site.

Stage 4 – Assessment where no Alternative Solutions Exist and where Adverse Impacts Remain

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. First, the project should aim to avoid any impacts on European sites by identifying possible impacts early in the design process in order to avoid such impacts. Second, mitigation measures should be applied, if necessary, during the AA process to the point where no adverse impacts on the site(s) remain. If the plan is still likely to result in impacts on European sites, and no further practicable mitigation is possible, then it must be rejected. If no alternative solutions are identified and the plan is required for imperative reasons of overriding public interest (IROPI test) under Article 6(4) of the Habitats Directive, then compensation measures are required for any remaining adverse effect.

In the case of this Habitats Directive Screening Report, it was found that the project does not require Stage 2 Appropriate Assessment.

Data required to carry out the Habitats Directive screening was collated through a desktop review of existing datasets and published reports together with multidisciplinary ecological walkover surveys of the development site undertaken over two days in November and December 2016.

An ecology chapter is included in Chapter 5.1 of the Environmental Impact Statement (EIAR) included with the application.

3 HABITATS DIRECTIVE SCREENING

3.1 PROJECT DESCRIPTION

This development comprises the proposal to construct a waste transfer, recycling station, and associated ancillaries on a greenfield site in Courtstown industrial estate, Little Island, Co. Cork. The proposal supersedes a previous proposal which was granted planning permission in 2007 on the same site. The original proposal was granted for a smaller facility on the same site. The proposal comprises the construction of the following buildings and ancillaries:

- Waste transfer and recycling station;
- Site office;
- ESB sub-station;

- Wheel wash facility; and
- Weigh bridge

It is expected that the throughput of waste at the facility will be approximately 95,000 tonnes per annum. The development complies with the specific zoning requirements for the site, industry and enterprise. The proposed site layout is presented in Appendix I.

3.2 SITE DESCRIPTION (EXISTING ENVIRONMENT)

A detailed description of the existing ecological environment within and immediately surrounding the proposed development site is presented in an EIAR that accompanies the application. A habitat map of the area following the Fossitt (2000) classification scheme is presented in Figure 3.1.1.

3.2.1 Study Area

The proposed development occurs on a greenfield site located in Courtstown, Little Island, Cork City. The proposed development occurs within the Courtstown industrial estate. Habitats that surround the proposed development site comprise buildings and artificial surfaces (BL3) to the east which comprises warehouses and access roads, recolonising bare ground (ED3) immediately south. A former golf course occurs to the west of the proposed development site with agricultural land used for the production of arable crops (BC1) occurring immediately north of the site.

The proposed development site comprises rank grassland (dry meadows and grassy verges, GS2), with recolonising bare ground (ED3) occurring along the eastern parts of the site. Bramble and gorse scrub (WS1) encroachment is frequent throughout the site. A small area of dense bracken (HD1) occurs within the north-eastern section of the site.

Field boundaries are defined by hedgerows (WL1) to the east and north, and a treeline (WL2) along the western boundary. Hedgerows are overgrown and unmanaged, typically comprising hawthorn with dense ivy cover. A treeline occurs along the western boundary of the site. A small area of mixed broadleaved woodland (WD1) occurs immediately adjacent to the western part of the site. The eastern boundary of the site comprises hedgerow with gorse and willow scrub (WS1) occurring locally. Operational warehouses (buildings and artificial surfaces, BL3) occur to the east of the proposed development site.



Figure 3.1.1: Map illustrating the habitats that occur within the proposed development site overlain on aerial photography.

3.3 IS THE PROJECT NECESSARY TO THE MANAGEMENT OF EUROPEAN SITES

Under the Habitats Directive, projects that are directly connected with or necessary to the management of a European site do not require AA. For this exception to apply, management is required to be interpreted narrowly as nature conservation management in the sense of Article 6(1) of the Habitats Directive. This refers to specific measures to address the ecological requirements of annexed habitats and species (and their habitats) present on a site(s). The relationship should be shown to be direct and not a by-product of the project, even if this might result in positive or beneficial effects for a site(s).

The primary purpose of the project is not the nature conservation management of European sites, but to develop a waste transfer and recycling facility. Therefore, the project is not considered by the Habitats Directive to be directly connected with or necessary to the management of European designated sites.

3.4 IDENTIFICATION OF EUROPEAN SITES

This section of the screening process identifies and describes the European sites within a 5km radius of the proposed development or those hydrologically linked downstream. A distance of 5km is considered as a precautionary measure, taking account of the scale and character of the proposed development, to ensure that all potentially affected European sites are included in the screening process (DoEHLG 2009). Two European sites occur within 5km of the proposed development; the Great Island Channel cSAC and the largely overlapping Cork Harbour SPA. The location of the proposed development in the context of European sites is presented in Figure 3.1.2.

Since the conservation management objectives for the European sites focus on maintaining the favourable conservation status of the qualifying interests of each site, the screening process concentrated on assessing the potential implications of the proposed development against the qualifying interests of the sites.

3.4.1 Great Island Channel cSAC

The Great Island Channel cSAC (NPWS Site Code: 001058) stretches from Little Island to Middleton, with its southern boundary being formed by Great Island. The cSAC occurs approximately 0.4km south-east of the proposed development site at its nearest point. The main habitats of conservation interest in Great Island Channel SAC are the sheltered tidal sand and mudflats and the Atlantic salt meadows. The site is an integral part of Cork Harbour which is a wetland of international importance for the birds it supports.

<u>Recognised Threats and Vulnerabilities</u>

The site receives polluted waters from agricultural, domestic and industrial sources. Various surveys, however, indicate that the levels of pollutants in the water and sediments of this part of the harbour are not excessive, and the site appears to have a normal macro-invertebrate fauna. The Middleton sewage outfall has recently been relocated to a more favourable location. A major road has recently been constructed across intertidal flats in the north-western sector of the site. Owing to the proximity of the site to Cork City, reclamation schemes continue to be a threat. Aquaculture occurs in the North Channel and may cause disturbance to birds. Spartina is well established and may have caused some alterations to the intertidal and salt marsh habitats.

Qualifying Interests (QIs)

The site has been selected by the National Parks and Wildlife Service for the qualifying habitats of conservation interest listed in Table 5.2.1 below.

Table 5.2.1: Qualifying interests of the Great Island Channel cSAC (source: www.npws.ie)

EU Annex I Habitat [EU code]
Tidal mudflats and sandflats [1140]
Atlantic salt meadows [1330]

Conservation Objectives

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain or restore habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites. The maintenance of habitats and species within European sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- *its natural range, and area it covers within that range, are stable or increasing, and*
- *the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and*
- *the conservation status of its typical species is favourable.*

The favourable conservation status of a species is achieved when:

- *population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and*
- *the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and*
- *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis*

In the case of the Great Island Channel cSAC while a conservation management plan has not yet been prepared, detailed site specific conservation objectives (SSCOs) are available (NPWS 2014a).

These SSCOs of each qualifying habitat and species are presented as a series of attributes relating to the parameters: area, range, and structure and functions. Site specific targets are set against each of these attributes. These targets define the favourable conservation status for the habitat or species at the site.

The conservation objectives relating to each of the QIs that occur in proximity to the site are as presented in Table 5.2.2. The various attributes and targets that define favourable conservations condition are detailed in NPWS (2014a).

Table 5.2.2: Qualifying interest and corresponding conservation objective for the site.

Qualifying Interest	Site Specific Objective
Tidal mudflats [1140]	To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide.
Atlantic salt meadows [1330]	To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

3.4.2 Cork Harbour SPA

The Cork Harbour SPA (NPSWS Site Code: 004030) comprises most of the main intertidal areas of Cork Harbour. The SPA occurs approximately 0.4km south-east of the proposed development at its nearest point. Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, it supports nationally important wintering populations of 22 species, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Little Egret, Golden Plover, Bar-tailed Godwit, Ruff, Mediterranean Gull, and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it. Cork Harbour is also a Ramsar Convention site and part of Cork Harbour SPA is a Wildfowl Sanctuary.

Recognised Threats and Vulnerabilities

There are no serious imminent threats to the wintering birds. Though the intertidal areas receive polluted water, there are no apparent significant impacts on the associated flora and fauna. Oil pollution from shipping in Cork Harbour is a general threat. Aquaculture occurs though it is not known if this has significant impacts on the birds. Recreational activities are high in some areas, including jet skiing which causes disturbance to roosting birds. Extensive areas of estuarine habitat has been reclaimed since about the 1950's for industrial, port-related and road projects, and further reclamation remains a threat.

Special Conservation Interests (SCIs)

The site has been selected by the National Parks and Wildlife Service for the Special Conservation Interests (SCIs) listed in Table 5.2.3 below.

Table 5.2.3: Special Conservation Interests (SCIs) of the Cork Harbour SPA.

Special Conservation Interests
Little Grebe (*Tachybaptus ruficollis*) [A004]
Great Crested Grebe (*Podiceps cristatus*) [A005]
Cormorant (*Phalacrocorax carbo*) [A017]
Grey Heron (*Ardea cinerea*) [A028]
Shelduck (*Tadorna tadorna*) [A048]
Wigeon (*Anas penelope*) [A050]
Teal (*Anas crecca*) [A052]
Pintail (*Anas acuta*) [A054]
Shoveler (*Anas clypeata*) [A056]
Red-breasted Merganser (*Mergus serrator*) [A069]
Oystercatcher (*Haematopus ostralegus)* [A130]
Golden Plover (*Pluvialis apricaria*) [A140]
Grey Plover (*Pluvialis squatarola*) [A141]
Lapwing (*Vanellus vanellus*) [A142]
Dunlin (*Calidris alpina*) [A149]
Black-tailed Godwit (*Limosa limosa*) [A156]
Bar-tailed Godwit (*Limosa lapponica*) [A157]
Curlew (*Numenius arquata*) [A160]
Redshank (*Tringa totanus*) [A162]
Black-headed Gull (*Chroicocephalus ridibundus*) [A179]
Common Gull (*Larus canus*) [A182]
Lesser Black-backed Gull (*Larus fuscus*) [A183]
Common Tern (*Sterna hirundo*) [A193] - **BREEDING**
Wetlands [A999]

Conservation Objectives

In the case of the Cork Harbour SPA, detailed site specific conservation objectives (SSCOs) are available (NPWS 2014b). The SSCOs for each SCI are presented as a series of attributes and associated targets. These targets define the favourable conservation status for the SCI at the site.

For each of the water bird species listed the overall conservation objective is as follows (NPWS 2014b):

To maintain the favourable conservation condition in Cork Harbour SPA, which is defined by the following list of attributes and targets:

- Population trend - Long term population trend stable or increasing.
- Distribution - No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.

In relation to Common Tern, the conservation objectives are somewhat different due to their breeding status within the site:

- Breeding population abundance: apparently occupied nests (AONs) – No significant decline
- Productivity rate: fledged young per breeding pair – No significant decline
- Distribution: breeding colonies – No significant decline
- Prey biomass available – No significant decline
- Barriers to conductivity – No significant increase
- Disturbance at the level of impact breeding site - Human activities should occur at levels that do not adversely affect the breeding common tern population

In relation to the SCI 'wetlands and waterbirds' the following objective applies:
To maintain the favourable conservation condition of the wetland habitat in Cork Harbour SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following list of attribute and target:

- Habitat area – The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,587 hectares, other than that occurring from natural patterns of variation

The various attributes and targets that define favourable conservations condition are further detailed in NPWS (2014b).

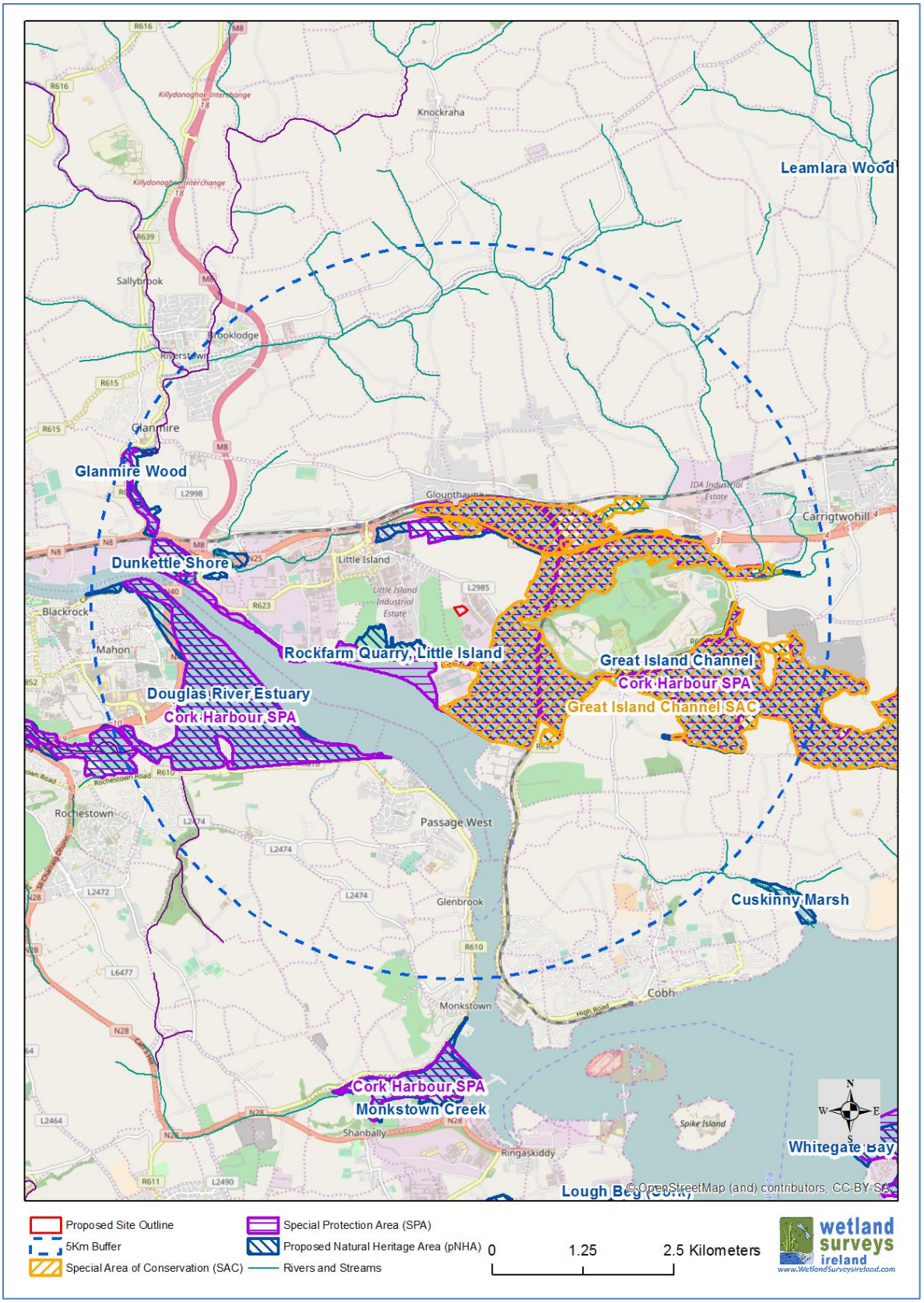


Figure 3.1.2: European sites within 5km of the proposed development site.

3.5 IDENTIFICATION AND DESCRIPTION OF POTENTIAL IMPACTS

Ecological receptors of the potentially affected European sites that are sensitive to potential impacts from the proposed development include habitats and species for which the sites are designated. The characteristics, location, and scale of the development together with the ecological requirements of the conservation interests of the European sites potentially affected have been taken into consideration in identifying potential impacts.

3.5.1 Elements of the proposed Works with Potential to Give Rise to Significant Effects

Construction Phase

- Construction of waste transfer and recycling station, office, ESB sub-station, and associated site works could give rise to habitat loss and displacement of resident species of fauna;
- Noise, vibration, and light during construction could give rise to disturbance of resident fauna;
- Excavation and earthworks associated with the construction phase could give rise to sediment run-off and potentially impact aquatic receptors; and
- Potential run-off of hydrocarbons or other harmful substances could lead to deterioration of downstream water quality.

Operational Phase

The proposed development site presently comprises an undeveloped greenfield site. The following elements of the operational phase of the proposed development may potentially give rise to significant effects:

- Artificial lighting, noise and vibration may give rise to disturbance impacts on resident fauna (including avifauna).
- Increased traffic associated with the operation of the waste facility may potentially give rise to disturbance impacts on resident fauna

3.5.2 Direct, Indirect or Secondary Impacts

The potential for impacts to occur through the implementation of the proposed development can be assessed under the following headings (as outlined by guidelines issued by the European Commission (2002)):

- Loss / reduction of habitat area
- Disturbance to key species
- Habitat or species fragmentation
- Reduction in species density
- Changes in key indicators of conservation value such as decrease in water quality and quantity

The qualifying interests (and their conservation requirements) of each European site are considered together with the characteristics of the proposed development. Potential impacts on the qualifying features of the Great Island Channel cSAC and the Cork Harbour SPA are described in the following paragraphs. Both sites which are largely overlapping are discussed in the following sections.

3.5.2.1 Great Island Channel cSAC

The Great Island Channel cSAC is removed from the footprint of the proposed development site, and therefore no direct habitat impacts will occur. As the proposed development occurs within habitats of low ecological importance in a sub-urban industrial setting there is no potential for habitat or species fragmentation.

The habitats for which the cSAC is designated include intertidal mudflats and salt marsh. Neither of these habitats occur within or in proximity to the proposed development site.

There are no natural watercourses within or in close proximity to the proposed development site which occurs on relatively flat terrain. No functional artificial drainage channels occur within the site and therefore there is limited hydrological connectivity between the site and the cSAC.

Considering the scale and characteristics of the proposed development, its location adjacent and upstream of the cSAC / SPA and the ecological requirements of qualifying habitats and species, no potential impacts of significance have been identified.

3.5.2.2 Cork Harbour SPA

The Cork Harbour SPA occurs approximately 0.4km south-east of the proposed development at its nearest point.

The majority of Special Conservation Interests (SCIs) of the SPA are confined to wetlands, intertidal or coastal habitat types. None of those species for which the site is selected are likely to occur or interact with the proposed development site. This conclusion is based on the presence of rank grassland and encroaching scrub throughout the development site.

There are no watercourses within or adjacent to the development site that could provide a potential impact pathway to the SPA.

Based on the absence of suitable habitat and the current background levels of activity at the proposed development site, disturbance impacts on bird species for which the SPA is designated are not foreseen.

3.6 ASSESSMENT OF IMPACT SIGNIFICANCE

3.6.1.1 Great Island Channel cSAC

The footprint of the proposed development is removed from the cSAC and therefore direct habitat loss will not occur due to the development of the waste transfer and recycling facility.

Any significant deterioration in water quality within the designated site could lead to adverse impacts on its conservation interest. There are no watercourses within the proposed development site and therefore no direct links between the site and the cSAC. There is an absence of watercourses or drainage ditches that could provide a pathway for sediment laden run-off or contaminants to reach the Cork Harbour. The risk of downstream impacts therefore is considered low. Rainwater will be collected onsite and used in onsite truck washing and as toilet water. All other surface draining water will pass through a hydrocarbon interceptor along with all other surface drainage at the site and will flow into the sewer. The truck wash waste water is to be treated as trade effluent and a discharge license will be sought for its discharge to the foul sewer. All waste water will be discharged to the sewer and foul drain pipe and no discharges to surface waters will occur at the site. The existing water infrastructure and drains at the site are sufficient to service the proposed development.

It is concluded that no significant adverse impacts on the conservation interests of Great Island Channel cSAC are foreseen and therefore the site can be excluded from further consideration in the Appropriate Assessment. The outcome of the assessment in relation to each qualifying feature of the cSAC are summarised in Table 5.2.4.

Table 5.2.4: Potential for likely significant effects on the Great Island Channel cSAC

EU Annex I Habitat [EU Code]	Threats	Potential for significant effects	Stage II AA Required
Estuaries [1130]	Pollution and fishing/aquaculture related activities affect habitat quality, particularly in some highly sensitive areas.	Any significant deterioration in water quality could impact on these downstream habitats. However, considering the hydrological and topographical characteristics of the site, the risk of contaminated run-off is very low. In addition, the surface water management regime within the proposed development site and various other control measures built into the project will act to safeguard sensitive ecological receptors that may occur downstream of the development. It is therefore concluded that there are no potential direct, indirect, or cumulative impacts of significance foreseen.	No
Tidal mudflats and sandflats [1140]	Pollution and fishing/aquaculture and diverse use of the foreshore are likely to affect habitat quality, particularly eelgrass beds.		

3.6.1.2 Cork Harbour SPA

The footprint of the proposed development and all associated construction works are to take place outside of the designated site and therefore no direct habitat impacts will occur. As the proposed development occurs within habitats of low ecological importance in a sub-urban industrial setting there is no potential for habitat or species fragmentation.

Bird species for which the SPA is designated are highly unlikely to interact with the proposed development site. This conclusion is based on the absence of suitable habitat within or immediately surrounding the site.

There are no natural watercourses within or in close proximity to the proposed development site which occurs on relatively flat land. In addition no functional artificial drainage channels occur within the site and therefore the risk of water quality impacts downstream of the development site is low.

Furthermore, as outlined in Section 3.6.1.1, the proposed drainage and surface water management system aims to ensure that the development will not give rise to water quality impacts on downstream waterbodies (including the aquatic habitats of the SPA).

It is concluded that no significant adverse impacts on the conservation interests of Cork Harbour SPA are foreseen and therefore the site can be excluded from further consideration in the Appropriate Assessment. The outcome of the assessment in relation to each Special Conservation Interest of the SPA are summarised in Table 5.2.5.

Table 5.2.5: Potential for likely significant effects on the Cork Harbour SPA

Special Conservation Interests	Potential for significant effects	Stage II AA Required
Little Grebe	Not likely to occur within the proposed development site as grebe species are confined to wetland habitats.	No
Great Crested Grebe		
Cormorant	Not likely to occur or rely on those habitats that occur within the proposed development site.	No
Grey Heron		
Shelduck	These species are largely confined to wetland habitat types. These species may also forage on improved pasture in proximity to water. No suitable habitat occurs on site.	No
Wigeon		
Teal		
Pintail		
Shoveler		
Red-breasted Merganser		
Oystercatcher	Confined to shingle shores, dunes, and saltmarshes. May also utilise improved pasture. No suitable habitat occurs within the proposed development site.	No
Golden Plover	Known to flock inland during the winter months. The grassland within the proposed development site is considered unsuitable to support this Annex I species.	No
Grey Plover	An exclusively coastal species, likely to be confined to more suitable habitats to the south of the proposed development site.	No
Lapwing	The rank grassland and scrub within the proposed development site does not provide suitable habitat for lapwing.	No
Dunlin	The habitats within the proposed development site are considered to be unsuitable for dunlin, confined to mudflats and sandflats in the winter and grasslands in proximity to open water in summer months.	No
Black-tailed Godwit	No suitable habitat to support godwit occurs within the proposed development site.	No
Bar-tailed Godwit		
Curlew	The disturbed ground within the proposed development is considered to be of low value to Curlew.	No
Redshank	No suitable habitat for Redshank occurs within the site and therefore the site is considered to be of low value to this species, likely to be confined to estuarine and tidal mudflat habitats south of the site.	No
Black-headed Gull	No suitable habitat occurs on site, black-headed gull are typically associated with estuaries, watercourses, and ploughed agricultural fields.	No
Common Gull	No suitable habitat occurs within the proposed development site, common gull typically occur within wetlands, estuaries, watercourses, and ploughed agricultural fields.	No

Special Conservation Interests	Potential for significant effects	Stage II AA Required
Lesser Black-backed Gull	No suitable habitat occurs within the proposed development site, lesser black-backed gull typically occur within wetlands, estuaries, watercourses, and ploughed agricultural fields.	No
Common Tern	No suitable habitat occurs within the proposed development site, common tern are likely to be confined to coastal habitats.	No
Wetlands	No wetlands occur within or adjacent to the site. Based on the absence of surface water features within the site, and the proposed water management regime it is concluded that there is negligible risk to water quality in downstream waterbodies or associated wetlands. Potential adverse impacts on wetland habitats within the SPA have not been identified.	No

3.7 IN-COMBINATION / CUMULATIVE IMPACTS

It is a requirement of Appropriate Assessment that the combined effects of the proposed development together with other plans or projects be considered.

Considering the ecological characteristics of the site and scale of the proposed development together with the magnitude of potential impacts of the proposed development it is considered that the potential for cumulative impacts is negligible and no significant cumulative impacts on the Natura 2000 network are foreseen.

3.8 CONCLUSION OF SCREENING

In order to determine the potential impacts if any, of the development of a waste transfer, recycling station, and associated infrastructure on European Sites, Habitats Directive screening was undertaken. Two European sites occur within a 5km radius of the proposed development; the Great Island Channel cSAC and Cork Harbour SPA. The likely impacts (direct, indirect, and cumulative), which could arise from the development have been examined in the context of a number of factors that could potentially give rise to significant effects on the conservation interest of European sites.

In conclusion, it has been determined that the proposed development is not directly connected with or necessary to the management of European sites. Secondly, it can be objectively concluded that there are not likely to be any significant effects on the Natura 2000 network of sites resulting from the proposed development and accordingly it is considered that there is no need to prepare a Natura Impact Statement / Appropriate Assessment, in this instance.

Screening matrices summarising the outcome of the screening exercise in relation to the relevant European sites is presented in Appendix II.

4 REFERENCES

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European Commission (2002). Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Luxembourg: Office for official publications of the European Communities.

NPWS (2014a) Conservation Objectives: Great Island Channel SAC 001058. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

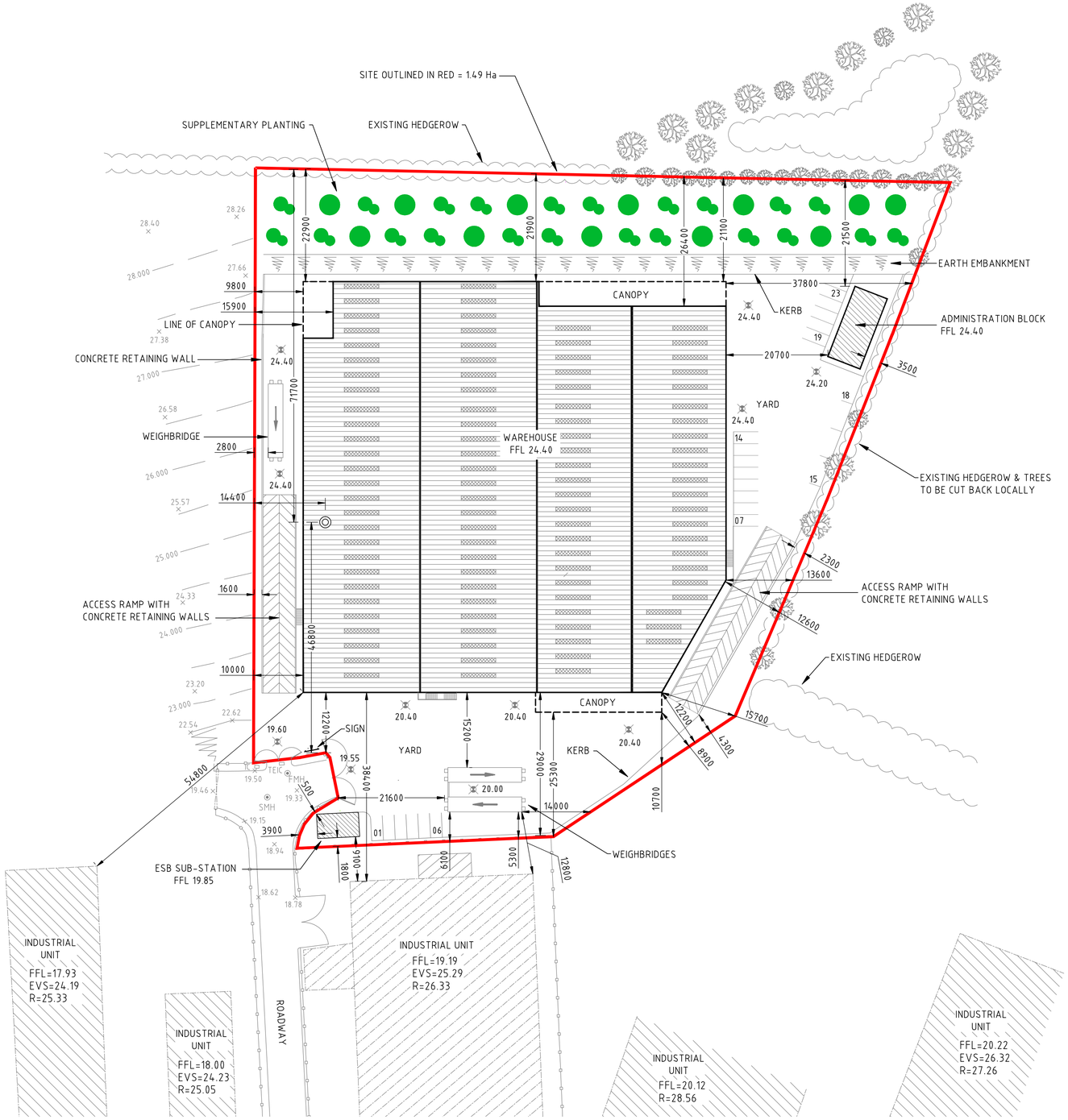
NPWS (2014b) Conservation Objectives: Cork Harbour SPA 004030. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

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Original Drawing Size A1

Notes

1. This drawing is to be read in conjunction with all relevant engineers and architects drawings and specifications.
2. Do not scale drawings. Use figured dimensions only. All dimensions to be checked on site.
3. All dimensions are in millimetres (mm).
4. Any discrepencies to be reported immediately to the consulting engineer.



PROPOSED SITE LAYOUT - -
SCALE 1:500

NOTES:

North refers to Magnetic North.

All levels relate to Malin Head Datum.

All dimensions are in milllimeters
Do not scale fom drawing

LEGEND:

MH = MANHOLE
CL = COVER LEVEL
IC = INSPECTION CHAMBER
FFL = FINISHED FLOOR LEVEL
EVS = EAVES LEVEL
R = RIDGE LEVEL
LS = LAMP STANDARD
SV = SLUICE VALVE
GY = ROAD GULLY
IC = INSPECTION CHAMBER
TEIC = TELECOM INSPECTION CHAMBER

Rev	Date	Drawn	Description	Ch'k'd
PL	Nov.'18	M.E.	Issued for Planning	PF

2 Clogheen Business Park,
Blarney Road, Cork,
Ireland.
T: +353 (0)21 4399799
F: +353 (0)21 4399797
E: admin@rka.ie
W: www.rka.ie
RAY KEANE & ASSOCIATES
CONSULTING ENGINEERS
CIVIL | STRUCTURAL | PROJECT MANAGEMENT

Client:
Country Clean

Project:
Proposed Construction of Waste Transfer and Recycling Station At Courtstown, Little Island, Co.Cork.

Drawing Title:
Proposed Site Layout

Designed:	P.F.	Drawn:	M.E.	Date:	Nov 2018
Eng Chk:	P.F.	Dwg. Chk:	P.F.	Scale:	1:500 @ A1
Project. No:	0600-168				
Drawing No:	1001			Status: Planning	Rev: PL

Appendix II

Completed Appropriate Screening matrix summarising the outcome of AA Screening process

Screening Matrix for the Great Island Channel cSAC (Site Code: 001038)

Screening Matrix	
Brief description of the project or the plan	The proposed development site is located in the townland of Courtstown, Little Island, Co. Cork. The site comprises unmanaged recolonising bare ground and grassy verge habitats. Field boundaries are defined by hedgerows and a treeline. The proposed development site is approximately 1.5ha in extent and occurs on moderately sloping terrain at an altitude ranging from 25m to 29m above sea level. The proposal comprises the proposal to construct a waste transfer and recycling station on a greenfield site in Courtstown industrial estate, Little Island, Co. Cork. The proposal supersedes a previous proposal which was granted planning permission in 2007 on the same site. The proposal comprises the construction of the following buildings and ancillaries: • Waste transfer and recycling station; • Site office; • ESB sub-station; • Wheel wash facility; and • Weigh bridge It is expected that the throughput of waste at the facility will be approximately 95,000 tonnes per annum. The development complies with the specific zoning requirements for the site, industry and enterprise.
Brief description of the European site	Great Island Channel cSAC (NPWS Site Code: 001058) (see Section 3.4.1 above). The Great Island Channel is an integral part of Cork Harbour which contains several other sites of conservation interest. The main habitats of conservation interest in Great Island Channel SAC are the sheltered tidal sand and mudflats and the Atlantic salt meadows. The site is an integral part of Cork Harbour which is a wetland of international importance for the birds it supports. The site is of major importance for the two habitats listed on Annex I of the E.U. Habitats Directive, as well as for its important numbers of wintering waders and wildfowl. It also supports a good invertebrate fauna.

Screening Matrix	
Describe any likely direct, indirect or secondary impacts of the project (either alone or in-combination with other plans or projects) on the European site by virtue of: • Size and scale; • Land-take; • Distance from the European site or key features of the site; • Resource requirements (water abstraction etc.); • Emissions (disposal to land, water or air); • Excavation requirements • Transportation requirements • Duration of construction, operation, decommissioning etc.; • Other	Proposed development removed from cSAC therefore direct habitat impacts not foreseen. The proposed development site occurs in close proximity to the cSAC, no direct links to the cSAC have been identified. The run-off of silt and / or other pollutants from the proposed development site may potentially lead to adverse impacts on the cSAC if not mitigated. However, considering the hydrological and topographical characteristics of the site, the risk of contaminated run-off is very low. In addition, the surface water management regime within the proposed development site and various other control measures built into the project will act to safeguard sensitive ecological receptors that may occur downstream of the development. It is therefore concluded that there are no potential direct, indirect, or cumulative impacts of significance foreseen.
Describe any likely changes to the site arising as a result of: • Reduction of habitat area; • Disturbance to key species; • Habitat or species fragmentation; • Reduction in species density; • Changes in key indicators of conservation value (water quality etc.); • Climate change	No potential impacts have been identified.
Describe any likely impacts on the European site as a whole in terms of: • Interference with the key relationships that define the structure of the site; • Interference with key relationships that define the function of the site.	No potential impacts have been identified.
Provide indicators of significance as a result of the identification of effects set out above in terms of:	No potential impacts have been identified.

Screening Matrix	
• Loss; • Fragmentation; • Disruption; • Disturbance; • Change to key elements of the site (e.g. water quality etc.).	
Describe from above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	No potential impacts have been identified.

Screening Matrix for the Cork Harbour SPA (Site Code: 004030)

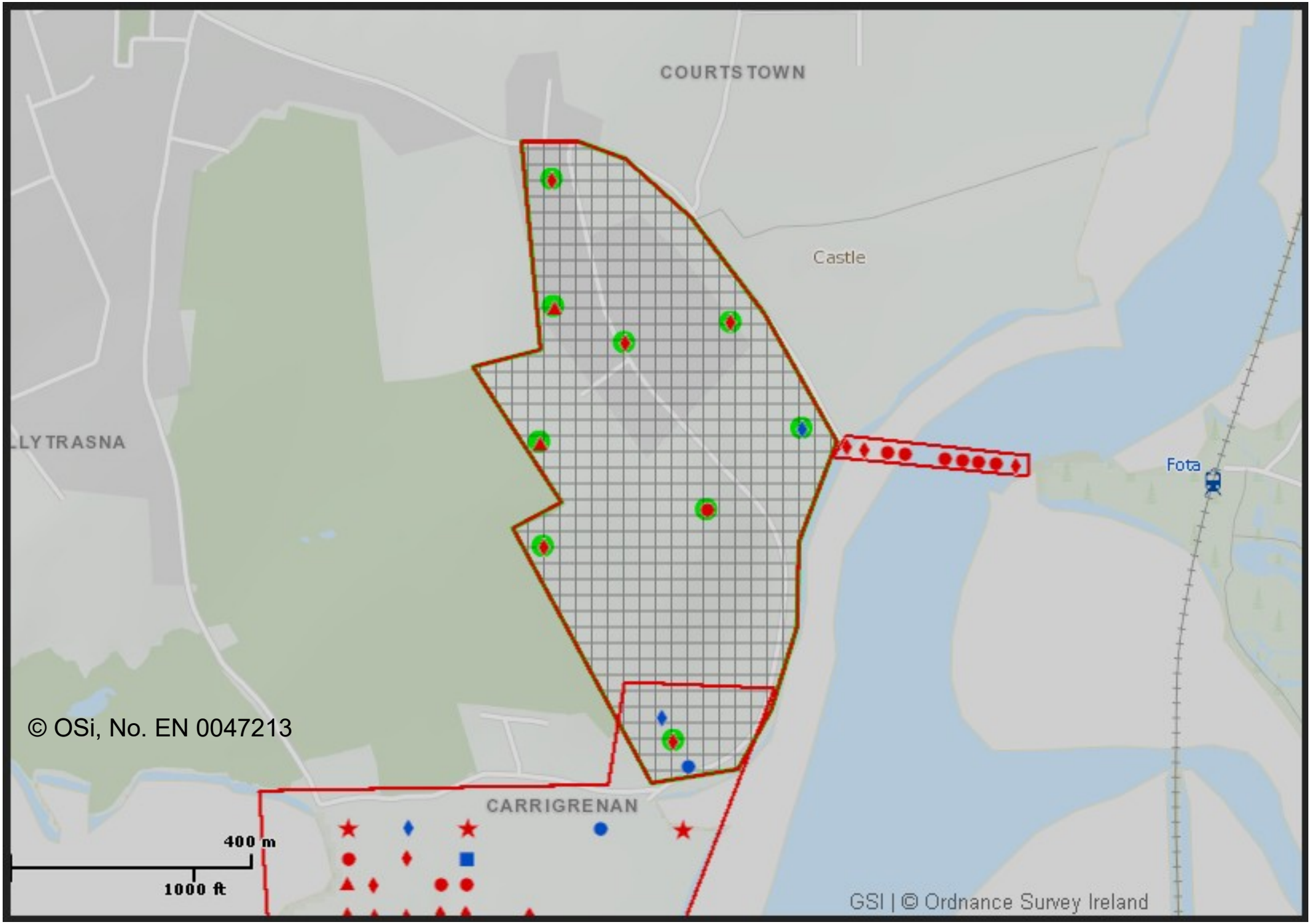
Screening Matrix	
Brief description of the project or the plan	The proposed development site is located in the townland of Courtstown, Little Island, Co. Cork. The site comprises unmanaged recolonising bare ground and grassy verge habitats. Field boundaries are defined by hedgerows and a treeline. The proposed development site is approximately 1.5ha in extent and occurs on moderately sloping terrain at an altitude ranging from 25m to 29m above sea level. The proposal comprises the proposal to construct a waste transfer and recycling station on a greenfield site in Courtstown industrial estate, Little Island, Co. Cork. The proposal supersedes a previous proposal which was granted planning permission in 2007 on the same site. The proposal comprises the construction of the following buildings and ancillaries: • Waste transfer and recycling station; • Site office; • ESB sub-station; • Wheel wash facility; and • Weigh bridge It is expected that the throughput of waste at the facility will be approximately 95,000 tonnes per annum. The development complies with the specific zoning requirements for the site, industry and enterprise.
Brief description of the European site	Cork Harbour SPA (NPWS Site Code: 004030) - Cork Harbour is a large, sheltered bay system, with several river estuaries. Cork Harbour is of major ornithological significance, being of

Screening Matrix	
	international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, it supports nationally important wintering populations of 22 species, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Little Egret, Golden Plover, Bar-tailed Godwit, Ruff, Mediterranean Gull and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it. Cork Harbour is also a Ramsar Convention site and part of Cork Harbour SPA is a Wildfowl Sanctuary.
Describe any likely direct, indirect or secondary impacts of the project (either alone or in-combination with other plans or projects) on the European site by virtue of: • Size and scale; • Land-take; • Distance from the European site or key features of the site; • Resource requirements (water abstraction etc.); • Emissions (disposal to land, water or air); • Excavation requirements • Transportation requirements • Duration of construction, operation, decommissioning etc.; • Other	Bird species for which the SPA is designated do not occur within or interact with the proposed development site (sub-urban site within an industrial park) and therefore direct displacement or disturbance impacts are not foreseen. Suitable water bird habitat is removed from the proposed development site. The SPA is located downstream of the development site. Any significant deterioration in water quality due to pollution events could adversely affect the wetland habitats which support the waterbird species (mud flats and sand flats). However, the risk of such effects are negligible considering the hydrological characteristics of the proposed development site. Furthermore the surface water management regime within the proposed development site and various other control measures built into the project will act to safeguard sensitive ecological receptors that may occur downstream of the development. It is therefore concluded that there are no potential direct, indirect, or cumulative impacts of significance foreseen.
Describe any likely changes to the site arising as a result of: • Reduction of habitat area; • Disturbance to key species; • Habitat or species fragmentation; • Reduction in species density; • Changes in key indicators of conservation value (water quality etc.); • Climate change	No potential impacts have been identified.

Screening Matrix	
Describe any likely impacts on the European site as a whole in terms of: • Interference with the key relationships that define the structure of the site; • Interference with key relationships that define the function of the site.	No potential impacts have been identified.
Provide indicators of significance as a result of the identification of effects set out above in terms of: • Loss; • Fragmentation; • Disruption; • Disturbance; • Change to key elements of the site (e.g. water quality etc.).	No potential impacts have been identified.
Describe from above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	No potential impacts have been identified.

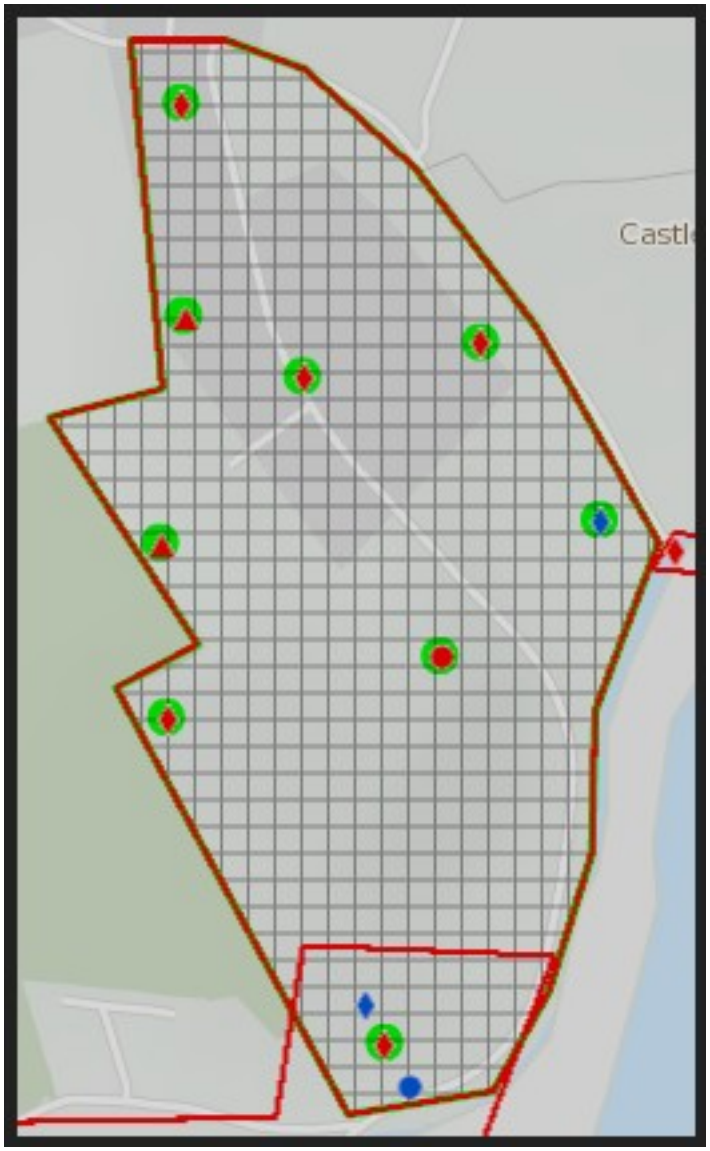
Appendix 6.1

Little Island Geotechnical Survey Ireland Report



Overview Map for GSI Report 1275: Matsui Factory
Little Island, Cork Harbour, Cork, Co. Cork
Points Observed: 9

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GSI REPORT 1275

Matsui Factory Little Island, Cork Harbour, Cork, Co. Cork Borehole List:

Borehole	Name	Depth	DTB	ODMALIN	Easting	Northing	Description
66419	1	9.296		6.26	177454	71604	Cable Percussion (Shell and Auger)
66420	2	10.363	9.601	6.26	177296	71469	Cable Percussion (Shell and Auger)
66421	3	7.01	6.706	6.26	177241	71086	Cable Percussion (Shell and Auger)
66422	4	7.468	6.858	5.95	177025	71408	Cable Percussion (Shell and Auger)
66423	5	7.468	6.858	6.26	177160	71746	Cable Percussion (Shell and Auger)
66424	6	8.687	7.925	6.26	177039	72017	Cable Percussion (Shell and Auger)
66425	7	4.877	4.572	6.26	177042	71806	Cable Percussion (Shell and Auger)
66426	8	1.524	.762	6.26	177019	71581	Cable Percussion (Shell and Auger)
66427	9	5.182	4.572	6.26	177336	71780	Cable Percussion (Shell and Auger)

LAYERS FOR BOREHOLE 49 (Company Name: 1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
6641901	0	.46			Clayey	Top Soil	Top Soil
6641902	.46	2.44	Firm	Brown		Boulder Clay	Boulder Clay
6641903	2.44	4.72			Medium to Coarse	Gravel And Boulders	Gravel And Boulders
6641904	4.72	7.77	Hard	Brown	Clayey	Clay, Cobbles And Boulders	Clay, Cobbles And Boulders
6641905	7.77	9.3	Firm	Brown	Clayey	Clay, Cobbles And Boulders	Clay, Cobbles And Boulders

LAYERS FOR BOREHOLE 49 (Company Name: 1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
6642001	0	.46			Clayey	Top Soil	Top Soil
6642002	.46	1.52	Firm	Brown		Clay And Gravel	Clay And Gravel
6642003	1.52	5.64			Medium to Coarse	Gravel, Cobbles And Boulders	Gravel, Cobbles And Boulders
6642004	5.64	8.84	Coarse	Brown		Gravel	Gravel
6642005	8.84	9.14	Coarse			Sand	Sand
6642006	9.14	9.6				Boulders	Boulders
6642007	9.6	10.36				Bedrock	Bedrock

LAYERS FOR BOREHOLE 40 (Company Name: 2)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
6642101	0	.3			Claybound Sandy	Top Soil	Top Soil
6642102	.3	3.05		Mottled brown		Clay	Clay
6642103	3.05	5.33			Large	Boulders	Boulders
6642104	5.33	6.71				Gravel And Boulders	Gravel And Boulders
6642105	6.71	7.01				Bedrock	Bedrock

LAYERS FOR BOREHOLE 5 (Company Name: 3)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
6642201	0	.46			Clayey	Top Soil	Top Soil
6642202	.46	2.74	Firm	Brown		Clay	Clay
6642203	2.74	3.96			Clayey	Sand And Gravel	Sand And Gravel
6642204	3.96	6.86			Clayey	Gravel And Cobbles	Gravel And Cobbles
6642205	6.86	7.47				Bedrock	Bedrock

LAYERS FOR BOREHOLE 5 (Company Name: 4)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
6642301	0	.3			Clayey	Top Soil	Top Soil
6642302	.3	1.52		Brown	Clayey	Clay	Clay
6642303	1.52	2.74			Stony	Clay	Clay
6642304	2.74	4.57				Gravel	Gravel
6642305	4.57	5.79			Large	Boulders And Gravel	Boulders And Gravel
6642306	5.79	6.86	Firm			Gravel And Cobbles	Gravel And Cobbles
6642307	6.86	7.47				Bedrock	Bedrock

LAYERS FOR BOREHOLE 5 (Company Name: 5

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
6642401	0	.3			Clayey	Top Soil	Top Soil
6642402	.3	1.52		Brown	Clayey	Clay And Gravel	Clay And Gravel
6642403	1.52	3.05		Brown	Clayey	Gravel And Clay	Gravel And Clay
6642404	3.05	5.18			Clayey	Gravel And Clay	Gravel And Clay
6642405	5.18	7.32			Clayey	Clay, Cobbles And Boulders	Clay, Cobbles And Boulders
6642406	7.32	7.92			Clayey	Boulders And Gravel	Boulders And Gravel
6642407	7.92	8.69				Bedrock	Bedrock

LAYERS FOR BOREHOLE 6 (Company Name: 6)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
6642501	0	1.52			Medium Gravelly	Clay And Gravel	Clay And Gravel
6642502	1.52	2.74			Medium	Clay And Gravel	Clay And Gravel
6642503	2.74	4.57				Boulders	Boulders
6642504	4.57	4.88				Bedrock	Bedrock

LAYERS FOR BOREHOLE 6 (Company Name: 7)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
6642601	0	.3			Clayey	Top Soil	Top Soil
6642602	.3	.76		Brown	Sandy Clayey	Clay And Gravel	Clay And Gravel
6642603	.76	1.52				Bedrock	Bedrock

LAYERS FOR BOREHOLE 6 (Company Name: 8)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
6642701	0	.3			Clayey	Top Soil	Top Soil
6642702	.3	1.22		Brown		Clay And Gravel	Clay And Gravel
6642703	1.22	2.74				Gravel And Cobbles	Gravel And Cobbles
6642704	2.74	4.57	Stiff	Grey		Boulder Clay	Boulder Clay
6642705	4.57	5.18				Bedrock	Bedrock

LAYERS FOR BOREHOLE 6 (Company Name: 9

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3.96	FIELD	Standard Penetration Test	80	NBLOW

TESTS FOR LAYER 6 IN BOREHOLE 66419 (Company Name: 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
5	7.92	FIELD	Standard Penetration Test	9	NBLOW

TESTS FOR LAYER 7 IN BOREHOLE 66419 (Company Name: 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	4.88	FIELD	Standard Penetration Test	125	NBLOW
4	6.4	FIELD	Standard Penetration Test	58	NBLOW

TESTS FOR LAYER 7 IN BOREHOLE 66419 (Company Name: 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1.83	FIELD	Standard Penetration Test	52	NBLOW
2	3.05	FIELD	Standard Penetration Test	76	NBLOW
3	4.57	FIELD	Standard Penetration Test	74	NBLOW

TESTS FOR LAYER 6642003 IN BOREHOLE 66420 (Company Name: 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
4	6.1	FIELD	Standard Penetration Test	80	NBLOW
5	8.23	FIELD	Standard Penetration Test	62	NBLOW

TESTS FOR LAYER 6642004 IN BOREHOLE 66420 (Company Name: 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	4.57	FIELD	Standard Penetration Test	131	NBLOW

TESTS FOR LAYER 6642103 IN BOREHOLE 66421 (Company Name: 3)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	6.1	FIELD	Standard Penetration Test	83	NBLOW

TESTS FOR LAYER 6642104 IN BOREHOLE 66421 (Company Name: 3)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	5.49	FIELD	Standard Penetration Test	137	NBLOW

TESTS FOR LAYER 804 IN BOREHOLE 66422 (Company Name: 4)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	6.1	FIELD	Standard Penetration Test	112	NBLOW

TESTS FOR LAYER 806 IN BOREHOLE 66423 (Company Name: 5)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	4.57	FIELD	Standard Penetration Test	76	NBLOW

TESTS FOR LAYER 804 IN BOREHOLE 66424 (Company Name: 6)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	6.1	FIELD	Standard Penetration Test	69	NBLOW

TESTS FOR LAYER 6642405 IN BOREHOLE 66424 (Company Name: 6)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	3.05	FIELD	Standard Penetration Test	169	NBLOW

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TESTS FOR LAYER 6642503 IN BOREHOLE 66425 (Company Name: 7)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1.52	FIELD	Standard Penetration Test	79	NBLOW

TESTS FOR LAYER 6642704 IN BOREHOLE 66427 (Company Name: 9)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3.05	FIELD	Standard Penetration Test	194	NBLOW

Appendix 6.2

First Draft Midleton Groundwater Body Description Report

Midleton GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
19 Cork Co. Co.	**Rivers:**.Dower, Owennacurra, Dungourney, Womanagh, Dissour. **Lakes:** Aderry, Ballyhonock, Ballybutler.	Ballyvergan Marsh (000078), Ballyquirk Pond (001235), Clasharinka Pond (001183), Loughs Aderry and Ballybutler (000446)	136

Topography	This GWB occupies the floor of an elongate east west trending valley in east Cork. The valley is bounded to the north and south by parallel east west trending ridges which comprise the Ballinhassig and Knockadoon GWBs respectively. The valley floor is generally flat to gently undulating. Ground elevations range from 2–30 m OD. Areas of higher ground occur along the centre of the valley (20-30 m OD) but ground is generally lower along the valley margins, and in the east of the body near the coast (<20 m OD). The ready weathering & erosion of the thin shaly limestones which occur at the margins of the body is thought to be responsible for the topographic lows along the edges of the valley. In the west of the body large surface water channels extending to Lough Mahon intersect the body partially surrounding Little Island and Fota Island. These areas are considered to have sufficiently similar hydrogeology to be described as part of the Midleton GWB.	
Geology and Aquifers	**Aquifer categories**	The main aquifer category in this GWB is: **Rkd**: Regionally important karstified aquifer dominated by diffuse flow. A narrow area (12 km^2 in total) around the margins of the body has an aquifer category of: **Ll:** Locally important aquifer, moderately productive only in local zones
	Main aquifer lithologies	The main aquifer lithology in this GWB is Dinantian Pure Unbedded Limestones (primarily Waulsortian Limestone Formation). Some Dinantian Pure Bedded Limestones occur in the centre of the body. A narrow area (12 km^2 in total) around the margins of the body is composed of Dinantian Lower Impure Limestones.
	Key structures	During the Variscan Orogeny, rocks in South Munster were compressed from the south into a series of folds on east west axes. Subsequent erosion stripped the more soluble Carboniferous Limestones from the fold crests or ridges (anticlines) exposing the harder, more resistant sandstones underneath. The Carboniferous Limestones were preserved in the fold troughs (synclines) which today line elongate east-west trending valleys separated by the intervening sandstone ridges. This body lies in the east of the Cork Syncline. Extensive fracturing and faulting accompanied the folding of the rocks. The ridges and valleys are cut by series of shear faults trending approximately north-south and a series of thrust faults with a general east-west trend. The major north-south shear faults are paralleled by a very well developed system of vertical or near-vertical north-south joints which are very evident in exposures in quarries and caves in East Cork. These joints are commonly spaced at intervals of about 0.5 to 2 metres (Wright, 1979).
	Key properties	The pure unbedded limestones of the South Munster region are highly productive. Faults and joints were enlarged by karstification as groundwater moved through the limestones. There are numerous surface karst features in these limestones, (e.g. swallow holes, collapse features and closed depressions) and extensive cave systems (e.g. Carrigtohill, Midleton and Cloyne). The strong structural influence on the development of karstification is demonstrated by cave plans from Southeast Cork (e.g. Poulnahorka Caves, Castlemartyr, Co Cork) where the main passages or 'galleries' have developed along north-south joints in the order of 1 to 6 metres apart (Wright 1979). Transmissivity in the pure unbedded limestones can range up to a few thousand m^2/d. Pumping tests in the same rock type in the Cloyne GWB to this south of this body gave a range of transmissivity of 200 to over 2000 m^2/day, and 900 - 13,000 m^2/d for a water supply borehole near Dungarvan, Co Waterford (Dungarvan GWB, SERBD). Groundwater gradients within the pure unbedded limestones are low, around 0.001-0.002. (Wright & Gately 2002). There are a large number of wells with Excellent (>400 m^3/d) and Good (100-400 m^3/d) yields and the large "Dower Spring" occurs in this GWB. Springs in the pure unbedded limestone range in size from small to large, but have reliable discharges. Tracer tests carried out within this GWB recorded groundwater flow velocities of 30 m/h between Carrignashinny swallow hole and Dower Spring and 16.5 m/h between Dower Ford swallow hole and Dower Spring (Wright & Gately 2002). The pure bedded limestones are also highly productive although less evidence of extensive karstification is currently recorded. In the impure limestones, transmissivities are lower; they will generally be in the range 5-20 m^2/d but may be higher where karstification has occurred. Storativity is low in all bedrock aquifers. Groundwater storage may be enhanced by overlying sand and gravel deposits which are in continuity with the underlying limestone.

	Thickness	The Dinantian Pure Unbedded Limestones (Waulsortian Limestone) are at least 600m thick in the Cork Syncline (Sleeman & Pracht, 1994). Most groundwater flow may occur in an epikarstic layer a couple of metres thick and in a zone of interconnected solutionally-enlarged fissures and conduits that extends approximately 30 m below this. However deeper flows can occur. Boreholes have intersected major zones of fissuring at depth at Cloyne (Cloyne GWB), where a major zone of fissuring occurs at approximately 41 m below ground level, i.e. approximately 20 m below OD, and at Ringaskiddy (Carrigaline GWB), where major water inflows occur down to 40 m below OD (Wright, 1979). In the past sea level is estimated to have been approximately 50-60 m below present day OD, the level to which the now infilled channel of the River Lee was eroded (Farrington, 1959) enabling karstification at depth. Today this region is an example of a drowned karst terrain. In the Impure Limestones at the margins of this GWB, most groundwater flow occurs in an upper weathered layer of a few metres and a zone of interconnected fissures often not extending more than 15 m from the top of the rock, although occasional deep inflows associated with major faults can be encountered. Impure limestones are also much less susceptible to karstification.
Overlying Strata	**Lithologies**	This GWB is primarily covered by glacial till of varying permeability. West of Castlemartyr, and in some smaller areas east of Castlemartyr, the subsoil is generally of 'moderate' permeability. East of Castlemartyr there are areas with 'low' permeability subsoil. Sand and gravel deposits ('high' permeability) also occur in many areas within this GWB. Several small surface sand and gravel deposits have been identified within this GWB by Teagasc mapping, the most extensive being south of Ballynacorra. Drilling has revealed extensive sand and gravel deposits at Carrigtohill (Carrigtohill GWB) and in the northeast of the GWB between Youghal and Killeagh over 10 m of gravel was recorded beneath 8 m of clayey till. Frequent areas of rock outcrop and shallow rock occur in this GWB, particularly in the centre and towards the west of the body. *Subsoil Types identified in Midleton GWB by Teagasc Parent Material Mapping (Draft): Alluvium (A); Sandstone sands and gravels (Devonian) (GDSs); Marine sands and gravels (MGs); Made Ground (Made); Beach/raised beach sand (Mbs); Estuarine sediments (silts/clays) (Mesc); Marine Silts (Msi); Rock outcrop and rock close to surface (Rck); Till – Devonian Sandstone Till (TDSs), Limestone Till (TLs).*
	Thickness	There are many areas with subsoils of <3m where rock outcrop is common, particularly along the centre of the body, east of Castlemartyr, around Midleton and much of Little Island. Along the northern side of the GWB, between Killeagh and Youghal, is an area of deep subsoil where depths of >20 m are recorded. East of Carrigtohill and north of Fota Island up to 60 m of sand and gravel have been recorded (Carrigtohill GWB). Elsewhere subsoil depths of 5-10m are frequently recorded, although isolated points of deep and shallow subsoil do occur. The underlying pure unbedded limestone in this valley is highly karstified and likely to have a very irregular bedrock surface. Subsoil depths in these areas can therefore be highly variable within short distances.
	% area aquifer near surface	
	Vulnerability	This GWB has many areas of Extreme Vulnerability, particularly along the centre of the valley, in an area east of Castlemartyr, around Midleton and on Little Island. The remainder of the body west of Castlemartyr is generally of High Vulnerability. East of Castlemartyr there are some areas of Extreme and High Vulnerability coinciding with areas of shallower subsoil, but in general where subsoil depths are >3 m the remaining area is of Moderate Vulnerability.
Recharge	**Main recharge mechanisms**	The sandstone ridges to the north and south of this GWB (Ballinhassig & Knockadoon GWBs), provide abundant runoff which recharges the limestone aquifer in the valley. A small volume of groundwater may cross as through-flow from the sandstones into this GWB. In the GWB itself both point and diffuse recharge will occur. Swallowholes and collapse features provide the means for point recharge to the karstified aquifer. Diffuse recharge will occur over the entire GWB via rainfall percolating through the subsoil. The lack of surface drainage in several parts of this GWB indicates that potential recharge readily percolates into the groundwater system. There are some low-lying areas with a high water table, where a proportion of the effective rainfall is rejected due to lack of storage space in the aquifer. Groundwater in this body generally shows a rapid response to recharge. Where gravels overlie the karstified aquifer they provide a permeable pathway for recharge. They can also augment storage in the aquifer. The generally 'moderate' permeability subsoils in the west of the body will generally not restrict percolation of recharge. In the east of the body where some areas of 'low' permeability subsoil occur percolation of recharge may be restricted. However, variability in subsoil depths due to the underlying karstified limestone means that even in areas with lower permeability subsoil, opportunities for recharge to areas of shallower limestone can still occur.
	Est. recharge rates	

Discharge	**Large springs and high yielding wells (m^3/d)**	*Note: The following data need to be checked and updated by RBD Project Consultants.* Data from GSI Well Database: Dower Spring (Whitegate RWSS) - Estimated average discharge 32,880 m^3/day (1979); Average abstraction (4545 m^3/d). Knockgriffin, Dawn Meats (IMP), Midleton – (1200 m^3/d) Knockgriffin, Frioscandia Building – (1200 m^3/d) Ballycrenane Beg, Imokilly Co-Op Creamery , Mogeely – (1091 m^3/d) Ballintubbrid West TW3 (Carrigtohill Industrial Estate) - (852 m^3/d) Additional data from EPA Groundwater Sources List: Rossmore (W Ellis & Sons) spring (909 m3/d) Carrigtohill (John A Wood Ltd) bore (909 m3/d)
	Main discharge mechanisms	Groundwater discharges to springs within the GWB and to the rivers and streams crossing the GWB. Rivers overlying the limestones in the South Munster Synclines have relatively high dry weather flows representing contributions from the underlying aquifer.
	Hydrochemical Signature	The groundwater in this body is dominated by calcium and bicarbonate ions. Hardness can range from moderately hard to very hard (200 to >400 mg/l (as $CaCO_3$). Spring waters tend to be softer as throughput is quicker and there is less time for the dissolution of minerals into the groundwater. Groundwater alkalinity is high, up to 400 mg/l (as $CaCO_3$). Alkalinity is generally less than hardness, indicating that ion exchange (where calcium or magnesium are replaced by sodium) is not significant. These hydrochemical signatures are characteristic of clean limestone. Like hardness and alkalinity, electrical conductivities (EC) can vary greatly. Typical limestone water conductivities are of the order of 500-700 µS/cm. Lower values suggest that the residence times of some of the sources are very short, for example at the Dower Spring (Midleton GWB) where conductivities average 396 µS/cm. This value reflects a karstic system with rapid flow velocities. Chloride levels in groundwater in this body can be elevated near the coast. Due to the high level of interaction between groundwater and surface water in karstic aquifers, microbial pollution can travel very quickly from the surface into the groundwater system. The normal filtering and protective action of the subsoil is often bypassed in karstic aquifers due to the number of swallow holes, dolines and large areas of shallow rock. The hydrochemical signature of groundwater from public supply wells in the same rock type in the nearby Cloyne GWB is demonstrated in an expanded Durov plot in Figure 2 below.
Groundwater Flow Paths		These rocks are devoid of intergranular permeability. Groundwater flow occurs in the many faults and joints, enlarged by karstification. Past depression of the sea level enabled karstification at depth, which further enhances the permeability of these rocks. Because of the high frequency of fissures in this region, overall groundwater flow is thought to be diffuse, although solutionally enlarged conduits and cave systems occur. Groundwater flow occurs in an upper shallow highly karstified weathered zone in which groundwater moves quickly in rapid response to recharge. Below this is a deeper zone where there are two components to groundwater flow. Groundwater flows through interconnected, solutionally enlarged conduits and cave systems that are controlled by structural deformation. In addition there is a more dispersed slow groundwater flow component in smaller fractures and joints outside the larger conduits. The water table is generally within 10 m of the surface, except for the more elevated parts of the limestone aquifers, and the typical annual fluctuation of the water table ranges up to 6 or 7 m (Wright 1979). Hydrographs for two wells within this GWB, Attiquin (4 km west of Dower Spring) and Ballyquirk (3 km northeast of Dower Spring) (Figures 1 and 2) show annual fluctuation of water levels in the limestone of about 3-5 metres. At Dower Spring the natural water level normally varies by less than half a metre from winter to summer, although extreme flood events can add a further 0.3 m or so to this figure (Wright & Gately, 2002). Groundwater is generally unconfined. The highly permeable aquifer supports a regional scale flow system. Groundwater flow paths can be up to several kilometres long, but may be significantly shorter in areas where the water table is very close to the surface. Regional groundwater flow is towards the rivers draining the valley, to the sea in the east and to Lough Mahon and the surface water channels to the west and south west of the body. The limestones in this body are frequently overlain by sand and gravel deposits in hydraulic continuity with the underlying bedrock. Where present they provide a permeable pathway for recharge to the karstic aquifer and where saturated provide additional storage for the underlying bedrock aquifer. At Carrigtohill, the deposits are large enough, with sufficient saturated thickness, to be a locally important gravel aquifer (Lg) (Carrigtohill Gravel GWB).
Groundwater & Surface water interactions		The nature of the karstic system leads to rapid interchanges of water between surface and underground. Swallow holes and caves receive surface water, and groundwater is discharged to surface as springs or as baseflow to rivers crossing the groundwater body. Several ponds and small lakes with fluctuating water levels and exposed mud edges in summer, that appear to be at least partially fed by groundwater, occur in this GWB: (Ballyquirk Pond (001235), Clasharinka Pond (001183), Loughs Aderry and Ballybutler (000446). Near the coast tidal effects may be experienced in boreholes or springs, and brackish water may be encountered. Ballyvergan Marsh (000078) a freshwater coastal marsh near Youghal is unlikely to be dependent on water from the limestone aquifer as it occurs in an area of deep subsoil where low permeability clayey till overlies gravel.

Conceptual model	• This GWB occupies the floor of an elongate east west trending valley in east Cork. The body is generally flat to gently undulating (2-30 mAOD) with ground elevation at centre of the valley often higher than at the valley margins. • The GWB is bounded to the north and south by the contact with the low permeability sandstones and mudstones of the Ballinhassig and Knockadoon GWBs respectively. It is bounded to the east by the coast and to the west by Lough Mahon and the large urban development of Cork City. • The GWB is composed mainly of diffusely karstified, highly permeable pure limestones with a narrow underlying layer of less permeable impure limestone around the margins of the body. To the north and south of the body are ridges of low permeability sandstones. • The regional structural deformation that created the characteristic South Munster sandstone ridge (anticline)-limestone valley (syncline) topography was accompanied by intense fracturing and high frequency jointing (N-S jointing dominates) within the limestone synclines. Subsequent karstification of these openings has significantly enhanced the permeability of the pure limestones. Karst features such as cave systems, sinking streams, springs, swallow holes and other collapse features are common in this GWB. Karstification is known to extend well below present sea levels, and is estimated to extend to depths of 50 to 60 m below O.D. Malin Head. • Groundwater flows through the many faults and joints formed by deformation that were subsequently enlarged by karstification. Most groundwater flow occurs in an upper shallow highly karstified weathered zone of a few metres thick in which groundwater moves quickly in rapid response to recharge. Below this is a deeper zone where there are two components to groundwater flow. Groundwater flows through interconnected, solutionally enlarged conduits and cave systems that are controlled by structural deformation (influence of N-S jointing). In addition there is a more dispersed slow groundwater flow component in smaller fractures and joints outside the larger conduits. Generally this connected fractured zone extends to about 30 mbgl in pure limestones, however in the pure bedded limestones of the South Munster region, deep inflows from major zones of fissuring have been encountered to 40-50 mbgl. • Groundwater in this body is unconfined. The water table is generally less than 10 metres below the surface with an average annual fluctuation up to 6 metres. Groundwater gradients are very flat in the permeable limestones (0.001-0.002). The highly permeable aquifer can support regional scale flow systems. Groundwater flow paths can be up to several kilometres long, but may be significantly shorter in areas where the water table is very close to the surface. Overall groundwater flow is to the rivers draining the valley and ultimately to the sea in the east and to Lough Mahon and the surface water channels to the west and south west of the body. • Recharge to this GWB is both point and diffuse. The ridges to the north and south of this GWB (Knockadoon & Whitegate GWBs) provide runoff which supplies recharge to the limestone aquifer in the valley. Swallow holes, collapse features and sinking streams provide the means for point recharge to the karstified aquifer. Diffuse recharge will occur over the entire GWB via rainfall percolating through the subsoil. The lack of surface drainage in much of this GWB indicates that potential recharge readily percolates into the groundwater system. Some areas of low permeability subsoil in the east of the body may restrict percolation of recharge in areas where they are present in sufficient thickness. A relatively small volume of groundwater may cross as through-flow into this GWB from the adjacent low transmissivity GWBs. • There are many areas of Extreme Vulnerability within this GWB, particularly along the centre of the valley, in an area east of Castlemartyr, around Midleton and on Little Island. Outside areas of Extreme Vulnerability the remainder of the body west of Castlemartyr is generally of High vulnerability, while east of Castlemartyr there are areas of Moderate Vulnerability due to the presence of > 5 m 'low' permeability subsoils. In a highly karstified aquifer such as this GWB the underlying limestone will have a very irregular surface. Subsoil depths in this GWB can therefore be highly variable within short distances. • The limestones in this body are frequently overlain by sand and gravel deposits which are in hydraulic continuity with the underlying bedrock. Where present they provide a permeable pathway for recharge to the karstic aquifer and where saturated provide additional storage for the underlying bedrock aquifer. At Carrigtohill, the deposits are large enough, with sufficient saturated thickness, to be a locally important gravel aquifer (Lg) (Carrigtohill Gravel GWB) • There is a high degree of interaction between surface water and groundwater in this GWB. Swallow holes and caves receive surface water, and groundwater is discharged to surface as springs or as baseflow to rivers crossing the groundwater body.
Attachments	Hydrochemical Signature (Figure 1); Groundwater Hydrograph (Figure 2)
Instrumentation	**Stream gauges:** 19002, 19003, 19005, 19019, 19022, 19025, 19029, 21016. **EPA Water Level Monitoring boreholes:** Ballyquirk (COS 73), Ballynabointra (COS 74). **EPA Representative Monitoring points:** None
Information Sources	Farrington A (1959) The Lee Basin Part one: glaciation. Proc. R. Ir. Acad. 60B (3), 135-166. Kelly C (2000) Conna Water Supply Scheme (village bore): Groundwater Source Protection Zones. Report to Cork County Council (Northern Division). Geological Survey of Ireland. Sleeman AG, Pracht M (1994) *Geology of South Cork. A geological description of South Cork to accompany the Bedrock Geology 1:100,000 Map Series, Sheet 25.* Geological Survey of Ireland, 59pp Wright G, Gately C (2002) *Whitegate Regional WaterSupply Scheme (Dower Springs).* Groundwater Source Protection Zones. Geological Survey of Ireland Report, 19pp. Wright G (1979) Groundwater in the South Munster Synclines. In: Hydrogeology in Ireland, Proceedings of a Hydrogeological Meeting and associated Field Trips held in the Republic of Ireland from 22 to 27 May, 1979. Published by the Irish National Committee of the International Hydrological Programme.
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

Figure 1: Hydrochemical signature
(GSI Monitoring as part of Source Protection Report)

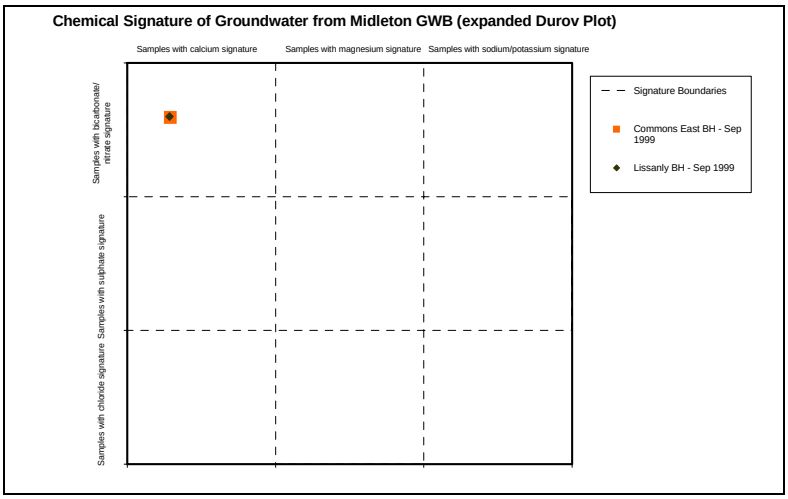
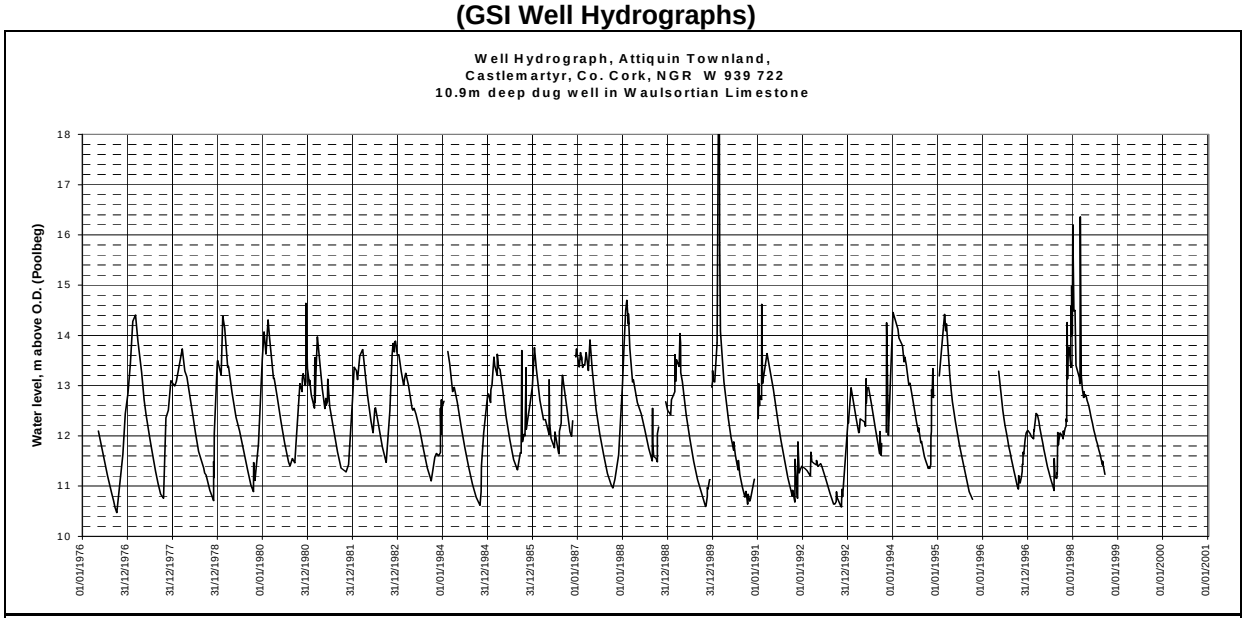
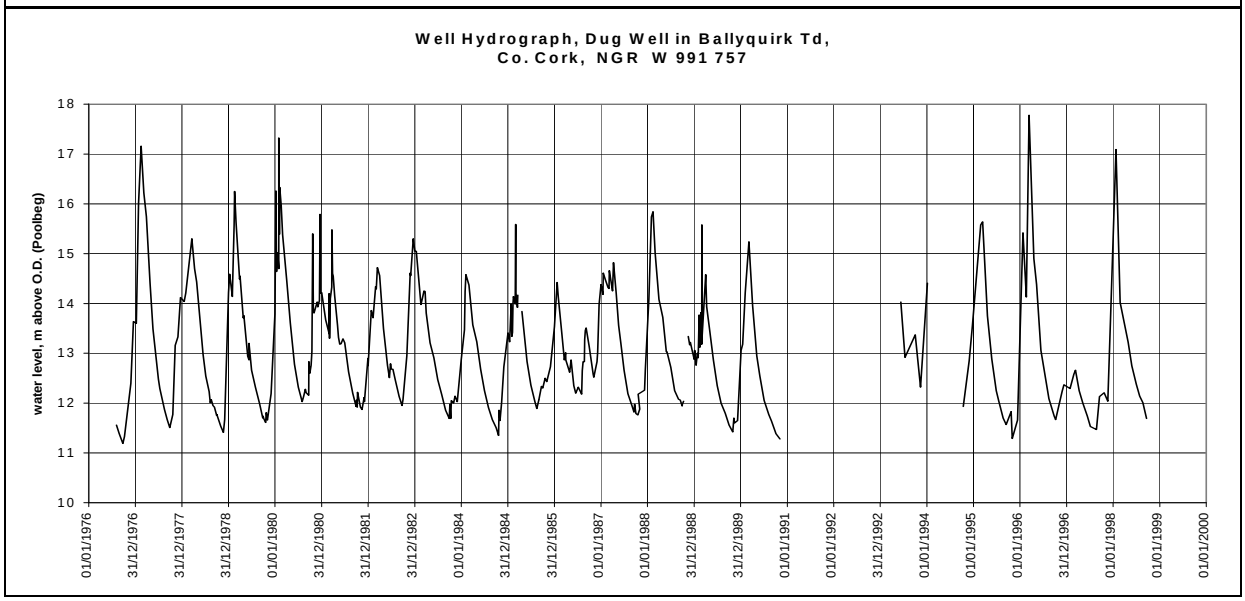
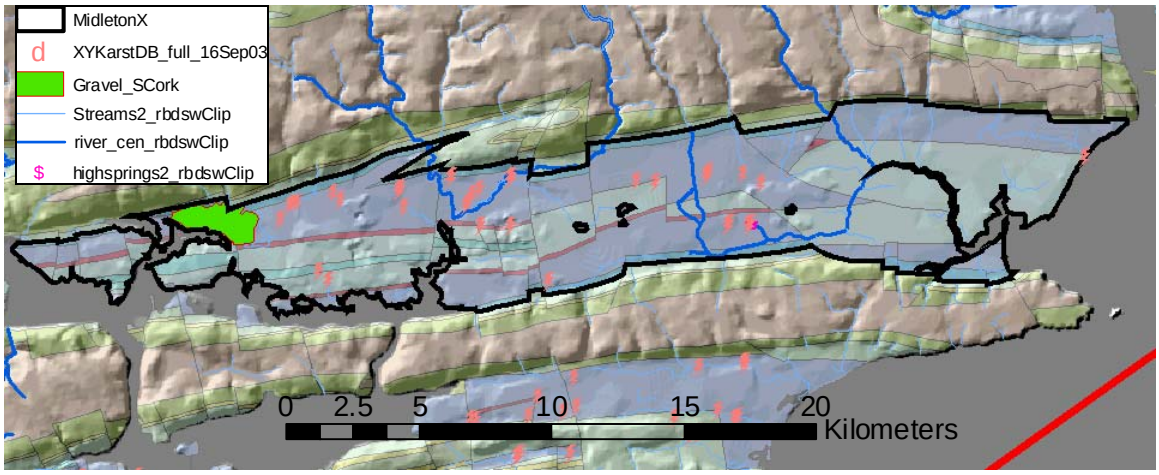


Figure 2: Groundwater hydrographs
(GSI Well Hydrographs)





Midleton GWB (For Reference)



List of Rock units in Midleton GWB

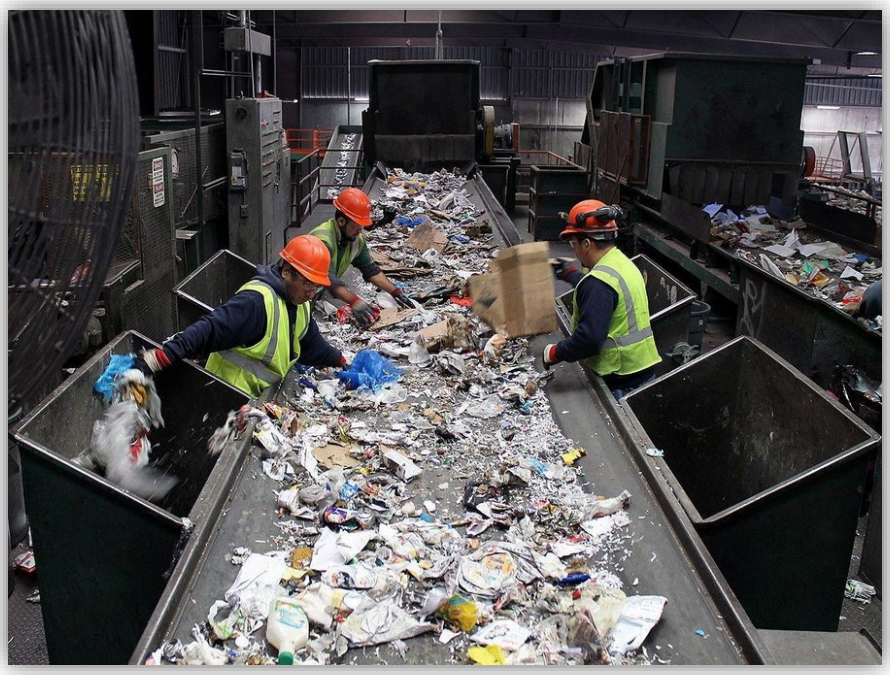
Rock unit name and code	Description	Rock unit group
Clashavodig Formation (CV)	Oolitic, peloidal, cherty fine limestone	Dinantian Pure Bedded Limestones
Little Island Formation (Ll)	Massive and crinoidal fine limestone	Dinantian Pure Unbedded limestones
Cork Red Marble Formation (CK)	Red brecciated calcilutite limestone	Dinantian Pure Bedded Limestones
Waulsortian Limestones (WA)	Massive unbedded fine-grained limestone	Dinantian Pure Unbedded limestones
Ballysteen Formation (BA)	Fossiliferous dark-grey muddy limestone	Dinantian Lower Impure Limestones

Appendix 6.3

Construction Environmental Management Plan (CEMP)

Little Island Waste Recycling and Transfer Station

Courtstown Industrial Park, Little Island, Co. Cork



Proposed Development of a Recycling and Transfer Station at Courtstown Industrial Park, Little Island, Co Cork.

Construction Environmental Management Plan (CEMP)

November 2018

ENVIRONMENT ISO 14001:2004 NSAI Certified
HEALTH & SAFETY OHSAS 18001:2007 NSAI Certified
QUALITY ISO 9001:2008 NSAI Certified

OES Consulting
Liber House
Tralee, Co. Kerry
Crescent Building, Northwood
Santry, Co. Dublin
Osborne Promenade
Warrenpoint, Co. Down

Control Sheet

Document Title:	CEMP for Little Island Recycling and Transfer Station	**Document No.**	R3_1297-01

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01	Planning Issue	EOC	DH	POL	20.10.2018

Little Island Waste Recycling and Transfer Station

Courtstown Industrial Park, Little Island, Co. Cork

Construction Environmental Management Plan (CEMP)

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1. Introduction

OES Consulting have been commissioned by Country Clean Recycling (CCR) to prepare a Construction Environmental Management Plan (CEMP) for the works associated with the proposed development of a waste recycling and transfer facility located at Courtstown Industrial Park, Little Island, Co. Cork.

The CEMP will form part of the submission to Cork County Council (CCC) for development permission and relates to the development of the proposed facility and the following elements:

- *Provision of a new warehouse facility to provide a waste transfer and recycling plant and office area with a waste throughput of 95,000 tonnes per annum.*
- *Provision of appropriate receiving areas for receiving mixed non-hazardous waste materials.*
- *Development of a two-storey site office building.*
- *ESB MV sub Station Building.*

This document is compiled as a Construction Environmental Management Plan covering the project at the construction stage. It is structured to set out the minimum goals required to allow the project to be developed in an environmentally sustainable manner, with little or no impact on the receiving environment.

This document should be read as a guide to the minimum requirement expected by the contractors on the construction of the waste facility development.

1.1. Purpose of the CEMP

The purpose of this CEMP is to identify the key mitigation and environmental control measures specific to the construction of the waste recycling and transfer facility in Courtstown Industrial Park, Little Island, Co. Cork that must be adhered to at all times, in order to ensure that the project is developed in a sensitive manner and provides environmental reassurance to Cork County Council (CCC) and other potentially interested parties i.e. National Parks and Wildlife Services (NPWS) and Inland Fisheries Ireland (IFI) etc. on the manner in which the works will be undertaken.

This CEMP presents the environmental control measures which will be undertaken during the construction phase of the development and outlines the mitigation measures that are required to be adhered to in order to develop the facility in a manner which will not cause a negative environmental impact. The measures outlined in this CEMP will be incorporated in the site-specific construction stage management plan (CMS) which will be produced by the Construction Works Contractor (CWC). This CMS will describe, explain and monitor how the mitigation measures proposed in this Construction Environmental Management Plan (CEMP) will be implemented on site.

1.2. Site Location

The proposed waste transfer & recycling facility is situated near the south-east coastline of Little Island, in the townland of Courtstown. The site is located within the Courtstown Industrial Park (national grid reference: 177044E, 071656N). Drawings of the site's location

and maps of the site layout are presented in **Figures 1** and **2** provided in **Appendix 1 – Figures and Drawings.** The proposed green-field site is located within an established commercial industrial estate and is bounded by lands formerly used as the Harbour Point Golf Club to the west, an agricultural field to the north and number of commercial properties to the east and south.

1.3. Site Description

The eastern boundary of the proposed site is lined by the industrial properties lining Courtstown Park Road whilst the nearest residential properties to the south are those on Clash Road, 450m from the southern boundary of the site. The nearest residential properties to the west are those lining Clash Road, on the western boundary of the now disused Harbour Point Golf Club, 550m to the west.

The eastern boundary of the site abuts existing business/warehousing premises and contains some vegetation including oak, goat willow, gorse and bramble. The northern boundary is defined by a hawthorn hedge and two ash trees. The western boundary is defined by dense vegetation cover including hawthorn and elder. Dense vegetation on the other side of the western boundary includes poplar, pine, alder and Monterey cypress. The southern boundary of the site is undefined in the field which the site forms part of. The field is currently unmanaged and consists of grass sward which has become heavily infested with weeds.

The topography of Courtstown Industrial Park is described as relatively low-lying at an elevation of between 10m – 20m AOD with the topographic gradient rising to 30m AOD along the western boundary of the site.

The proposed facility is located within the catchment of the River Lee, which rises in the west Cork mountain ranges approximately 60km to the west of Cork City and is located approximately 400m to the west of the Cork Harbour Special Protection Area (SPA) and the Great Island Channel Special Area of Conservation (SAC) and proposed Natural Heritage Area (pNHA).

On a local scale there are no rivers or streams within or in the immediate vicinity of the development site. The natural drainage characteristics of the proposed Little Island site are affected in certain places by man-made drainage channels. The northern boundary of the proposed site contains a drainage ditch which is associated with improvements for agricultural purposes. The ditch is generally in a somewhat degraded condition and inundated with vegetation but appears effective in draining surface water towards the existing industrial properties to the east. The drainage channel runs north-west to south-east discharging to the adjacent storm water network in the industrial estate. There are no other surface water features on the site.

The Geological Survey of Ireland (GSI) has mapped the underlying bedrock as Dinantian Pure Unbedded Limestones consisting of massive and crinoidal fine limestone which forms the Little Island Formation.

The GSI classify the soils underlying the Little Island site as being predominantly deep well drained mineral (Mainly basic) (BminDW) derived mainly from calcareous parent material. They are in the great soil groups of Grey Brown Podzolics, Brown Earths.

2. Land Use, Access and Existing Development

2.1. Location

The proposed waste transfer & recycling facility is situated near the south-east coastline of Little Island, in the townland of Courtstown. The site is located within the Courtstown Industrial Park (national grid reference: 177044E, 071656N). The proposed development site is located immediately to the rear of existing industrial premises situated along the main access road into Courtstown Business Park/Little Island. The site is zoned for industrial use within both the Cork County Development Plan and the Cobh Municipal District Local Area Plan.

The extent of the area to which this development relates is approximately 1.5 ha.

2.2. Existing Access and Infrastructure

The proposed site is currently accessed via the main access road to Harbour Point and Courtstown Business Parks (Harbourpoint Business Park Road). The main business park access road leads to Ballytrasna Park to the north, and meets this road in the form of a simple priority junction. This will facilitate the passage of materials, equipment and plant.

2.3. Existing Drainage

2.3.1. Catchment Area

On a regional scale, the proposed development site is located within the Lee, Cork Harbour, Youghal River catchment area, Hydrometric Area 19 of the South-Eastern River Basin District (SERBD).

Surface water bodies in the study area include Lough Mahon, which together with the outer River Lee Estuary, forms the upper section of Cork Harbour SAC. Surface water flowing into Lough Mahon includes freshwater flow from the River Lee into the tidal estuary which is mixed with tidal seawater from the lower Cork Harbour.

2.3.2. Internal Site Drainage and Flood Risk

As discussed in Section 1.3 above, existing drainage within or in the vicinity of the proposed development area is limited to man-made drainage ditches.

A flooding risk screening exercise was conducted. A review of the Office of Public Works (OPW) Catchment Flood Risk Assessment and Management (CFRAMS) flood mapping integrated maps determined that the proposed development site is not at risk of fluvial, coastal or pluvial flooding.

A review of the Cobh Municipal District Local Plan land zoning map for Little Island shows that the site is not located within Flood Zone A or B. As the site is not at risk of flooding, as confirmed by the OPW mapping, it was not deemed necessary to complete a flood risk assessment for the proposed development.

2.4 Site Sensitivities

The proposed development site does not lie within any sites designated or under consideration for designation for nature conservation. Two European designated sites occur within proximity to the proposed development site; Great Island Channel cSAC (NPWS Site Code: 001058) and the Cork Harbour SPA (004030). A single site of proposed national importance, the Great Island Channel pNHA (NPWS Site Code: 001058), is located within 0.4km of the development site. In this area all three designated sites are spatially overlapping.

Candidate Special Areas of Conservation (cSACs) are sites of international importance due to the presence of listed habitats or species that are of European importance. The nearest cSAC to the proposed development is the Great Island Channel cSAC that occurs ca 0.4km south-east of the proposed development site at its nearest point. The cSAC is designated for two Annex I habitats listed on the EU Habitats Directive. It is noted however that there are no direct pathways from the proposed development site particularly with respect to surface water.

An Appropriate Assessment screening report was included as Appendix 5.2 of the EIAR which concluded that the proposed development is not directly connected with or necessary to the management of European sites and posed no ecological risk to any Natura 2000 sites.

An Archaeological Impact Statement was prepared for the site and included as part of Chapter 10 of the EIAR and found that no archaeological features were recorded within the proposed development site or in the immediate vicinity.

3. Description of Proposed Development and Construction Methodology

3.1 Description of Development

The proposed waste transfer & recycling facility is situated near the south-east coastline of Little Island, in the townland of Courtstown. The site is located within the Courtstown Industrial Park (national grid reference: 177044E, 071656N). The location of the proposed development is shown on **Figure 1** and **Figure 2.** The proposed site layout is presented in **Drawing 1001** provided in **Appendix 1.**

The primary construction elements of the development are as follows:

- Earthworks to create level areas for construction;
- Establishing a temporary site construction compound;
- Construction of warehouse structure to house waste transfer and recycling operations, surrounding yard area, site office, weighbridge, and associated infrastructure;
- Installation of associated site infrastructure including drainage and services;
- Construction of site administration offices in the north-west corner of the site

The key elements of the project are as follows:

- Provision of a new warehouse facility to provide a waste transfer and recycling plant and office area with a waste throughput of 95,000 tonnes per annum.
- Provision of appropriate receiving areas for receiving mixed non-hazardous waste materials.
- Development of a two-storey site office building.
- ESB MV sub Station Building.

3.2 Outline Construction Methodology and Programme

The outline construction methodology is discussed under the following headings:

- Expected Duration of Works;
- Contractor's Compound and Welfare Facilities;
- Proposed Sequence of Work and Methodology;
- Detailed Construction Method Statement, and
- Record Keeping.

3.3 Expected Duration of Works

Site enabling and installation of the plant items and ancillary infrastructure and utilities is expected to take approximately 12 -15 months.

3.4 Proposed Sequence of Work and Methodology

Site Entrance

The main construction access to the site will be via an existing developed permanent tarmac road located at the south-eastern corner of the proposed development site.

The site is served by the main access road to Harbour Point and Courtstown Business Parks. The main business park access road leads to Ballytrasna Park to the north, and meets this road in the form of a simple priority junction.

Site Enabling and Earthworks

The construction phase of the facility will involve the excavation of soils for foundation construction to provide a base for infrastructure. Proposed depth of excavation (approximately 1 - 3m in the majority of the site with deeper excavations envisaged near the site entrance and to allow for the installation of the firewater retention tank) and future site levels are illustrated in site sections **Drawing 1004** included in **Appendix 1**. Excavated topsoil will be temporarily stored along the western boundary of the proposed development area as shown in **Drawing 1022** included in **Appendix 1.**

Given the extent and approximate proposed depth of excavations within the development area it is possible that groundwater will be encountered through surface run-off and ponding of rainwater within open excavations. Subsequently, as a result localised dewatering of these areas may be required.

All excavated materials during landscaping and foundation construction will be used for reinstatement works where possible. Excavated material will also be utilised to form an earthen embankment between the proposed facility and the natural area of trees to be planted along the western boundary, as shown on **Drawings 1001** and **1026**. Any excess materials will be disposed of to a licensed disposal facility.

Construction Compound

The construction compound will be located to the north-west of the proposed development site as shown on **Drawing 1022**. The compound will comprise car parking, toilets (male/female), site office, civil site office and storage containers.

The Contractor will be obliged to ensure that the compound is properly designed and maintained throughout the construction period, the areas reinstated as appropriate following completion of the works, and that their construction and maintenance does not compromise water quality or ecology of the site.

The temporary facilities will be removed on completion of the construction phase of the waste facility project. Once the primary waste building/warehouse is constructed the external site compound will be re-located within this building, in order to facilitate the construction of the proposed offices.

The site compound will be used for the storage of fuels and oils required for the various items of construction activity. Fuel will be stored in a suitably sized bunded bowser within the site compound. The compound will have a designated bunded area for storage of the fuel bowser.

The site compound will be the designated location for waste receptacles. Skips should be used for recycling and general waste and will be removed from site by an authorised waste haulier

Construction/Installation

The proposed waste facility includes the construction of a new warehouse facility to provide a waste transfer and recycling plant and office area, provision of receiving areas for, a purpose built Bring Centre for use by the public, development of a two-storey office area and ESB MV sub-station building.

The construction phase of the facility development will involve the excavation of soils for foundation construction to provide a base for new buildings. It is expected that soil excavations for foundation construction associated with the facility development will be between 1 to 3m deep below existing ground levels.

4. Primary Construction Constraints

4.1 Working Hours

It is proposed to adopt standard construction hours, where all construction works shall be confined to 8.00am to 8.00pm Monday to Friday and 8.00am to 5.00pm on Saturdays. It should be noted that there may be times such as optimum weather windows when construction will need to take place outside the above-mentioned hours.

4.2 Drainage

As stated, there are no significant surface waterbodies within or in the immediate vicinity of the proposed development site. An existing drainage ditch runs along the northern boundary of the proposed development site. Although not considered to be a significant drainage feature, particularly in terms of potential downstream impacts or connectivity to environmentally sensitive locations/sites consideration must be taken to avoid adversely impacting on this such as to avoid any potential impacts.

A number of measures will be implemented onsite during the construction phase in order mitigate or avoid drainage related impacts. **Drawing 1022** provided in **Appendix 1** illustrate these proposed measures. A number of cut-off drains will be constructed in order to mitigate the potential for silt laden run-off to enter drainage adjacent to the site. Drainage management and control is discussed in greater detail in Section 5 below.

If significant groundwater is encountered during construction and excavation dewatering may be required. Any pumped water will be contained and disposed of in a safe manner such as to not cause adverse impacts on the existing environment. Dewatering measures are discussed further in Section 5.5 below.

4.3 Designated Sites

Section 2.4 provides information on designated sites. As described above, no works will take place within or in proximity to designated sites. Therefore, there will be no habitat loss or disturbance of such sites during the construction phase.

It is noted that no surface waters or discharges will flow from the proposed development area into rivers, drains and/or streams ensuring that there will be no direct hydrological link with nearby protected sites.

4.4 Noise Limits

The developers are committed to ensure that all operations on site are carried out in a manner such that noise emissions do not result in significant impairment of, or significant interference with, amenities or the environment beyond the site.

4.4.1 General Construction Noise Limits

There are no national guidelines for construction noise, however limits for construction noise are generally set below 65 dB LAeq, with no Sunday operations. The noise from the construction site will be kept well below this target.

4.4.2 Mitigation Measures for Construction Noise

All construction will be carried out in accordance with BS 5228: Part 1: 2009 (Noise Control on Construction and Open Sites - Part 1. Code of Practice for Basic Information and Procedures for Noise Control). Cognisance will also be taken from the 'Environmental good practice site guide' 2015 compiled by CIRIA and the UK Environmental Agency. This guide provides useful and practical information regarding the control of noise emissions at construction sites.

Plant and machinery used on-site will comply with the EU (Construction Plant and Equipment) Permissible Noise Levels Regulations, 1988 (S.I. No. 320 of 1988). All noise producing equipment will comply with S.I. No 632 of 2001 European Communities (Noise Emission by Equipment for Use Outdoors) Regulations 2001.

Construction activity, due to its nature, is a temporary activity and thus any impacts will be short-term. Construction plant will be throttled down or turned off when not in productive use. Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery. Where possible, the contractor will be instructed to use the least noisy equipment. With efficient use of well-maintained mobile equipment, considerably lower noise levels than those predicted can be attained.

Accordingly, all construction traffic to be used on site will have effective well-maintained silencers. Where practicable, all mechanical plant will be fitted with effective exhaust silencers and pneumatic percussive tools fitted with mufflers or silencers. Mechanical static plant will be enclosed by acoustic sheds or screens unless they are likely to have negligible impact upon the nearest sensitive receptors. All compressors will be of the "noise reduced" variety and fitted with properly lined and sealed acoustic covers. In all cases engine and/or machinery covers will be maintained in good and effective working order and will be kept closed whenever the machines or engines are in use.

5. Site Drainage Management Plan & Protection of Water Quality

5.1 Overview

As with any civil engineering project of this nature it is vital to ensure that prior to works commencing on site, adequate mitigation measures as outlined within this document and within the EIAR are put in place. All such mitigation measures will be detailed within a Construction Management Plan (CMS) produced by the Construction Works Contractor (CWC) prior to the commencement of the construction phase, which will provide information on how the mitigation measures outlined in this CEMP will be implemented on site. The Project/Site manager, who represents the Civil Works Contractor (CWC) will be responsible for enforcing the technical and contractual requirements of the project.

The proposed development site is not located within the immediate vicinity of any significant drainage or surface water features.

One of the main impacts which could arise with this project is an impact on local hydrology through an influx of potentially silt laden surface run-off. Due to the lack of a direct pathway from the site to nearby sensitive locations/designated ecological sites, is not anticipated that any adverse impacts on these sites will occur as a result of any run-off. However, it should be ensured that potentially silt laden run-off from the site should not enter local watercourses or drainage features in surrounding lands.

The Construction Works Contractor (CWC) will consult the CIRIA guidance documents, “Control of Water Pollution from Construction Sites 2001,” and “Control of Water Pollution from Linear Construction Projects 2006” for best practice measures for controlling water pollution.

The site engineers have produced a site drainage plan for the construction phase of the development to mitigate the potential for silt-laden or contaminated run off to enter off-site drainage features and travel beyond the development site. The proposed drainage management measures are illustrated in **Drawing 1022** included in **Appendix 1** and are discussed in further detail in subsequent sections below**.**

5.2 Sedimentation Erosion Control

Control of both erosion and sediment entrainment in runoff will be a key undertaking for the duration of the project. The CWC will ensure that the risk of potential erosion is minimised during the construction works undertaken as part of the development.

Silt management measures will be implemented onsite utilising a combination of silt fencing and cut-off/diversion drains. These drains will be used to channel potentially silt-laden run-off to a desired location and prevent contaminated run-off offsite. The proposed locations of these drainage control features are illustrated in **Drawing 1022** included in **Appendix 1** of this CEMP.



Plate 1: Typical pumped dirt bag & silt fence arrangement

Cut-off/Diversion drains will be employed for the following activities;

- Diverting upslope runoff, particularly off-site runoff, along, across or around the site,
- For collecting and channelling silty runoff downslope of the site to prevent it leaving the site,
- Around the toe of stockpiles or cut/fill embankments,
- At the top of slopes, channelling runoff to a slope drain,
- Around any other disturbed area.

The performance of silt control measures will be assessed through frequent observations and measurements by the team put in place by the CWC.

As shown in **Drawing No. 1022** included in **Appendix 1** Harris fencing will be erected along the western and north-western boundary of the proposed development site. This fencing will also be utilised to form and implement a buffer zone along the drainage ditch on the northern boundary.

A 225mm perforated land drain wrapped in teram will be constructed on both the western and eastern side of the proposed excavation spoil storage area located along the western boundary of the site. This will function to cut-off and divert potentially silt-laden run-off from the spoil. It is proposed that these drains will connect to a proposed 225mm PVC storm water pipe shown in pink in **Drawing 1022.** This additional 225mm PVC storm pipe drain will run in an easterly/ south-easterly direction and connect to an existing storm manhole located at the

adjacent roadway to the south-east of the site. This pipe will be equipped with an NSB4 Bypass Separator.

It is also proposed to install silt fencing downgradient of both the stored spoil area and the development footprint of the main warehouse building. This will further reduce the risk of potentially, excessive silt-laden surface water run-off from traversing the site and impacting on existing drainage features or adjacent lands.

A perforated land drain will also be constructed in the east of site along the proposed site access route as shown outlined in blue in **Drawing 1022**. The topography of the proposed development site is a decreasing elevation in a north-westerly to south-easterly direction therefore this is the natural pathway for surface run-off to travel. This constructed drain will function to cut-off potentially silt-laden or otherwise contaminated surface run-off from exiting the site to adjacent properties. This drain will also be connected to the proposed 225mm PVC storm pipe and will subsequently discharge to an existing storm pipe located to the south-east of the proposed development site as shown in **Drawing 1022**.

It is also proposed that moveable silt fencing will also be placed upgradient of this land drain further limiting the potential for silt laden run-off to traverse the site and beyond to adjacent lands.

5.3 Design Criteria

The proposed surface water management plan for the site will aim:

- To minimise any change to the hydrology and groundwater conditions within the site. It is proposed that the source control measures be used to deal with rainwater, generating construction runoff as close as possible to where runoff occurs, rather than conveying it for long distances to large balancing ponds. It is proposed, where possible, to replicate the natural drainage and hydrological characteristics of the area.
- To manage hydraulic erosion on site and retain silts on site (restrict silts from entering receiving watercourses).
- To maintain runoff rates at pre-development rates for the areas proposed for infrastructure.
- To encourage natural groundwater recharge (where appropriate) to minimise the impacts on aquifers and river base flows in the receiving catchment.
- To remove pollutant concentrations (silt) in surface water, thus protecting the quality of the receiving water body.
- To act as a buffer for accidental spills by preventing direct discharge of high concentrations of contaminants to the receiving water body.

5.4 Protecting Water Quality & Environmental Management

Protocols to protect water quality and manage environmental issues will address the following:

- Promotion and Awareness;
- Excavation and Spoil Management Principles;

- Placement of materials / rock;
- Concrete works guidelines;
- Materials Storage Guidelines;
- Site Plant Management Guidelines;
- Incident Management, and
- Incident Reporting.

All site personnel will be made aware of their environmental responsibilities at the site induction prior to being allowed to work on site, and through the production of a Method statement, outlining environmental requirements for sub-contractors, which will include environmental emergency response procedures to deal with spillages, should they occur.

In principle, soil excavation will be undertaken during dry periods. However, it is noted that other factors may affect working timeframes. Therefore, working only during dry weather will not always be practicable or feasible.

The works programme for the initial construction stage of the development will take account of weather forecasts, and predicted rainfall in particular. Large excavations and movements of subsoil or vegetation stripping should be suspended or scaled back if heavy rain is forecast. The extent to which works should be scaled back or suspended will relate directly to the amount of rainfall forecast.

It is recommended to suspend works if forecasting suggests either of the following is likely to occur:

- >10 mm/hr (i.e. high intensity local rainfall events); or
- >25 mm in a 24 hour period (heavy frontal rainfall lasting most of the day); or, half monthly average rainfall in any 7 days.

Prior to works being suspended the following control measures shall be completed:

- Secure all open excavations to prevent ingress of rainwater/runoff;
- Provide temporary or emergency drainage in the form of diversion channels to prevent back-up of surface runoff; and,
- Avoid working during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded.

The following site-specific protection measures will be undertaken as part of the development to ensure the protection of watercourses:

- Siltation of existing watercourses will be minimised using surface water run-off cut-off/diversion drainage channels and storm water piping;
- Off and on-site run-off will be intercepted and managed to ensure no pollution events occur;
- A buffer zone to be marked by Harris fencing will be implemented along the existing drainage ditch located along the northern boundary of the proposed development site, as shown in **Drawing 1022** included in **Appendix 1**. Although, not regarded as a

significant hydrological feature, best practice is to mitigate any potential negative impacts on existing drainage features during construction e.g. through significant physical disturbance of the existing feature or influx of potential contaminated or silt-laden run-off from the development site. This buffer zone will limit activity taking place in close proximity to the drainage ditch and thus reduce the potential risk of construction activity adversely impacting on it.

Silt fences on the Little island site will present a physical barrier which will retain silt whilst allowing filtered water through and reduce flow velocity allowing soiled particulates to settle from suspension. Silt fence systems work effectively in different situations but all require maintenance and inspection to work efficiently.

A silt fence can comprise geotextile filter fabric supported by posts, straw bales or a combination of the two installed in the path of sheet flow runoff to filter out heavy sediments. Silt fences are suitable for use along the perimeter of a site, below the toe of a cleared slope, Regular inspection of silt fences will be carried out to check for clogging, tears and to clear sediment build up when required and particularly after periods of heavy rainfall.



Plate 2: Fabric Silt Fencing at the toe of a slope (CIRIA C648, 2006)



Plate 3: Silt Fence and Straw Bales (CIRIA C648, 2006)



Plate 4: Silt Fence

Erosion control and attenuation facilities, namely diversion/cut-off drains will be regularly maintained during the construction phase. If during the works the drains are found to be eroding, they will be lined with a suitable geotextile fabric. All personnel working onsite will be trained in pollution incident control response.

Construction of the site drainage and sediment control system will only be carried out during dry conditions or periods of low rainfall, therefore minimising runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and operational for all subsequent construction works.

A designated wheel wash area will be implemented onsite during construction. This area will be contained and will be drained via 225mm PVC pipe and will be equipped with a silt trap to mitigate excessive solids entering the proposed PVC storm pipe as shown in **Drawing 1022.**

5.5 Dewatering

Standing water, which could arise in excavations, has the potential to contain an increased concentration of suspended solids as a result of the disturbance to soils, and site procedures will be developed to minimise risks to surface water.

Given the extent of excavation and approximate proposed depth of those excavations within the development area it is possible that groundwater will be encountered through influx of surface water run-off or direct ponding of rainwater within open excavations. Subsequently, as such localised dewatering may be required.

The extent of localised dewatering that may be required is likely to vary with seasons and may show a flashy response to heavy rainfall. Excavations that are dry in summer may require dewatering during winter and spring or following heavy rainfall.

Where dewatering is required, only the minimum volume and rate needed to produce suitable working conditions (dry excavations) will be dewatered. Dewatering bags will be used at the outlet of pumped water to retain silt potentially entrained in the water.

Minimisation of further or continuous groundwater ingress to the excavation is a key aspect of dewatering and groundwater management. In order reduce the necessity for pumping and volume of water to be pumped, measures will be implemented to maintain dry conditions once established.

In order to prevent ingress of surface water into open excavations during construction, the following actions will be implemented;

- cut-off ditches/trenches be created surrounding the open excavations,
- grading the ground or;
- placing sand bags or a small earth bund around the edge of the excavation

Where dewatering is required, pumped and filtered water will be discharged to the proposed construction phase drainage network comprising diversion drains following visual inspection.

All pumps using fuel or containing oil will be locally and securely bunded when situated within close proximity of waters or when sited such that taking account of gradient and ground conditions there is the possibility of discharge to waters.

5.6 Spoil Management

The CWC will ensure that any storage of excavated material is controlled so that it does not pose a negative impact on water quality. It is proposed that excavated soils will be stored within a c.15m wide area along the western boundary of the proposed development area as shown in **Drawing 1022**, included in **Appendix** 1 of this CEMP.

The following will be adhered to as a minimum in terms of drainage for spoil management areas:

- The placing of spoil from excavations and local concentrated loads on slopes will be avoided without first establishing adequacy of the ground to support the load.
- The storage of spoil will be avoided on slopes greater than 10 degrees as run-off and potential instability is more likely to occur.
- As a general rule of thumb all stored spoil will be kept to a maximum height of 1.0m. This will be confirmed with the CWC prior to construction.
- Temporary fills or stockpiles will be covered with polyethylene sheeting
- Where practical, the surface of the stored spoil will be shaped to allow efficient run-off of surface water. Where possible, shaping of the surface of the stored spoil will be carried out as placement of spoil within the storage area progresses.
- Silt fencing will be used where necessary to prevent entry to existing drainage. Silt fencing will be put in place along the eastern/north-eastern boundary of the proposed development as shown in **Drawing No. 1022** included in Appendix 1.
- Cut-off drains will be constructed at the toe of the proposed spoil area located to the western edge of the proposed development area.
- Where possible, the CWC will use excess spoil for site landscaping and reinstatement. Surplus materials post construction works will be removed and placed in a licensed waste facility.
- Movement of material will be minimised in order to reduce of the soil structure and minimise generation of dust.

6. Materials Storage

6.1 Concrete & Materials Delivery, Storage and Handling

Concrete structures required during the construction phase of the development will be manufactured off-site as much as possible, thereby reducing the risk of water pollution by cementitious material.

On-site placement of concrete will be planned and strictly controlled to ensure quality control, safe working operation and no impact on the environment. Thus, prior to advancing this item of work the developer will ensure the following conditions prevail:

- Compliance with Health and Safety Regulations;
- Clear access to works locations;
- Secure ground working conditions;
- Adequate construction plant and
- Mitigation measures in place to prevent any environmental impact during placement of concrete.

Ready Mix Trucks shall be employed for the transport of concrete to site as required. This operation will be strictly controlled to ensure safe passage of the material while on route, with particular attention given to spillage. All transport deliveries shall be carried out strictly within the permitted truck carrying capacity and no allowance will be permitted for exceeding the carrying specification of the lorry.

Clearly visible signs will be placed in prominent locations close to concrete pour areas, stating that washout of concrete lorries is not permitted on the site.

The arrangements for concrete deliveries to the site will be discussed with suppliers before commencement of work, agreeing routes, prohibiting on-site washout and discussing emergency procedures.

Raw or uncured waste concrete will be disposed of by removal from the site.

So as to avoid spillage, concrete will not be transported around the site in open trailers or dumpers. All concrete used will be pumped directly into the shuttered formwork from the delivery truck.

Concrete pours will be avoided where prolonged periods of heavy rain are forecast and covers will be available for freshly placed concrete to avoid the surface washing away in heavy rain.

Only the chute of the concrete delivery truck will be cleaned on site, using the smallest volume of water necessary. Concrete trucks will be directed back to their batching plant for washout.

The pouring of concrete will be controlled to ensure quality control, safe working operation and no impact on the environment. All concrete works are to take place in dry conditions only.

Any spillages will be cleaned up and disposed of correctly and expediently.

Although anticipated to be used in small quantities, all oils and fuel required for the project will be stored in a bunded area with provisions of adequate spill retention capacity (a minimum of 110% tank capacity where applicable).

All tanks on site will be properly labelled showing their contents and capacities. The bund and tanks facilities will be checked on a regular basis to ensure any leaks or drips are fixed to prevent loss and pollution. Drainage from bunded areas will be diverted for collection and safe disposal by appropriate contractors.

Where construction materials are imported (e.g. stone, pipework, concrete etc), these materials will be delivered for secure storage or direct to the area of site where the material will be immediately utilised. All materials will be COSHH assessed and will be stored in accordance with the manufacturer's details. Dry stone may be stockpiled for use over a short period of time and topsoil will be stored for longer durations.

6.2 Oil Storage and Re-fuelling

The issue of accidental spillage of hydrocarbons such as diesel and lubrication oil during refuelling of plant machinery is a potential risk during the construction phase. Where on site refuelling takes place, it will be carried out in a designated area, which will be supplied with spill response materials. All machinery will be maintained in good working order, free from leakage of fuel or hydraulic fluid.

As illustrated in **Drawing 1022** included in **Appendix 1** a 225mm PVC stormpipe will be constructed during the construction phase. This stormpipe will divert run-off from the adjacent proposed land drains and construction compound to an existing stormwater network. A bypass interceptor will also be installed on this stormpipe upstream of the connection point with stormwater network.

Plant equipment such as generators and pumps will be placed on drip trays.

7. Pollution Control & Environmental Management

7.1 Risks

The proposed construction works required for this project could lead to environmental pollution under the following main headings.

- Sediment run off from on-site construction works;
- Oil and fuel spills from construction plant;
- Run off from concrete leaching;
- Dust;
- Noise; and
- Ecology.

7.2 Mitigation Measures

With respect to the above risks the following actions will be taken:

7.2.1 Sediment run-off from on-site construction works

All construction activity on site will ensure that any works carried out as part of this project will not lead to a free / uncontrolled discharge of soiled waters downgradient or contribute to a wash out of soils with elevated sediment levels reaching any existing water channels.

Further information in relation to mitigation measures for sediment control is discussed in Section 5 above.

7.2.2 Oil and fuel spills from construction plant

In order to carry out the construction works required for this development the CWC will require the deployment of a number of items of construction equipment. This plant may consist mainly of tracked excavators, dump trucks, eight-wheel tippers and dozers. In addition, some items of smaller plant such as vibrating rollers, plate compactors, compressors, mechanical pumps and electric generators will also be employed on site.

Refuelling of such plant will only occur in a designated and bunded location within the construction compound as discussed above in Section 6.

An emergency plan to deal with accidental spillages will be drafted and kept on site during the construction period should such an incident occur. Should any item of contractor's equipment require major mechanical repair then arrangement shall be made to remove the plant off site for repair and maintenance.

7.2.3 Runoff from concrete leaching

Concrete will be required for the construction of the proposed development. During the transport and placement of the concrete there is scope for a likely incident, which could result in a risk to the environment.

Concrete has a high pH and if allowed to enter the natural drainage system, it could have profound impact on aquatic life downhill, thus all concrete construction works will be advanced on site in a planned sequence.

Prior to work proceeding, a detailed method statement will be prepared by the CWC to accurately detail the intended works, taking into consideration the transport, placement and curing of the concrete. Issues relating to drainage adjacent to the proposed works will be examined and a system of working devised to ensure that no elevated sediment run off from the concrete pour takes place.

7.2.4 Air Quality – Dust control

The main air quality impact associated with the construction of the proposed development is the potential for dust. The potential for dust arising depends on a number of factors, including the prevalent weather conditions. It is envisaged that this problem arises during the summer season and on windy days during winter months.

The main creation of dust during the project will be generated from heavy earth moving plant during activities such as excavations, transport and unloading of crushed stone and also vehicle movements over hard, dry surfaces on site.

In order to ensure minimal impact on air quality during the works, mitigation measures will be undertaken. Such measures may include the regular cleaning, sweeping and maintenance of approach roads and construction areas and the suppression of dust using a tractor-drawn bowser.

If a complaint relating to dust arises it will be entered into the site's complaints log and the Project Manager, following consultation with the Developer, will arrange to meet with those affected. The situation will be acted upon immediately.

7.2.5 Noise Control

Noise will be generated from inter alia heavy earthmoving plant and excavations. The main control measure will be the suppression of noise at source by the use of new plant and equipment where possible. For all other plant a full maintenance schedule will ensure all pieces of equipment are in good working order.

All plant operatives will contact their foreman in the event that their machine becomes defective with resulting high noise emissions. Any defective plant will be kept out of service until the necessary repairs are done.

Complaints regarding noise will be entered into the site's complaints log and the project manager will arrange to meet with those affected. The situation will be acted upon immediately and reviewed by the Project Manager. If nuisance is occurring, then the Project Manager will decide what action is necessary to reduce to acceptable levels or eliminate the disturbance.

7.3 Ecology/Ecological Clerk of Works

It is recommended that a site walkover will be undertaken over the footprint of the development prior to construction at an appropriate time of year by a suitably qualified ecologist.

An Ecological Clerk of Works (ECoW) will be employed who will make at least weekly site visits for the duration of the construction works, and more frequently at start-up and during critical construction events such as concrete pours.

The ECoW will also be the liaison for the purposes of consulting environmental bodies including the NPWS and IFI. The ECoW will be responsible for carrying out regular audits of the Contractor's CMS on behalf of the proposed developer. In addition, the ECoW will be the primary person involved in the developer's monitoring role. The ECoW will be delegated sufficient powers under the construction contract so that he/she will be able to instruct the contractor to stop works and to direct the carrying out of emergency mitigation/clean-up operations.

The ECoW will maintain a register indicating whether all mitigation measures have been carried out satisfactorily. This register will be signed off by the contractor's site foreman.

Inspections by ECoW

- Weekly Inspection of surface water treatment measures by the ECoW (silt fencing, sandbags, etc.) to ensure monitoring undertaken by the contractor on a daily basis is consistent with the CMS and onsite conditions;
- Wheel wash facilities shall be inspected on a weekly basis by the ECoW as will the effectiveness and condition of onsite silt traps;
- Stockpiles shall be monitored by the contractor's project manager on a daily basis while being filled or emptied and otherwise on a weekly basis;
- Control measures for works at or near water bodies such as drains shall be inspected on a daily basis by the contractor's project manager and by the ECoW when necessary;
- The Contractor's CMS monitoring results shall be audited on a frequent basis by the ECoW (weekly at a minimum).

Contractors monitoring/inspections will include the following:

- Daily inspection of surface water treatment by the CWC measures including wheel wash facilities, designated chute washing out facilities and other attenuation and control features such as silt traps etc.
- Daily inspection of stockpiles by the CWC for integrity, run-off and erosion.
- Daily Inspection by the CWC of the onsite ditch along the north boundary of the site in proximity to the works to ensure the buffer zone implemented by the contractor is operating successfully.

7.3.1 Habitat Protection Measures

A number of measures are proposed for the purpose of the protection of existing terrestrial habitats. These measures are outlined below.

Site Clearance

- To offset the removal of vegetation, new vegetation will be planted at suitable locations around the site perimeter as shown on **Drawing 1026**. A 20m buffer zone will be applied along the western, vegetated boundary of the proposed development area for the purpose of protecting vegetation.
- No invasive woody vegetation will be planted and all reasonable care to prevent the importation of seeds or pieces of invasive plants will be taken by the contractor.

Artificial Lighting

- The use of artificial lighting during the operational phase will be kept to a minimum and where feasible lighting will comply with the guidelines, Bats and lighting in the UK, Bat Conservation Trust, UK (report available from www.bats.org.uk (BCT 2007a), on appropriate light designs and positioning to minimise the impact on bats and other fauna. The lighting design and operation should in particular ensure minimal light spill.

Additional measures to be implemented include;

- Smooth newt, frogs, or viviparous lizard species are fully protected under the Irish Wildlife Acts 1976 - 2012 and if found on site works will stop immediately to allow proper assessment and management.
- Although no invasive species were identified within the proposed development area, consideration will be given avoiding the spread and/or introduction of invasive species and noxious weeds. This will be avoided by adopting appropriate mitigation measures as per NRA guidance 'Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads' (NRA, 2010).

8. Developers Consideration and Management Requirements

8.1 Environmental Monitoring

Environmental performance will be monitored on a continuous basis by the assigned Ecological Clerk of Works (ECOW) on the site and improvement items will be communicated locally (e.g. excavator drivers and foreman) and to the site management.

Site environmental performance will be discussed at weekly construction site meetings and will any open corrective actions will be addressed. The ECOW will maintain a monitoring programme to include the following as a minimum:

- Daily general inspections will be undertaken at the areas where works are being carried out to check for evidence of uncontrolled silt laden runoff;
- Any drainage management measures/features will be checked on a daily basis to ensure a continued effective operation. Monitoring frequencies to be increased to hourly inspections during pumping operations.
- Weekly inspection checks will be completed on all plant to ensure spill kits are on board.
- Weekly inspection of the existing on-site deposition area in addition to any temporary stockpiles of surplus materials on site to check for evidence of sediment runoff.

The ECOW will also maintain a drainage inspection regime to the following minimum requirements:

- General inspections will be undertaken at the areas where works are being carried out, with appropriate records and notes kept;
- A minimum of weekly inspections on all construction drainage features;
- Periodic inspections after rainfall/storm events.

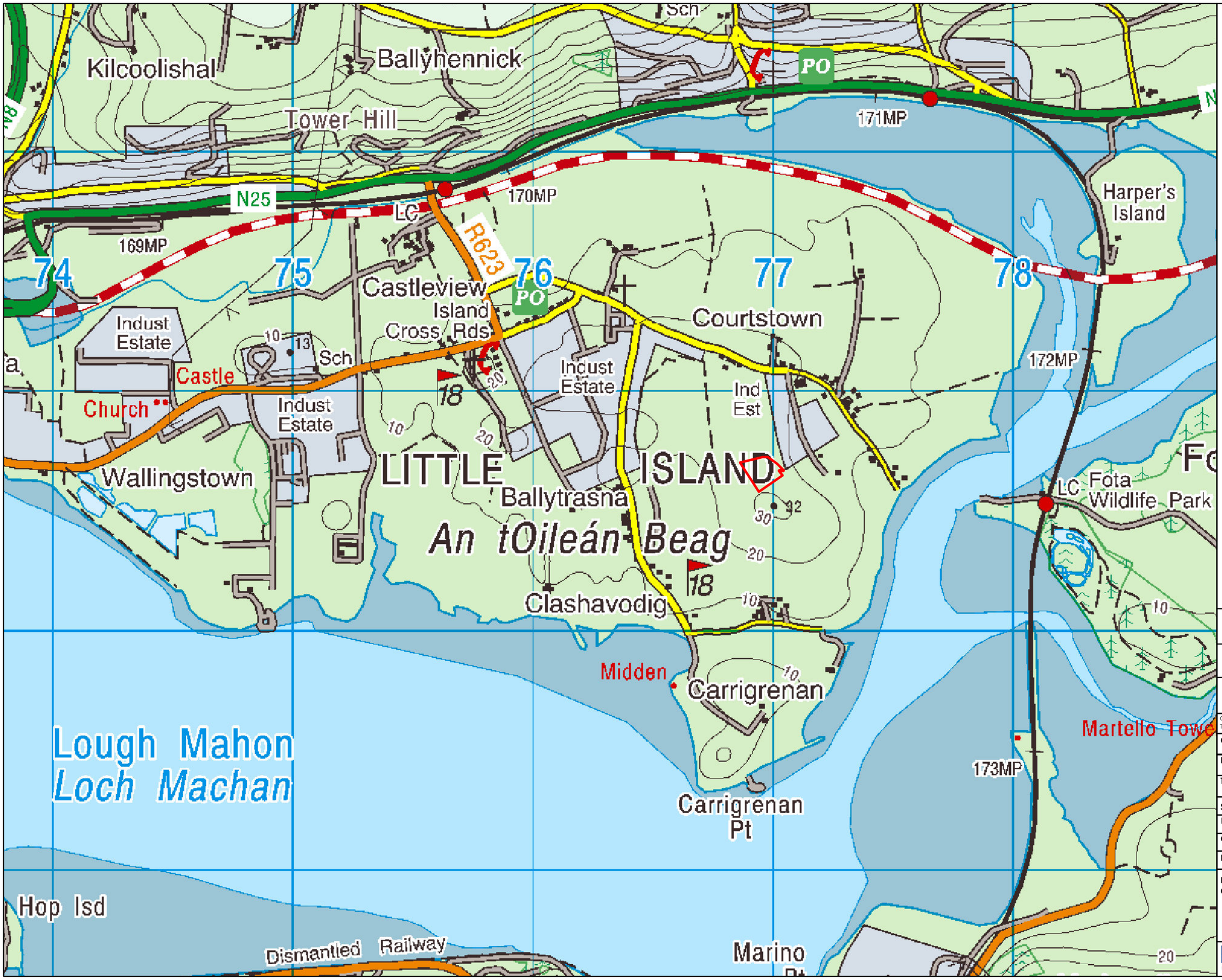
Inspections will be undertaken more regularly during and following extreme weather conditions. Roads, drains and silt fencing/traps will be inspected for damage after intense storms and repaired or replaced as appropriate. Appropriate records of monitoring will be maintained as part of the environmental monitoring/auditing.

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Appendix 1

Figures and Drawings

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Legend

Proposed Site Boundary

OES Consulting 2nd Floor, FBD House, Fels Point, Tralee, Co Kerry
T: (066) 7128321 F: (066) 7180061 E: info@oes.ie

Client:	Ray Keane & Associates
Project:	Waste Transfer Facility - Little Island
Title:	Site Location
Scale:	1:5,000 @ A3 Paper Size
Ref:	Figure 1
OES Ref:	1297_01
Revision:	01
Document Control: Date:	2/11/2016
Drawn By:	D Hayden
Checked By:	DH
Approved By:	DH

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Legend

Proposed Site Boundary

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T: (066) 7128321 F: (066) 7180061 E: info@oes.ie

Client:	Ray Keane & Associates	
Project:	Waste Transfer Facility - Little Island	
Title:	Existing Site Layout	
Scale:	1:5,000 @ A3 Paper Size	
Ref:	Figure 2	
OES Ref:	1297_01	
Revision:	01	
Document Control:	Date:	2/11/2016
	Drawn By:	D Hayden
	Checked By:	DH
	Approved By:	DH

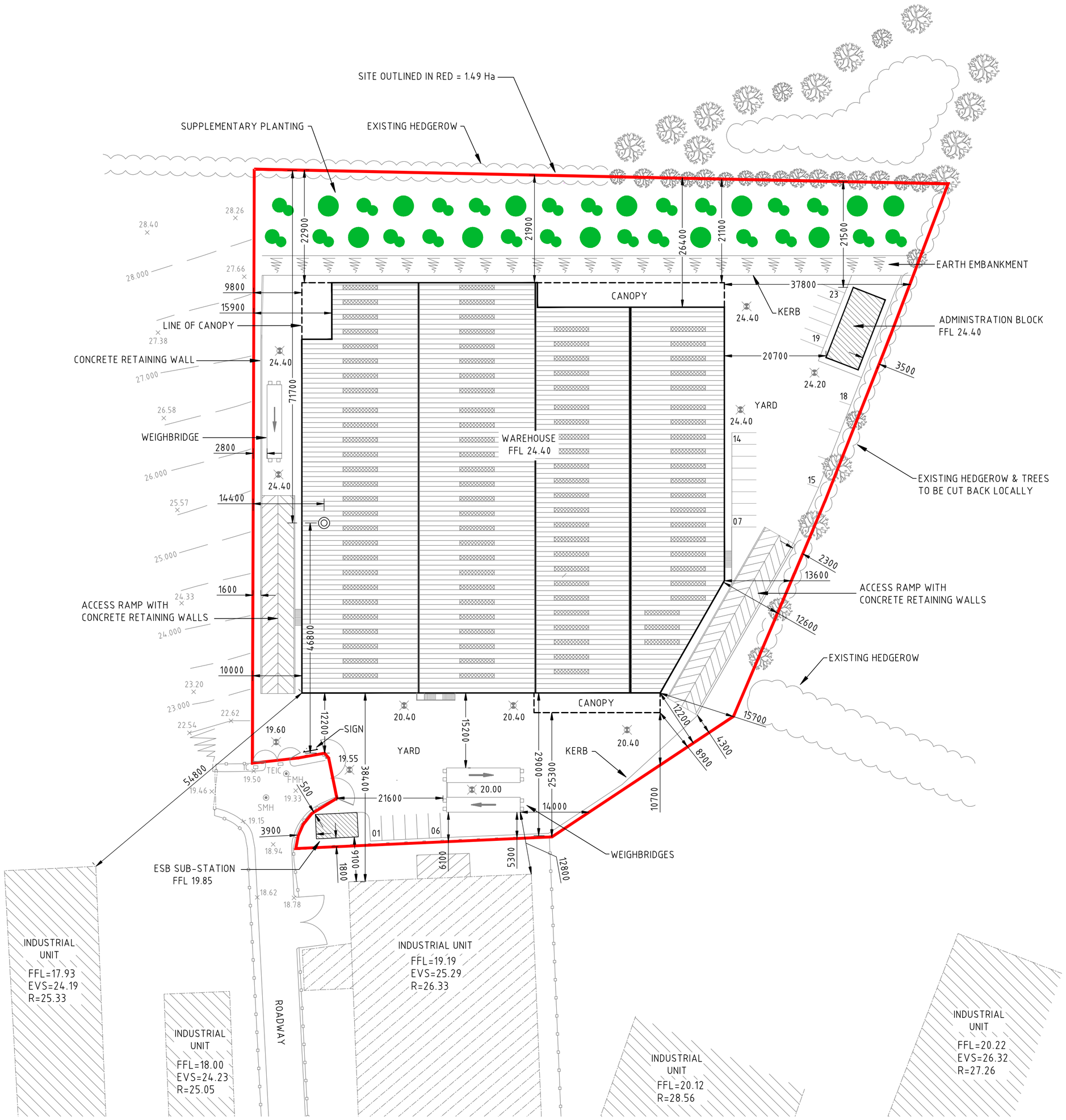
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Notes

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2. **Do not scale drawings. Use figured dimensions only. All dimensions to be checked on site.**
3. **All dimensions are in millimetres (mm).**
4. **Any discrepancies to be reported immediately to the consulting engineer.**



PROPOSED SITE LAYOUT
SCALE 1:500

NOTES:

North refers to Magnetic North.

All levels relate to Malin Head Datum.

All dimensions are in milllimeters
Do not scale fom drawing

LEGEND:

MH = MANHOLE
CL = COVER LEVEL
IC = INSPECTION CHAMBER
FFL = FINISHED FLOOR LEVEL
EVS = EAVES LEVEL
R = RIDGE LEVEL
LS = LAMP STANDARD
SV = SLUICE VALVE
GY = ROAD GULLY
IC = INSPECTION CHAMBER
TEIC = TELECOM INSPECTION CHAMBER

Rev	Date	Drawn	Description	Ch'k'd
PL	Nov.'18	M.E.	Issued for Planning	PF

2 Clogheen Business Park,
Blarney Road, Cork,
Ireland.
T: +353 (0)21 4399799
F: +353 (0)21 4399797
E: admin@rka.ie
W: www.rka.ie
RAY KEANE & ASSOCIATES
CONSULTING ENGINEERS
CIVIL | STRUCTURAL | PROJECT MANAGEMENT

Client:
Country Clean

Project:
Proposed Construction of Waste Transfer and Recycling Station At Courtstown, Little Island, Co.Cork.

Drawing Title:
Proposed Site Layout

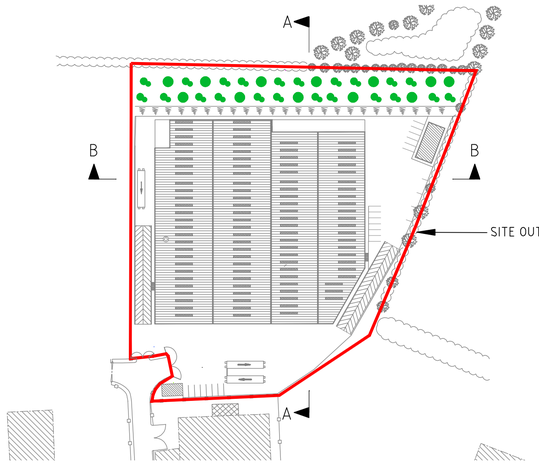
Designed:	P.F.	Drawn:	M.E.	Date:	Nov 2018
Eng Chk:	P.F.	Dwg. Chk:	P.F.	Scale:	1:500 @ A1
Project. No:	0600-168				
Drawing No:	1001			Status:	Planning
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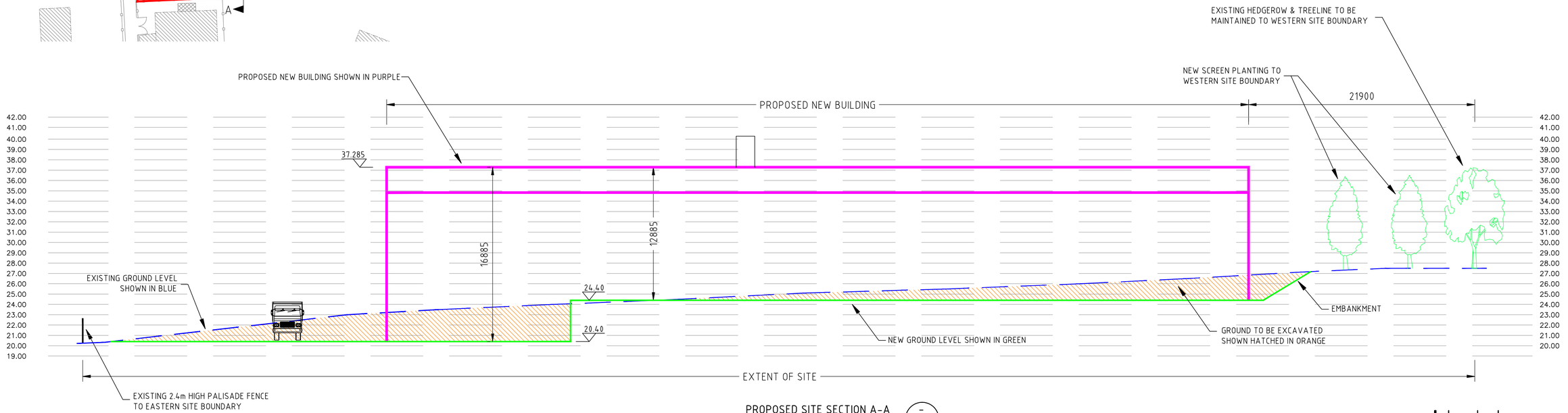
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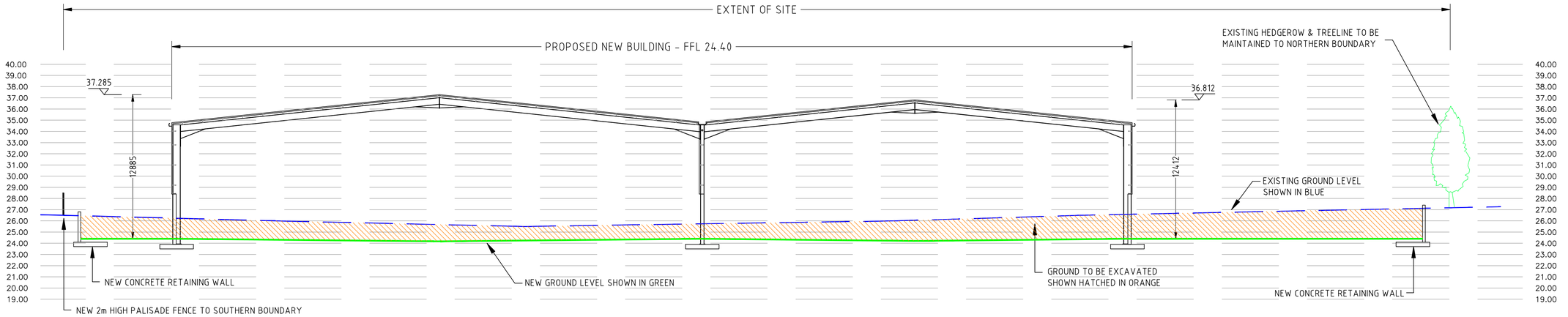
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4. Any discrepencies to be reported immediately to the consulting engineer.



KEY PLAN
NOT TO SCALE



PROPOSED SITE SECTION A-A
SCALE 1:200



PROPOSED SITE SECTION B-B
SCALE 1:200

Rev	Date	Drawn	Description	Ch'k'd
PL	Nov.'18	ME	Issued for Planning	PF

2 Clogheen Business Park,
Blarney Road, Cork,
Ireland.
T: +353 (0)21 4399799
F: +353 (0)21 4399797
E: admin@rka.ie
W: www.rka.ie

RAY KEANE & ASSOCIATES
CONSULTING ENGINEERS
CIVIL | STRUCTURAL | PROJECT MANAGEMENT

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Drawing Title:
Proposed Site Sections

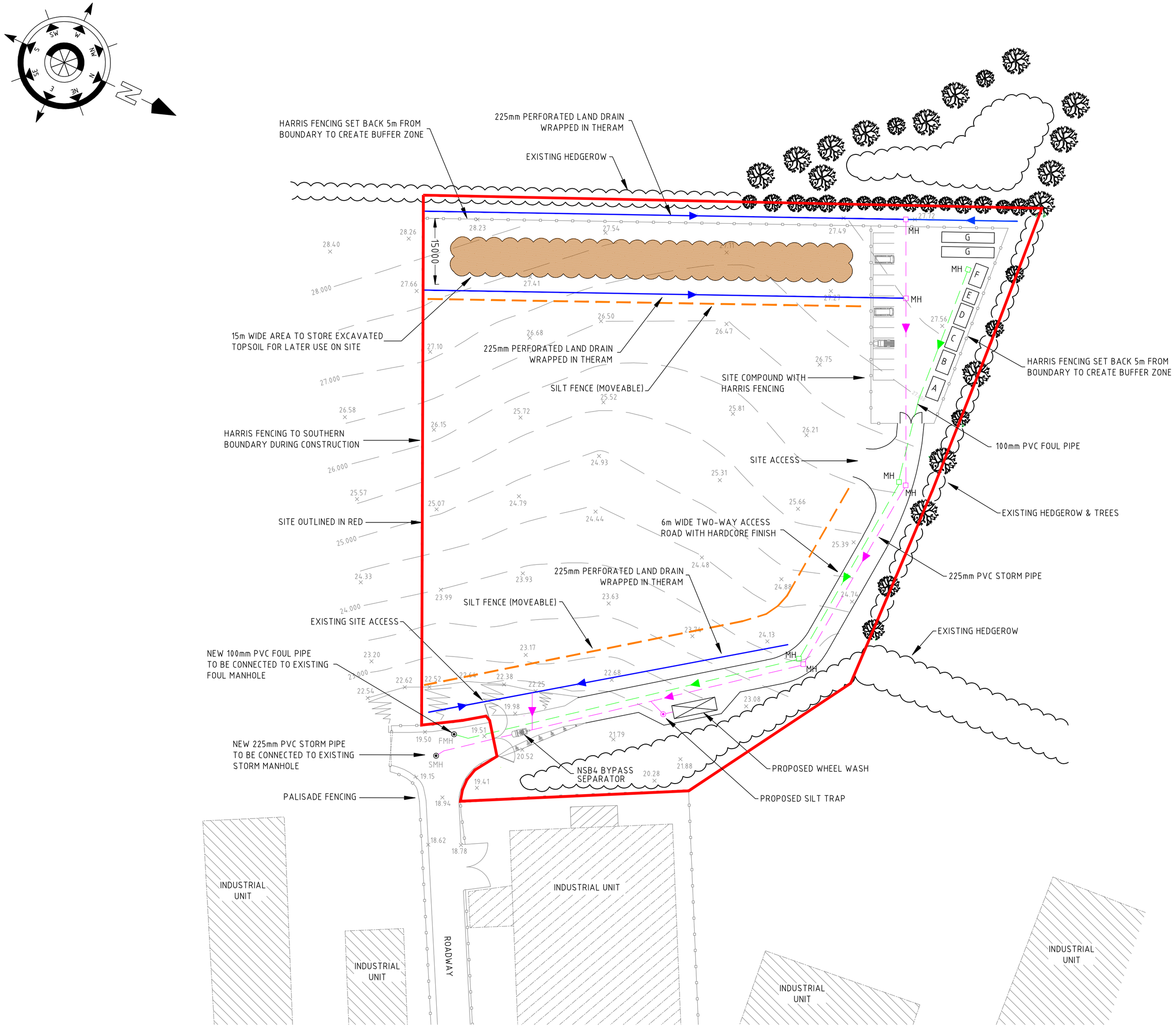
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Eng Chk: P.F.	Dwg. Chk: P.F.	Scale: 1:200 @ A1	
Project. No: 0600-168			
Drawing No: 1004		Status: Planning	Rev: PL

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Notes

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2. **Do not scale drawings. Use figured dimensions only. All dimensions to be checked on site.**
3. **All dimensions are in millimetres (mm).**
4. **Any discrepancies to be reported immediately to the consulting engineer.**



PROPOSED PLAN OF SITE WORKS CONSTRUCTION PHASE
SCALE 1:500

CONTRACTORS COMPOUND LEGEND:

A	SITE OFFICE
B	CIVIL SITE OFFICE
C	CANTEEN
D	CHANGING & DRYING ROOM
E	FEMALE TOILETS
F	MALE TOILETS
G	STORAGE CONTAINERS

TEMPORARY DRAINAGE LEGEND:

- 225mm PVC STORM PIPE
- 100mm PVC FOUL PIPE
- 225mm PERFORATED LAND DRAIN
- SILT FENCE (MOVEABLE)
- NSB4 BYPASS SEPARATOR

NOTE:
CONTROL OF GROUND WATER DURING CONSTRUCTION PHASE WILL BE IN ACCORDANCE WITH CIRIA C648 PUBLICATION.

Rev	Date	Drawn	Description	Ch'k'd
PL	Nov.'18	M.E.	Issued for Planning	PF

2 Clogheen Business Park,
Blarney Road, Cork,
Ireland.
T: +353 (0)21 4399799
F: +353 (0)21 4399797
E: admin@rka.ie
W: www.rka.ie
RAY KEANE & ASSOCIATES
CONSULTING ENGINEERS
CIVIL | STRUCTURAL | PROJECT MANAGEMENT

Client:
Country Clean

Project:
Proposed Construction of Waste Transfer and Recycling Station At Courtstown, Little Island, Co.Cork.

Drawing Title:
Proposed Plan of Site Works Construction Phase

Designed: P.F.	Drawn: M.E.	Date: Nov 2018	
Eng Chk: P.F.	Dwg. Chk: P.F.	Scale: 1:500 @ A1	
Project. No: 0600-168			
Drawing No: 1022		Status: Planning	Rev: PL

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Original Drawing Size A1

Notes

1. This drawing is to be read in conjunction with all relevant engineers and architects drawings and specifications.
2. Do not scale drawings. Use figured dimensions only. All dimensions to be checked on site.
3. All dimensions are in millimetres (mm).
4. Any discrepancies to be reported immediately to the consulting engineer.

EXISTING HEDGEROW TO BE MAINTAINED & STRENGTHENED AS NECESSARY

SUPPLEMENTARY PLANTING

19500

22000

EARTH EMBANKMENT

2500

1800

CONCRETE RETAINING WALL (2.5m MAXIMUM HEIGHT)

ADMINISTRATION BLOCK FFL 24.40

YARD

WAREHOUSE FFL 24.40

CONCRETE RETAINING WALL (2.5m MAXIMUM HEIGHT)

EXISTING HEDGEROW & TREES TO BE CUT BACK LOCALLY

NOTE: PROVIDE 2m HIGH PALISADE FENCE ALONG SOUTHERN SITE BOUNDARY

ACCESS RAMP WITH CONCRETE RETAINING WALLS

2100

ACCESS RAMP WITH CONCRETE RETAINING WALLS

EXISTING HEDGEROW

1800

CONCRETE RETAINING WALL (2.5m MAXIMUM HEIGHT)

6500

CONCRETE RETAINING WALL (2.5m MAXIMUM HEIGHT)

YARD

NEW 2.4m HIGH EXIT GATE

KERB LINE

EXISTING 2.4m HIGH PALISADE FENCE TO BE RETAINED

SITE OUTLINED IN RED = 1.49 Ha

1000

800

NOTES:

North refers to Magnetic North.

All levels relate to Malin Head Datum.

All dimensions are in milllimeters
Do not scale fom drawing

Rev	Date	Drawn	Description	Ch'k'd
PL	Nov '18	M.E.	Issued for Planning	PF

2 Clogheen Business Park,
Blarney Road,
Cork.
tel 021 4399799
fax 021 4399797
e-mail admin@rka.ie

Ray Keane & Associates
CONSULTING ENGINEERS
CIVIL, STRUCTURAL, PROJECT MANAGEMENT
(INCORPORATING BARRY KELLEHER & ASSOC.)

Client:
Country Clean

Project:
Proposed Construction of Waste Transfer and Recycling Station At Courtstown, Little Island, Co.Cork.

Drawing Title:
Proposed Boundary Treatments

Designed:	P.F.	Drawn:	M.E.	Date:	Nov 2018
Eng Chk:	P.F.	Dwg. Chk:	P.F.	Scale:	1:250 @ A1
Project. No:	0600-168				
Drawing No:	1026			Status: Planning	Rev: PL

Appendix 7.1

Office of Public Works Catchment Flood Risk Assessment and Management (CFRAMS) Preliminary Flood Risk Assessment Maps 38 & 39

© Government of Ireland
Osi permit number EN-002-1011

DRAFT DRAFT DRAFT

© Government of Ireland
Osi permit number EN-002-1011

CARRIGTWOHILL

MIDDLETON& BALLYNACORRA

No Fluvial Data Available For Area

No Fluvial Data Available For Area

DRAFT DRAFT DRAFT

Appendix 8.1

Photo- Log Noise Monitoring Locations



Plate 04: NMP4
Clash Road facing south



Plate 05: NMP5
East of Business Park facing northwest



Plate 01: NMP1
Site facing northeast



Plate 02: NMP2
Park area near Castlelake facing east



Plate 03: NMP3
Ballytarsna Road facing west

Appendix 8.2

Acoustic Calibrator Certificates

Manufacturer Calibration Certificate

The following instrument has been tested and calibrated to the manufacturer specifications.
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: M2230 consisting of
  - MA220 Serial Number: 5062
  - Capsule Serial Number: 8694

- Date of Calibration: 15 September 2015

- Results: PASSED
  (for detailed report see next page)

Tested by: M.Frick

Signature:

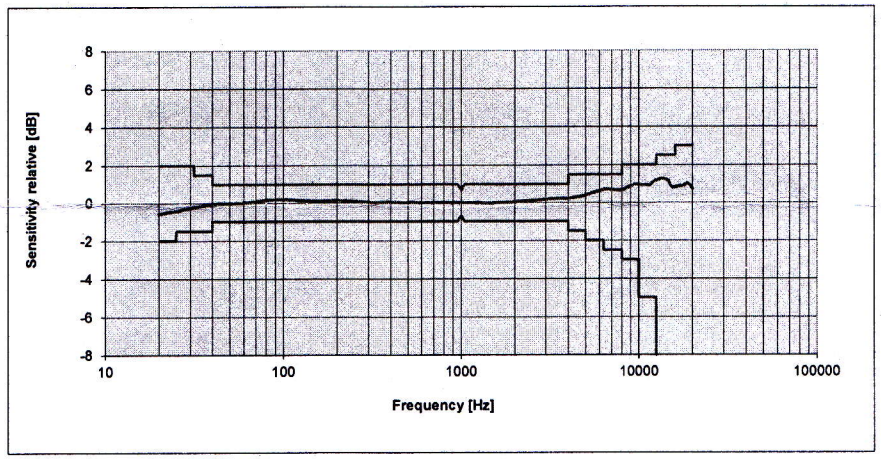
Stamp:

NTi Audio AG
Im alten Riet 102
LI - 9494 Schaan
www.nti-audio.com

Date:	15 September 2015		
Calibration of:	M2230 consisting of		
	MA220	Serial Number:	5062
	Capsule	Serial Number:	8694

- Detailed Calibration Test Results:

		calibration
System calibration	actual	uncertainty[1]
Sensitivity @ 1 kHz, 114 dBSPL	45.4 mV/Pa	±2.85%
Frequency response	Class 1	acc. IEC 61672



- Test Conditions:

Temperature:	25.7°C	±0.5 °C
Relative Humidity:	43.4%	±2%
Air Pressure:	95.98 kPa	±0.25 kPa

- Calibration Equipment Used:

- Norsonic Sound Calibrator, Type 1251, S/No. 30930
  Last Calibration: 3. Dec. 2014, Next Calibration: 2. Dec. 2016
  Calibrated by Metas, Switzerland

- NTi Audio FX100, S/No. 11094
  Last Calibration: 17. Aug. 2015, Next Calibration: 16. Aug. 2016
  Calibrated by NTi Audio meeting product specifications

- MTG MV203, S/No. 0630 / Mic Capsule, MK221 S./No. 13164
  Last Calibration: 26. Jun. 2014, Next Calibration: 25. Jun. 2016
  Calibrated by MTG, Germany

[1] The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the regulations of the GUM.

Sonitus Systems

Certificate of Calibration

Issued to:	Certificate Number
Redkite Environmental Ltd Huntersmoon Ballykeane Road Redcross Co. Wicklow	AC16007

Test Date: 14/11/2016
Procedure: TP-ACOCAL-1

Equipment Information

Item Calibrated:	Acoustic Calibrator	**Model:**	CAL200
Make:	Larson Davis (NTi)	**Serial Number:**	11728

Calibration Procedure

The above calibrator was verified in line with the requirements of BS EN 60942:2003. The calibrator was allowed to stablize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound pressure level in the cavity (half-inch) was measured. The operating frequency and signal distortion were also measured.

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	19C91D2
GRAS 42AA Pistonphone	227947
GRAS 46A0 Pressure Field Microphone	228216

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

Paul McDonald

Certificate of Calibration

Cirrus Research plc
dedicated to noise measurement

Certificate Number: **105433**

Date of Issue: **18 April 2016**

Microphone Capsule

Manufacturer: **Cirrus Research plc** Serial Number: **204016A**

Model Number: **MK224**

Calibration Procedure

The microphone capsule detailed above has been calibrated to the published data as described in the operating manual of the associated sound level meter (where applicable).

The frequency response was measured using an electrostatic actuator in accordance with BS EN 61094-6:2005 with the free-field response derived via standard correction data traceable to the National Physical Laboratory, Middlesex, UK.

The absolute sensitivity at 1 kHz was measured using an acoustic calibrator conforming to IEC 60942:2003 Class 1.

Date of Calibration: **14 April 2016**

Open Circuit Sensitivity at 1 kHz: **50.1 mV/Pa** **-26.0 dB rel 1 V/Pa**

Environmental Conditions

Pressure: **100.30 kPa**

Temperature: **22.0 °C**

Humidity: **35.0 %**

Calibration Laboratory

Laboratory: Cirrus Research plc
Acoustic House, Bridlington Road, Hunmanby
North Yorkshire, YO14 0PH, United Kingdom

Test Engineer: Debra Swalwell



Certificate of Calibration

Cirrus Research plc
dedicated to noise measurement

Equipment Details

Instrument Manufacturer	Cirrus Research plc
Instrument Type	CR:171B
Description	Sound Level Meter
Serial Number	G056143

Calibration Procedure

The instrument detailed above has been calibrated to the publish test and calibration data as detailed in the instrument hand book, using the techniques recommended in the latest revisions of the International Standards IEC 61672-1:2002, IEC 60651:1979, IEC 60804:2001,IEC 61260:1995, IEC 60942:1997, IEC 61252:1993, ANSI S1.4-1983, ANSI S1.11-1986 and ANSI S1.43-1997 where applicable.
Sound Level Meters: All Calibration procedures were carried out by subsitituting the microphone capsule with a suitable electrical signal, apart from the final acoustic calibration.

Calibration Traceability

The equipment detailed above was calibrated against the calibration laboratory standards held by Cirrus Research plc. These are traceable to International Standards {A.0.6}. The standards are:

Microphone Type	B&K 4192	Serial Number	1920791	Calibration Ref.	S6450
Pistonphone Type	B&K 4220	Serial Number	613843	Calibration Ref.	S6388

Calibrated by T. A. Goodhill

Calibration Date	18 April 2016
Calibration Certificate Number	237216

This Calibration Certificate is valid for 12 months from the date above.

Cirrus Research plc, Acoustic House, Bridlington Road, Hunmanby, North Yorkshire, YO14 0PH
Telephone: +44 (0) 1723 891655 Fax: +44 (0) 1723 891742
Email: sales@cirrusresearch.co.uk

Certificate of Calibration

Certificate Number: **105432**
Date of Issue: **18 April 2016**

Cirrus Research plc
dedicated to noise measurement

Acoustic Calibrator

Manufacturer: **Cirrus Research plc** Serial Number: **55191**
Model Number: **CR:515**

Calibration Procedure

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC 60942:2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer s data.

Date of Calibration: **14 April 2016**

Initial Calibration Results

Measurement	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
1	93.96	1000.1	0.42
2	93.95	1000.1	0.36
3	93.97	1000.1	0.35
Average	**93.96**	**1000.1**	**0.38**
Uncertainty	± 0.13	± 0.1	± 0.10

The reported uncertainties of measurement are expanded by a coverage factor of k=2, providing a 95% confidence level.

Adjusted Calibration Results

Measurement	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
1	94.00	1000.1	0.37
2	93.99	1000.1	0.37
3	94.01	1000.1	0.38
Average	**94.00**	**1000.1**	**0.37**
Uncertainty	± 0.13	± 0.1	± 0.10

The reported uncertainties of measurement are expanded by a coverage factor of k=2, providing a 95% confidence level.

Cirrus Research plc, Acoustic House, Bridlington Road
Hunmanby, North Yorkshire, YO14 0PH, United Kingdom
Telephone: 0845 230 2434 **Int**: +44 1723 891655
Email: sales@cirrusresearch.co.uk
Web: www.cirrusresearch.co.uk
UK Registration No. 987160

bsi. ISO 9001 Quality Management FM 531001 ISO 14001 Environmental Management EMS 552104

Sonitus Systems

Calibration Report

Equipment Information

Model: CAL200
Serial Number: 11728

Ambient Conditions

Measurement conditions were within the tolerances defined in BS EN 60942.

Barometric Pressure: 1026 hPa
Temperature: 22.0 °C
Relative Humidity: 41 %

Results

Calibrator Setting	Measured Parameter	Measured Value	Tolerance +/-	Uncertainty +/-
94 dB, 1KHz	Sound pressure level (dB)	93.86	0.4 dB	0.14 dB
	Frequency (Hz)	1000.52	10 Hz	0.25 Hz
	Distortion (%)	0.19	3.0 %	0.3 %
114 dB, 1KHz	Sound pressure level (dB)	113.83	0.4 dB	0.14 dB
	Frequency (Hz)	1000.50	10 Hz	0.25 Hz
	Distortion (%)	0.27	3.0 %	0.3 %

RESULT: PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003

The manufacturers guidelines concerning free-field correction should be ovserved when using the calibrator.

Notes

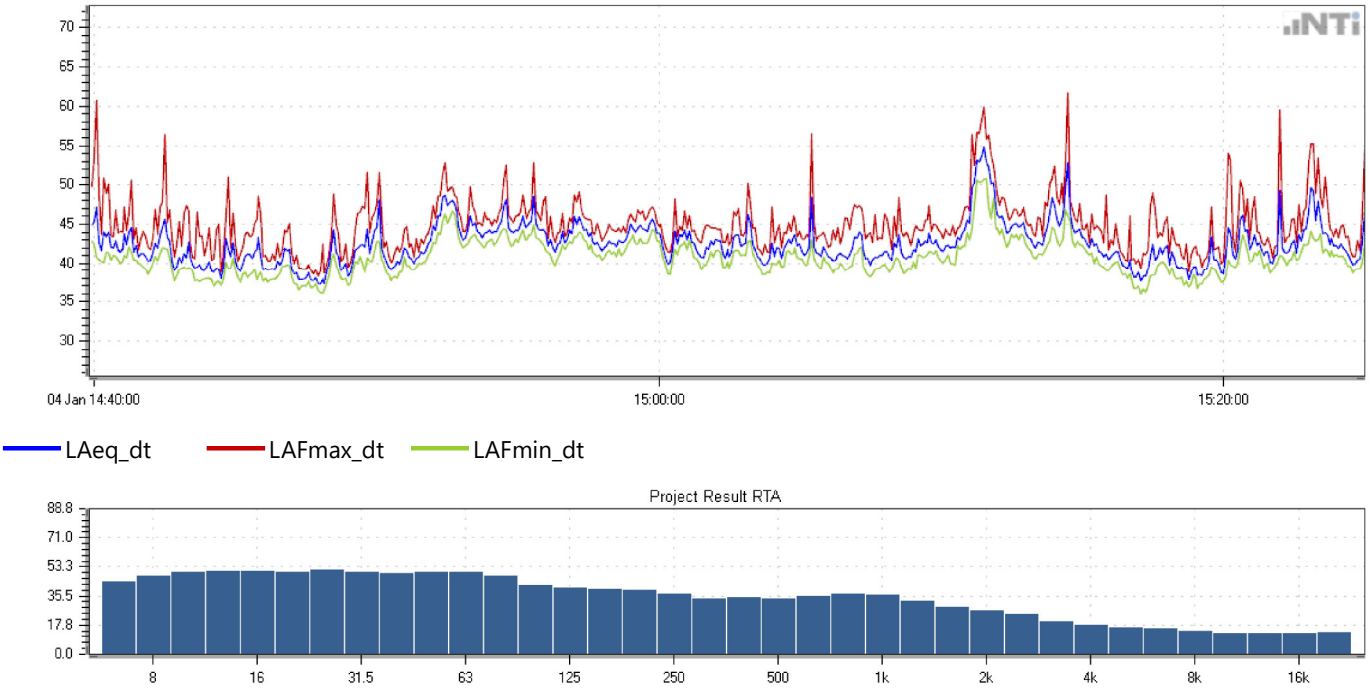
1. All measurements were made with the half-inch configuration of the calibrator in place.
2. The measurement uncertainty is reported as a standard uncertainty multiplied by a coverage factor k=2 which, for a normal probabbility distribution, corresponds to a coverage probability of approximately 95%.
3. The given uncertainty corresponds to measured values only and does not relate to the long term stability of the device under test.
4. The user manual for the device under test was obtained from the manufacturer's website.

Appendix 8.3:
Summary results of ambient sound monitoring

NMP1 Daytime #1 - #3

Start: 2017-01-04 14:39:52

End: 2017-01-04 15:24:57.6



Configuration

Device Info:	XL2, SNo. A2A-08898-E0, FW3.12
Mic Type:	NTi Audio M2230, SNo. 5062, User calibrated 2017-01-04 14:38
Mic Sensitivity:	43.8 mV/Pa
Range:	20 - 120 dB
LN based on:	LAeq_dt

Results

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded		**00:45:05.6**	**43.6**	**61.7**	**36.0**		
Project Result		**00:45:05.6**	**43.6**	**61.7**	**36.0**	**45.6**	**39.2**

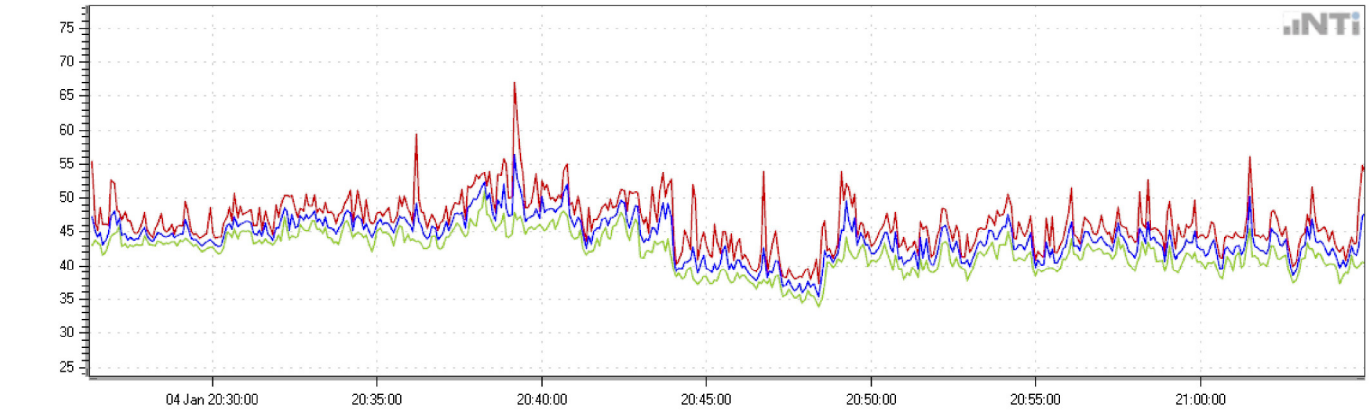
Audit Intervals

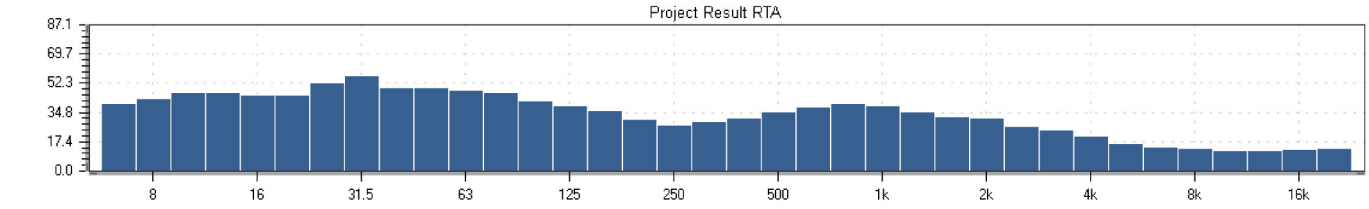
Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	**2017-01-04 14:30:00**	**00:05:08**	**42.0**	**60.7**	**37.0**	**44.0**	**38.8**
15'	**2017-01-04 14:45:00**	**00:15:00**	**43.3**	**52.8**	**36.1**	**45.8**	**38.7**
15'	**2017-01-04 15:00:00**	**00:15:00**	**44.7**	**61.7**	**38.2**	**46.7**	**40.3**
15'	**2017-01-04 15:15:00**	**00:09:57.6**	**42.4**	**59.5**	**36.0**	**44.3**	**38.7**

NMP1 Evening

Start: 2017-01-04 20:26:18

End: 2017-01-04 21:04:58.5





Configuration

Device Info:	XL2, SNo. A2A-08898-E0, FW3.12
Mic Type:	NTi Audio M2230, SNo. 5062, Factory adjusted
Mic Sensitivity:	45.4 mV/Pa
Range:	20 - 120 dB
LN based on:	LAeq_dt

Results

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded		**00:38:40.5**	**45.2**	**67.0**	**33.9**		
Project Result		**00:38:40.5**	**45.2**	**67.0**	**33.9**	**48.0**	**39.7**

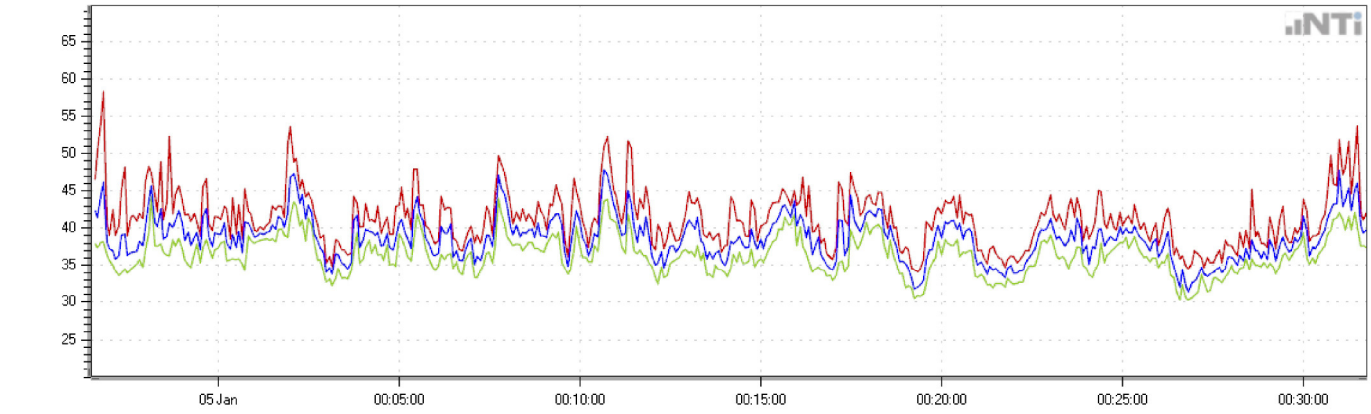
Audit Intervals

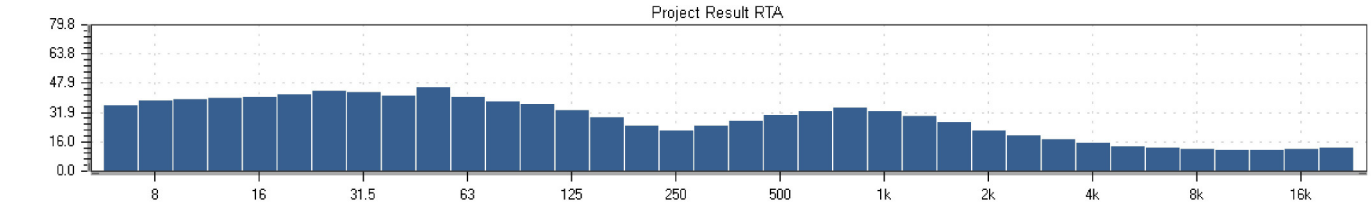
Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	**2017-01-04 20:15:00**	**00:03:42**	**44.8**	**55.5**	**41.6**	**46.3**	**43.3**
15'	**2017-01-04 20:30:00**	**00:15:00**	**47.2**	**67.0**	**37.2**	**49.5**	**43.1**
15'	**2017-01-04 20:45:00**	**00:15:00**	**42.8**	**53.9**	**33.9**	**45.3**	**38.2**
15'	**2017-01-04 21:00:00**	**00:04:58.5**	**43.3**	**56.1**	**37.3**	**45.2**	**40.0**

NMP1 Night time

Start: 2017-01-04 23:56:32

End: 2017-01-05 00:31:42.5





Configuration

Device Info:	XL2, SNo. A2A-08898-E0, FW3.12
Mic Type:	NTi Audio M2230, SNo. 5062, Factory adjusted
Mic Sensitivity:	45.4 mV/Pa
Range:	20 - 120 dB
LN based on:	LAeq_dt

Results

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded		**00:35:10.5**	**39.8**	**58.3**	**30.3**		
Project Result		**00:35:10.5**	**39.8**	**58.3**	**30.3**	**42.5**	**34.6**

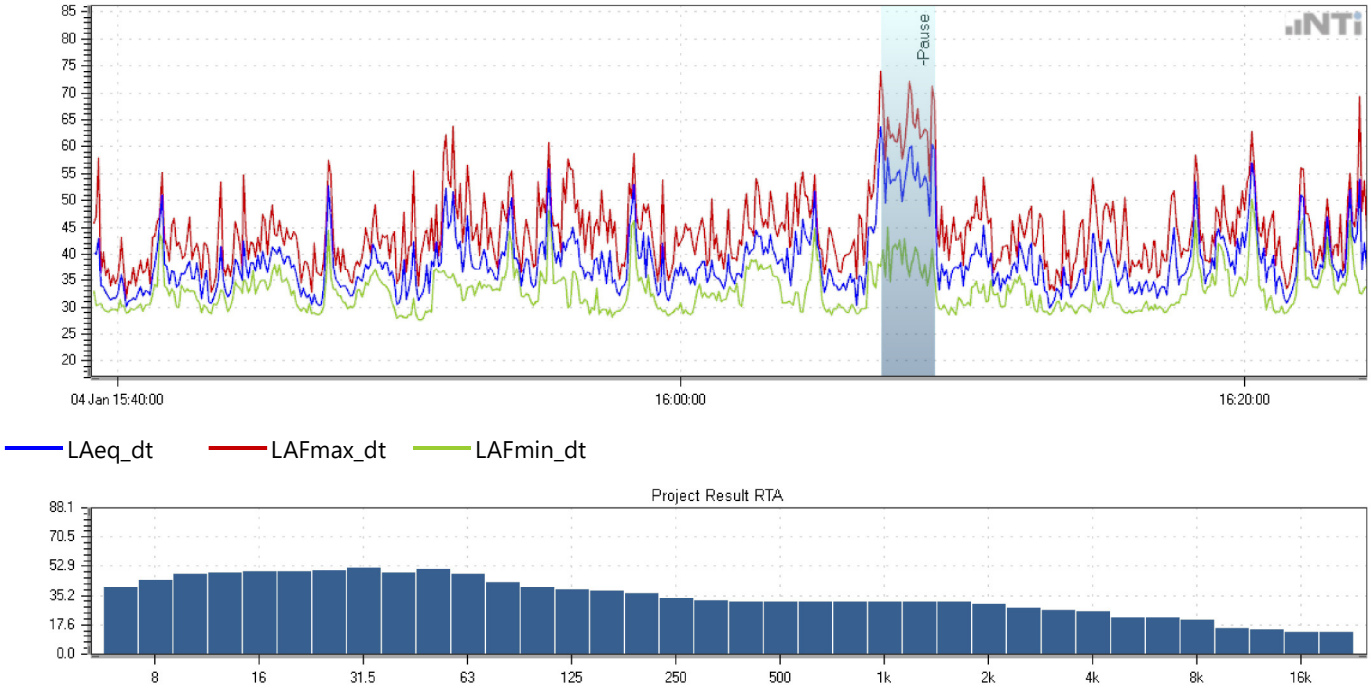
Audit Intervals

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	**2017-01-04 23:45:00**	**00:03:28**	**40.5**	**58.3**	**33.6**	**42.9**	**35.8**
15'	**2017-01-05 00:00:00**	**00:15:00**	**40.2**	**53.6**	**32.2**	**42.9**	**35.5**
15'	**2017-01-05 00:15:00**	**00:15:00**	**38.5**	**47.4**	**30.3**	**41.5**	**33.7**
15'	**2017-01-05 00:30:00**	**00:01:42.5**	**42.6**	**53.7**	**35.2**	**45.1**	**37.2**

NMP2 Daytime #1 - #3

Start: 2017-01-04 15:39:06

End: 2017-01-04 16:24:19



Configuration

Device Info:	XL2, SNo. A2A-08898-E0, FW3.12
Mic Type:	NTi Audio M2230, SNo. 5062, User calibrated 2017-01-04 14:38
Mic Sensitivity:	43.8 mV/Pa
Range:	20 - 120 dB
LN based on:	LAeq_dt

Results

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded		**00:45:13**	**45.6**	**74.0**	**27.6**		
-Pause (1)		**00:01:55.7**	**57.0**	**74.0**	**34.0**	**60.1**	**38.7**
Project Result		**00:43:17.3**	**41.9**	**69.3**	**27.6**	**43.5**	**30.7**

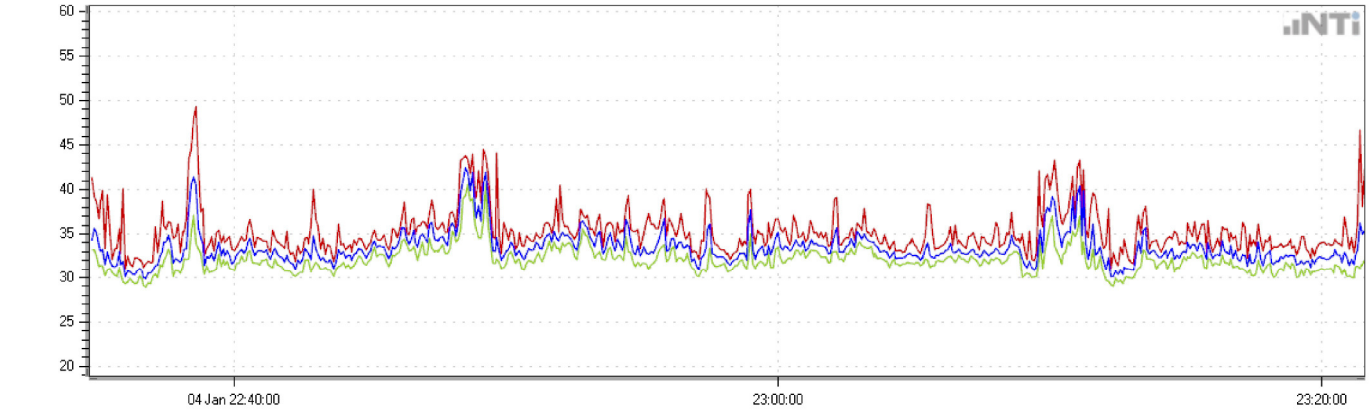
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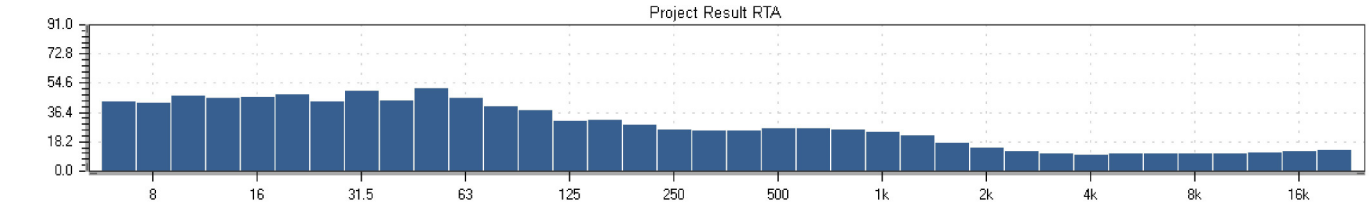
Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	**2017-01-04 15:30:00**	**00:05:54**	**38.1**	**57.9**	**28.8**	**39.9**	**30.5**
15'	**2017-01-04 15:45:00**	**00:15:00**	**41.9**	**63.8**	**27.6**	**43.8**	**30.6**
15'	**2017-01-04 16:00:00**	**00:13:04.3**	**41.1**	**67.1**	**28.5**	**42.5**	**30.6**
15'	**2017-01-04 16:15:00**	**00:09:19**	**43.8**	**69.3**	**28.8**	**46.1**	**30.9**

NMP2 Evening & Night time

Start: 2017-01-04 22:34:42

End: 2017-01-04 23:21:32.2





Configuration

Device Info:	XL2, SNo. A2A-08898-E0, FW3.12
Mic Type:	NTi Audio M2230, SNo. 5062, Factory adjusted
Mic Sensitivity:	45.4 mV/Pa
Range:	20 - 120 dB
LN based on:	LAeq_dt

Results

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded		**00:46:50.2**	**34.0**	**49.3**	**28.9**		
Project Result		**00:46:50.2**	**34.0**	**49.3**	**28.9**	**35.5**	**31.4**

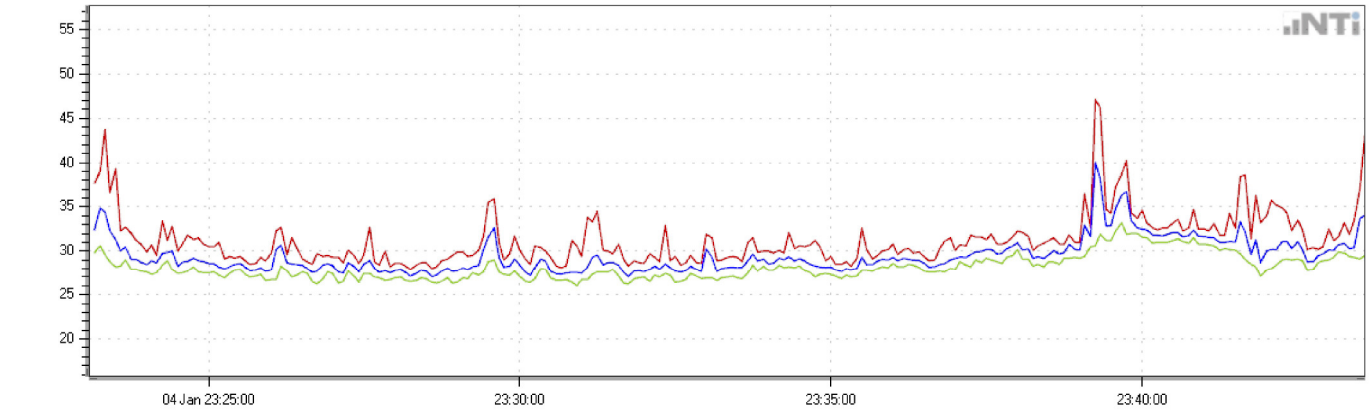
Audit Intervals

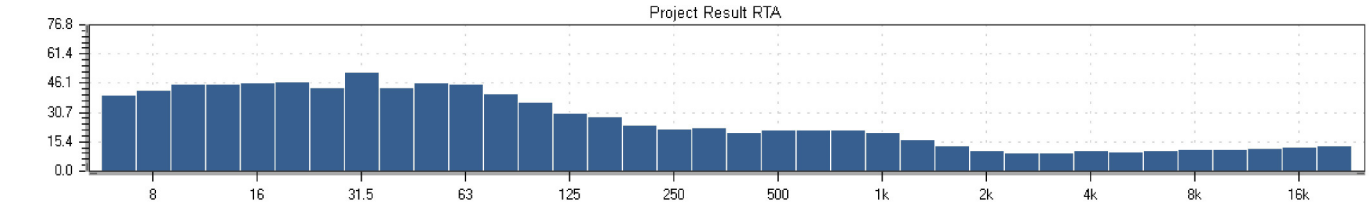
Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	**2017-01-04 22:30:00**	**00:10:18**	**33.3**	**49.3**	**28.9**	**34.3**	**30.9**
15'	**2017-01-04 22:45:00**	**00:15:00**	**34.9**	**44.5**	**30.1**	**36.6**	**32.2**
15'	**2017-01-04 23:00:00**	**00:15:00**	**33.8**	**43.3**	**29.0**	**35.3**	**31.5**
15'	**2017-01-04 23:15:00**	**00:06:32.2**	**32.7**	**46.7**	**30.0**	**34.0**	**31.3**

NMP2 Night time

Start: 2017-01-04 23:23:08

End: 2017-01-04 23:43:33.5





Configuration

Device Info:	XL2, SNo. A2A-08898-E0, FW3.12
Mic Type:	NTi Audio M2230, SNo. 5062, Factory adjusted
Mic Sensitivity:	45.4 mV/Pa
Range:	20 - 120 dB
LN based on:	LAeq_dt

Results

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded		**00:20:25.5**	**30.0**	**47.1**	**26.0**		
Project Result		**00:20:25.5**	**30.0**	**47.1**	**26.0**	**31.9**	**27.5**

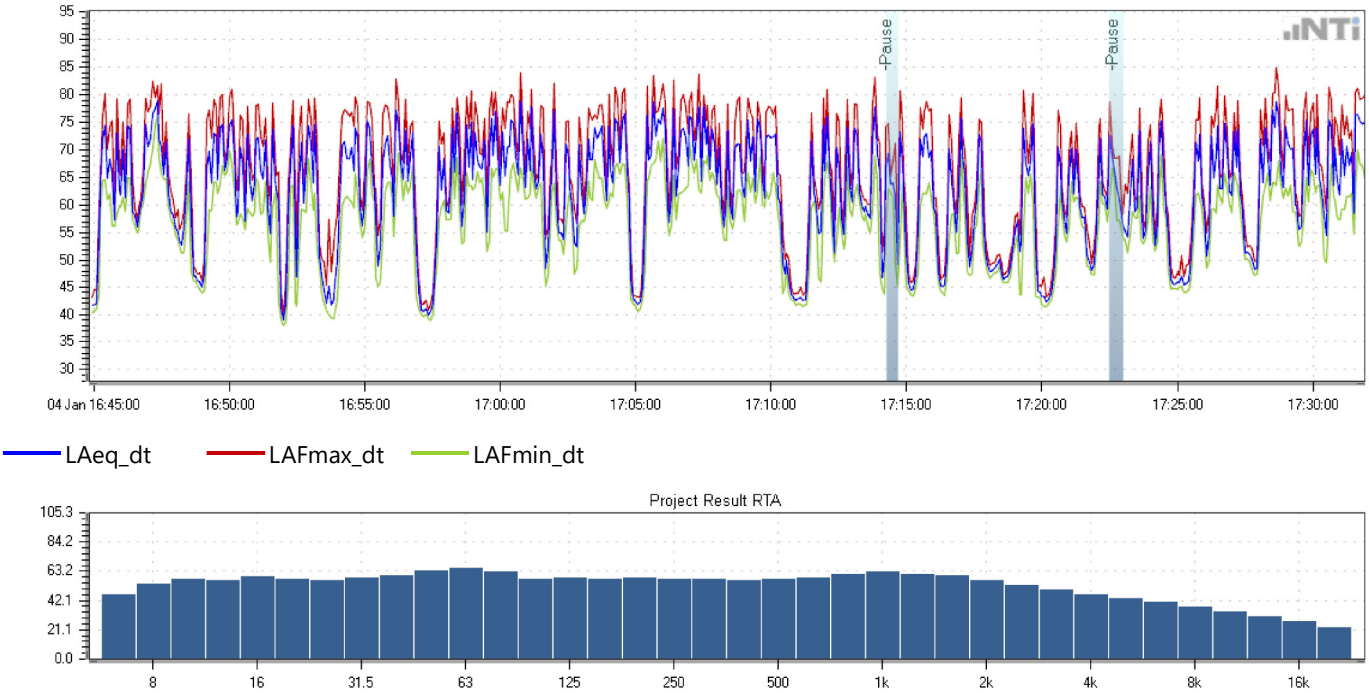
Audit Intervals

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	**2017-01-04 23:15:00**	**00:06:52**	**29.0**	**43.7**	**26.2**	**30.4**	**27.3**
15'	**2017-01-04 23:30:00**	**00:13:33.5**	**30.4**	**47.1**	**26.0**	**32.2**	**27.6**

NMP3 Daytime #1 - #3

Start: 2017-01-04 16:44:52

End: 2017-01-04 17:31:54.6



Configuration

Device Info:	XL2, SNo. A2A-08898-E0, FW3.12
Mic Type:	NTi Audio M2230, SNo. 5062, User calibrated 2017-01-04 14:38
Mic Sensitivity:	43.8 mV/Pa
Range:	20 - 120 dB
LN based on:	LAeq_dt

Results

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded		**00:47:02.6**	**69.6**	**84.9**	**38.0**		
-Pause (2)		**00:00:50.9**	**65.4**	**74.8**	**44.9**	**69.3**	**54.9**
Project Result		**00:46:11.7**	**69.6**	**84.9**	**38.0**	**74.7**	**45.7**

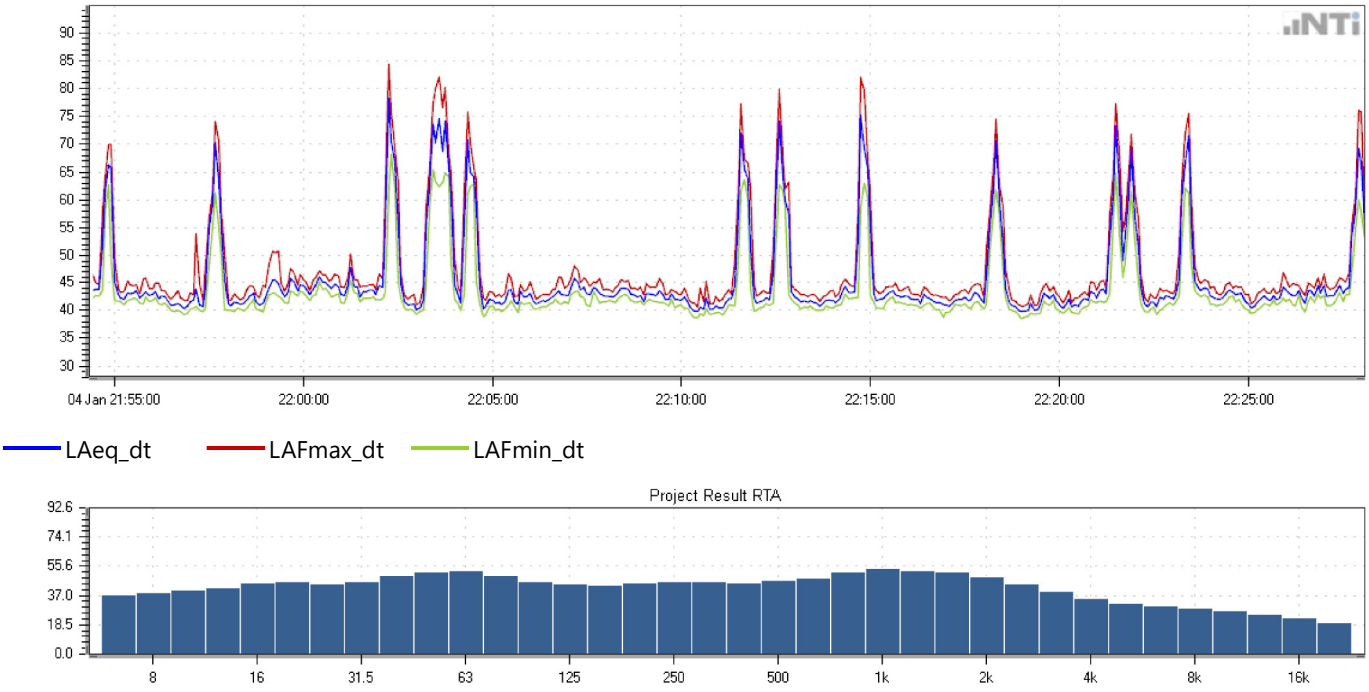
Audit Intervals

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	**2017-01-04 16:30:00**	**00:00:08**	**41.7**	**44.4**	**40.3**	**42.6**	**40.7**
15'	**2017-01-04 16:45:00**	**00:15:00**	**69.5**	**82.9**	**38.0**	**74.6**	**44.9**
15'	**2017-01-04 17:00:00**	**00:14:35.8**	**70.8**	**84.0**	**40.5**	**75.8**	**46.9**
15'	**2017-01-04 17:15:00**	**00:14:33.3**	**67.8**	**84.9**	**41.4**	**72.2**	**45.7**
15'	**2017-01-04 17:30:00**	**00:01:54.6**	**71.7**	**81.4**	**49.6**	**77.0**	**58.1**

NMP3 Evening

Start: 2017-01-04 21:54:20

End: 2017-01-04 22:28:03.3



Configuration

Device Info: XL2, SNo. A2A-08898-E0, FW3.12

Mic Type: NTi Audio M2230, SNo. 5062, Factory adjusted

Mic Sensitivity: 45.4 mV/Pa

Range: 20 - 120 dB

LN based on: LAeq_dt

Results

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded		**00:33:43.3**	**60.1**	**84.4**	**38.5**		
Project Result		**00:33:43.3**	**60.1**	**84.4**	**38.5**	**59.2**	**40.8**

Audit Intervals

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	**2017-01-04 21:45:00**	**00:05:40**	**55.7**	**74.1**	**39.2**	**55.6**	**40.8**
15'	**2017-01-04 22:00:00**	**00:15:00**	**62.3**	**84.4**	**38.7**	**63.4**	**40.9**
15'	**2017-01-04 22:15:00**	**00:13:03.3**	**57.4**	**77.3**	**38.5**	**56.0**	**40.7**

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Measurement Summary Report

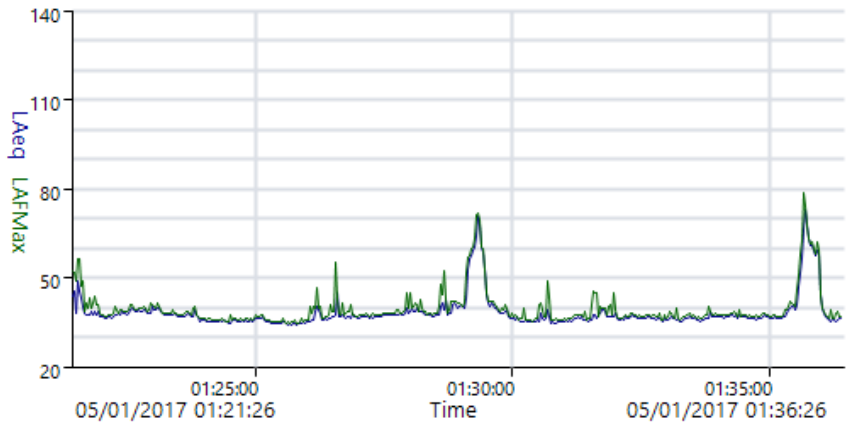
Name	NMP3 Night time #1			
Time	05/01/2017 01:21:26	**Person**	**Place**	**Project**
Duration	00:15:00	Aisling Walsh	Courtstown	
Instrument	GO56143, CR:171B			

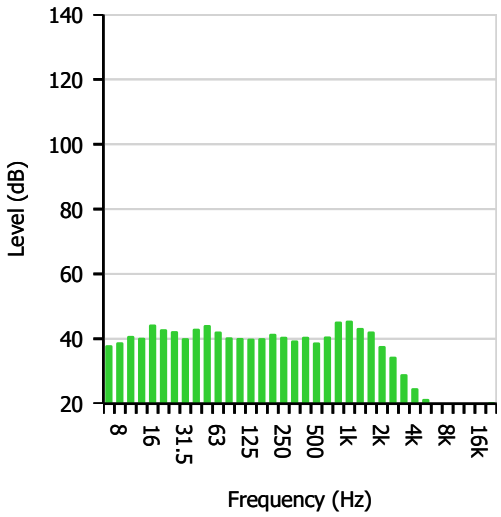
Calibration

Before	05/01/2017 00:36	Offset	-0.56 dB	**After**	05/01/2017 02:30	Offset	-0.95 dB

Basic Values	
LAeq	51.6 dB
LAE	81.1 dB
LAFMax	78.3 dB

Statistical Levels (Ln)	
LAF1	64.2 dB
LAF5	50.4 dB
LAF10	40.2 dB
LAF50	36.7 dB
LAF90	35.0 dB
LAF95	34.7 dB
LAF99	34.2 dB





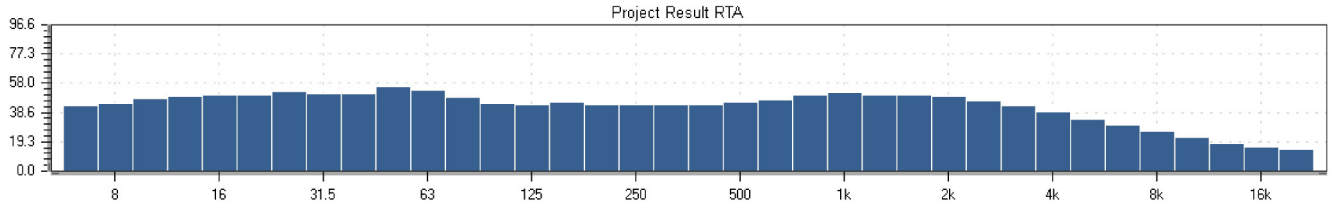
ReportId

NMP4 Daytime #1 - #3

Start: 2017-01-04 17:54:08

End: 2017-01-04 18:40:24.3





Configuration

Device Info:	XL2, SNo. A2A-08898-E0, FW3.12
Mic Type:	NTi Audio M2230, SNo. 5062, User calibrated 2017-01-04 17:33
Mic Sensitivity:	43.7 mV/Pa
Range:	20 - 120 dB
LN based on:	LAeq_dt

Results

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded		**00:46:16.3**	**58.9**	**81.9**	**35.2**		
Project Result		**00:46:16.3**	**58.9**	**81.9**	**35.2**	**55.4**	**38.4**

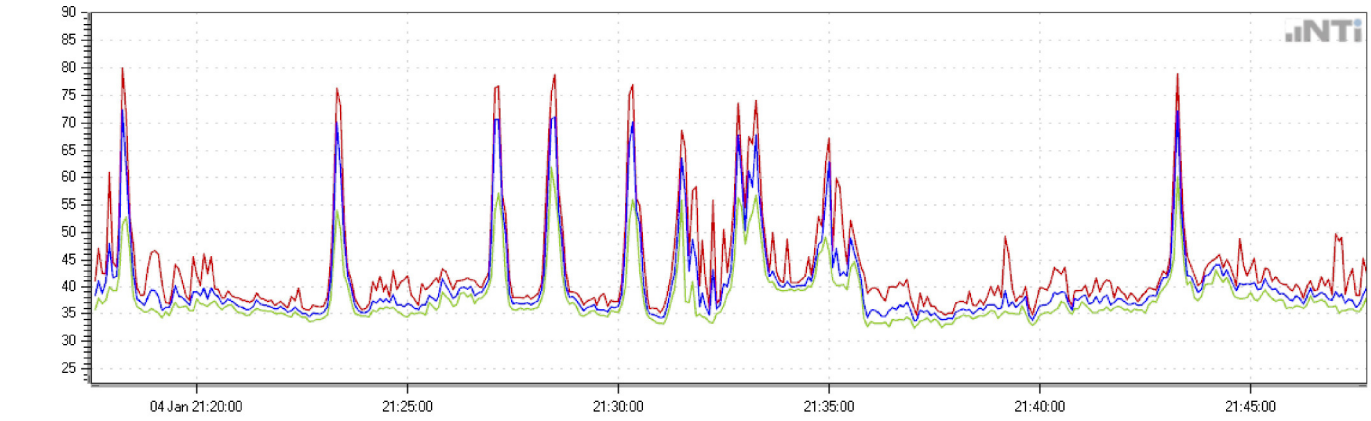
Audit Intervals

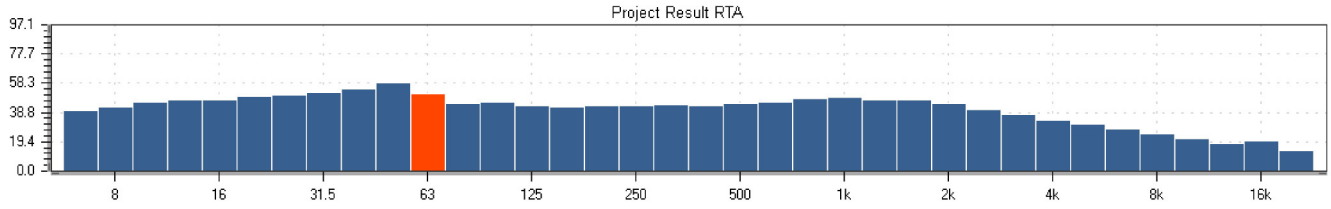
Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	**2017-01-04 17:45:00**	**00:05:52**	**60.8**	**81.9**	**37.3**	**58.6**	**39.0**
15'	**2017-01-04 18:00:00**	**00:15:00**	**58.6**	**80.9**	**38.0**	**54.2**	**40.1**
15'	**2017-01-04 18:15:00**	**00:15:00**	**58.7**	**79.6**	**38.4**	**56.2**	**40.3**
15'	**2017-01-04 18:30:00**	**00:10:24.3**	**58.4**	**79.8**	**35.2**	**52.3**	**37.1**

NMP4 Evening

Start: 2017-01-04 21:17:32

End: 2017-01-04 21:47:42.4





Configuration

Device Info: XL2, SNo. A2A-08898-E0, FW3.12

Mic Type: NTi Audio M2230, SNo. 5062, Factory adjusted

Mic Sensitivity: 45.4 mV/Pa

Range: 20 - 120 dB

LN based on: LAeq_dt

Results

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded		**00:30:10.4**	**55.7**	**80.0**	**32.4**		
Project Result		**00:30:10.4**	**55.7**	**80.0**	**32.4**	**48.6**	**35.2**

Audit Intervals

Type	Start Date and Time	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	**2017-01-04 21:15:00**	**00:12:28**	**57.3**	**80.0**	**33.6**	**48.0**	**35.5**
15'	**2017-01-04 21:30:00**	**00:15:00**	**54.8**	**78.9**	**32.4**	**50.7**	**34.7**
15'	**2017-01-04 21:45:00**	**00:02:42.4**	**38.6**	**49.8**	**35.1**	**40.3**	**36.6**

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Measurement Summary Report

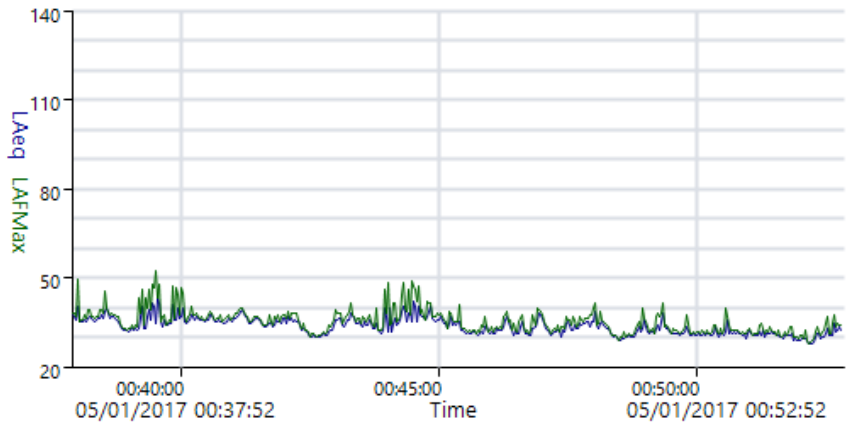
Name	NMP4 Night time #1			
Time	05/01/2017 00:37:52	**Person**	**Place**	**Project**
Duration	00:15:00	Aisling Walsh	Courtstown	
Instrument	GO56143, CR:171B			

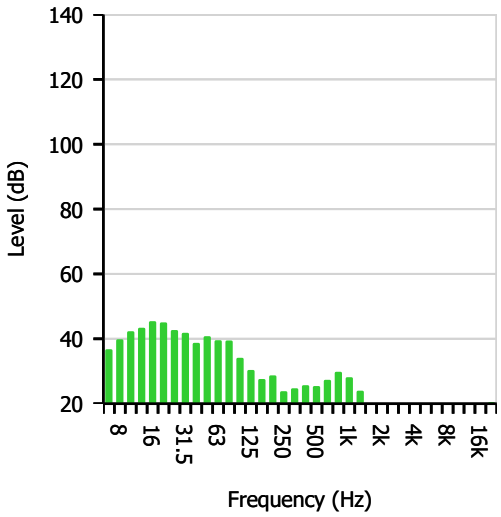
Calibration

Before	05/01/2017 00:36	Offset	-0.56 dB	**After**	05/01/2017 02:30	Offset	-0.95 dB

Basic Values	
LAeq	34.6 dB
LAE	64.1 dB
LAFMax	52.4 dB

Statistical Levels (Ln)	
LAF1	41.5 dB
LAF5	37.7 dB
LAF10	36.7 dB
LAF50	33.1 dB
LAF90	30.1 dB
LAF95	29.6 dB
LAF99	28.3 dB





ReportId

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Measurement Summary Report

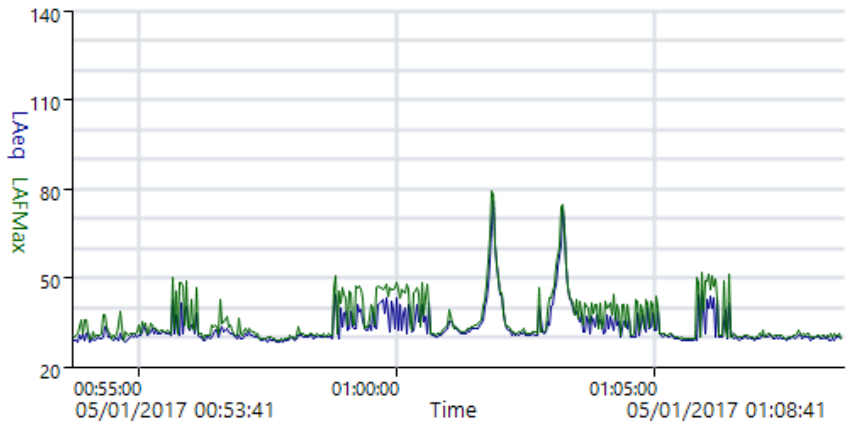
Name	NMP4 Night time #2			
Time	05/01/2017 00:53:41	**Person**	**Place**	**Project**
Duration	00:15:00	Aisling Walsh	Courtstown	
Instrument	GO56143, CR:171B			

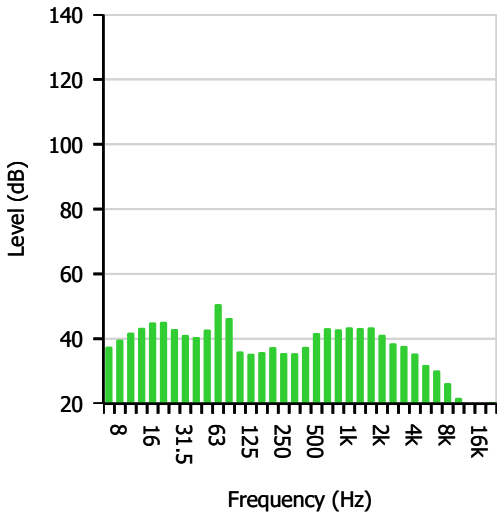
Calibration

Before	05/01/2017 00:36	Offset	-0.56 dB	**After**	05/01/2017 02:30	Offset	-0.95 dB

Basic Values	
LAeq	52.0 dB
LAE	81.5 dB
LAFMax	79.2 dB

Statistical Levels (Ln)	
LAF1	60.0 dB
LAF5	44.7 dB
LAF10	39.7 dB
LAF50	30.6 dB
LAF90	29.0 dB
LAF95	28.7 dB
LAF99	28.2 dB





ReportId

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Measurement Summary Report

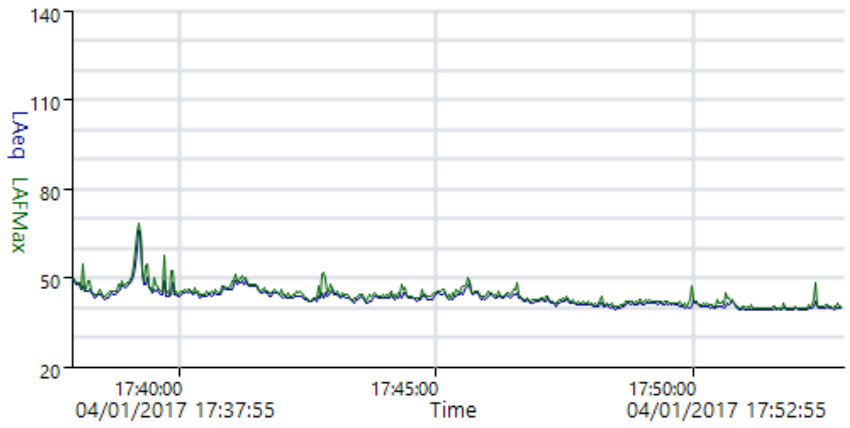
Name	NMP5 Daytime #1			
Time	04/01/2017 17:37:55	**Person**	**Place**	**Project**
Duration	00:15:00	Aisling Walsh	Courtstown	
Instrument	GO56143, CR:171B			

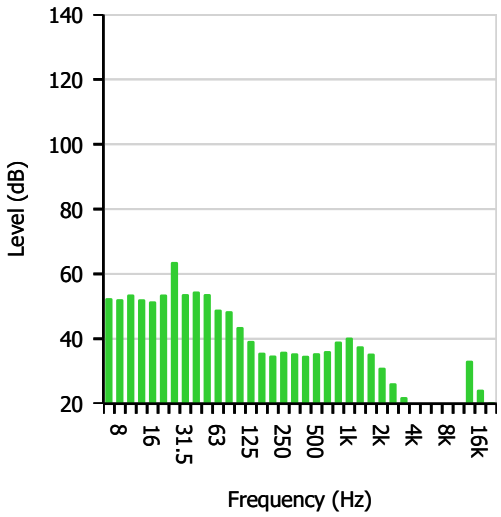
Calibration

Before	04/01/2017 17:25	Offset	-0.79 dB	**After**	04/01/2017 21:11	Offset	-0.79 dB

Basic Values	
LAeq	46.1 dB
LAE	75.6 dB
LAFMax	68.5 dB

Statistical Levels (Ln)	
LAF1	52.7 dB
LAF5	47.7 dB
LAF10	46.4 dB
LAF50	42.8 dB
LAF90	39.5 dB
LAF95	39.2 dB
LAF99	38.8 dB





ReportId

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Measurement Summary Report

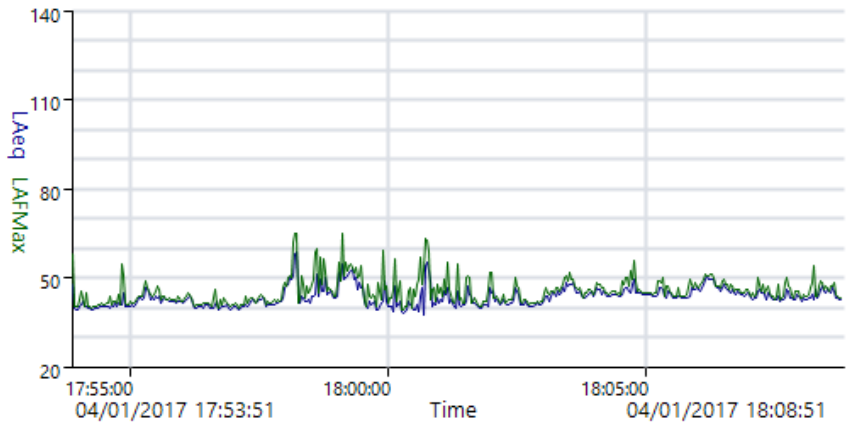
Name	NMP5 Daytime #2			
Time	04/01/2017 17:53:51	**Person**	**Place**	**Project**
Duration	00:15:00	Aisling Walsh	Courtstown	
Instrument	GO56143, CR:171B			

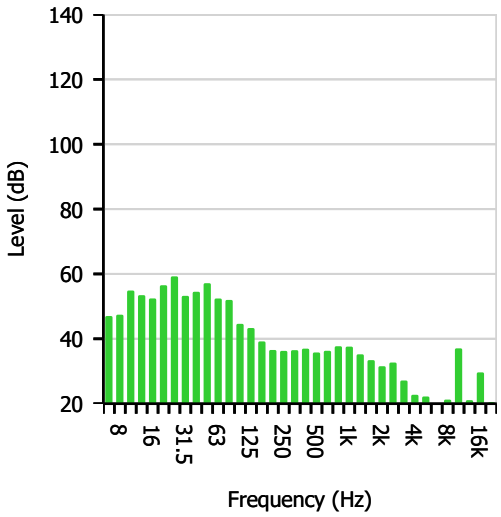
Calibration

Before	04/01/2017 17:25	Offset	-0.79 dB	**After**	04/01/2017 21:11	Offset	-0.79 dB

Basic Values	
LAeq	45.7 dB
LAE	75.2 dB
LAFMax	75.1 dB

Statistical Levels (Ln)	
LAF1	53.7 dB
LAF5	48.9 dB
LAF10	46.9 dB
LAF50	42.8 dB
LAF90	39.7 dB
LAF95	39.3 dB
LAF99	38.1 dB





ReportId

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Measurement Summary Report

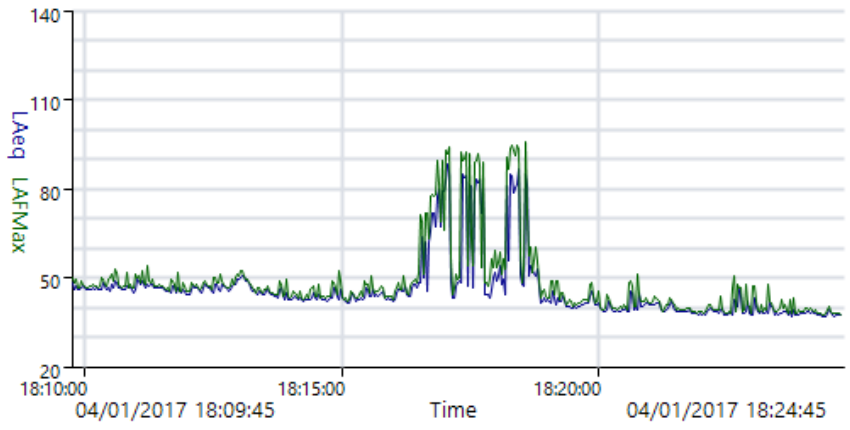
Name	NMP5 Daytime #3			
Time	04/01/2017 18:09:45	**Person**	**Place**	**Project**
Duration	00:15:00	Aisling Walsh	Courtstown	
Instrument	GO56143, CR:171B			

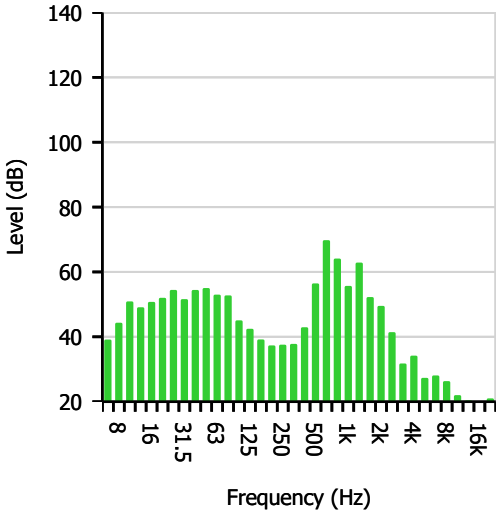
Calibration

Before	04/01/2017 17:25	Offset	-0.79 dB	**After**	04/01/2017 21:11	Offset	-0.79 dB

Basic Values	
LAeq	70.7 dB
LAE	100.2 dB
LAFMax	95.5 dB

Statistical Levels (Ln)	
LAF1	85.6 dB
LAF5	59.9 dB
LAF10	49.5 dB
LAF50	43.5 dB
LAF90	37.9 dB
LAF95	37.4 dB
LAF99	36.8 dB





ReportId

Cirrus Research plc

Measurement Summary Report

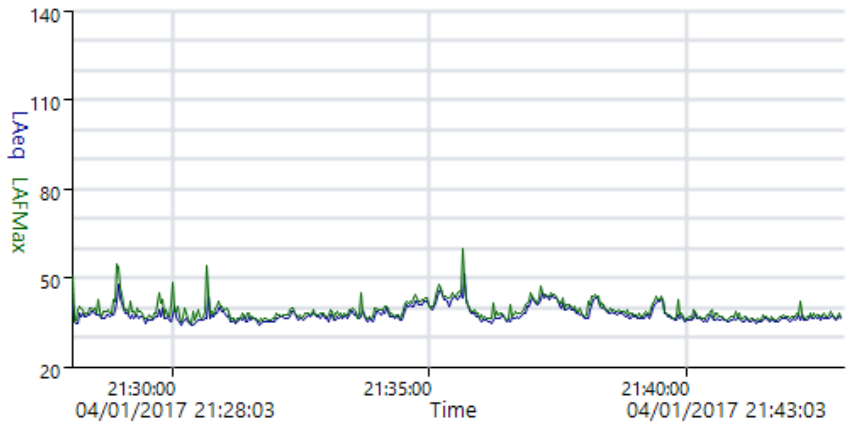
Name	NMP5 Evening #2			
Time	04/01/2017 21:28:03	**Person**	**Place**	**Project**
Duration	00:15:00	Aisling Walsh	Courtstown	
Instrument	GO56143, CR:171B			

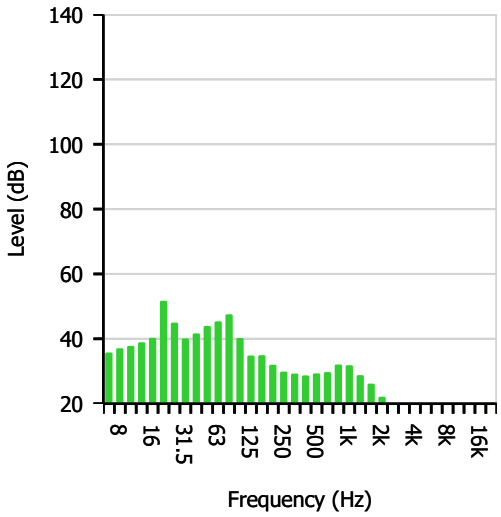
Calibration

Before	04/01/2017 21:11	Offset	-0.79 dB	**After**	05/01/2017 00:36	Offset	-0.56 dB

Basic Values	
LAeq	38.6 dB
LAE	68.1 dB
LAFMax	60.0 dB

Statistical Levels (Ln)	
LAF1	44.7 dB
LAF5	42.9 dB
LAF10	41.5 dB
LAF50	36.6 dB
LAF90	35.2 dB
LAF95	34.8 dB
LAF99	34.2 dB





ReportId

Cirrus Research plc

Measurement Summary Report

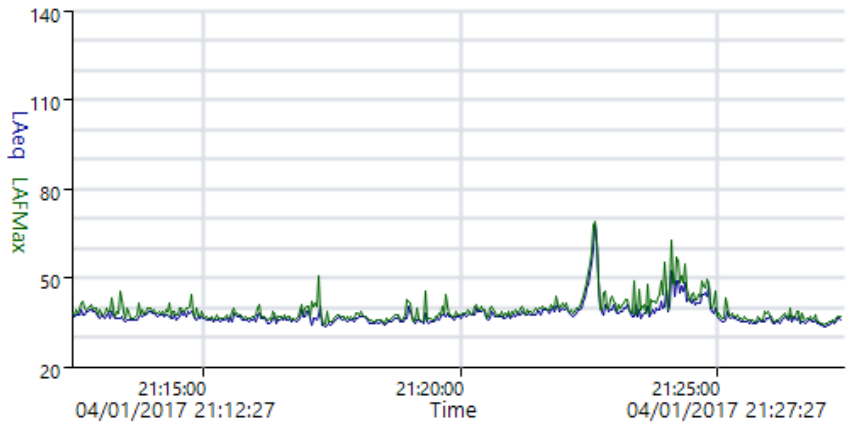
Name	NMP5 Evening #1			
Time	04/01/2017 21:12:27	**Person**	**Place**	**Project**
Duration	00:15:00	Aisling Walsh	Courtstown	
Instrument	GO56143, CR:171B			

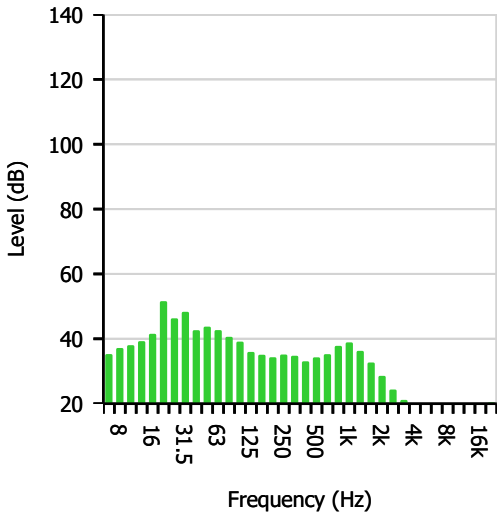
Calibration

Before	04/01/2017 21:11	Offset	-0.79 dB	**After**	05/01/2017 00:36	Offset	-0.56 dB

Basic Values	
LAeq	44.4 dB
LAE	73.9 dB
LAFMax	69.1 dB

Statistical Levels (Ln)	
LAF1	53.7 dB
LAF5	42.8 dB
LAF10	40.0 dB
LAF50	36.6 dB
LAF90	34.7 dB
LAF95	34.3 dB
LAF99	33.6 dB





ReportId

Cirrus Research plc

Measurement Summary Report

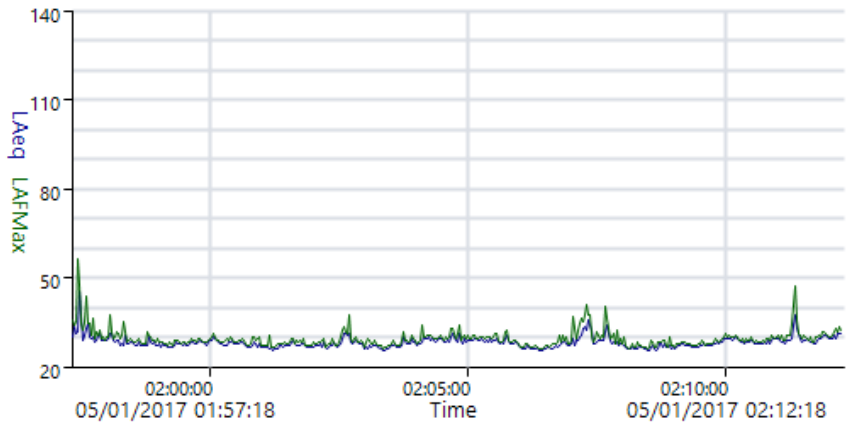
Name	NMP5 Night time #1			
Time	05/01/2017 01:57:18	**Person**	**Place**	**Project**
Duration	00:15:00	Aisling Walsh	Courtstown	
Instrument	GO56143, CR:171B			

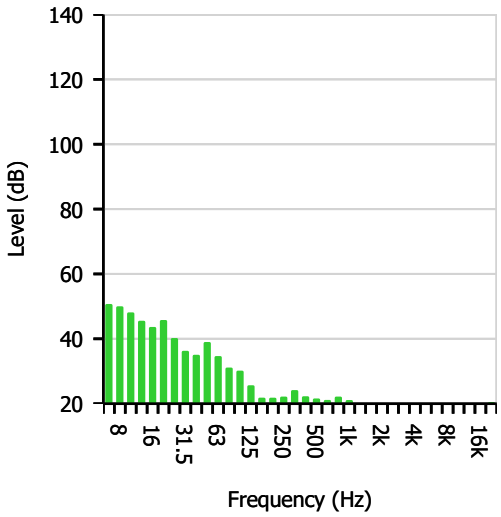
Calibration

Before	05/01/2017 00:36	Offset	-0.56 dB	**After**	05/01/2017 02:30	Offset	-0.95 dB

Basic Values	
LAeq	29.0 dB
LAE	58.5 dB
LAFMax	56.6 dB

Statistical Levels (Ln)	
LAF1	34.3 dB
LAF5	31.0 dB
LAF10	29.9 dB
LAF50	27.8 dB
LAF90	26.2 dB
LAF95	25.9 dB
LAF99	25.4 dB





ReportId

Cirrus Research plc

Measurement Summary Report

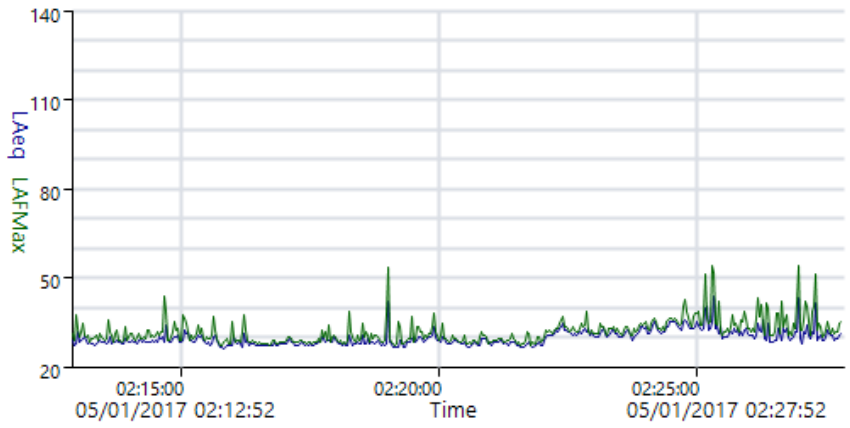
Name	NMP5 Night time #2			
Time	05/01/2017 02:12:52	**Person**	**Place**	**Project**
Duration	00:15:00	Aisling Walsh	Courtstown	
Instrument	GO56143, CR:171B			

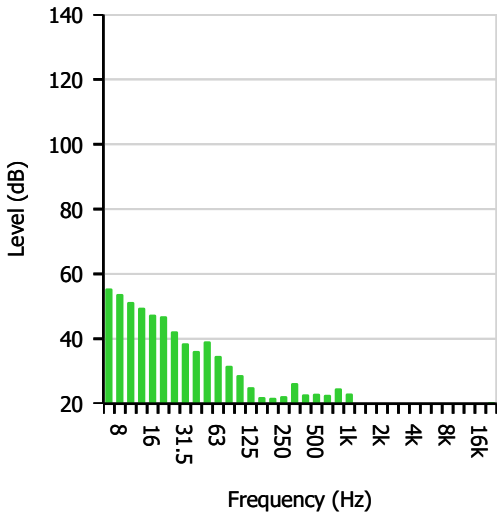
Calibration

Before	05/01/2017 00:36	Offset	-0.56 dB	**After**	05/01/2017 02:30	Offset	-0.95 dB

Basic Values	
LAeq	30.9 dB
LAE	60.4 dB
LAFMax	54.0 dB

Statistical Levels (Ln)	
LAF1	36.9 dB
LAF5	34.0 dB
LAF10	32.8 dB
LAF50	28.7 dB
LAF90	27.1 dB
LAF95	26.8 dB
LAF99	26.3 dB





ReportId

Appendix 9.1

Air & Odour Quality Assessment Report

ODOUR MONITORING IRELAND
rt
Unit 32 De Granville Court, Dublin Rd, Trim, Co. Meath

Tel: +353 46 9437922
Mobile: +353 86 8550401
E-mail: info@odourireland.com
www.odourireland.com

AIR AND ODOUR QUALITY ASSESSMENT OF THE PROPOSED WASTE RECYCLING FACILITY TO BE LOCATED IN COURTSTOWN, LITTLE ISLAND, CO. CORK.

PERFORMED BY ODOUR MONITORING IRELAND LTD ON BEHALF OF COUNTRY CLEAN RECYCLING UNLIMITED COMPANY

REPORT PREPARED BY:	Dr. Brian Sheridan
REPORT VERSION:	Document Ver.2
ATTENTION:	Mr. Flor Crowley
DATE:	06th July 2018 Rev 1 & 04th Nov 2018 Rev 2
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SUMMARY

1.1 The Air Quality and Odour assessment has been carried out in line with all relevant guidance to include:

- H4 – Odour Management – how to comply with your environmental permit, Environment Agency March 2011.
- Air Guidance 4 – Air dispersion modelling from industrial installations guidance note, EPA 2010.

The proposed Waste Recycling Plant has been designed to ensure that there are no significant adverse effects on air quality with respect to classical air pollutants and odours. This is demonstrated through the air modelling study, which establishes that no air quality standards or guidelines are forecast to be exceeded. All odours generated through the handling and treatment of the waste will be captured and treated to acceptable levels within a dedicated odour control system designed specifically for the proposed plant. The assessment concludes that the controls built into the proposed plant mean that emissions to air will have no significant adverse effects on air quality with respect to odours. During the operational phase of the facility, emissions to air from the plant will be regulated in accordance with specific conditions set out by the Environmental Protection Agency. Country Clean Recycling Unlimited Company will be required to regularly monitor emissions to air, in accordance with the provisions of their PA licence and these results will be made available to the public.

INTRODUCTION

1.2 This assessment has been undertaken by Odour Monitoring Ireland Ltd. The chapter describes the potential impacts to ambient air quality from the proposed Waste Recycling Facility (henceforth referred to as the proposed plant) to be located within Courtstown, Little Island, Co. Cork. Particular attention is given to the potential exposure of receptors to airborne pollutants resulting from the development and operation of the proposed plant. Sensitive receptors, including local business units and residential dwellings in the vicinity of the subject site have been included within the assessment although the assessment is performed over an area of 12.96 km square centred on the facility emission points.

1.3 The application area of 1.49 ha encompasses the proposed plant which will occupy a footprint of 0.67 ha (the subject site).

1.4 The scope of the study consists of the following components:

- assessment of effects on climate;
- review of background ambient air quality in the vicinity of the application area using available reference data generated by the Environmental Protection Agency and actual baseline monitoring data gathered in the vicinity of the site;
- identification of the significant substances likely to be released from the proposed plant during operation;
- review of maximum emission levels and other relevant information needed to inform the dispersion modelling study for odours;
- detailed air dispersion modelling of odours expected to be released during the operational phase;
- identification of predicted ground level concentrations (GLC's) of odours at the site boundary and at identified sensitive receptors in the local environment;
- a full cumulative assessment of significant releases from the proposed plant taking into account the releases from all other significant sources such as traffic;

- evaluation of the significance of these predicted concentrations, including consideration of whether these GLC's are likely to exceed the odour quality standards and guidelines;
- assessment of other potential air quality impacts such as dust and emissions from operational phase traffic associated with the proposed plant.

CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

1.5 The proposed activities (which are all managed within the building) include the following:

- Pre-treatment & baling of residual waste;
- Bulking up of mixed dry recyclables (MDR);
- Bulking up of biowaste;
- Skip hire and segregation;
- Office & car park;

1.6 The proposed waste sorting plant comprises the construction of a waste transfer warehouse and recycling station, a two-story office building, ESB sub-station and associated site works including two weighbridges, ramps and associated parking bays and will be located on a green field site within the Courtstown Industrial Park (in the townland of Courtstown) to the east of Little Island.

1.7 The footprint of the proposed warehouse development, excluding the external elements such as the weighbridges, ramps and associated parking bays will be approximately 6,757m^2 (0.67 ha)**.** It is proposed that the new warehouse facility will have a maximum height of approximately 12.9m high (viewed from west) or 16.9m (viewed from east).

1.8 The key elements of the proposed development are as follows:

- Provision of a new warehouse facility to provide a waste transfer and recycling plant and office area;

- Provision of appropriate receiving areas for receiving mixed non-hazardous waste materials;
- Foul drainage at the site will connect into the existing foul drainage network located at the entrance of the development. All foul waste will be directed to the municipal waste water treatment plant at Carrigrennan, Little Island, via the existing pipeline network. Discharges to surface waters will not place at the facility with all waste water going straight to the local sewer network.
- The proposed facility will accept materials in accordance with the following Operations of the Fourth Schedule of the Waste Management Act (1996)
- Development of a two storey site office building.
- ESB MV sub Station Building.

The proposed development will not accept or handle hazardous waste of any nature and proposes separation, sorting and recycling facilities only with no further treatment or chemical treatment processes proposed at the site such as incineration, pyrolysis or gasification.

1.9 The proposed warehouse facility will be the primary element of the proposed development and will take up the majority of the site. The facility will be approximately 12.9m high (viewed from west) or 16.9m (viewed from east) and will be spread over a total of 6,757m^2. Building elevations will be concrete block built with insulated metal cladding on the top half of each elevation up to roof level which will be grey in colour.

1.10 The operational site offices will be located in the north eastern corner of the site and will provide offices, a staff canteen, locker rooms, toilets and a tea station over two floors**.** The office building will be 8.5m high from ground level to roof tip point and will have a smooth plaster painted render finish. The roof will consist of Kingspan KS1000RW Wall and Roof cladding. The office building will offer two floors each covering an area of 107m^2.

1.11 A 3m high ESB sub station and switch room is proposed in the south eastern corner of the development site, adjacent to the site entrance onto Harbourpoint Business Park road. The external facades will have a rendered blockwork finish with steel doors and an asphalt roof.

1.12 A designated waste recycling area will be provided along the south eastern side of the proposed warehouse to provide a public recycling facility. Members of the public will enter and exit this area via the main site entrance from Harbourpoint Business Park Road. A series of skips will be provided for waste segregation purposes which will be removed and replaced as necessary.

1.13 CCR will apply for an EPA waste license to operate the facility. The proposed facility is essentially a new warehouse functioning as a waste processing plant. It will include the acceptance of source separation waste (e.g. brown bin waste, glass packaging, cardboard and co-mingled packaging waste) along with residual municipal waste and skip waste from household and commercial sources. The facility will allow for the diversion of these waste types to non-disposal waste management routes, by means of manual sorting, mechanical treatment, crushing, grading, magnetic separation, sorting and baling.

1.14 The proposed facility will accept waste types in accordance with Waste Disposal Activities D11, D12 and D13 of the Third Schedule of the Waste Management Act 1996 as amended which are defined as follows:

- D13 Blending or mixing prior to submission to any of the operations numbered from D1 to 12 (if there is no other D code appropriate, this can include preliminary operations prior to disposal including pre-processing such as, amongst others, sorting, crushing, compacting, pelletising, drying, shredding, conditioning or separating prior to submission to any of the operations numbered D1 to D12);
- D14 Repackaging prior to submission to any of the operations numbered D 1 to D 13, and
- D15 Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced).

1.15 The proposed facility will recover materials in accordance with Operations R3, R4, R5, R11& R13 of the Fourth Schedule of the Waste Management Act 1996 as amended. These aforementioned activities relate to the waste blending, repackaging, and storage activities, defined as follows:

- R3 Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes), which includes gasification and pyrolysis using the components as chemicals;
- R4 Recycling/reclamation of metals and metal compounds;
- R5 Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials;
- R11 Use of waste obtained from any of the operations numbered R 1 to R 10, and
- R13 Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced)".

Odour Control System

1.16 The odour control system to be implemented in Country Clean Recycling facility will be based on the principles of good odour management to include:

- Odour containment
- Odour capture,
- Odour extraction and
- Odour treatment.

1.17 In terms of odour containment, all process buildings will be sealed with a near 100% leak proof building fabric (i.e. leakage rate of less than 3 $m^3/m^2/hr$ @ 50 Pa). All process external to the building fabric will be enclosed and sealed with negative extraction applied to ensure no fugitive emissions of odours during operation. All waste handling and pre-processing activities will be carried out indoors at the facility. The building will be placed under negative pressure. A total extraction volume flow rate of up to 155,000 Nm^3/hr will be applied to the process buildings. The waste intake buildings will be fitted with

rapid roller doors which will be interlocked and fitted with air curtains so as to maintain good building integrity in terms of odour containment (main access doors only) when doors are opened intermittently during delivery/removal of material. In addition to this, the main facility building will be fitted with absolute pressure controlled fresh air intake louvers in order to control the negative pressure placed upon the building.

1.18 In terms of odour capture, a network of extraction pipework will be fitted throughout the bailed waste storage and Food and Refuse area building rooms so as to provide negative pressure extraction to all odour generation areas located within the facility building. This will be ducted to the odour control system for treatment. The ductwork will be fitted with a number of volume control extraction grills to allow for the focused extraction of odours from dedicated areas located along the extraction pipework.

1.19 Two fans VSD controlled fans will be connected to the ductwork whereby odourous air will be extracted and ducted to the odour treatment plant. The odour treatment plant will consist of a Reverse jet pulse filter (RJP), followed by plasma injection and carbon filtration and all treated air vented through a 16m high vent for final dispersion.

1.20 The RJP will treat all incoming air for the removal of dust with greater than 99.5% of all dust greater than 2µm in size. This will prevent any significant issues with the carbon filtration vessels. The air will then be treated with the addition of gas plasma whereby plasma will be injected into the air stream upstream of the main extraction fans. This will promote the oxidation of odourous compounds and also lead to a promotion of odourous compound breakdown adsorbed into the carbon. The air will travel to two carbon filtration vessels whereby the air will be filtered of odourous compounds before being exhaust to atmosphere through a 16m high vent.

1.21 It is anticipated that the odour control system will achieve an exhaust odour threshold concentration of less than 250 Ou_E/m^3 on the exhaust. This will ensure that odours above the recommended EPA guideline levels at ground level will not be exceeded.

1.22 The overall odour control system will be fitted with a SCADA monitoring system whereby building under-pressure monitoring system, door operation,

fans, RJP, plasma injection system and carbon filtration vessels will be monitored for parameters such as pressure, temperature, consumed power and operation efficiency.

1.23 The system has been designed with 100% duty and 50% standby in mind so that odour treatment coverage is available during routine maintenance of the system.

STUDY METHODOLOGY

Plant Design Review

1.24 A full review of the design of the proposed plant was undertaken in order to establish emission levels of classical air pollutants such as Carbon monoxide, Oxides of nitrogen, Sulphur dioxide, Particulate matter and Odours.

Assessment Criteria

1.25 Air quality is judged relative to the relevant Air Quality Standards, which are concentrations of pollutants in the atmosphere, which achieve a certain standard of environmental quality. Air quality Standards are formulated on the basis of an assessment of the effects of the pollutant on public health and ecosystems.

1.26 Air quality standards and guidelines referenced in this report include - • SI 180 of 2011 – Air quality standard regulations 2011.

1.27 In terms of odour, the Environment Agency Horizontal Guidance Notes H4 and Irish EPA's *Air Dispersion Modelling from Industrial Installations Guidance Note* (AG4) was taken into account. These documents were used to assess whether the proposed plant is likely to give rise to air quality and/or odour impact at or beyond the facility boundary and/or identified sensitive receptors.

1.28 The limit values for each compound / parameter is reported in **Tables 1-1 and 1-2**.

Table 1-1SI 180 of 2011 – Air quality standard regulations 2011

Note1	Directive / Regulation	Limit Type	Value
Nitrogen Dioxide	SI 180 of 2011	Hourly limit for protection of human health – not to be exceeded more than 18 times/year-1 hour average	200 μg/m^3 NO_2
		Annual limit for protection of human health-Annual	40 μg/m^3 NO_2
		Annual limit for protection of vegetation-Annual	30 μg/m^3 $NO + NO_2$
Sulphur Dioxide	SI 180 of 2011	Hourly limit for protection of human health – not to be exceeded more than 24 times/year-1 hour average	350 μg/m^3
		Daily limit for protection of human health – not to be exceeded more than 3 times/year-24hr average	125 μg/m^3
		Annual & Winter limit for the protection of ecosystems-Annual	30 μg/m^3
Particulate Matter as PM_{10}	SI 180 of 2011	24-hour limit for protection of human health – not to be exceeded more than 35 times/year-24 hour average	50 μg/m^3 PM_{10}
		Annual limit for protection of human health-Annual	40 μg/m^3 PM_{10}
Particulate matter as $PM_{2.5}$	SI 180 of 2011	Annual limit for protection of human health-Annual	25μg/m^3 $PM_{2.5}$
Benzene	SI 180 of 2011	Annual limit for protection of human health	5μg/m^3
Carbon Monoxide	SI 180 of 2011	8-hour limit (on a rolling basis) for protection of human health	10 mg/m^3

Note[1] There shall be no releases of Lead or 1,3 Butadiene, PAH's or Ozone

Table 1-2UK Environment Agency and Irish EPA Odour Air Quality Guidelines

Pollutant	Guidance	Limit Type	Value
Odour	Irish EPA AG4 Guidance and EA Guidance	Expressed as 1 hr average at the 98%ile	<1.50 OuE/m^{3}at nearest worst case receptor

1.29 The above standards have been set by environmental and health professionals across Europe following extensive worldwide research and are designed to protect the most sensitive of receptors, including elderly humans with existing respiratory ailments and areas valued for their flora and fauna.

RECEIVING ENVIRONMENT - AIR

Sensitive Receptors

1.30 The receiving environment is described elsewhere in the EIS. (see Chapter X). Table 1-3 outlines a proportion of sensitive receptors located in the vicinity of the facility. The impact of odours on these receptors in addition to **all** locations outside the site boundary will be assessed.

Table 1-3Residential / Commercial sensitive receptors in the vicinity of the subject site.

Receptor Identity	X Coordinate (m)	Y Coordinate (m)
R1	177012.4	72012.2
R2	177011.7	71978
R3	177017.2	71916.7
R4	177031.9	71884.6
R5	177029.8	71819.1
R6	177080.7	71770.3
R7	177077.9	71704.1
R8	177128.8	71676.3
R9	177121.1	71644.9
R10	177175.4	71614.2
R11	177217.3	71572.4
R12	177260.5	71526.4
R13	177051.4	71449
R14	176668	70030
R15	176912	72123
R16	176328	71906
R17	177259	71828

Baseline Air Quality Assessment

1.31 The Irish Environmental Protection Agency has been monitoring Air quality from a number of sites around the country including the Cork area. This information is available from the EPA website – www.epa.ie. The values presented for PM10, SO2, NO2, and CO give an indication of expected emissions of the compounds listed in **Table 1-1**. **Tables1-4**illustrates the baseline data expected to be obtained for baseline data in cork / Ringaskiddy area (urban location) and where data for the specific pollutant is not available

at these sites, another appropriate worst-case monitoring location is chosen. In addition, baseline monitoring data was collected in the vicinity of the facility. This data was collected at 6 monitoring locations and is presented in this table for reference purposes also. **Figure 1-2** presents the monitoring locations relative to the proposed plant location.

Carbon Monoxide (CO)

1.32 Carbon monoxide is produced as a result of the incomplete burning of carbon-containing fuels including coal, wood, charcoal, natural gas, and fuel oil. It can be emitted by combustion sources such as un-vented kerosene and gas heaters, furnaces, woodstoves, gas stoves, fireplaces and water heaters, automobile exhausts, etc.

1.33 A number of the EPA air quality monitoring locations include analysis of carbon monoxide over a 1-year period. Results from this monitoring are presented in **Table1-4**.

1.34 As can be observed in **Table 1-4**, the baseline annual average 8 hr concentration of Carbon monoxide expected in this region is between the range 300 µg/m^3 which is well within the limit value of 10 mg/m^3 presented in **Table 1-1**.

Nitrogen Dioxides (NO_2)

1.35 Nitrogen is a constituent of both the natural atmosphere and of the biosphere. When industrial metabolism releases nitrogen to the environment it is considered a "pollutant" because of its chemical form: NO, NO_2, and N_2O. In the transportation sector, NOx emissions result from internal combustion engines. In power plants and industrial sources, NOx is produced in boilers. The overwhelming fraction of nitrogen oxide emissions arises from the high temperature combustion of fossil fuels; emissions from metal-processing plants and open-air burning of biomass.

1.36 Nitrogen dioxide is classed as both a primary pollutant and a secondary pollutant. As a primary pollutant NO_2 is emitted from all combustion processes (such as a gas/oil fired boiler or a car engine). Potentially, the main source of primary NO_2 for the proposed development will be from vehicle exhausts.

1.37 A number of the EPA air quality monitoring locations include analysis of Oxides of nitrogen over a 1-year period. Results from this monitoring are presented in **Table1-4**. In addition, specific site baseline data is also presented in **Table1-4.**

1.38 As can be observed in **Table 1-4**, the baseline annual average concentration of Nitrogen dioxide expected in this region is between the range of 10.32 to 22.7 µg/m^3 which is recorded at an urban location and on the specific site.

1.39 The baseline value is well within the limit values for both the protection of vegetation and human health.

Sulphur Dioxide (SO_2)

1.40 Sulphur dioxide is a colourless gas, about 2.5 times as heavy as air, with a suffocating faint sweet odour. It occurs in volcanic gases and thus traces of sulphur dioxide are present in the atmosphere. Other sources of SO_2 include smelters and utilities, electricity generation, iron and steel mills, petroleum refineries, pulp and paper mills, metallurgical processes, chemical processes and the combustion of iron pyrites, which is often present in coal. Small sources include residential, commercial and industrial space heating.

1.41 A number of the EPA air quality monitoring locations include analysis of sulphur dioxide over a 1-year period. Results from this monitoring are presented in **Table1-4**. In addition, specific site baseline data is also presented in **Table1-4.**

1.42 As can be observed in **Table 1-4**, the baseline annual average concentration of Sulphur dioxide was in the range of 2.67 to6.10 µg/m^3 which is well within the limit value of 20 µg/m^3 for protection of ecosystems and well within the limit value of 125 µg/m^3 for protection of human health, as presented in **Table 1-1**.

Particulate Matter (as PM_{10} and $PM_{2.5}$)

1.43 PM_{10} and $PM_{2.5}$ refer to particulate matter with an aerodynamic diameter of 10 and 2.5 µm, respectively. Generally, such particulate matter remains in the air due to low deposition rates. Particulate matter is of concern in Europe and as a result air quality limits have been established for both parameters.

1.44 A number of the EPA air quality monitoring locations include analysis of Particulate matter over a 1-year period. Results from this monitoring are presented in **Table1-4**. In addition, specific site baseline data is also presented in **Table1-4.**

1.45 As can be observed in **Table 1-4**, the baseline annual average concentrations of Particulate matter as PM_{10} and $PM_{2.5}$ expected in this region is between the range 11.5 and 17.90 µg/m³for PM_{10} and 7.0 and 8.20 µg/m³ for $PM_{2.5}$, respectively, which is well within the limit values for protection of human health of 40 and 25 µg/m³ respectively, as presented in **Table 1-1**.

Benzene

1.46 The sources associated with individual volatile organic compounds (VOCs) tend to be dependent on the nature of industries in a region. Methane is a naturally occurring VOC derived from plants and animals; it is also generated as a by-product of certain industries. Benzene and other aromatic/alkanes are most often derived from petrol driven vehicle exhausts. Heavier semi-volatile organic compounds are frequently derived from diesel-powered engines.

1.47 A number of the EPA air quality monitoring locations include analysis of Benzene over a 1-year period. Results from this monitoring are presented in **Table1-4**. In addition, specific site baseline data is also presented in **Table1-4.**

1.48 As can be observed in **Table 1-4**, the baseline annual average concentration of Benzene expected in this region is between the range 1.01 to 1.40 µg/m³ which is well within the limit value of 5.0 µg/m³ for protection of human health, as presented in **Table 1-1**.

Table 1-4Irish EPA Baseline and Site-Specific Baseline air quality monitoring data for selected sites

Compound	South Link Road (2016) (µg/m³)[1]	Heatherton Park 2012 (µg/m³)[1]	Baseline data (March to April 2018)
Carbon monoxide 8 hr (Annual mean)	300	-	-
Oxides of nitrogen (Annual mean)	22.70	-	10.32 (6.17-11.89)
Sulphur dioxide (Annual mean)	6.10	-	2.67 (2.09-2.93)
Particulate matter as PM10 (Annual mean)	17.90	11.50	16.90
Particulate matter as PM2.5 (Annual mean)	-	7.0	8.20
Benzene (Annual mean)	1.01	-	1.40 (1.1-2.0)

Notes: [1] seewww.epa.ie – Air quality in Ireland 2016
[2] monitoring locations identified on Location map Figure 1-2, Locations A2, A3, A4, A5, A8, A11

Odour

1.49 An odour sniff survey was performed in the vicinity of the application area at eleven locations over one day during March 2018. This survey was performed in line with the EPA's *Air Guidance Note 5 (*AG5) and allowed for the establishment of subjective baseline odour levels in the vicinity of the application area.

1.50 The odour sniff survey is a very useful fast test, which can provide a subjective "snap-shot" assessment of the presence, strength and character of an odour either within an installation boundary, at the boundary or in the area/community surrounding the site.

1.51 The survey map is presented in **Figure 1-2** and the results of the survey are presented in **Table 1-5**. In terms of the survey, no distinct odours were detected in the vicinity of the application area and therefore baseline odours were considered to be ambient, not distinct and neutral. It is therefore considered that there are no significant contributory sources to odour in the immediate vicinity of the application area on the day of monitoring.

Baseline Odour Assessment

1.52 In terms of the assessment, the location sensitivity, odour intensity and odour extent are recorded along with meteorological conditions throughout the survey period.

1.53 Odour intensity is described using 5 categories, where 0 denotes no odour, 1 faint odour, 2 moderate odour (easily detectable), 3 strong odour (bearable but offensive) and 4 very strong odour (unbearable, difficult to remain in area affected by odour).

1.54 Odour persistence is described using three categories 0 to 2, where 0 denotes no odour, 1 intermittent and 2 persistent odour (detected throughout the period of assessment).

1.55 Location sensitivity is categorized from 1 to 5, where 1 denotes a remote location, 2 low sensitivity (no housing / commercial within 100m of facility), 3 moderate sensitivity (housing / commercial within 100 m of the facility), 4 high sensitivity (housing / commercial within the area of the observation) and 5 an extra sensitive location (complaints arising from residences, business and users of public areas, etc.). A value of 0 is given if no odour was detected.

Table 1-5Baseline ambient air monitoring locations and sniff survey monitoring results in the vicinity of the application area.

Location	Hydrogen sulphide conc (ppb)	Odour Intensity	Odour persistence	Location Sensitivity	Odour Descriptor
Day 1 Sniff Survey –March 2018					
A 1	<3	0	0	1	No detectable odour
A 2	<3	0	0	1	No detectable odour
A 3	<3	0	0	1	No detectable odour
A 4	<3	0	0	1	No detectable odour
A 5	<3	0	0	1	No detectable odour
A 6	<3	0	0	1	No detectable odour
A 7	<3	0	0	1	No detectable odour
A 8	<3	0	0	1	No detectable odour
A 9	<3	0	0	1	No detectable odour
A 10	<3	0	0	1	No detectable odour
A 11	<3	0	0	1	No detectable odour

IMPACT ASSESSMENT

‘Do Nothing’

1.56 The baseline survey undertaken as part of this assessment suggests that air quality in the vicinity of the application area is expected to be average/good with typical levels of pollutants for a rural area. All pollutant levels are within the relevant Irish and EU limits. In the event that the development does not proceed it is likely that the application area would be developed in the future for some industrial use in line with its surrounds.

Construction Phase Impact – Air Quality

1.57 The following sections describe the potential impacts to air quality resulting from the construction phase of the proposed plant. The impacts have been assessed on a local scale to determine impacts on human health and ecological receptors. The aspects considered include:

- construction dust and its potential to impact on sensitive receptors and to cause an environmental nuisance,
- construction traffic emissions and their potential for impacts on sensitive receptors.

1.58 The impacts are assessed in the following sections with respect to the relevant assessment criteria where appropriate.

Construction Dust

1.59 Construction activities such as excavation, earth moving and backfilling can generate dust, particularly in dry weather conditions. These activities will be minimal. The extent of dust generation is dependent on the nature of the material being transported and the location of the construction activity (whether indoors or outdoors). In addition, the potential for dust dispersion depends on the local meteorological factors such as rainfall, wind speed and wind direction. Vehicles transporting material to and from the site also have the potential to cause dust generation along the selected haul routes.

1.60 **Table 1-6** presents the distances within which dust could be expected to result in a nuisance from construction sites for impacts such as soiling (dust

nuisance), PM_{10} deposition and vegetation effects. This data has been taken from the National Roads Authority (NRA) *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* and is considered a worst-case assessment. These distances present the potential for dust impact with standard mitigation in place.

1.61 Detail of proposed mitigation measures to be implemented as part of the construction phase of the project will be presented in a Construction Environmental Management Plan that will be developed for the site.

Table 1-6Assessment criteria for the impact of dust from construction, with standard mitigation in place

Source		Potential distance for significant effects (distance from source)		
Scale	**Description**	**Soiling**	**PM_{10}**	**Vegetation effects**
Major	Large construction sites with high use of haul roads	100m	25m	25m
Moderate	Moderate sized construction sites with moderate use of haul roads	50m	15m	15m
Minor	Minor construction sites with minor use of haul roads	25m	10m	10m

Source: National Roads Authority, 2006.

1.62 The construction phase of this proposal is deemed for the purposes of this assessment to be of a minor scale and less, given the fact that there will be minor use of temporary haul roads. Using this screening assessment tool, at a minor construction site there is a risk that dust may cause an impact at sensitive receptors less than 25m of the source of the dust generated. The nearest residential sensitive receptors to the centre of the subject site is located at a distance of much greater than this, therefore, the impact from construction activities can be considered to be imperceptible. A number of commercial receptors are in close proximity to the facility and therefore careful consideration will need to be given to these within the CEMP.

1.63 All sensitive habitats are located at a distance greater than 25m from the emission source as a result the impact on habitats will be imperceptible.

1.64 A Construction Environmental Management Plan (CEMP) incorporating dust mitigation measures will further reduce any impacts significantly and this will be implemented as part of the proposed development if deemed necessary.

Construction Traffic Emissions

1.65 Emissions associated with construction traffic can impact on local air quality. In particular, the proposed routes used for deliveries and any sensitive receptors that line these routes may experience impacts to local air quality.

1.66 The potential impact of construction traffic associated with this proposal was estimated as a worst case Annual Average Daily Traffic (AADT) scenario of 100 (which is considered worst case) with a mean traffic speed of 20km/hr. The detailed results of the modelling exercise are presented in **Table 1-7**.

Table 1-7Predicted contribution of air pollutants to baseline air quality as a result of construction traffic.

Link location	Carbon monoxide Annual mean (µg/m^3)	Benzene Annual mean (µg/m^3)	Oxides of nitrogen Annual mean (µg/m^3)	Particulate matter 10um	
				Annual mean (µg/m^3)	Days > 50 (µg/m^3)
Worst case receptor 5m from road centreline on any roadway	<0.02	<0.02	<0.22	<0.04	0

Operational Phase Impacts – Air Quality

1.67 Air quality impacts may arise from process-based emissions and traffic movements associated with the operational phase of the proposed plant. Traffic based air quality emissions will result from traffic making deliveries and collections to and from the proposed plant and employee traffic movements.

Traffic

1.68 The detailed information provided in the traffic and transport assessment guideline forms for development proposals in Ireland has been used to identify whether any significant impact on sensitive receptors will occur. The traffic information has been inputted into the Design Manual for Roads and Bridges (DMRB), Volume 11 (ver. 1.03c) model. This model was prepared by the United Kingdom Department of Transport, the Scottish Office of Industrial Development, the Welsh Office, the Department of Environment for Northern Ireland and Ireland as a screening tool to assess worst-case air quality impact associated with traffic movements.

1.69 The screening model uses a worst-case scenario in calculating emissions. The emission factors used for each pollutant are intentionally set to bias and to overestimate the actual emission rate. In addition, wind speeds are assumed to be 2 ms^{-1} (approximately 3.90 knots compared to a mean wind speed of between 5 to 6 ms^{-1} at the nearest Met station (Cork Airport Met Station). Emission rates predicted as a result of traffic are added to the cumulative emissions generated by the proposed plant's scheduled emission points and baseline data. In this case, there are no scheduled emission points for the proposed facility. This is considered a worst-case assessment of likely impact. It can therefore be assumed with confidence that traffic related air pollution will not arise if the model does not identify any issues.

1.70 Traffic figures have been assessed using Annual Average Daily Traffic (AADT) figures. The Heavy Goods Vehicle (HGV) percentage was taken from the traffic assessment and includes a worst-case comfort level in order to remain conservative. As the average speed of vehicles has a significant effect on the generation of pollutants, calculations are carried out at a worst-case traffic speed scenario. The speed used is 20 km hr^{-1}, to represent gridlock conditions so as to assess the worst-case scenario. In addition, it was

assumed within the model that the sensitive receptor was located within 5m of the road centreline, again to represent worst case conditions.

Traffic: Output Data from Traffic Air Quality Model

1.71 **Table 1-8** presents the results of the worst-case conservative traffic air quality modelling data, performed in order to ascertain the likely increase in air quality impact as a result of additional traffic generated during the operational phase of this proposed plant.

1.72 As can be observed, there is no significant increase in the air quality impact of named pollutants as a result of increased baseline traffic numbers in 2019 or 2025 with only a slight increase occurring in pollutant concentration predicted 5m from the road centreline.

1.73 In terms of the 'do nothing' versus 'do something' for 2019 and 2025, there is a slight increase in pollutant concentration in the order of 1 to 2% which is considered to be imperceptible. When this increase is added to baseline data presented in **Table 1-4** for each named pollutant, emissions will remain well within the air quality limits presented in **Table 1-1** for the protection of human health.

Table 1-83Predicted contribution of air pollutants as a result of increased traffic in 2019and 2025

Year	Worst case receptor assessment of air quality impact associated with increased traffic from 2019 to 2025	
	Proposed site	
Do something **2019**	Carbon monoxide Annual mean (µg/m^3)	0.10
	Benzene Annual mean (µg/m^3)	0.10
	Oxides of nitrogen Annual mean (µg/m^3)	0.58
	Particulate matter 10um - Annual mean (µg/m^3)	0.08
	Particulate matter 10um - Days > 50 (µg/m^3)	0
Do something **2025**	Carbon monoxide Annual mean (µg/m^3)	0.10
	Benzene Annual mean (µg/m^3)	0.10

Year	Worst case receptor assessment of air quality impact associated with increased traffic from 2019 to 2025	
	Proposed site	
	Oxides of nitrogen Annual mean (µg/m^3)	0.51
	Particulate matter 10um - Annual mean (µg/m^3)	0.06
	Particulate matter 10um - Days > 50 (µg/m^3)	0

Scheduled Emission Points

1.74 The relative location of the one scheduled emission point within the subject site is presented in **Figure 1-1**.

- Odour control vent, A2-1 vented through a vent of 17 m.

1.75 There will be no classical air pollutants emitted from the scheduled emission point with only odour possibly emitted. Odours from the proposed scheduled emission point was examined utilising process guaranteed odour air quality emission rate data for the odour control equipment. The relative location of scheduled emission point within the subject site is presented in **Figure 1-1**.

1.76 The predicted impacts as a result of operation of scheduled emission point at the proposed plant for odours was examined utilising odour emission rate data as presented in **Table 1-11**, in accordance with procedures and methods contained in the following publications:

- *EN13275:2003 - Air quality - Determination of odour concentration by dynamic olfactometry*, (CEN), 2003.
- *H4 Odour Management, Guidance Parts 1 and 2*, Environment agency, UK, 2011.
- *Air Dispersion Modelling from Industrial Installations Guidance Note* (AG4), EPA 2010.

1.77 This data was inputted into a dispersion model in order to predict the impacts of odour emissions from the scheduled emission point located within the proposed plant boundary. AERMOD Prime (18018) and 5 years of hourly

sequential meteorological data (Cork Airport 2011 to 2015 inclusive) representative of the study area were utilised within the dispersion model with the worst-case year Cork 2015 used for data presentation.

Dispersion Model AERMOD Prime

1.78 The AERMOD model was developed through a formal collaboration between the American Meteorological Society (AMS) and U.S. Environmental Protection Agency (U.S. EPA). AERMOD is a Gaussian plume model and replaced the ISC3 model in demonstrating compliance with the National Ambient Air Quality Standards (Porter et al., 2003). AERMIC (USEPA and AMS working group) is emphasising development of a platform that includes air turbulence structure, scaling, and concepts; treatment of both surface and elevated sources; and simple and complex terrain. The modelling platform system has three main components: AERMOD, which is the air dispersion model; AERMET, a meteorological data pre-processor; and AERMAP, a terrain data pre-processor (Cora and Hung, 2003).

Model Assumptions

1.79 The approach adopted in this assessment is considered a worst-case investigation in respect of emissions to the atmosphere from the proposed scheduled emission point to be located within the operational plant. These predictions are therefore most likely to overestimate the GLC's that may actually occur for each modelled scenario. The assumptions are summarised and include:

- all emissions were assumed to occur at maximum potential emission concentration and mass emission rates for each scenario and were assumed to occur for 100% of an operating year, (when the proposed plant is in operation);
- five years of hourly sequential meteorological data from Cork 2011 to 2015 inclusive was used in the modelling screen which will provide statistically significant results in terms of the short- and long-term assessment. The worst-case year 2015 was used for data analysis, this is in keeping with guidance presented in Environment Agency and Irish EPA publications. In addition, AERMOD incorporates a meteorological pre-processor AERMET PRO. The AERMET PRO meteorological pre-processor requires the input of surface characteristics, including surface roughness

(z0), Bowen Ratio and Albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. The values of Albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc) and vary with seasons and wind direction. The assessment of appropriate land-use type was carried out to a distance of 10km from the meteorological station for Bowen Ratio and Albedo and to a distance of 1km for surface roughness in line with USEPA recommendations.

- AERMOD Prime (18018) dispersion modelling was utilised throughout the assessment in order to provide the most conservative dispersion estimates;
- all building wake affects were assessed within the dispersion model and taken into account within the assessment;
- topographical data was inputted into the model in order to take account of the deviations in terrain and receptor hill height;

Odour Impact Criterion

1.80 An odour impact criterion defines the odour threshold concentration limit value above baseline in ambient air, which will result in an odour stimulus capable of causing an odour complaint. There are a number of interlinked factors, which cause a nearby sensitive receptor (i.e. resident) to complain, these include:

- odour threshold concentration, odour intensity and hedonic tone (a category judgement of the relative like or dislike of the odour) defined measurable parameters at odour source;
- frequency of odour i.e. how frequently the odour is detected at the receptor location;
- duration of odour i.e. how long the odour persists at the receptor location;
- physiological-previous experiences encountered by receptor.

1.81 By assessing these combined interlinked factors, the ability for a facility to cause odour complaint can be determined. Odour is not measurable in ambient air due to issues with sampling techniques, limit of detections for olfactometers and the inability to monitor continuously. As a result, dispersion models become useful tools in odour impact assessments and odour risk

analysis. Dispersion modelling also allows for the assessment of proposed changes in processes within the facility without actually having to wait for the processes to be changed (i.e. predictive analysis).

1.82 Potential odours from the proposed plant are associated with the operational phase and may arise from the release of odorous gases from:

- the handling and processing of feedstock material within the process;
- fugitive odour emissions from building leakage;
- storage of feedstock and baled material on site;
- any other ancillary process.

1.83 Any process changes which will improve / reduce the nature of the elements above will lead to reduction in potential odour release.

1.84 Impacts from the proposed plant's operations are assessed in accordance with the following requirements. These include:

- *Odour Impacts and Odour Emission Control Measures for Intensive Agriculture*, EPA, 2001;
- *Air Dispersion Modelling from Industrial Installations Guidance Note (AG4),* EPA, 2010, and
- *H4 Odour Management, Guidance Parts 1 and 2*, Environment agency, UK, 2011.

1.85 Based on these publications, a limit value at the nearest sensitive receptor of less than 1.50 Ou_{ed}/m^3 at the 98^{th} percentile of hourly averages for 5 years of screened hourly sequential meteorological data was examined as this was considered the most appropriate odour impact criterion given the nature of the proposed activity.

Meteorological Data

1.86 Five years of hourly sequential meteorological data was chosen for the modelling exercise (i.e. Cork Airport 2011 to 2015 inclusive). A schematic wind rose and tabular cumulative wind speed and directions of all five years are presented in **Figure 1-3 and Table 1-9**. All five years of meteorological data was screened to provide statistically significant output results from the dispersion model. The worst-case year 2015 was used for data presentation.

This is in keeping with national and international recommendations on quality assurance in operating dispersion models and will provide a worst-case assessment of predicted ground level concentrations based on the input emission rate data. Surface roughness, Albedo and Bowen ratio were assessed and characterised around Cork Airport Met Station for AERMET Pro processing.

Table 1-9 Cumulative wind speed and direction for meteorological data used for atmospheric dispersion modelling Cork 2011 to 2015 inclusive

Cumulative Wind Speed Categories							
Relative Direction	**> 1.54**	**>3.09**	**>5.14**	**>8.23**	**> 10.80**	**< 10.80**	**Total**
0	0.09	0.30	1.53	1.33	0.36	0.11	3.72
22.5	0.03	0.17	1.04	0.42	0.20	0.08	1.95
45	0.07	0.20	0.97	0.85	0.18	0.02	2.30
67.5	0.09	0.22	1.15	0.46	0.16	0.01	2.08
90	0.08	0.34	2.09	1.23	0.30	0.06	4.10
112.5	0.13	0.46	2.08	1.34	0.28	0.10	4.39
135	0.11	0.34	2.02	1.40	0.65	0.15	4.67
157.5	0.24	0.33	1.96	1.01	0.32	0.01	3.87
180	0.24	0.94	3.93	1.81	0.50	0.15	7.57
202.5	0.25	0.79	3.76	2.62	1.01	0.30	8.72
225	0.15	0.89	6.82	4.03	0.81	0.19	12.89
247.5	0.17	0.55	5.93	3.39	0.39	0.02	10.45
270	0.38	0.67	4.42	2.35	0.58	0.10	8.49
292.5	0.27	0.59	4.44	2.36	0.82	0.18	8.66
315	0.18	0.67	4.58	2.65	0.72	0.08	8.88
337.5	0.09	0.20	2.33	2.86	0.75	0.17	6.41
Total	2.57	7.66	49.03	30.11	8.04	1.74	99.16
Calms	--	-	-	-	-	-	**0.75**
Missing	-	-	-	-	-	-	**0.09**
Total	**-**	**-**	**-**	**-**	**-**	**-**	**100.00**

Terrain Data

1.87 Topography effects were accounted for within the dispersion modelling assessment as terrain was considered complex in the vicinity of the site. 10m spaced XYZ column format topographical data as gathered from Ordnance Survey Ireland and site specific data as collected through a topographical survey was pre-processed using AERMAP for the dispersion modelling area in order to allow for the characteristics of terrain to be accounted for in the model. A total fine and course grid area of 0.16, 2.25 and 12.96 km sqwas examined within the dispersion modelling assessment giving a total receptor grid number of 3020 receptor points in the assessment area.

Building Wake Effects

1.88 Building wake effects are accounted for in modelling scenarios through the use of the Prime algorithm (i.e. all building features located within the plant) as this can have a significant effect on the compound plume dispersion at short distances from the source and can significantly increase GLC's in close proximity to the proposed plant. All adjacent building structures, vent heights and orientations were inputted into the dispersion model in order to allow for wake effects to be taken in to account in the calculations. The latest Building Profile Input Programme (BPIP) was utilised in the analysis.

Input Source Characteristics for Dispersion Model

1.89 Input source characteristics for the dispersion model are specified within **Table 1-10**. The scheduled emission point is detailed within this Table to include, emission point location, vent height above ground level, vent tip diameter, efflux velocity, exhaust actual airflow volume, worst case building / structure height in the vicinity of the vent, etc. This data was utilised in conjunction with the emission rate data for odour (**see Tables 1-11**) in order to predict the worst case GLC over the specified receptor grid area detailed in the section entitled Terrain Data.

Table 1-10Proposed scheduled emission points source characteristics.

Parameter	Emission point A2-1 – Odour control vent
Emission point description	**Odour Control Vent**
X coordinate (m)	177023
Y coordinate (m)	71647
Vent height (m)	17
Vent tip diameter (m)	1.80
Volume flow (Am3/hr)	155,000
Flue gas temperature (K)	293.15
Efflux velocity (m/s)	16.86
Vent orientation	Vertical
Vent base level A.O.D (m)	24.40
Receptor height (normal breathing level) (m)	1.80
Max building / tank height (m)	15
Building base level A.O.D (m)	24.40

Notes:

It is assumed that the odour control system will treat 155,000 Am3/hr to a treatment exhaust odour threshold concentration of less than or equal to 250 Ou_E/m^3. Based on the author's experience, this exhaust odour threshold concentration is considered worst case as the technology proposed for odour control will typically achieve odour threshold concentration in the range of 200-300 Ou_E/m^3 (i.e.carbon filtration with plasma injection)

Input Odour Emission Data for Dispersion Modelling

1.90 **Table 1-11** presents the overall negative ventilation strategy for the proposed building assuming that all processes are negatively ventilated and each process building is placed under negative pressure. This will provide an air treatment capacity of approximately 3 AC/hr. In addition to this, it is assumed that the building envelope will be manipulated to achieve a building integrity sealing of near 100%. Ventilation capacity will be controlled to achieve a total negative under-pressure on the building of –ive 20 to –ive 30 Pa during operations.

1.91 Input odour emission data for the proposed plant processes is presented **Table 1-11**. The overall odour emission rate from identified processes will be 10,763 Ou_E/s. This data was inputted into the dispersion model AERMOD Prime 18018 with meteorological data, terrain and building and source characteristics as described undersection Odour Impact Criterion to allow for the examination of predicted odour levels at each of the identified sensitive receptors for each Scheduled Emission Points.

Table 1-11Odour emission rate data used as input data to the dispersion model AERMOD Prime 18018 for proposed operation of the plant.

Proposed odour emission rates for the Bioenergy Plant			
Odour source	**Volume flow rate (Nm^3/hr)**	**Odour threshold conc. (Ou_E/m^3)**	**Odour emission rate (Ou_E/s)**
Odour control system emission point ventA2-1	155,000	<250	10,763
Total predicted odour emission rate (OuE/s)	**-**	**-**	**10,763**

Output Odour Data for the Dispersion Model for Proposed Plant

1.92 **Tables1-12** presents the predicted odour values at each residential / commercial site receptor in the vicinity of the proposed plant when all processes are operating. The worst-case odour impact is determined to be that receptor with the highest recorded GLC of odour at the 98th percentile of hourly averages for the worst-case meteorological year Cork 2015.

1.93 Of all the receptors evaluated, R7(see **Table 1-12**), is identified as the worst-case receptor with a maximum predicted GLC of odour less than or equal to

1.30 Ou_E/m^3 at the 98th percentile of hourly averages for the worst-case meteorological year Cork 2015. This is less than or equal to 87% of the odour impact criterion of 1.5 Ou_E/m^3 stated in Environment Agency and Irish EPA Guidance AG4 (page 70). This is also well within the proposed limit value of less than or equal to 3.0 Ou_E/m^3 for the 98th percentile of hourly averages usually expected for such sites. In addition, the maximum predicted odour concentration anywhere in the vicinity of the facility (including inside and outside the boundary of the facility and within the grid area of 12.96km sq) will be less than or equal to 1.5 Ou_E/m^3 for the 98th percentile of hourly averages for the worst case meteorological year Cork 2015 (i.e. anywhere in the vicinity of the facility inside or outside the boundary of the site operations).

Table 1-12Predicted GLC at each residential sensitive receptor for the 98th percentile of hourly averages for worst case meteorological year, Cork 2015

Receptor Identity	X Coordinate (m)	Y Coordinate (m)	1 hr 98th %ile (Ou_E/m^3) Yr 2015
R1	177012.4	72012.2	0.40
R2	177011.7	71978	0.43
R3	177017.2	71916.7	0.52
R4	177031.9	71884.6	0.60
R5	177029.8	71819.1	0.73
R6	177080.7	71770.3	0.73
R7	177077.9	71704.1	1.30
R8	177128.8	71676.3	0.61
R9	177121.1	71644.9	0.56
R10	177175.4	71614.2	0.50
R11	177217.3	71572.4	0.41
R12	177260.5	71526.4	0.41
R13	177051.4	71449	0.30
R15	176668	70030	0.01
R16	176912	72123	0.25
R17	176328	71906	0.08
R18	177259	71828	0.54
Maximum predicted value (Ou_E/m^3)	**-**	**-**	**1.30**

MITIGATION MEASURES

1.94 In order to sufficiently ameliorate any potential negative impacts on air quality, a schedule of measures has been formulated for both the construction and operational phases of the proposed plant.

Incorporated Mitigation

1.95 In view of the potential for adverse environmental effects, the design and operation of the proposed plant is intended to ensure that feedstock is not handled outside the processing building. A number of measures, as outlined below, are incorporated to ensure that fugitive emissions of odours are minimised from the reception area of the main building:

- The main building is totally enclosed with access into or out of the building only possible through automatic rapid open/shut doors fitted with high efficiency air curtains. Pedestrian doors will for remain closed and only open when access is required. This will ensure the risk of egress of odour through building apertures is minimised;

- Extraction systems in the bailed waste storage and Food and Refuse area of the main building will maintain negative pressure inside these areas including processes where material is handled and processed. This will encourage air to flow into the building, thus further preventing uncontrolled egress of odour.

1.96 Other controls on emissions to air which will be implemented as an integral part of the design are as follows:

- The air extracted from the main building will be treated in an odour control system which will incorporate a process specific dust and carbon filter and plasma injection prior to being exhausted through a 16m vent. The vent will be located to the south of the main building, the vent is considered to have sufficient height to ensure an adequate level of dispersion as a means of tertiary protection.

Construction Phase Mitigation

1.97 A full traffic management plan and dust management plan will be incorporated into the Construction Environmental Management Plan (CEMP) in order to minimise such emissions as a result of the construction / operation phase of the development. This will be generated specifically for the proposed development when detailed design is completed.

1.98 In order to ensure that no dust nuisance occurs at sensitive receptors, a series of measures will be implemented through the CEMP:

- On site roads shall be regularly cleaned and maintained as appropriate.
- Hard surface roads shall be swept to remove mud and aggregate materials from their surface as a result of the development.
- Any un-surfaced roads shall be restricted to essential site traffic only.
- Furthermore, any on site road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during extended dry and/or windy conditions.
- Vehicles using site roads shall have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road and on hard surfaced roads speed shall be restricted to 20 km per hour.
- Vehicles delivering material with dust potential will be enclosed or covered with tarpaulin at all times to restrict the escape of dust.
- At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the subject site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.
- In relation to the completion of the proposed development, the hard-standing surface, and all roads will be tarmacadamed/concreted where applicable. In periods of dry weather when dust emission would be greatest, a road sweeper, which would also dampen the road, may be employed as required to prevent the generation of dust.

- In terms of good practice construction vehicles and equipment will receive regular maintenance. Technical inspection will be performed of vehicles to ensure they will perform most efficiently. A Traffic Management Plan will be implemented to minimise congestion.

Climate

1.99 Emissions of Oxides of nitrogen, Sulphur dioxide, Carbon monoxide and Carbon dioxide will be mitigated by using efficient operation vehicles, appropriate scheduling of activities to minimise duration, the shutting off of equipment during periods of inactivity if they do occur, and a transport management plan as part of the CEMP as described above. No additional mitigation measures are considered necessary.

Operational Phase Mitigation

1.100 Scheduled emission points operated within the facility are expected to be regulated through the permitting process and emission limit values presented are typical of emission levels stated in such permits. There will be no other scheduled emission points for the facility.

1.101 This assessment demonstrates that emission levels as a result of the operation of the proposed plant will not result in any odour and / or air quality impact in line with Irish and European assessment criteria limits. There will be no significant emissions of classical air pollutants.

1.102 In terms of the likelihood of fugitive emissions of odours, these will be negligible as all buildings and processes containing odorous activities will be of high containment integrity (near 100% integrity i.e. leakage rate of less than 3 $m^3/m^2/hr$ @ 50Pa) and all areas where odorous activities occur will be placed under negative extraction. All process odorous air will be vented through a three-stage odour treatment process to dedust and deodorise the collected air. In addition, this treated air will be vented through a 16 m vent to provide further dispersion as a final protection.

1.103 In terms of access doors to the waste reception area, these will be of rapid roller type to prevent emissions from escaping from doorways when vehicles access the main building's reception area. Buildings will be fitted with absolute pressure controlled louver system to maintain excellent integrity.

1.104 The entire odour management system including the containment, extraction and treatment system will be monitored by a network of sensors to ensure it is functioning adequately.

1.105 An odour management plan will be implemented at the proposed facility in line with environmental regulators requirements.

1.106 A detailed description of the odour treatment system has being provided.

Climate

1.107 The effects of the proposed plant on climate are expected to be negligible

RESIDUAL IMPACT

1.108 No residual impacts are anticipated as a result of the proposed development of a Waste recycling facility.

Construction Phase

1.109 The effect of construction of the proposed plant on air quality will not be significant following the implementation of the proposed mitigation measures. No residual impacts are anticipated. There will be very little external construction and the majority of construction occurring indoors as the building exists.

Operational Phase

1.110 Scheduled emission points operated within the proposed plant will be regulated through the local permitting process (Odour control vent). This assessment demonstrates that the level of emissions will not result in any air quality odour impact in line with guideline Irish and European assessment criteria limits. No residual impacts are anticipated.

"WORST CASE" SCENARIO

1.111 A worst case of assessment was utilised throughout the air quality odour impact study in order to assess any risk associated with the proposed operation of the plant. No impacts above the regulatory and guideline limit

values were identified with the proposed facility in full compliance with such limit and guideline value.



Figure 1-1. Receptor location map, emission point location (A2-1)and proposed facility layout.

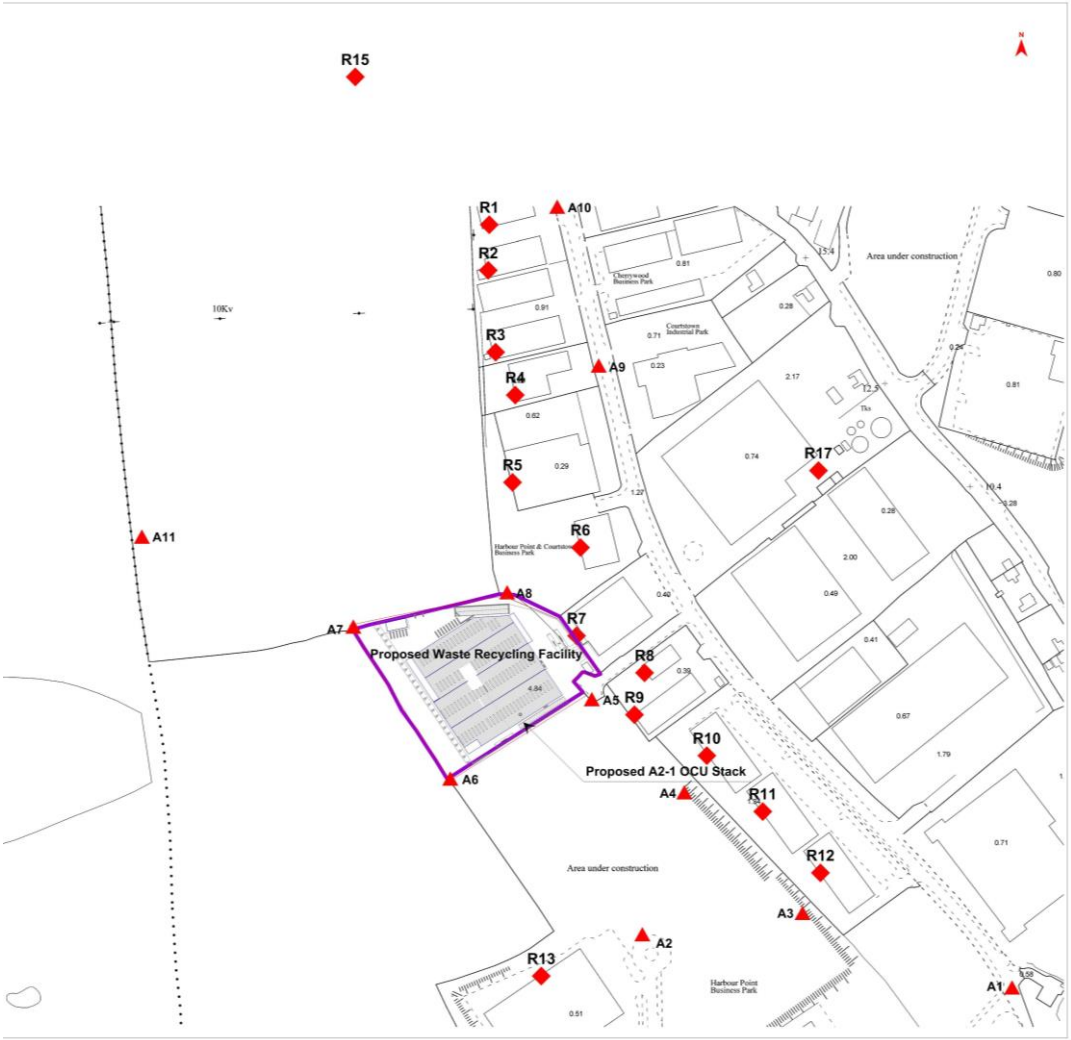


Figure 1-2. Schematic illustrating baseline monitoring locations in the vicinity of the proposed facility.

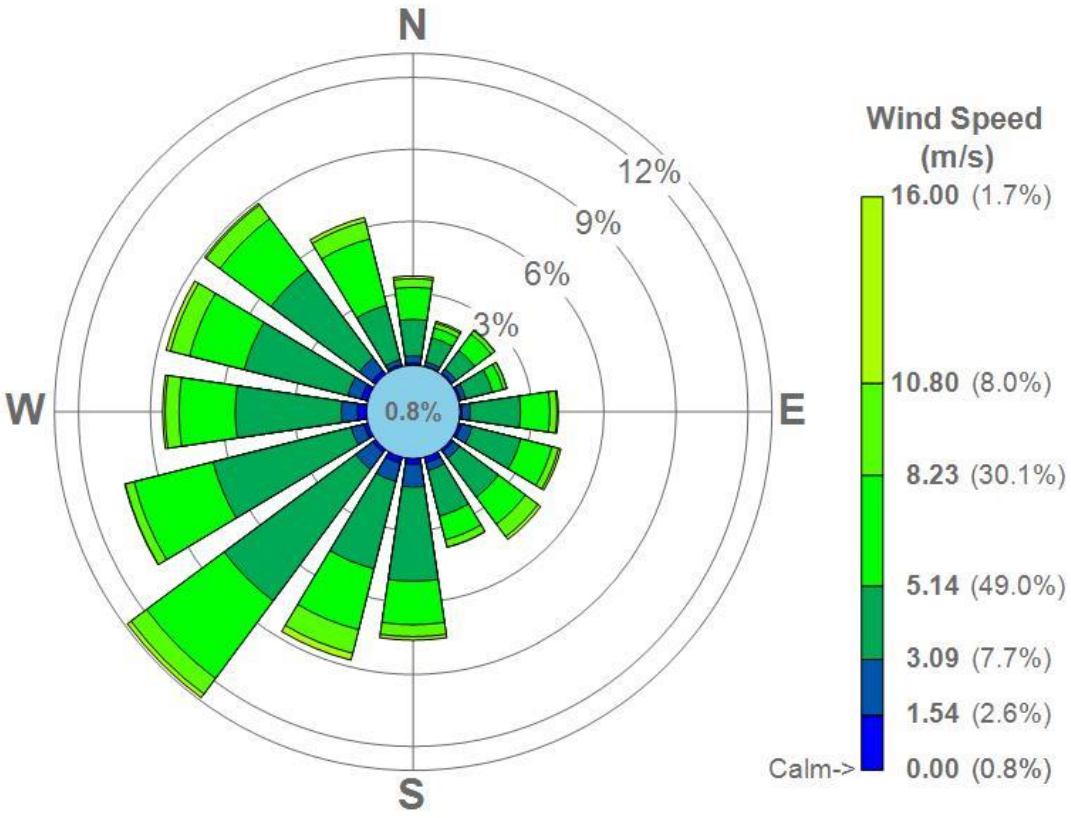


Figure 1-3. Schematic illustrating windrose for meteorological data used for atmospheric dispersion modelling, Cork 2011 to 2015 inclusive.

Air dispersion modelling contour plots (Process contributions and illustrative purposes only).



Figure 1-4. Predicted 98th percentile of 1 hr averages for an Odour ground level concentration of less than or equal to 1.50 Ou_E/m^3 ( ) for cumulative emission from proposed emission pointsA2-1 for Cork meteorological station (worst case year 2015) - 24 hr plant operation.

Table 1-13. Typical EA checklist as taken from their air dispersion modelling requirements report.

Item	Yes/No	Reason for omission/Notes
Location map	Section 6	-
Site plan	Section 6	-
List of pollutants modelled and relevant air quality guidelines	Yes	-
Details of modelled scenarios	Yes	-
Model description and justification	Yes	-
Special model treatments used	Yes	-
Table of emission parameters used	Yes	-
Details of modelled domain and receptors	Yes	-
Details of meteorological data used (including origin) and justification	Yes	-
Details of terrain treatment	Yes	-
Details of building treatment	Yes	-
Details of modelled wet/dry deposition	N/A	-
Sensitivity analysis	Yes	Five years of hourly sequential data screened from nearest valid met station-Cork 2011 to 2015.
Assessment of impacts	Yes	Pollutant emissions assessment from process identified.
Model input files	No	DVD will be sent upon request. Files are a total of 4.8 GB in size.

Appendix 10.1

Archaeological Assessment Photographic Plates

Appendix 10.1



Plate 10.1. Looking N, the area of the proposed development is in the northern part of this field. The field slopes down from west to east (l to r)



Plate 10.2. Within the site looking E with existing industrial unit in the background.



Plate 10.3. Within the site looking SE



Plate 10.4. The land adjoining the proposed site (to the south) had been reduced by *c.* 2m as part of ground preparation works for an adjoin site under construction

Appendix 10.2

National Monuments Legislation

Appendix 10.2.

National Monuments Legislation

All archaeological sites have the full protection of the National Monuments legislation (Principal Act 1930 and Amendments 1954, 1987 and 1994).

In amendment of Section 2 of the Principal Act (1930) in the National Monuments (Amendment) Act 1987, a 'monument' is defined as:

Definition of a Monument

(a) any artificial or partly artificial building, structure or erection or group of such buildings, structures or erections,

(b) any cave, stone or other natural product, whether or not forming part of the ground, that has been artificially carved, sculptured or worked upon or which (where it does not form part of the place where it is) appears to have been purposely put or arranged in position,

(c) any, or any part of any, prehistoric or ancient-

(i) tomb, grave or burial deposit, or(ii) ritual, industrial or habitation site, and

(d) any place comprising the remains or traces of any such building, structure or erection, any such cave, stone or natural product or any such tomb, grave, burial deposit or ritual, industrial or habitation site…'

Under Section 14 of the Principal Act (1930):

Interference With a Monument

(a) 'It shall not be lawful for any person…to demolish or remove wholly or in part or to disfigure., deface, alter, or in any manner injure or interfere with any such national monument without or otherwise than in accordance with the consent hereinafter mentioned [a licence issued by the Office of Public Works National Monuments Branch], or

(b) to excavate, dig, plough or otherwise disturb the ground within, around, or in the proximity to any such national monument without or otherwise than in accordance with the consent hereinafter mentioned [a licence issued by the Office of Public Works National Monuments Branch]…'

Under Amendment to Section 23 of the Principal Act:

Reporting of an Archaeological Find

'A person who finds an archaeological object shall, within 4 days after finding, make a report of it to a member of the Garda Síochána…or the Director of the National Museum or a servant or agent of his….'

The latter is of particular relevance to any finds made during development.

The 1994 Amendment (Section 12 (1-4) of the Principal Act (1930) established the Record of Monuments. All the sites and 'places' recorded by the Sites and Monuments Record of the Office of Public Works were provided with a new status in law. This new status provides protection to the listed sites, which is equivalent to that accorded to 'Registered' sites (Section 5-(1-10), National Monuments (Amendment) Act 1987) as follows:

The Record of Monuments

(1) The Commissioners shall establish and maintain a record of monuments and places where they believe there are monuments and the record shall be comprised of a list of monuments and such places and a map or maps showing each monument and such place in respect of each count in the State.

(2) The Commissioners shall cause to be exhibited in a prescribed manner in each county the list and map or maps of that county drawn up under subsection (1) of this section and shall publish in a prescribed manner information about when and where the lists and maps may be consulted.

(3) When the owner or occupier (not being the Commissioners) of a monument or place which has been recorded under *subsection (1)* of this section or any person proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such monument or place, he shall give notice in writing of his proposal to carry out the work to the Commissioners and shall not, except in the case of urgent

necessity and with the consent of the Commissioners, commence the work for a period of two months after having given the notice.'

In effect the record is the list of known archaeological sites and areas drawn up from The Sites and Monuments Record for each county. It includes:

1) All known monuments, e.g., ringforts, castles, etc. dating to before 1700AD, each surrounded by a standard circle defining a Zone of Archaeological Potential associated with the monument.

2) The details of the proposed record and its existence in law from the 1st January 1999 were advertised on the national papers on Wednesday 30th December 1998.

3) It requires that each person intending to undertake works on their property within a monument or zone must notify the Commissioners. The onus is on the owner/developer.

Appendix 14.1

Transportation Assessment Report

consulting engineers

NRB

Transportation Assessment Report

For

Proposed Recycling Centre

At

Harbour Point Business Park, Little Island, Cork.

SUBMISSION ISSUE

8 Leopardstown Business Centre, Ballyogan Avenue, Leopardstown, Dublin 18
Tel/fax: +353 1 292 1941, E-mail: info@nrb.ie, Web: www.nrb.ie

Registered in Ireland No. 491679

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C	Traffic Surveys, Traffic Generation, Trip Distribution & Network Traffic Flow Diagrams
D	Junction 9 (PiCADY) Simulation Model Output Results
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EXECUTIVE SUMMARY

NRB Consulting Engineers Ltd were originally appointed in 2017 to address the Traffic & Transportation impact associated with the construction of a proposed recycling centre on an industrial site at Harbour Point Business Park in Little Island, Cork. The subject lands are located to the west of and within an established business and industrial centre.

The Report has now been revised to omit development traffic associated with a previously proposed 'Public-Bring' Waste Recycling Facility and expanded to include a detailed assessment of impact upon the N25 Junction which includes detailed new classified traffic turning movements surveys of the N25 at junction #2. In addition, the Cork County Council plans to upgrade the local junctions within the Little Island area are now at an advanced stage (out to Tender), and the impact of the development on the proposed improved junctions has been assessed.

The Transportation Assessment has been prepared in accordance with the TII's Traffic & Transportation Assessment Guidelines and addresses the traffic impact of the proposals based on the worst case anticipated licensed tonnage/turnover of the facility. The assessment is based on comprehensive Weekday AM and PM Peak classified interval traffic turning movement surveys of the adjacent road network carried out in January 2017 ('Traffic Counts') supplemented by a 2018 survey of the N25 at Junction 2. Discussions were entered into with Cork County Council (CCC) Roads/Transportation personnel to establish the scope and extent of the study contained herein.

The Report & analysis includes an assessment of impact of the proposed facility fully operational during the projected Opening Year 2021 together with an assessment of the Design Year 2036 (TII Guidelines require future year assessment of impact, 15 years after opening, in this case 2036).

The Report addresses the adequacy of the existing road network to safely and appropriately accommodate the absolute worst case peak hour vehicular demands and in particular the safety and capacity of the established affected road junctions in the area.

The assessment herein is based on theoretical maximum demand at the facility based on proposed licensed usage (and it excludes the public-bring element that was previously included). It should be noted that we have assigned the licensed maximum traffic demand to the local network for peak hours as a robust assessment, which is required

under the Guidance. However, the reality is that the traffic generated by the facility during the weekday AM and weekday PM Peak hours is expected to be considerably less than outlined herein and the assessment is therefore Robust.

The Transportation Assessment Report confirms that the access junction serving Harbour Point Business Park and the affected junctions within Little Island, including the N25, will operate without any issues arising during the selected year of opening 2021 and the Design Year 2036, 15 years after opening.

We have included a comprehensive assessment of the impact of the traffic associated with the proposal upon the N25, based on recent traffic survey data. This assessment confirms that the development has a negligible and unnoticeable impact upon the N25. This addresses any concerns that TII may have in relation to the development.

In terms of the planned and committed upgrades to the N25 Junctions (as contained within ***Appendix B***), these works will be of very significant benefit to the Little Island area. Whilst the proposed development is demonstrated to have a negligible impact on their operation, these improvements will have a very beneficial effect including being of benefit to the subject development site.

Based on our study, we believe that there are no traffic/transportation capacity, traffic safety or operational issues associated with the proposed development that would prevent a positive determination of a planning application by Cork County Council.

1.0 INTRODUCTION

1.1 This Transportation Assessment (TA) has been prepared by NRB Consulting Engineers Ltd and addresses the traffic capacity considerations relating to the proposal to construct a recycling facility with a 95,000T annual capacity within an established Industrial and Business Park, in Little Island in Cork.

1.2 The Report addresses the impact of the proposed development on the adjacent road network for both the critical weekday AM and weekday PM Peak hours, including a detailed assessment of impact upon the N25 Junction #2 and the local affected junctions within Little Island.

1.3 A site location plan for the development is included below as ***Figure 1.1***.



Figure 1.1: Site Location Plan in Context of Little Island

1.4 Existing appropriate established accesses to the lands from the public roads are to be used to serve the proposed development. (Refer to layout plan included herein as ***Appendix A***.)

1.5 In describing the Receiving Environment and the Proposed Future Environment, this report addresses the following aspects of the proposed development:

- Very Small Scale of Development Proposals (conscious that the development constitutes a licensed recycling facility), with access via an established road network,
- Traffic & Transportation impact,
- Capacity of the proposed access to accommodate the worst-case development traffic flows,
- Capacity assessment of the affected junctions using industry standard software,
- Impact of the development on the free flow and capacity of the adjacent Local Roads conscious that there may be extraneous traffic control issues associated with the road network in the area,
- Impact upon the Cork County Council proposed upgrades to Junctions within Little Island which are now at Tender Stage,
- Telephone Discussions with Mr Peter O'Donoghue of CCC, and
- Impact of the proposed development on the N25 and the affected Junction (#2).

1.6 Recommendations contained within this Transportation Assessment are based on the following sources of information and industry-standard practices:

- Transport Infrastructure Ireland (TII) Traffic & Transport Assessment Guidelines,
- TII Project Appraisal Guidelines 'Link-Based Traffic Growth Forecasting' (January 2011),
- Comprehensive new interval Classified Traffic Surveys undertaken in January 2017,
- Supplementary Traffic Surveys of the N25/Junction #2 undertaken in late May 2018,
- CCC Published Drawings and Details of committed local junction improvements.
- Our experience in assessing the impact of Developments of this Nature.

1.7 The Report has been prepared in accordance with the requirements of TII's Traffic & Transport Assessment Guidelines. These are the professional Guidelines used to assess the impact of developments on public roads.

2. RECEIVING ENVIRONMENT & DEVELOPMENT PROPOSALS

2.1 The proposed development site is located on industrial use lands that are surrounded by similar scale and type developments located within the confines of Harbour Point and Courtstown Business Parks.

2.2 The site is served by the main access road to Harbour Point and Courtstown Business Parks. The main business park access road leads to Ballytrasna Park to the north, and meets this road in the form of a simple priority junction. Observations indicated that the existing junction operates without any significant capacity or queuing issues occurring and this is confirmed through the detailed assessment and simulation analysis contained within this report.

2.3 Ballytrasna Park consists of a moderately trafficked single carriageway road. The traffic survey undertaken in January 2017 indicates that the road carries an Annual Average Daily Traffic (AADT) of approximately 3,500 PCUs at the entrance to the Business Parks, and this confirms that it is moderately trafficked in terms of its carrying capacity. The road is subject to a 50kph urban speed limit past the site.

2.4 Ballytrasna Park runs generally in an E-W direction and meets the R623 Regional Road in Little Island by way of a 3-Arm junction controlled by traffic signals. Based on the recent traffic survey, the Regional Road R623 is moderately-highly trafficked, with an AADT of approximately 17,500 PCUs based on the recent traffic survey. In this regard, the road is considered moderately-heavily trafficked. It is recognised that the capacity of roads of this nature are ordinarily determined by the capacity of terminal junctions, however in terms of link capacity the road is moderately trafficked.

2.5 Observation indicated that the signal controlled junction operates within acceptable capacity limits, with some short duration queues occurring particularly during the PM Peak Commuter hour. In this regard there are CCC Plans in place to upgrade the junction, along with other key junctions in the area, and these are now at tender stage. The detail of the local junction upgrades are included herein as ***Appendix B***.

2.6 A review of the Road Safety Authority (RSA) online collision database indicates that there is no record of collisions proximate to the site, between 2005-2014 inclusive, from the Business Park Entrance to the Regional Road R623 junction inclusive.

2.7 We have undertaken detailed modelling and analysis of the junctions as per Figure 2.1 below. Modelling was undertaken for a year of opening 2021 and design year 2036 in accordance with industry Guidelines.

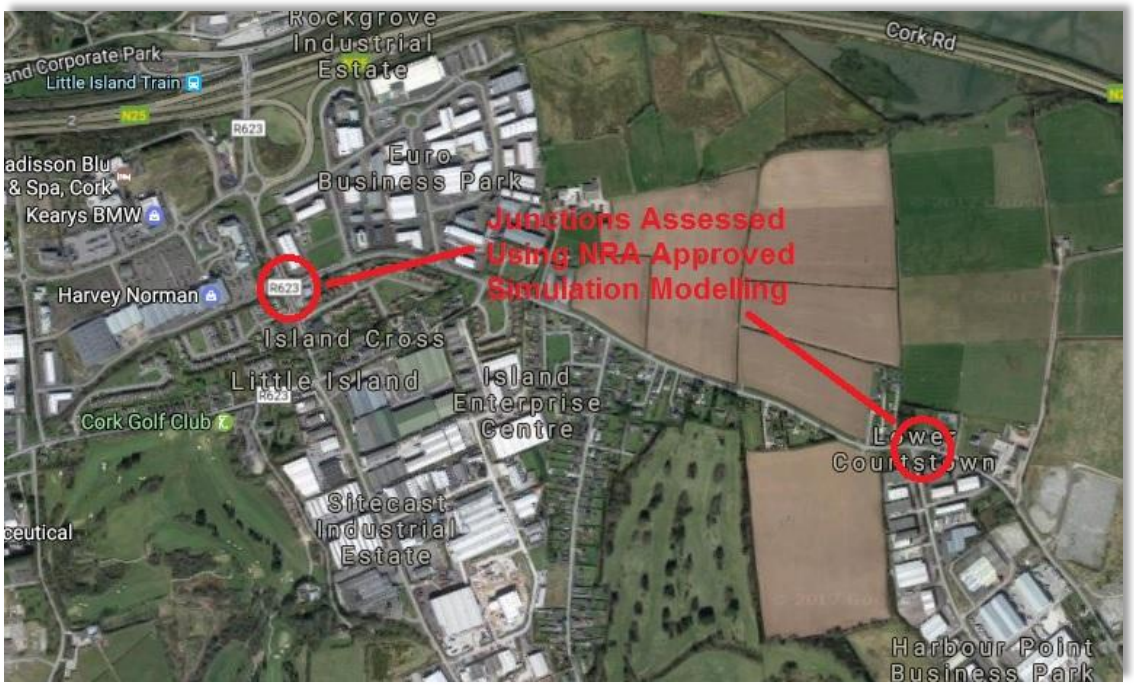


Figure 2.1 - Junctions Assessed

2.8 A detailed classified traffic survey was undertaken of the key junctions in proximity to the site during January 2017. In addition, a supplementary survey of the N25/Junction #2 was undertaken in May 2018 in order to further inform this study. These surveys included a comprehensive classified interval survey of each of the affected junctions (Refer to ***Appendix C***). This data was used in order to establish current peak commuter hour traffic conditions and to establish the current usage of the roadways. Details of the surveys undertaken was interrogated, summarised and included as stick diagrams within ***Appendix C***, with the Peak Hour Network flows (expressed as PCUs) identified. This traffic survey data has been used as the basis for the study.

Licensed Development Proposals

2.9 The proposed Development results in traffic movements associated with the following activities:

- Baled municipal waste removed to port,
- Recycling removed for further processing,
- Food waste removed for further processing,

- Recovered stone from construction and demolition waste,
- Recovered timber from construction and demolition waste,
- Bulky goods removed from the site,
- Refuse trucks transporting incoming domestic waste,
- Builders Skips, and
- Staff and service deliveries.

2.10 The small relative scale of the entire facility is confirmed through the robust assessment of actual allowed Traffic Generated, based on the proposed licensed arrangements, and this is addressed further within Section 3 of this Report.

2.11 It should be noted that this Report excludes the effect of the traffic associated with the previously included Public-Bring elements. The Report now also includes a detailed assessment of impact upon the N25 and the operation of the proposed improved Junction # 2. The CCC proposed Local Junction improvements are now at Tender Stage, and are therefore considered fully committed. The publicly available downloaded drawings of the CCC proposed improved junctions are included herein as ***Appendix B***.

3. TRIP GENERATION, ASSIGNMENT AND DISTRIBUTION

3.1 The Trip Rate Information Computer System (TRICS) database is ordinarily used to ascertain vehicular trip generation associated with the use of any particular site. This generally represents industry standard practice for Transportation Assessments in Ireland. However, in the particular case of Recycling facilities of this nature we have been provided with a detailed activity breakdown based on the proposed licensed uses, and this is considered more accurate and appropriate for use in this case.

3.2 We have included as ***Appendix C*** the detailed analysis and assessment of the traffic generated. A summary of the calculations based on the expected uses is included below as ***Table 3.1***

Table 3.1: SUMMARY of Anticipated Vehicular Arrivals per Peak Hour (PCUs)

Operation/Traffic Generation Description Provided	*No.*	*Frequency*	*Worst Case Avg No/Hr*	*Equiv PCUs*
Baled Municipal Waste by Artic	120	Every 2 weeks in 48hour period	2.5	8
Recycling Removed by Artic	5	Trucks per wk	1	3
Food waste removed by Artic	3	Trucks per wk	0	0
Recovered Stone Removed by Rigid	5	Trucks per wk	1	2
Recovered Glass Removed by Rigid	2	Trucks per wk	0	0
Bulky Goods Removed by Artic	2	Trucks per wk	1	3
Domestic Waste Trucks	20	Trucks per day	2.5	5
Skip Lorries	30	Trucks per day	3.75	8
Staff and visitors	21	Number per day	21	11
Consumable Deliveries	1	LGVs per day	0	0
Total 2-way in the peak hour (applied for worst-case assessment)			***33 Vehs***	***46 PCUs***

3.3 The above assessment is based on actual maximum demand at the facility based on proposed licensed usage, with the exclusion of the public-bring element that was previously included. It should be noted that we have assigned the above traffic to the local network for peak hours as a robust assessment, which is required under the guidance. However, the reality is that the traffic generated by the facility during the weekday AM and weekday PM Peak hours is expected to be considerably less than outlined.

3.4 Notwithstanding, in light of observation of existing capacity conditions, and the existing significantly trafficked roads, the use of higher Trip Rates, if required, would not have any significant effect on the conclusions of the study. This is particularly the case here given the clear modelled reserve capacity that exists in each existing and improved junction, which is demonstrated in Section 4 below.

3.5 We undertook supplementary comprehensive Traffic Surveys of the existing roads and affected junctions, including the N25 at Junction #2, in order to establish background traffic conditions. Summary Details of the weekday AM and PM Peak Traffic surveys are also included here as stick diagrams within ***Appendix C***.

3.6 In Traffic Engineering all vehicles are expressed in terms of "Passenger Car Units" (PCUs), sometimes referred to as "Car Equivalents". This is the methodology that has been employed here, with specific industry standard conversion factors to convert HGVs, Skip Lorries, Cars/Trailers and Bin Lorries to PCUs. The conversion factors used are in accordance with industry-standard recommendations.

3.7 We have assigned the traffic to the road network based on the reasonable and industry standard assumption that the trip patterns will mirror the existing established weekday AM and PM peak hour traffic count data in terms of traffic turning proportions and distribution at junctions and in particular here, they reflect the observed patterns during the commuter peak hours on the local roads.

3.8 The Guidance recommends that we are required to provide a robust and onerous assessment of the likely impact of the proposed development, in order to provide reassurance that the road infrastructure is adequate to accommodate a facility. We have therefore assigned the development traffic to the local roads based on the onerous assumption that ALL of the traffic is new traffic. The resulting calculations and traffic flow diagrams for the subject site are included as ***Appendix C***.

3.9 We have selected a year of opening of 2021 for the purposes of this assessment, however it should be noted that minor changes of 2-3 years in the selected or actual year of opening will have no impact on the conclusions of the study. We have also undertaken assessment of the Design Year 2036, 15 years following opening.

3.10 The standard methodology applied was to firstly ascertain the base background traffic conditions for both the weekday AM and weekday PM Commuter Peak periods. We then used the TII Project Appraisal Guidelines Unit 5.3 (Travel Demand Projections Table 5.3.2) to establish opening year 2021 and design year 2036 traffic conditions on the local road network for the Cork area.

Table 3.2 - Traffic Growth Rates, TII Project Appraisal Guidelines

Year	to Year	Table 5.5.1:
2018	2021	1.026
2021	2036	1.21

4. TRAFFIC IMPACT - ACCESS JUNCTION CAPACITY/N25 IMPACT

4.1 In accordance with our methodology, we have followed TII's Traffic and Transportation Assessment Guidelines, in the assessment of the traffic impact resulting from the proposed development.

4.2 We have undertaken detailed assessment of the critical junctions that are considered likely to be affected by the low volumes of traffic generated. It should be noted that the proposed development is expected to generate a total of 46 additional PCUs during the peak hours. This should be considered in light of the current traffic volumes on the R623 to the north of the Ballytrasna Park junction.

4.3 The R623 carries a total traffic flow of 1,418 PCUs in the AM Peak Hour and 1,751 PCUs during the PM Peak Hour in this location. An additional 46 PCUs equates to an impact of way less than 5% during each of the commuter peak hour, and this is further considered below.

4.4 TII's Traffic and Transportation Assessment Guidelines requires that a "Threshold Assessment" is undertaken to determine the increases in traffic associated with any particular development, and whether this might be considered as significant. For developments to be located in areas with roads that are considered as 'congested', the Guidance recommends the use of ***Threshold-levels of traffic increase of 5%***, which if exceeded require further assessment to be undertaken. The Threshold level is set at **10% for uncongested conditions**. It is clear based on our assessment that the proposed development will have a negligible impact to the north of the Ballytrasna Park junction.

4.5 Based on the recent comprehensive Traffic Data Collection and Surveys, and utilising the Traffic Generation Figures, we have undertake the Threshold Assessment included herein as ***Appendix C*** (Page 6 and 13). A summary of Opening Year Threshold Impact on each affected road/junction is as follows; -

N25 Carriageway East

- 0.6% (ie 0.6 of 1%) impact in the weekday AM Peak Hour,
- 1.6% impact in the weekday PM Peak Hour.

N25 Carriageway West

- 0.4% (ie 0.4 of 1%) impact in the weekday AM Peak Hour,
- 0.7% (ie 0.7 of 1%) impact in the weekday PM Peak Hour.

R623/N25 Off/On Slip Traffic Signals at Northside of N25

- 2.3% impact in the weekday AM Peak Hour,
- 2.9% impact in the weekday PM Peak Hour.

R623/N25 Off/On Slip "An Crompan" Roundabout at Eastgate Ave

- 2.5% impact in the weekday AM Peak Hour,
- 2.9% impact in the weekday PM Peak Hour.

R623/ Ballytrasna Road Traffic Signal Controlled Junction

- 5.2% impact in the weekday AM Peak Hour - JUNCTION ASSESSED,
- 4.5% impact in the weekday PM Peak Hour.

4.6 These worst-case traffic increases are all at or below the Guideline and industry standard level of 5% above which further assessment is required. To set these increased levels of traffic in context, the day-to-day variation in traffic volume (due to day of week or weather conditions) is accepted in the industry as being 10%, so in this context alone increases of (in almost all cases) way less than 5% will go entirely unnoticed. In the case of Ballytrasna Rd Traffic Signals, as the 5% threshold is breached a further detailed capacity assessment has been undertaken in accordance with the Guidelines.

4.7 Notwithstanding the above, we have included and undertaken detailed assessment of the Business Park Vehicular access junction and the CCC Proposed-Improved Ballytrasna Park/R623 Traffic Signal Controlled junction using industry standard TII approved simulation modelling packages.

Harbour Point/Ballytrasna Park Priority Junction

4.8 We have used the TII-approved software package 'Junctions 9' PICADY' (**P**riority **I**ntersection **C**apacity and **D**ela**y**) software package (as part of the TRL Package 'Junction 9') to confirm that the small increases in traffic associated with the construction of the facility can be accommodated. PiCADY produces results based on a ratio of flow to capacity (RFC) and queue length. An RFC greater that 1.00 indicates that a junction is operating at or above capacity, with 0.85 considered to be the optimum RFC value.

4.9 We have appended the detailed computer simulation model results (PiCADY Outputs) of the junction modelling in ***Appendix D***. A summary of the results is reproduced below as ***Table 4.1***

Table 4.1: Ballytrasna Park/Harbour Point Access Junction– Summary PiCADY Results, Worst Case Weekday AM and PM Commuter Peak Hours 2021 and 2036

Modelled Scenario	Period Mean Max Q (in PCUs)	Max RFC
2021 AM Peak Hour	1	0.44
2021 PM Peak Hour	1	0.45
2036 AM Peak Hour	2	0.52
2036 PM Peak Hour	2	0.53

4.10 The results of the modelling clearly show that the existing junction will have more than adequate capacity to accommodate the worst case traffic associated with the recycling facility. All of the RFCs are way below the theoretical capacity of 0.85 and no unacceptable queuing is anticipated. The results are so favourable that we are confident that the junction could accommodate higher traffic volumes (possibly more than several multiples of the volume) without any capacity related problems arising.

Proposed Improved Ballytrasna Park/R623 Traffic Signal Controlled Junction

4.11 We have used the TII-approved software package LiNSiG (Linked Signal Design) software package to confirm that the small increases in traffic associated with the construction of the facility can be accommodated at the improved junction. LiNSIG produces results based on a Degrees of Saturation (DoS) and Mean Maximum queue length.

4.12 A DoS greater that 100% indicates that a junction is operating at or above maximum capacity, with 90% considered to be the optimum DoS value. The results of the modelling are included herein as ***Appendix E***, and are summarised below as ***Table 4.2***.

Table 4.2: Improved Ballytrasna Park/R623 Junction– Summary LiNSiG Results, Worst Case Weekday AM and PM Commuter Peak Hours 2021 and 2036

Modelled Scenario	Max DoS (%)
2021 AM Peak Hour	55.1
2021 PM Peak Hour	89.3
2036 AM Peak Hour	65.7
2036 PM Peak Hour	85.2

4.13 The above analysis confirms that the construction of the recycling facility will have a negligible impact upon the capacity of the road network in the area and can easily be accommodated without any noticeable impact arising.

CONCLUSIONS

5.1 This Transportation Assessment assesses the traffic impact of the proposed recycling facility within the confines of Harbour Point Business Park. The proposed development has been revised to exclude the previously proposed Public-Bring element. In addition, this report now includes a comprehensive assessment of impact upon the N25 to the north and includes details of the committed CCC Proposed Junction improvements in the area.

5.2 This Report has been prepared in accordance with TII's Traffic & Transport Assessment Guidelines, and it provides an onerous and robust assessment of the impact of the proposed development. The scope and extent has been agreed during discussions with CCC Roads/Transportation Officials.

5.3 This report demonstrates that the proposed development will have an unnoticeable impact upon the established local traffic conditions and can easily be accommodated on the road network, conscious of the established busy conditions within Little Island generally. The addition of a total of worst case 46 Car Equivalent movements during either weekday commuter peak hour is considered to have a negligible effect.

5.4 The assessment herein is based on theoretical maximum demand at the facility based on proposed licensed usage (and it excludes the public-bring element that was previously included). It should be noted that we have assigned the licensed maximum traffic demand to the local network for peak hours as a robust assessment, which is required under the Guidance. However, the reality is that the traffic generated by the facility during the weekday AM and weekday PM Peak hours is expected to be considerably less than outlined herein and the assessment is therefore Robust

5.5 We have assessed the capacity of the key junctions using proprietary modelling tools and this confirms that adequate capacity exists. We have also demonstrated the absolutely negligible impact upon traffic conditions on the N25 and capacity of key junctions. There are CCC plans to upgrade the local junctions within the Little Island area, and these are now at an advanced stage (out to Tender), and the impact of the development on the proposed improved junctions has been assessed.

5.6 In terms of the planned and committed upgrades to the N25 Junctions, these works will be of very significant benefit to the Little Island area. Whilst the proposed development

is demonstrated to have a negligible impact on their operation, these improvements will have a very beneficial effect including being of benefit to the subject development.

5.7 A review of the Road Safety Authority database records indicates that there is no history of any reported accidents in the area. In this regard, given the very low additional traffic volumes, we conclude that the development will not have any adverse impact upon traffic safety.

5.8 It is considered that there are no significant Operational Traffic Safety or Road Capacity issues, affecting the established vehicular access or the established road network, that prevent a positive determination of the application by Cork County Council.

APPENDICES - CONTENT

A	Proposed Development Site Layout
B	Cork County Council Part 8 'Committed' Local Road Junction Improvements
C	Traffic Surveys, Traffic Generation, Trip Distribution & Network Traffic Flow Diagrams
D	Junction 9 (PiCADY) Simulation Model Output Results
E	LiNSiG Simulation Model Output Results

APPENDIX A

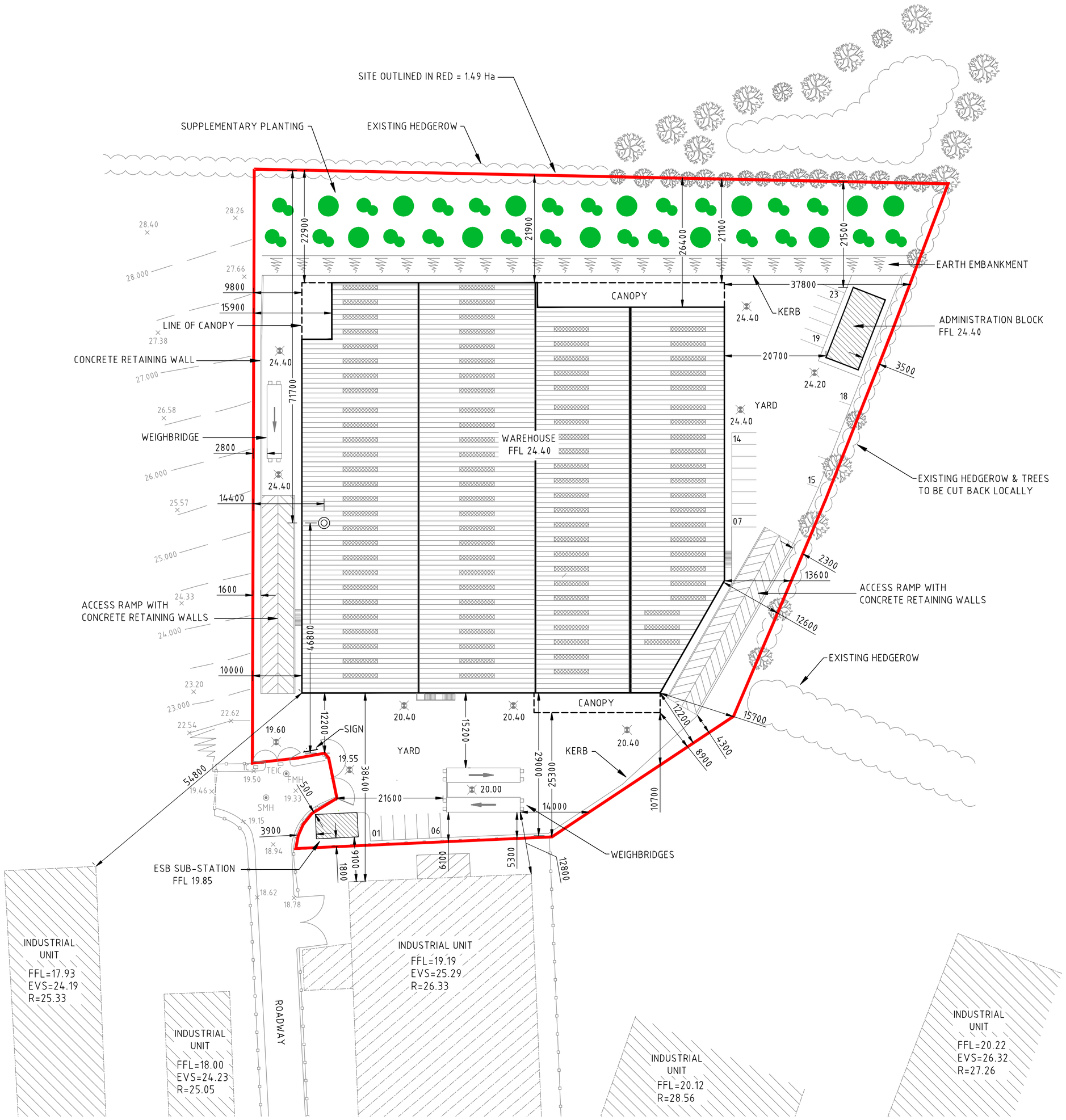
Proposed Development Site Layout

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Original Drawing Size A1

Notes

1. **This drawing is to be read in conjunction with all relevant engineers and architects drawings and specifications.**
2. **Do not scale drawings. Use figured dimensions only. All dimensions to be checked on site.**
3. **All dimensions are in millimetres (mm).**
4. **Any discrepancies to be reported immediately to the consulting engineer.**



PROPOSED SITE LAYOUT
SCALE 1:500

NOTES:

North refers to Magnetic North.

All levels relate to Malin Head Datum.

All dimensions are in milllimeters
Do not scale fom drawing

LEGEND:

MH = MANHOLE
CL = COVER LEVEL
IC = INSPECTION CHAMBER
FFL = FINISHED FLOOR LEVEL
EVS = EAVES LEVEL
R = RIDGE LEVEL
LS = LAMP STANDARD
SV = SLUICE VALVE
GY = ROAD GULLY
IC = INSPECTION CHAMBER
TEIC = TELECOM INSPECTION CHAMBER

Rev	Date	Drawn	Description	Ch'k'd
PL	Nov.'18	M.E.	Issued for Planning	PF

2 Clogheen Business Park,
Blarney Road, Cork,
Ireland.
T: +353 (0)21 4399799
F: +353 (0)21 4399797
E: admin@rka.ie
W: www.rka.ie
RAY KEANE & ASSOCIATES
CONSULTING ENGINEERS
CIVIL | STRUCTURAL | PROJECT MANAGEMENT

Client:
Country Clean

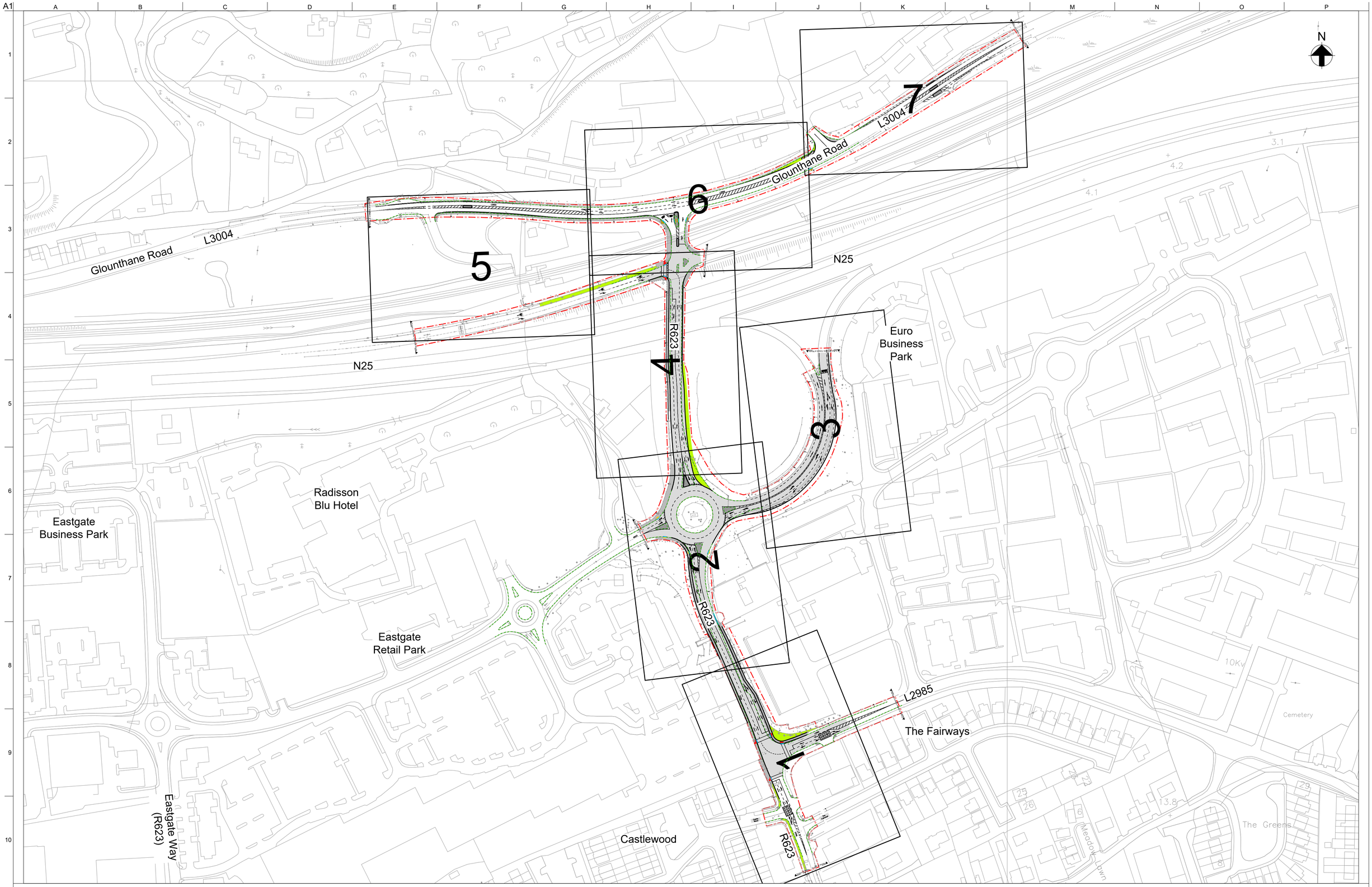
Project:
Proposed Construction of Waste Transfer and Recycling Station At Courtstown, Little Island, Co.Cork.

Drawing Title:
Proposed Site Layout

Designed:	P.F.	Drawn:	M.E.	Date:	Nov 2018
Eng Chk:	P.F.	Dwg. Chk:	P.F.	Scale:	1:500 @ A1
Project. No:	0600-168				
Drawing No:	1001			Status:	Planning
				Rev:	PL

APPENDIX B

Cork County Council Part 8 'Committed' Local Road Junction Improvements



T1	07/09/18	BMcD	BB	TL
Tender Issue				
Issue	Date	By	Chkd	Appd

Client
Cork County Council

Cork County Council
Comhairle Contae Chorcaí

Job Title
Little Island
Traffic Capacity Improvements

Scale at A1 1:1500 @ A1 (1:3000 @ A3)

Discipline Transportation

ARUP

Arup, One Albert Quay,
Cork, T12 X8N6, Ireland
Tel +353 (0)21 422 3200 Fax +353 (0)1 668 3169
www.arup.ie

Drawing Title
General Arrangement
Keyplan

Drawing Status
Tender

Job No	Drawing No	Issue
260712-00	**T0100-00**	**T1**

\\globalhaneropei\Cork\Jobs\260000\260712-00\4_Internal\4-02\Drawings\4-02-15 Tender\0100_Preliminaries & GA\T0100-00_260712-00_T1.dwg

Do not scale

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A1

Castle Wood

Eastgate
Retail Park

N

Extent of Works

Extent of Works

R623

R623

TIE INTO EXISTING

Additional 3.25m
Wide Traffic Lanes

Existing Right Turn Traffic Lane
Extended and Converted to a
Straight & Right Turn Traffic Lane

Road Widening
Required

Road Widening
Required

The Fairways

Existing Left Turn Traffic
Lane Converted to a Left
& Right Turn Traffic Lane

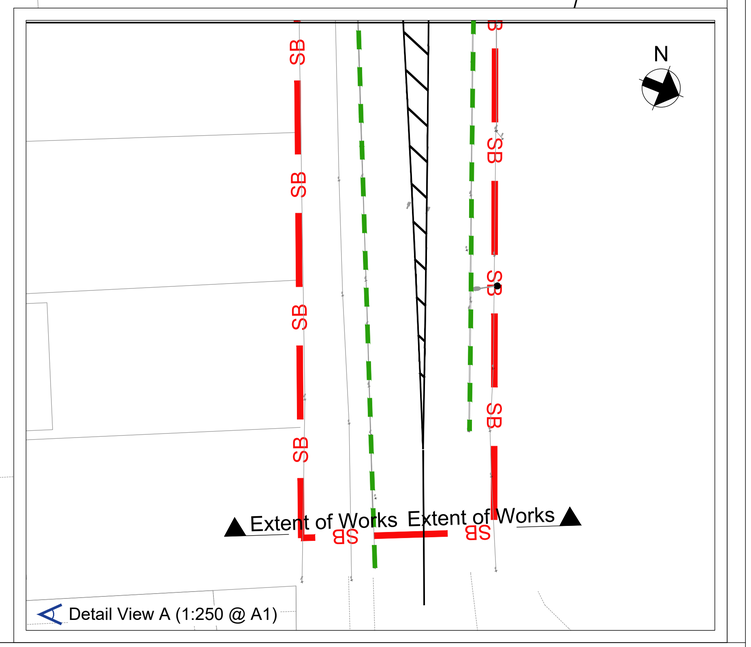
Detail View A

TIE INTO EXISTING

For Continuation Refer to Sheet No.02

LEGEND:

- EXISTING KERB
- SB — SITE BOUNDARY
- DROPPED KERB RAMP TO CC-SCD-01103
- FOOTWAY TO CC-SCD-01105
- CARRIAGEWAY
- TRAFFIC ISLAND TO CC-SCD-01107
- PROPOSED RED BLISTER PAVING
- PROPOSED BUFF BLISTER PAVING
- GRASS AREA



NOTES:

1. This drawing is only to be used for the Design Element identified in the title box. All other information shown on the drawing is to be considered as indicative only.
2. This drawing is to be read in conjunction with all other relevant Design Drawings and Specification Appendices.



Issue	Date	By	Chkd	Appd
T1	07/09/18	BMcD	BB	TL
Tender Issue				

Client
Cork County Council
Cork County Council
Comhairle Contae Chorcaí

Job Title
Little Island
Traffic Capacity Improvements

Scale at A1
1:250 @ A1 (1:500 @ A3)

Discipline
Transportation

ARUP

Arup, One Albert Quay,
Cork, T12 X8N6, Ireland
Tel +353 (0)21 422 3200 Fax +353 (0)1 668 3169
www.arup.ie

Drawing Title
General Arrangement

Sheet 01 of 07

Drawing Status
Tender

Job No	Drawing No	Issue
260712-00	**T0100-01**	**T1**

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For Continuation Refer to Sheet No.01

For Continuation Refer to Sheet No.04

For Continuation Refer to Sheet No.03

N

Eastgate Retail Park

Euro Business Park

An Crompán

R623

TIE INTO EXISTING

Extent of Works

Extent of Works

Additional 3.25m Wide Traffic Lanes

Additional 3.25m Wide Traffic Lanes

Road Widening Required

Road Widening Required

Road Widening Required

Road Widening Required

Alteration to Traffic Island

Alteration to Traffic Island

SB

LEGEND:

- EXISTING KERB
- SB — SITE BOUNDARY
- DROPPED KERB RAMP TO CC-SCD-01103
- FOOTWAY TO CC-SCD-01105
- CARRIAGEWAY
- TRAFFIC ISLAND TO CC-SCD-01107
- PROPOSED RED BLISTER PAVING
- PROPOSED BUFF BLISTER PAVING
- GRASS AREA

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2. This drawing is to be read in conjunction with all other relevant Design Drawings and Specification Appendices.



Issue	Date	By	Chkd	Appd
T1	07/09/18	BMcD	BB	TL
Tender Issue				

Client
Cork County Council

Cork County Council
Comhairle Contae Chorcaí

Job Title
Little Island
Traffic Capacity Improvements

Scale at A1 1:250 @ A1 (1:500 @ A3)

Discipline Transportation

ARUP
Arup, One Albert Quay,
Cork, T12 X8N6, Ireland
Tel +353 (0)21 422 3200 Fax +353 (0)1 668 3169
www.arup.ie

Drawing Title
General Arrangement

Sheet 02 of 07

Drawing Status
Tender

Job No	Drawing No	Issue
260712-00	**T0100-02**	**T1**

Do not scale

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For Continuation Refer to Sheet No.02

Provide 2No 4.1m Wide Traffic Lanes

Road Widening Required

Provide 2No 4.1m Wide Traffic Lanes

Road Widening Required

TIE INTO EXISTING

NO ENTRY

TIE INTO EXISTING

Extent of Works

LEGEND:

- EXISTING KERB
- SB — SITE BOUNDARY
- DROPPED KERB RAMP TO CC-SCD-01103
- FOOTWAY TO CC-SCD-01105
- CARRIAGEWAY
- TRAFFIC ISLAND TO CC-SCD-01107
- PROPOSED RED BLISTER PAVING
- PROPOSED BUFF BLISTER PAVING
- GRASS AREA

NOTES:

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2. This drawing is to be read in conjunction with all other relevant Design Drawings and Specification Appendices.

Keyplan

Issue	Date	By	Chkd	Appd
T1	07/09/18	BMcD	BB	TL
Tender Issue				

Client: Cork County Council

Job Title: Little Island Traffic Capacity Improvements

Scale at A1: 1:250 @ A1 (1:500 @ A3)

Discipline: Transportation

ARUP
Arup, One Albert Quay,
Cork, T12 X8N6, Ireland
Tel +353 (0)21 422 3200 Fax +353 (0)1 668 3169
www.arup.ie

Drawing Title: General Arrangement

Sheet 03 of 07

Drawing Status: **Tender**

Job No	Drawing No	Issue
260712-00	**T0100-03**	**T1**

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A1

For Continuation Refer to Sheet No.03

For Continuation Refer to Sheet No.06

N

N25

R623

TIE INTO EXISTING

Relocated Pedestrian Crossing

Refer to T1700 series dwgs for works to the Bridge

Road Widening Required

Additional 3m Wide Traffic Lanes

Additional 3m Wide Traffic Lane

Existing Traffic Island to be Removed

Alteration to

Extent of Works

Extent of

SB

2.0m

3m

0.6m

LEGEND:

- EXISTING KERB
- SB — SITE BOUNDARY
- DROPPED KERB RAMP TO CC-SCD-01103
- FOOTWAY TO CC-SCD-01105
- CARRIAGEWAY
- TRAFFIC ISLAND TO CC-SCD-01107
- PROPOSED RED BLISTER PAVING
- PROPOSED BUFF BLISTER PAVING
- GRASS AREA

NOTES:

1. This drawing is only to be used for the Design Element identified in the title box. All other information shown on the drawing is to be considered as indicative only.
2. This drawing is to be read in conjunction with all other relevant Design Drawings and Specification Appendices.

Keyplan

Issue	Date	By	Chkd	Appd
T1	07/09/18	BMcD	BB	TL
Tender Issue				

Client: Cork County Council

Cork County Council
Comhairle Contae Chorcaí

Job Title: Little Island
Traffic Capacity Improvements

Scale at A1: 1:250 @ A1 (1:500 @ A3)

Discipline: Transportation

ARUP

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Cork, T12 X8N6, Ireland
Tel +353 (0)21 422 3200 Fax +353 (0)1 668 3169
www.arup.ie

Drawing Title: General Arrangement

Sheet 04 of 07

Drawing Status: **Tender**

Job No	Drawing No	Issue
260712-00	**T0100-04**	**T1**

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A1

Extent of Works

Extent of Works

Proposed Entry Gateway Treatment
For Layout see Standard Details
Dwg 4000-08

IL3004

3.5m
3.5m
2.0m
2.0m

N

Extent of Works Extent of Works

LEGEND:

- EXISTING KERB
- SITE BOUNDARY
- DROPPED KERB RAMP TO CC-SCD-01103
- FOOTWAY TO CC-SCD-01105
- CARRIAGEWAY
- TRAFFIC ISLAND TO CC-SCD-01107
- PROPOSED RED BLISTER PAVING
- PROPOSED BUFF BLISTER PAVING
- GRASS AREA

For Continuation Refer to Sheet No.06

\\globaleurope\Cork\Jobs\260000\260712-00\4. Internal\4-02 Drawings\4-02.15 Tender\0100_Preliminaries & GA\T0100-00_260712-00_T1.dwg

NOTES:

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2. This drawing is to be read in conjunction with all other relevant Design Drawings and Specification Appendices.

Keyplan

Issue	Date	By	Chkd	Appd
T1	07/09/18	BMcD	BB	TL
Tender Issue				

Client: Cork County Council

Job Title: Little Island
Traffic Capacity Improvements

Scale at A1: 1:250 @ A1 (1:500 @ A3)

Discipline: Transportation

ARUP
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Cork, T12 X8N6, Ireland
Tel +353 (0)21 422 3200 Fax +353 (0)1 668 3169
www.arup.ie

Drawing Title: General Arrangement

Sheet 05 of 07

Drawing Status: **Tender**

Job No	Drawing No	Issue
260712-00	**T0100-05**	**T1**

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A1

For Continuation Refer to Sheet No.05

For Continuation Refer to Sheet No.07

N

SB

STOP

Proposed Crossing Point

Proposed Traffic Island

TIE INTO EXISTING

Extent of Works

For Continuation Refer to Sheet No.04

L3004

LEGEND:

- EXISTING KERB
- SB — SITE BOUNDARY
- DROPPED KERB RAMP TO CC-SCD-01103
- FOOTWAY TO CC-SCD-01105
- CARRIAGEWAY
- TRAFFIC ISLAND TO CC-SCD-01107
- PROPOSED RED BLISTER PAVING
- PROPOSED BUFF BLISTER PAVING
- GRASS AREA

NOTES:

1. This drawing is only to be used for the Design Element identified in the title box. All other information shown on the drawing is to be considered as indicative only.
2. This drawing is to be read in conjunction with all other relevant Design Drawings and Specification Appendices.

Keyplan

T1	07/09/18	BMcD	BB	TL
Tender Issue				
Issue	Date	By	Chkd	Appd

Client
Cork County Council

Cork County Council
Comhairle Contae Chorcaí

Job Title
Little Island
Traffic Capacity Improvements

Scale at A1 1:250 @ A1 (1:500 @ A3)

Discipline Transportation

ARUP
Arup, One Albert Quay,
Cork, T12 X8N6, Ireland
Tel +353 (0)21 422 3200 Fax +353 (0)1 668 3169
www.arup.ie

Drawing Title
General Arrangement

Sheet 06 of 07

Drawing Status
Tender

Job No	Drawing No	Issue
260712-00	**T0100-06**	**T1**

Do not scale

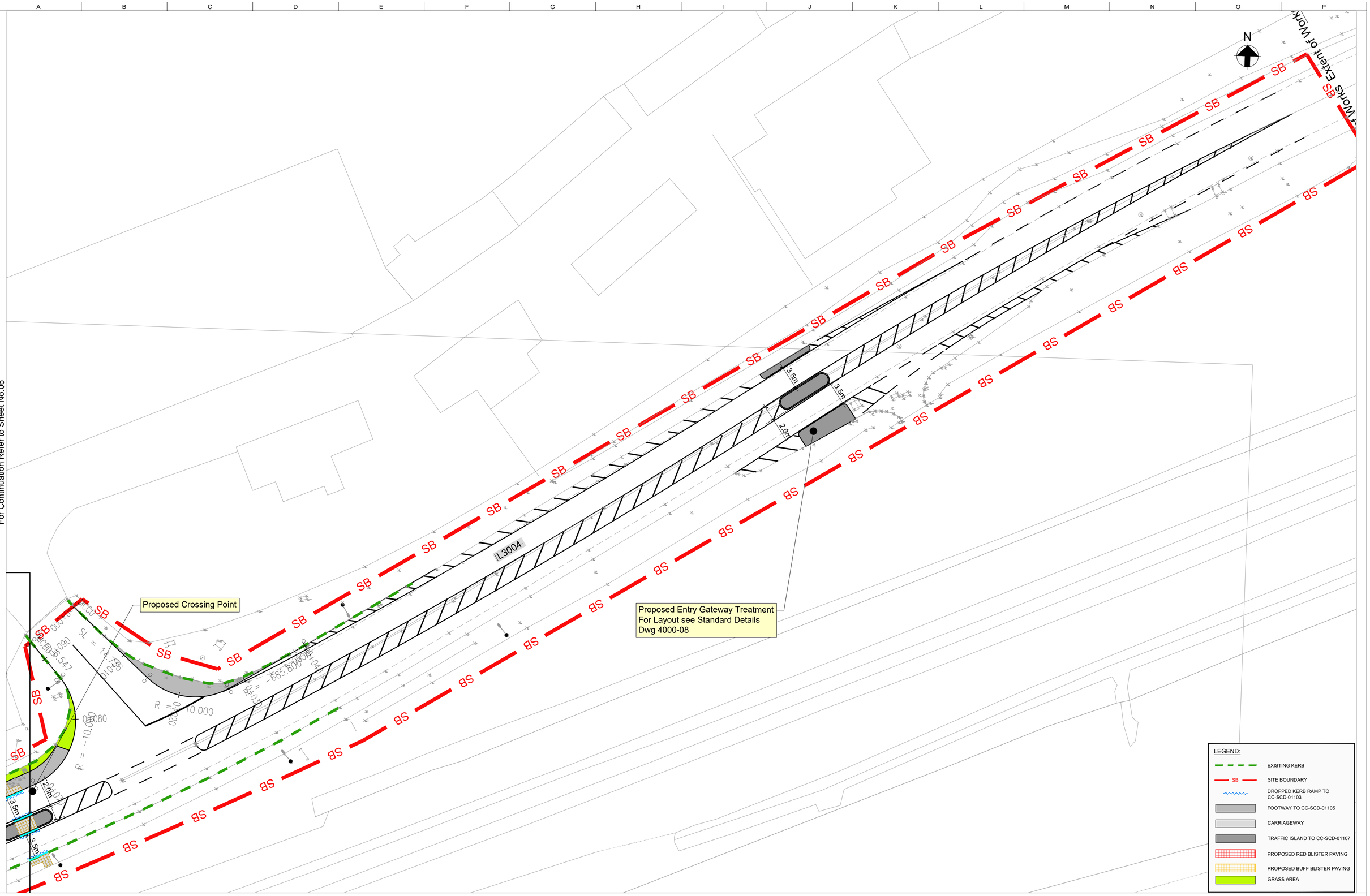
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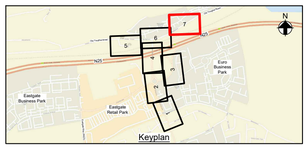
A1

For Continuation Refer to Sheet No.06



NOTES:

1. This drawing is only to be used for the Design Element identified in the title box. All other information shown on the drawing is to be considered as indicative only.
2. This drawing is to be read in conjunction with all other relevant Design Drawings and Specification Appendices.



Issue	Date	By	Chkd	Appd
T1	07/09/18	BMcD	BB	TL
Tender Issue				

Client
Cork County Council
Cork County Council
Comhairle Contae Chorcaí

Job Title
Little Island
Traffic Capacity Improvements

Scale at A1 1:250 @ A1 (1:500 @ A3)

Discipline Transportation

ARUP
Arup, One Albert Quay,
Cork, T12 X8N6, Ireland
Tel +353 (0)21 422 3200 Fax +353 (0)1 668 3169
www.arup.ie

Drawing Title
General Arrangement

Sheet 07 of 07

Drawing Status
Tender

Job No	Drawing No	Issue
260712-00	**T0100-07**	**T1**

Do not scale

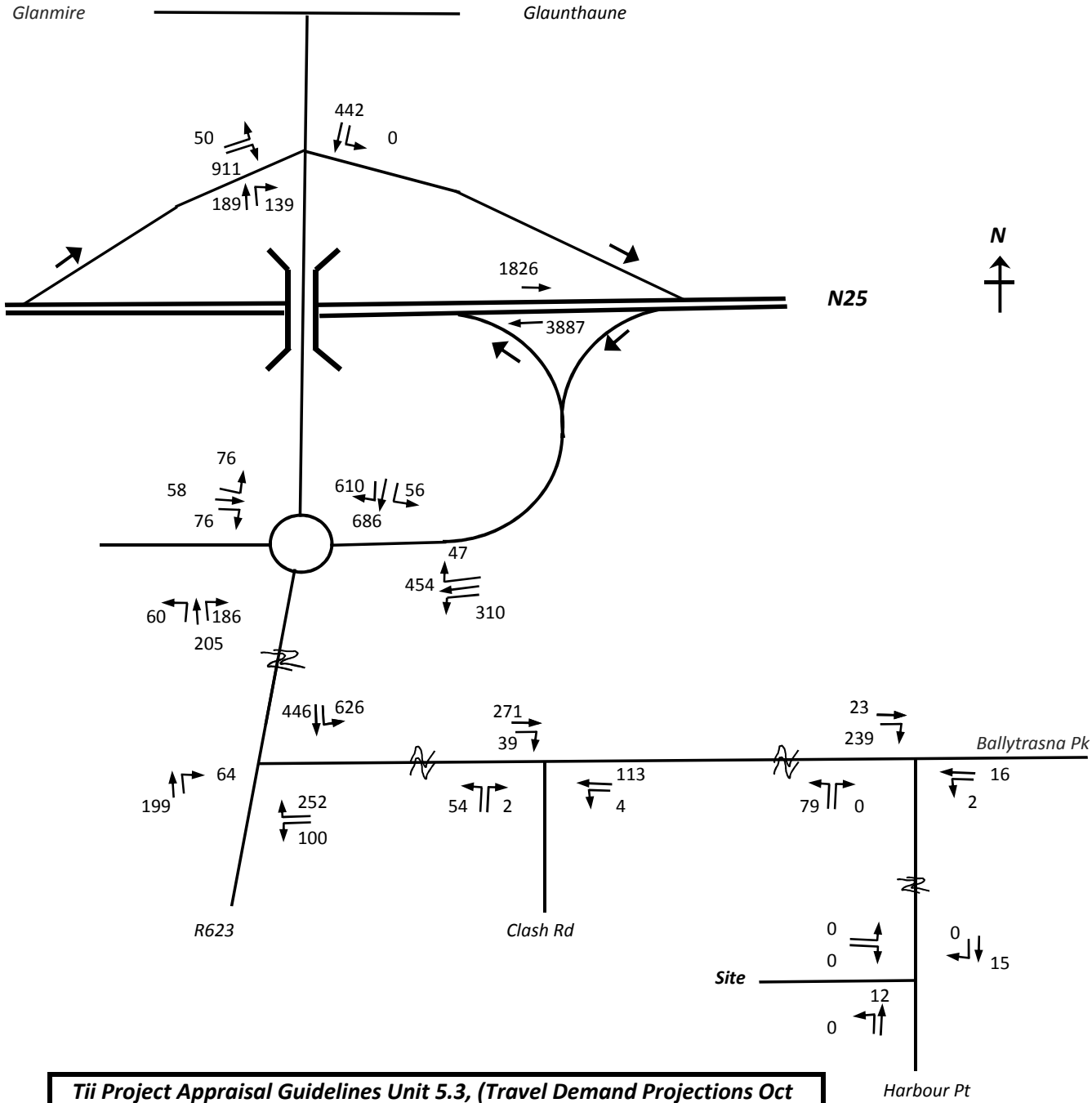
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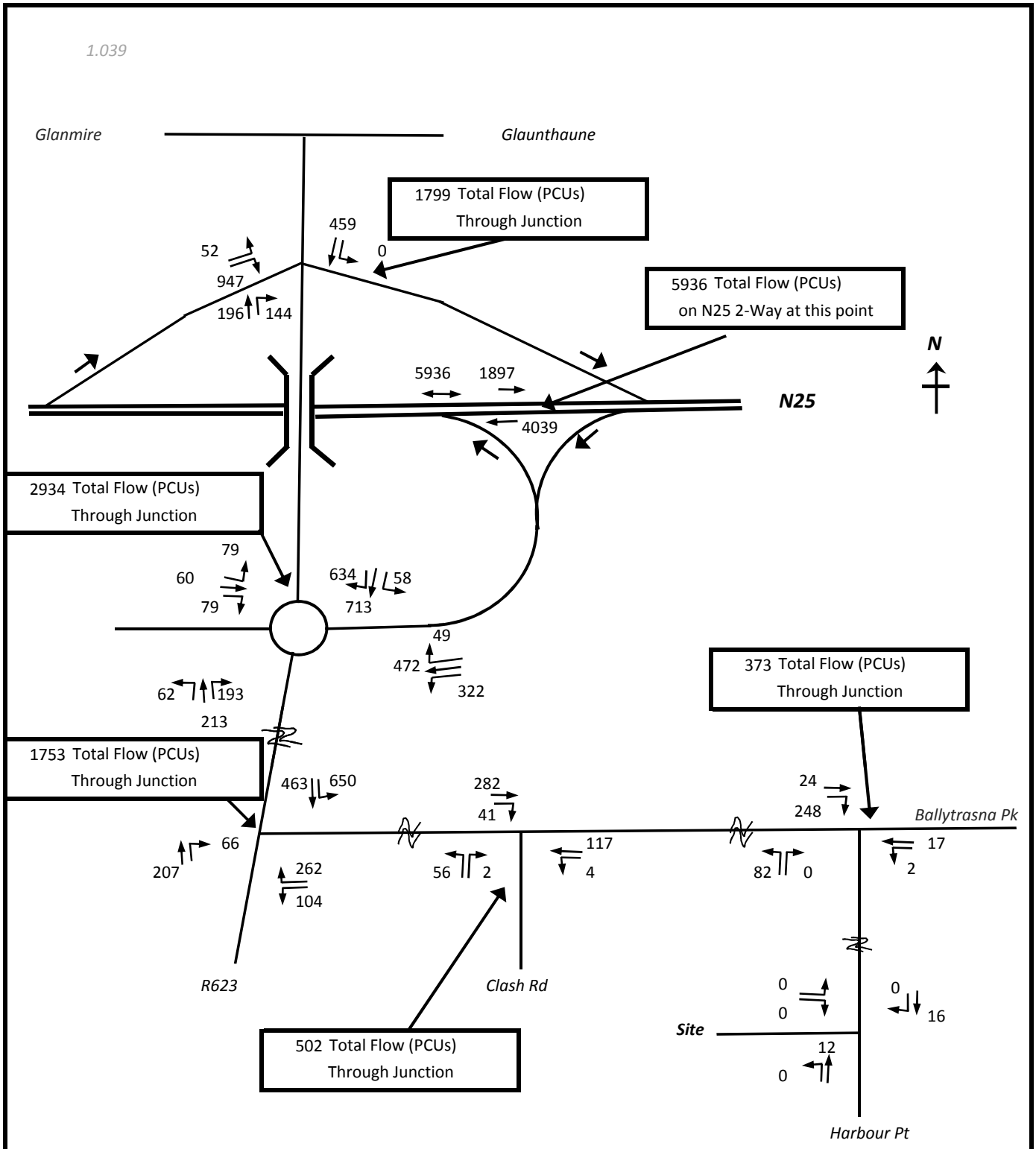
APPENDIX C

Traffic Surveys, Traffic Generation, Trip Distribution & Network Traffic Flow Diagrams

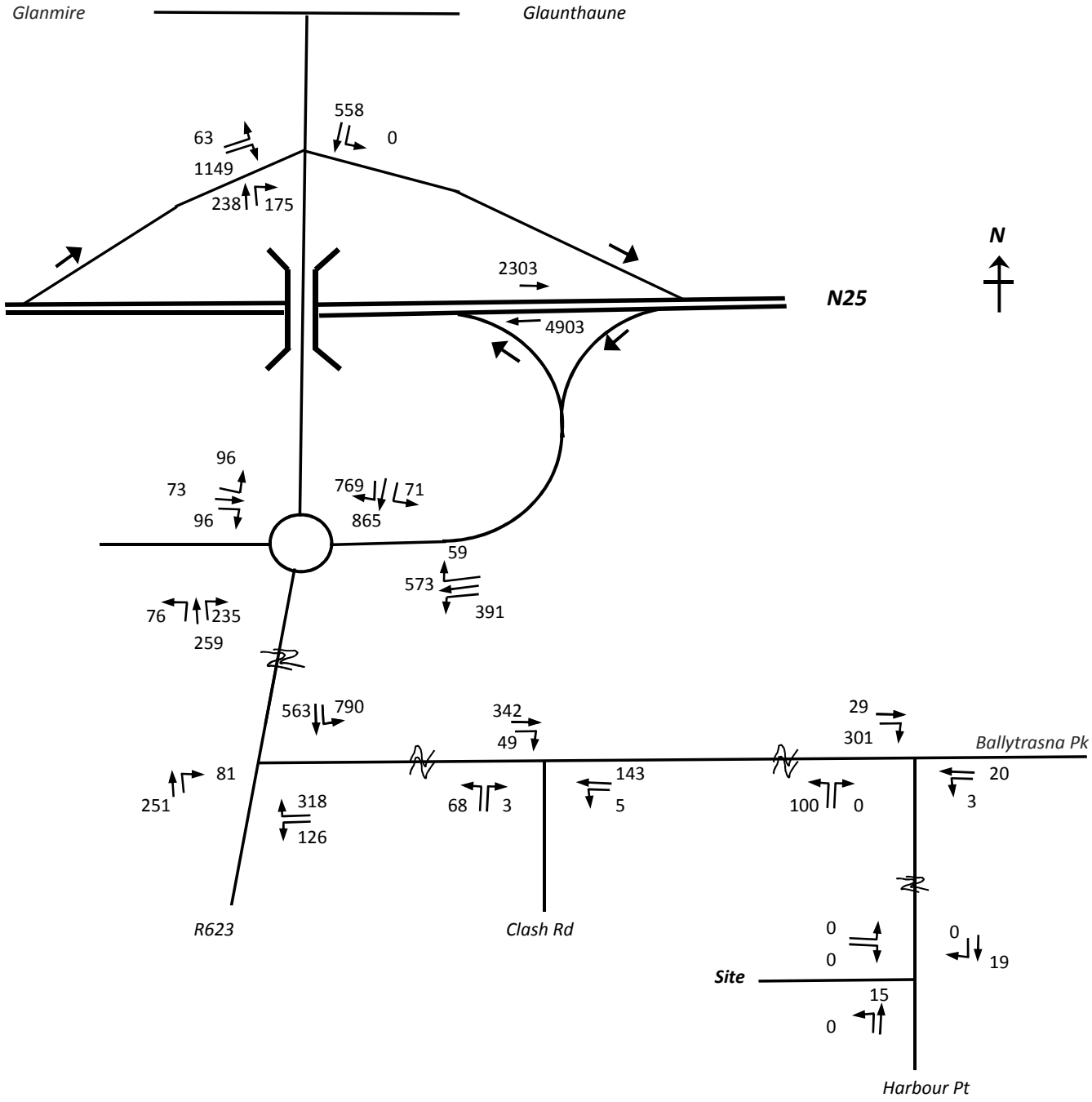


Tii Project Appraisal Guidelines Unit 5.3, (Travel Demand Projections Oct 2016, Table 5.3.2) Yr2018 to Yr2021 factor is 1.039, and Yr 2021 to Yr2036 factor is 1.214 - CORK AREA

Base Year 2018 Traffic Survey Data (PCUs)
Weekday AM Peak Hour (0800-0900H)



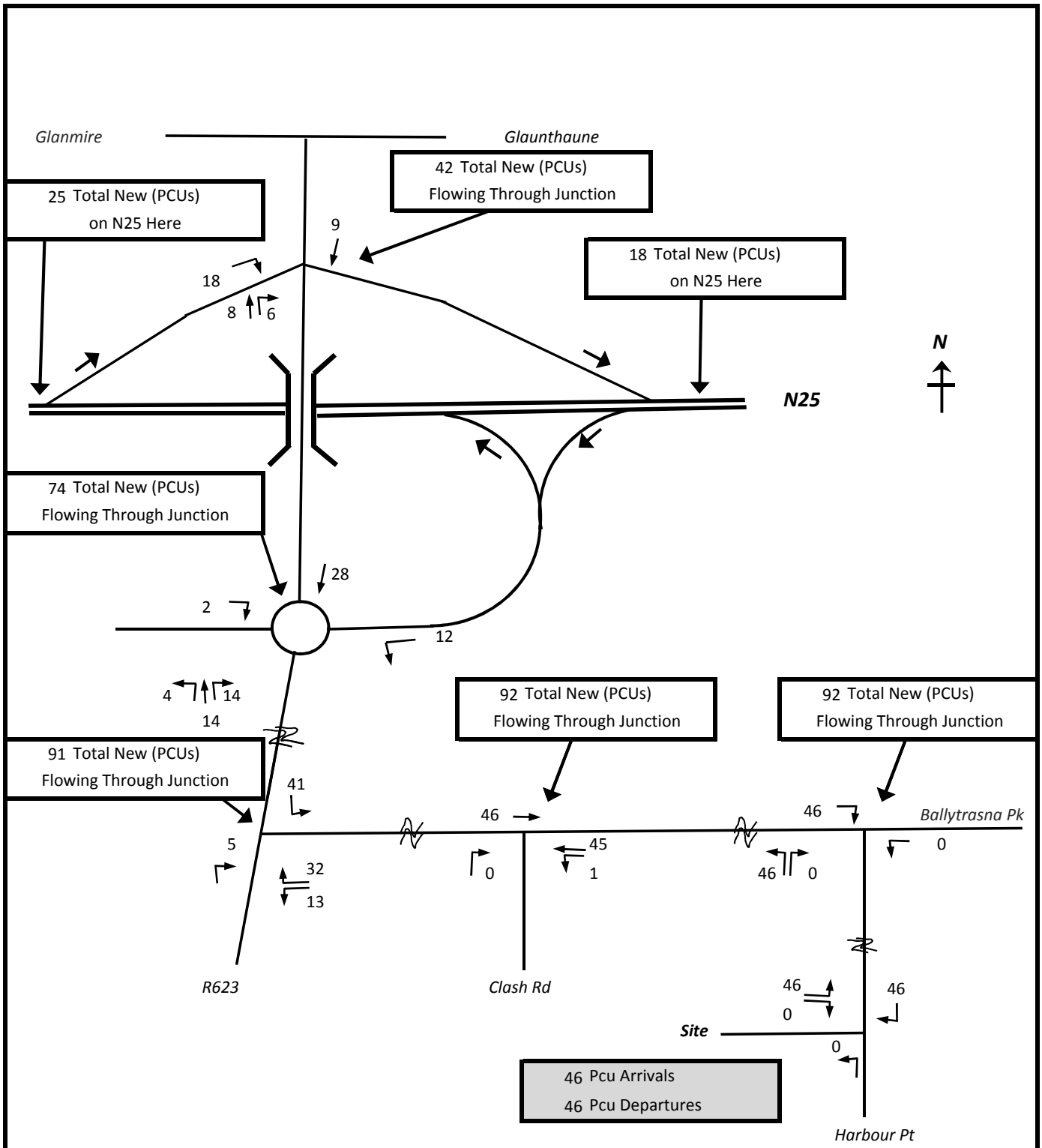
Projected Opening Year 2021 Traffic Flows (PCUs)
Weekday AM Peak Hour (0800-0900H)
WITHOUT SUBJECT DEVELOPMENT



Projected Design Year 2036 (Opening Tr +15) Traffic Flows (PCUs)
Weekday AM Peak Hour (0800-0900H)
WITHOUT SUBJECT DEVELOPMENT

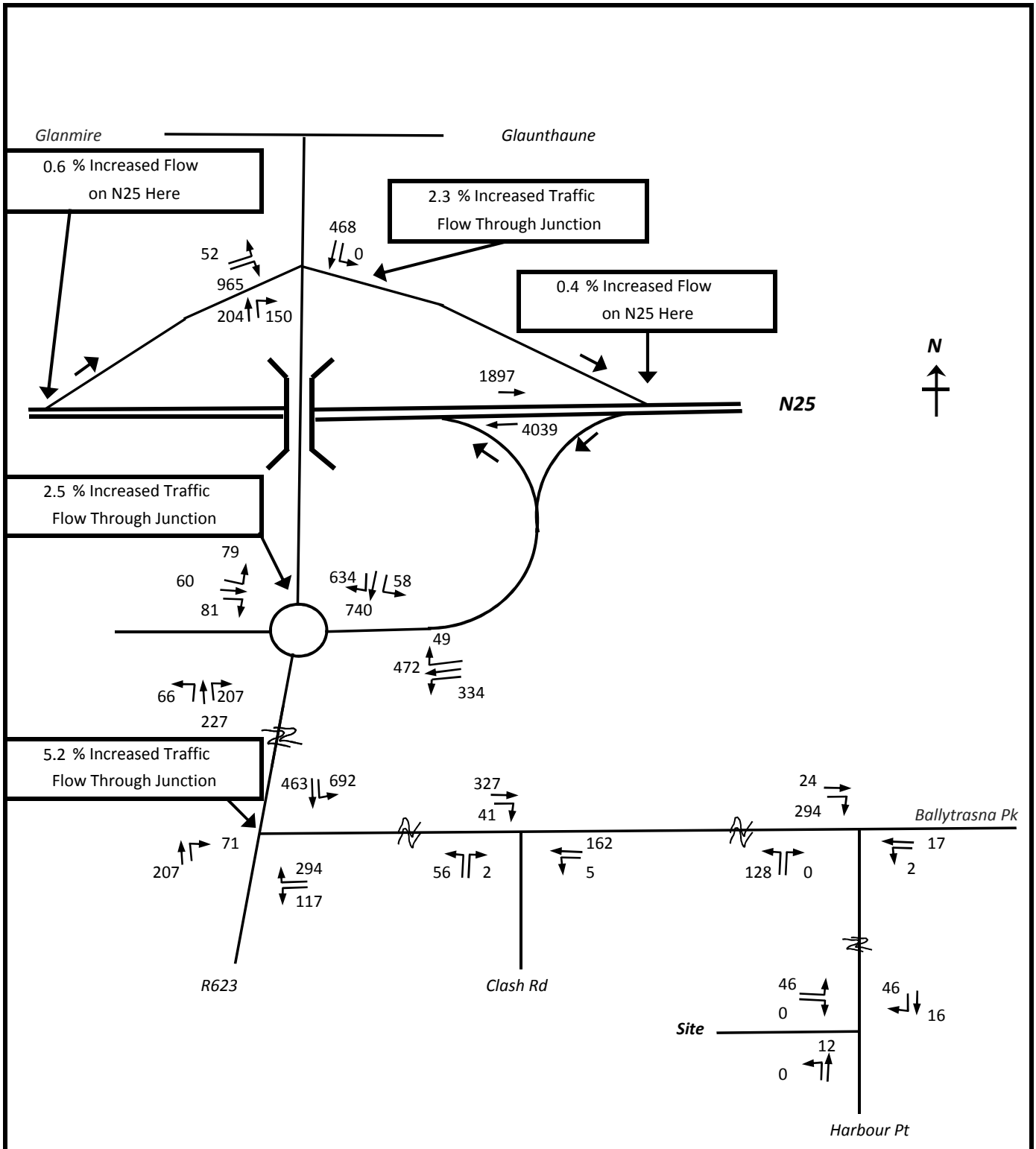
Worst Case Traffic Generation Calculations

Operation/Traffic Generator Description	No.	Frequency (Description)	Worst Case Avg No/Pk Hr	Equiv PCUs EW for Worst Case Assessment
Baled Municipal Waste by Artic	120	Every 2 wks in 48hr	2.5	8
Recycling Removed for Processing by Artic	5	Trucks/week	1	3
Food Removed for Processing by Artic	3	Trucks/week	0	0
Recovered Stone removed from Site by rigid	5	Trucks/week	1	3
Recovered Glass removed from Site by rigid	2	Trucks/week	0	0
Bulky Goods removed from Site by Artic	2	Trucks/week	1	3
Domestic Waste Refuse Trucks	20	Trucks/day	2.5	8
Skip Lorries	30	Trucks/day	3.75	11
~~Cars and LGVs to Bring Centre~~	0	No./day	0	0
Staff & Visitors	21	No./day	21	11
Consumable Deliveries	1	LGV Trucks/day	0	0
Total 2-Way in the Peak Hour (for absolute worst case assessment purposes)			***33 Vehs***	***46 PCUs***

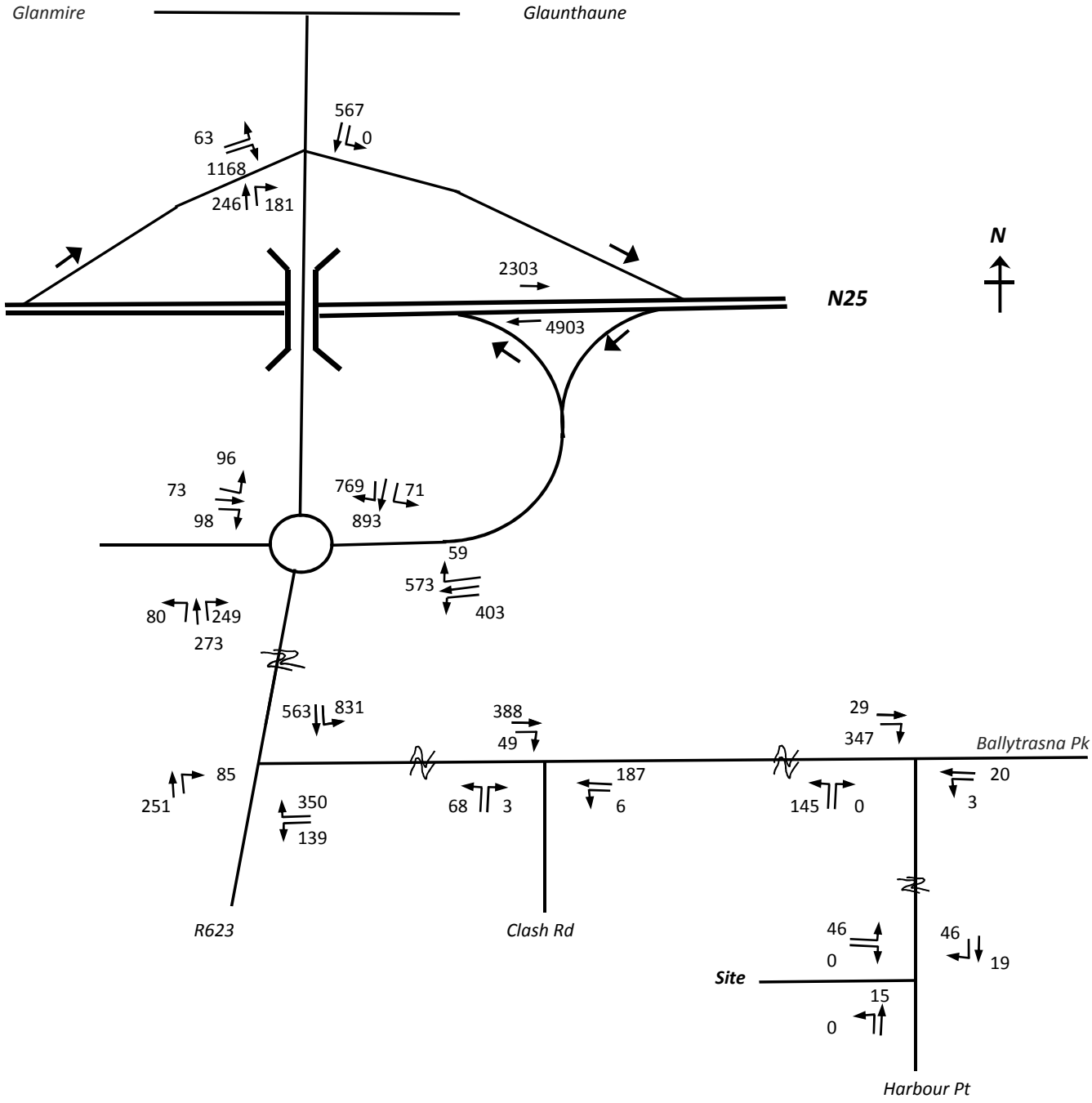


Assignment of Worst Case Development Traffic to Road Network (Weekday AM Peak Hour - 0800-0900H)

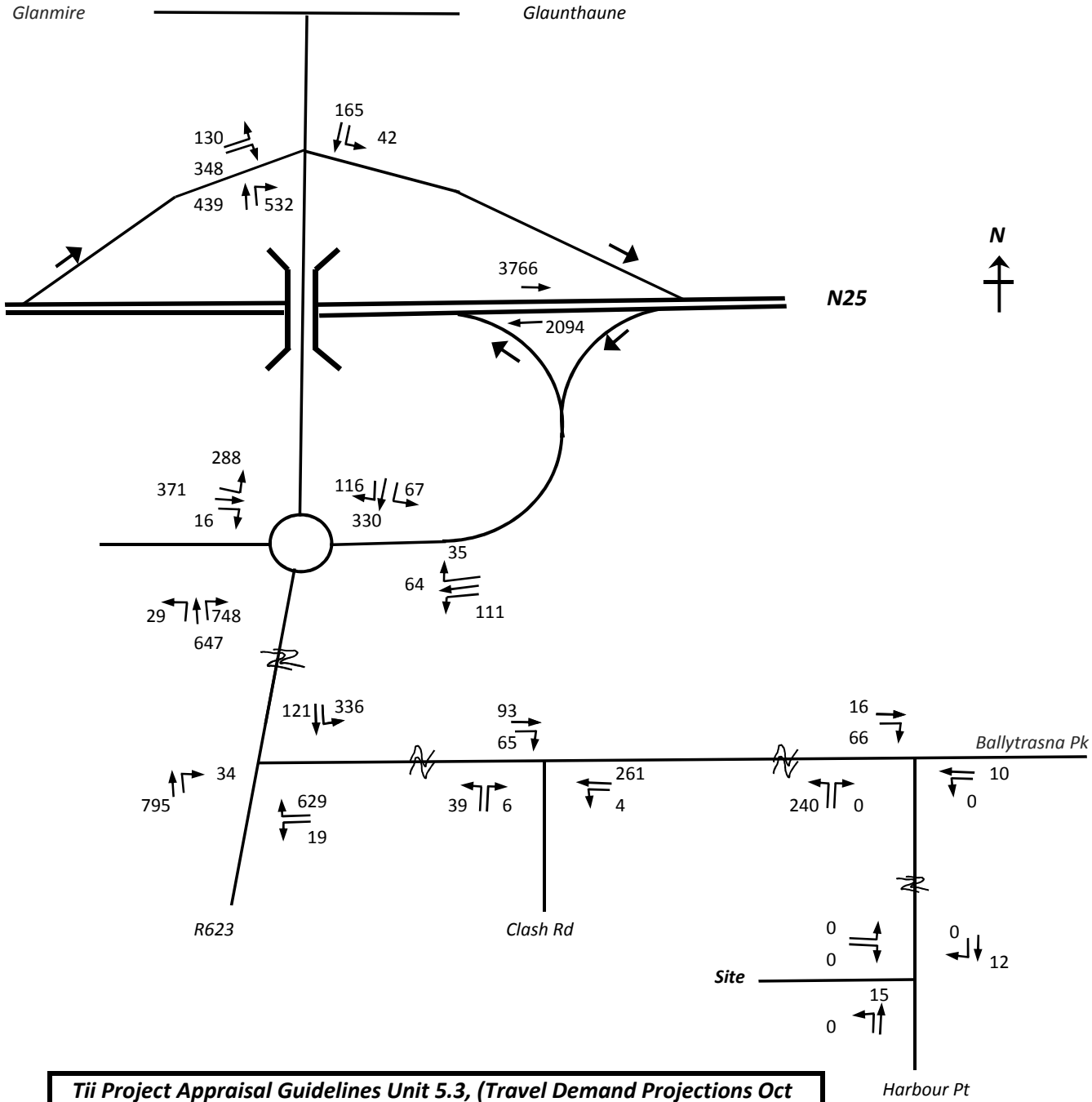
Distributed in Accordance with Industry Standard Established Movements



Projected Opening Year 2021 Traffic Flows (PCUs)
Weekday AM Peak Hour (0800-0900H)
WITH WORST CASE SUBJECT DEVELOPMENT TRAFFIC

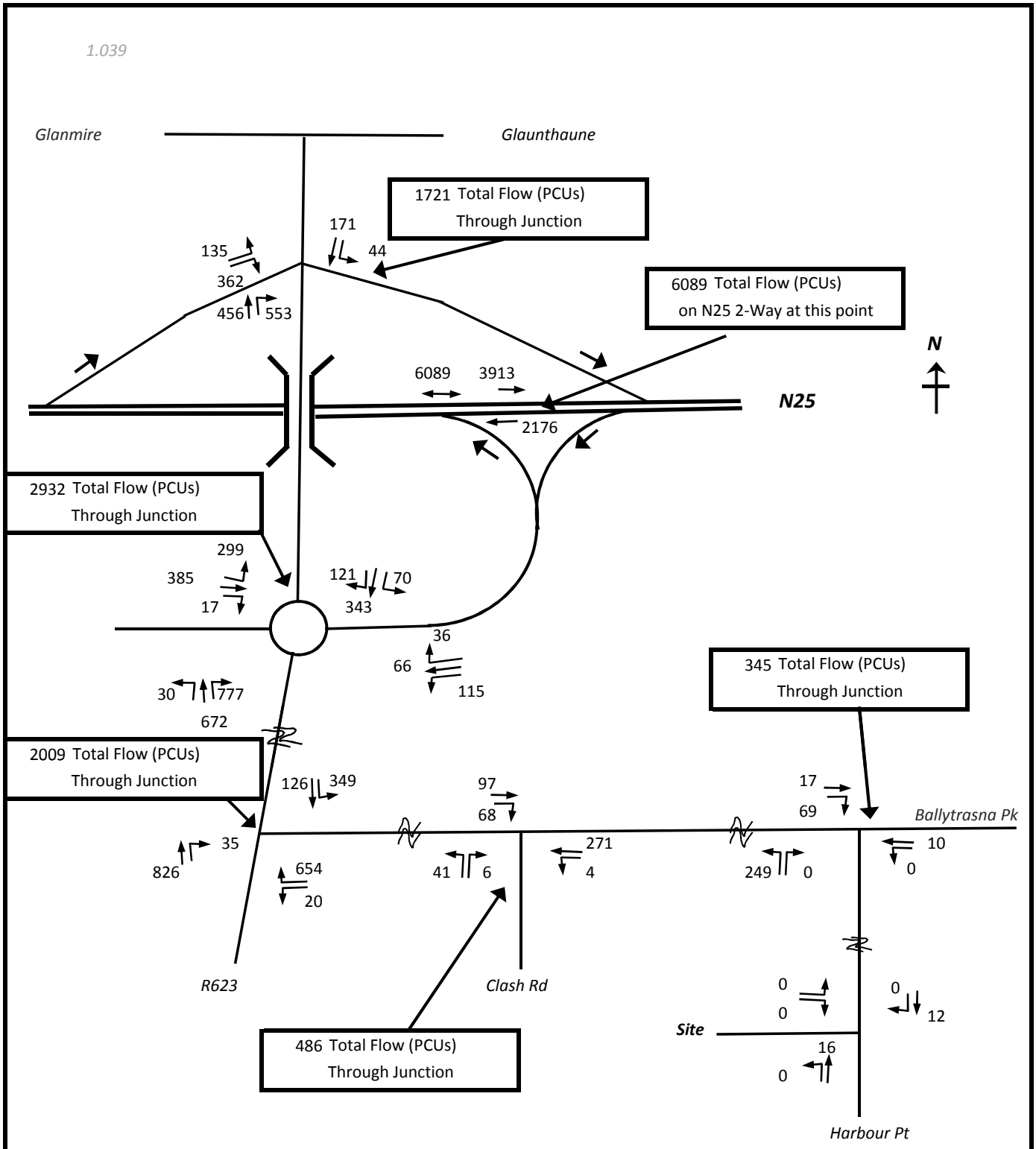


Projected Design Year 2036 (Opening Yr + 15) Traffic Flows (PCUs)
Weekday AM Peak Hour (0800-0900H)
WITH WORST CASE SUBJECT DEVELOPMENT TRAFFIC

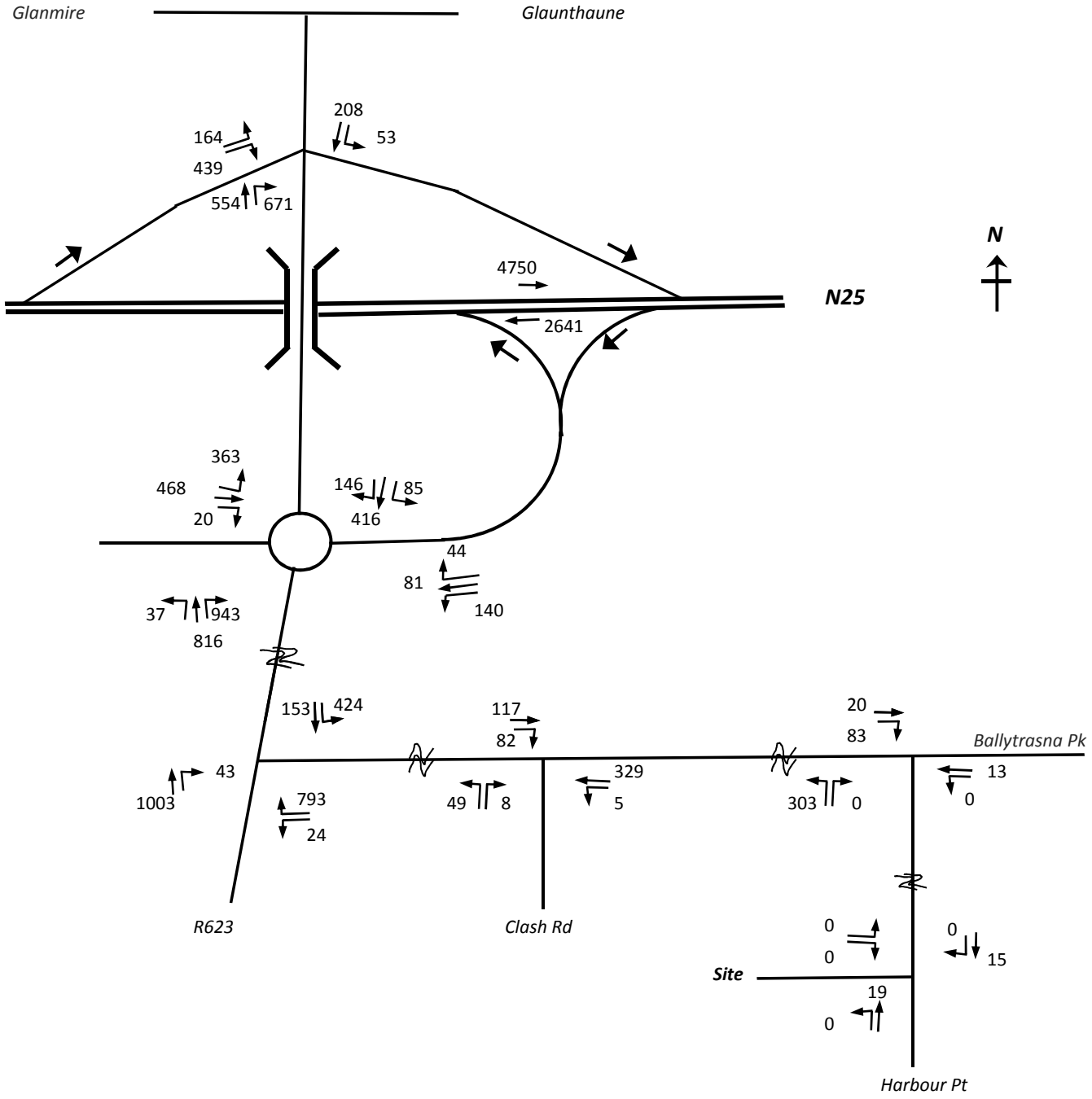


Tii Project Appraisal Guidelines Unit 5.3, (Travel Demand Projections Oct 2016, Table 5.3.2) Yr2018 to Yr2021 factor is 1.039, and Yr 2021 to Yr2036 factor is 1.214 - CORK AREA

Base Year 2018 Traffic Survey Data (PCUs)
Weekday PM Peak Hour (1700-1800H)



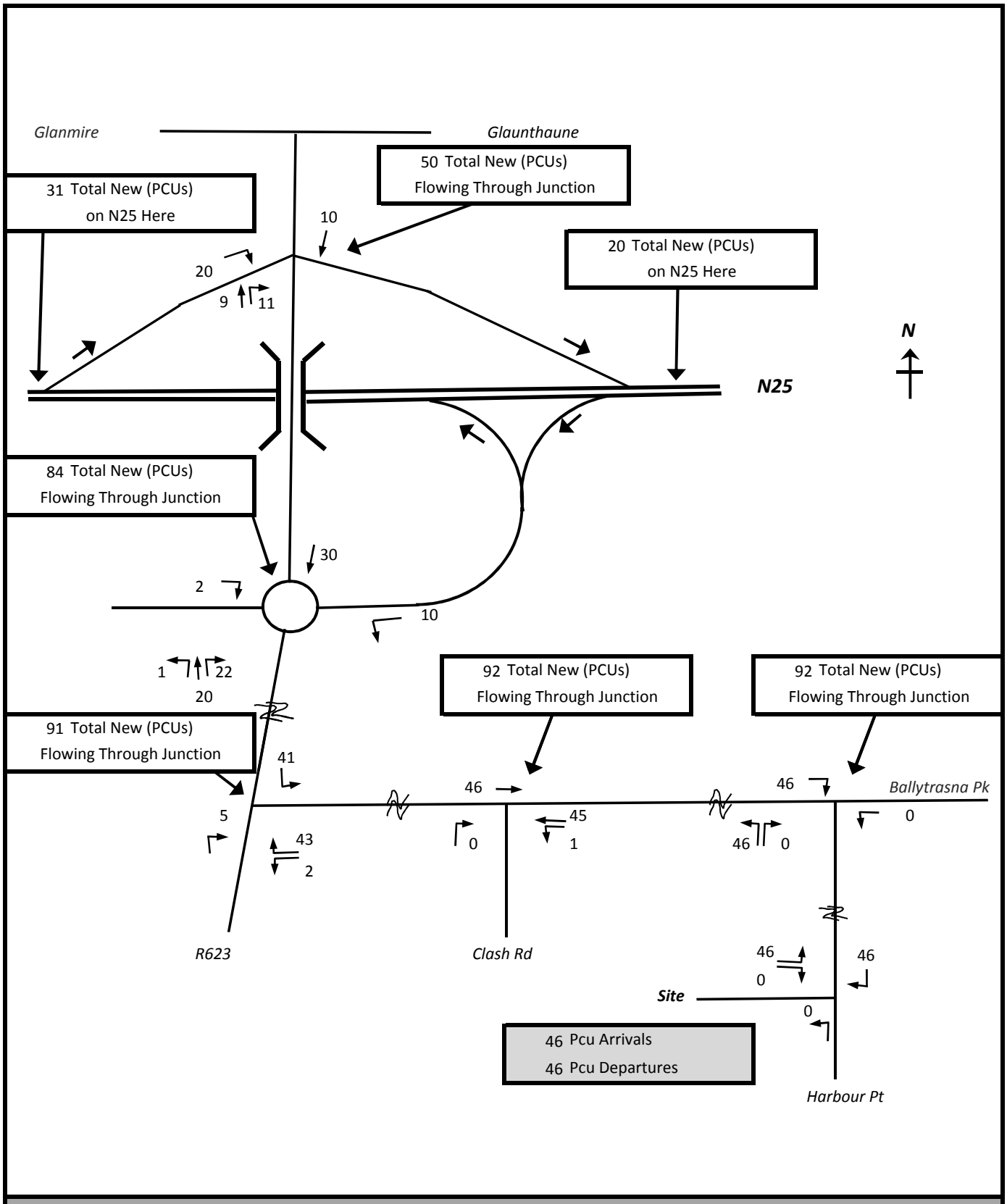
Projected Opening Year 2021 Traffic Flows (PCUs)
Weekday PM Peak Hour (1700-1800H)
WITHOUT SUBJECT DEVELOPMENT



Projected Design Year 2036 (Opening Tr +15) Traffic Flows (PCUs)
Weekday PM Peak Hour (1700-1800H)
WITHOUT SUBJECT DEVELOPMENT

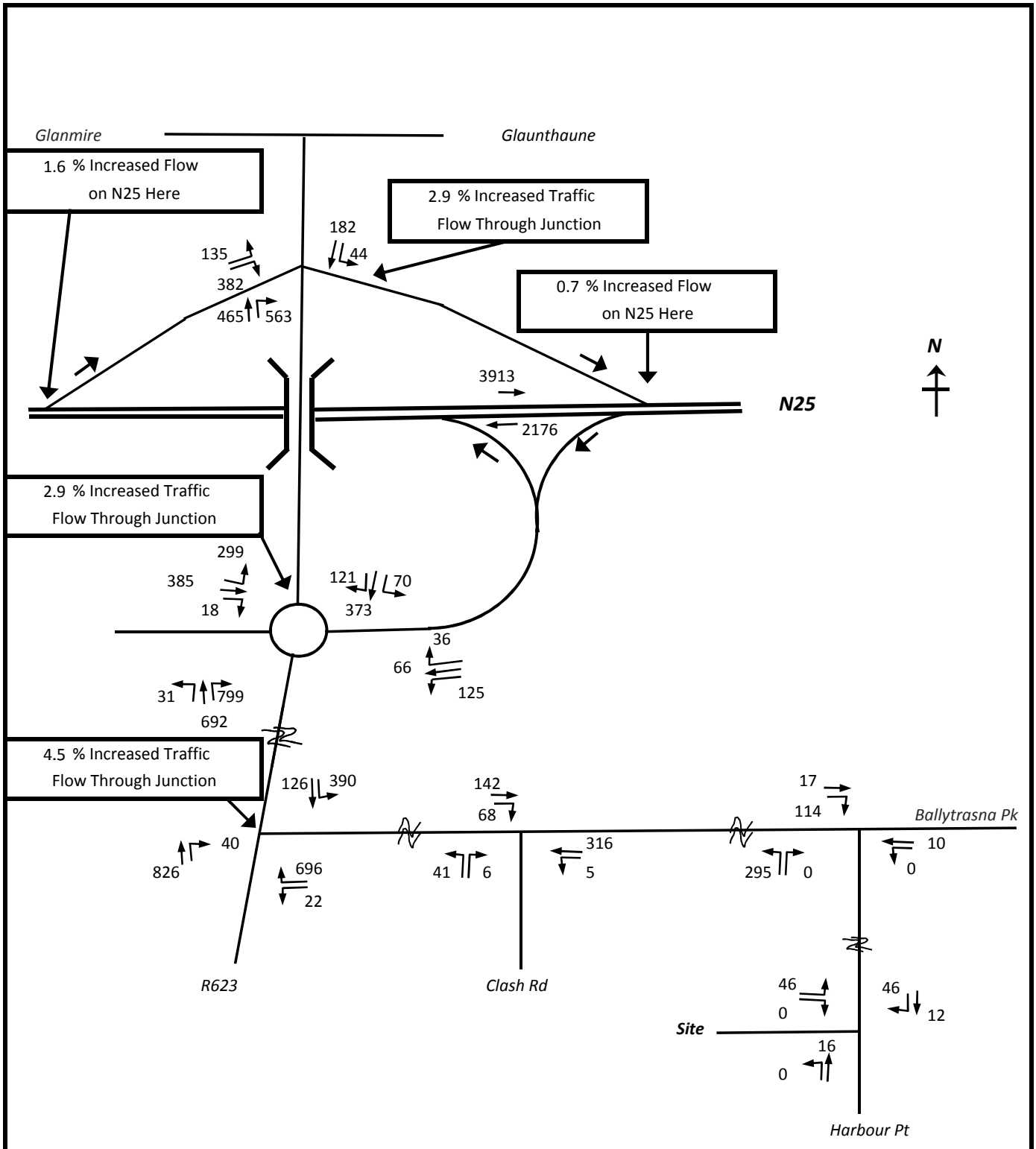
Worst Case Traffic Generation Calculations

Operation/Traffic Generator Description	No.	Frequency (Description)	Worst Case Avg No/Pk Hr	Equiv PCUs EW for Worst Case Assessment
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Recycling Removed for Processing by Artic	5	Trucks/week	1	3
Food Removed for Processing by Artic	3	Trucks/week	0	0
Recovered Stone removed from Site by rigid	5	Trucks/week	1	3
Recovered Glass removed from Site by rigid	2	Trucks/week	0	0
Bulky Goods removed from Site by Artic	2	Trucks/week	1	3
Domestic Waste Refuse Trucks	20	Trucks/day	2.5	8
Skip Lorries	30	Trucks/day	3.75	11
~~Cars and LGVs to Bring Centre~~	0	No./day	0	0
Staff & Visitors	21	No./day	21	11
Consumable Deliveries	1	LGV Trucks/day	0	0
Total 2-Way in the Peak Hour (for absolute worst case assessment purposes)			***33 Vehs***	***46 PCUs***

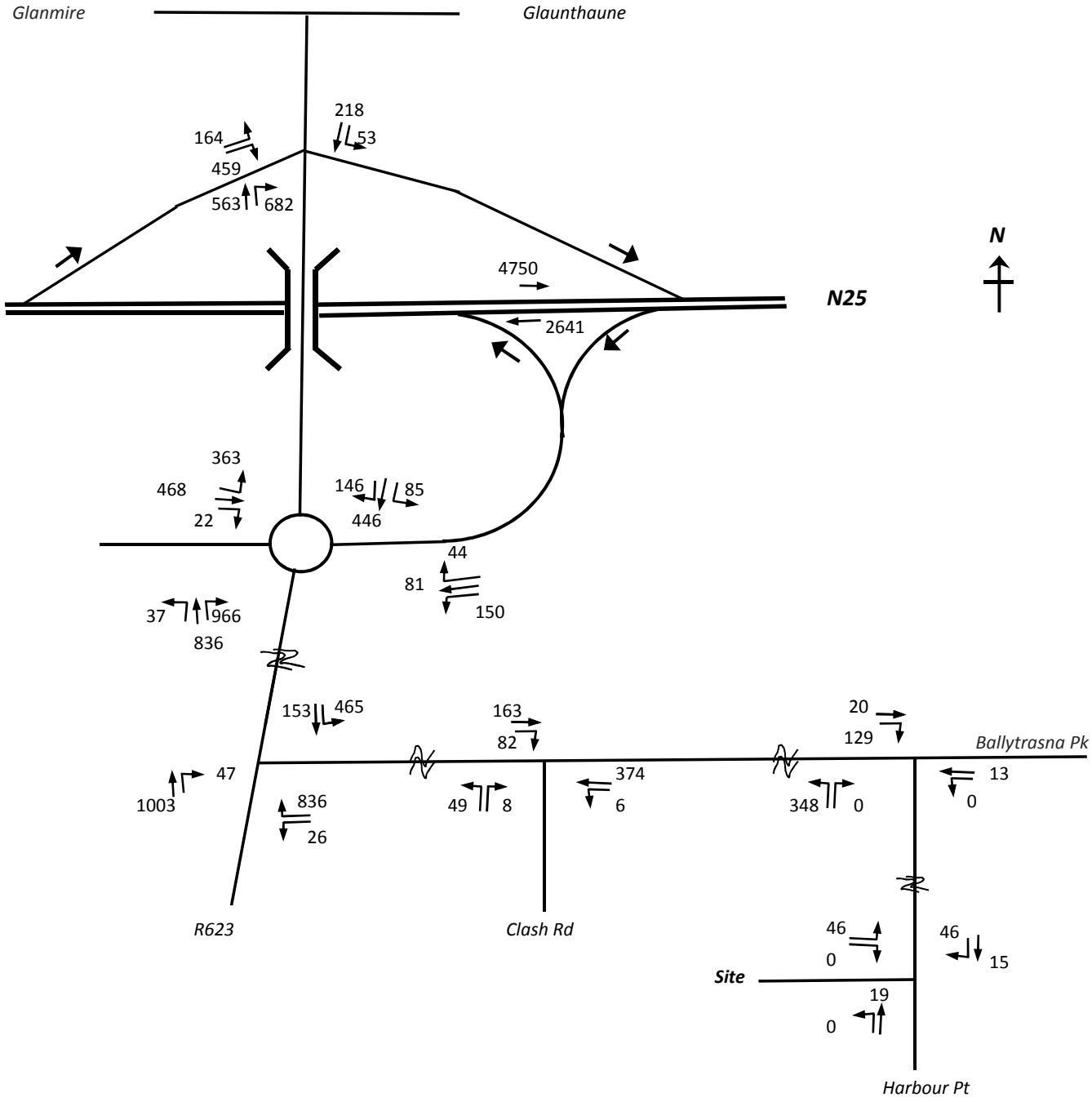


Assignment of Worst Case Development Traffic to Road Network (Weekday PM Peak Hour 1700-1800H)

Distributed in Accordance with Industry Standard Established Movements



Projected Opening Year 2021 Traffic Flows (PCUs)
Weekday PM Peak Hour (1700-1800H)
WITH WORST CASE SUBJECT DEVELOPMENT TRAFFIC



Projected Design Year 2036 (Opening Yr + 15) Traffic Flows (PCUs)
Weekday PM Peak Hour (1700-1800H)
WITH WORST CASE SUBJECT DEVELOPMENT TRAFFIC

APPENDIX C

Junction 9 (PiCADY)
Simulation Model Output Results

Existing Harbour Pt Business Park Ballytrasna Park T Junction
Summary Junction 9 Results, Worst Case Weekday AM and PM Commuter Peak Hours 2021 and 2036 WITH ALL PROPOSED Development Operational

Modelled Scenario	Period Mean Max Q (in PCUs)	Max RFC
2021 AM Peak Hour	1	0.44
2021 PM Peak Hour	1	0.45
2036 AM Peak Hour	2	0.52
2036 PM Peak Hour	2	0.53

All of the RFC's are WAY Below 0.85, the theoretical Capacity Limit, therefore No Problems Whatsoever are expected at the Junction in terms of Operational Capacity Constraints.

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.0.1.4646 []
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Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

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Filename: Open Year With Dev.j9
Path: N:\01 Projects\2017\17-001 Little Island Recycling\Calculations\Priority Junct
Report generation date: 02/10/2018 16:06:39

»2021, AM
»2021, PM

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2021							
Stream B-AC	0.3	7.50	0.19	A	1.0	10.93	0.45	B
Stream C-B	0.9	10.87	0.44	B	0.2	7.31	0.17	A

Values shown are the highest values encountered over all time segments. Delay is the maximum value of Av. delay per arriving vehicle.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	20/04/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	NRB-004\Eoin
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Av. delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Q Percentiles	Calculate residual capacity	RFC Threshold	Av. Delay threshold (s)	Q threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2021	AM	ONE HOUR	07:45	09:15	15
D2	2021	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2021, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	8.93	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Ballytrasna Pk East		Major
B	Harbour Point Business Pk		Minor
C	Ballytrasna Pk West		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Width for right turn (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	9.50		✓	3.50	90.0		-

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.50	90	90

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	580	0.090	0.226	0.142	0.323
1	B-C	715	0.093	0.235	-	-
1	C-B	715	0.235	0.235	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2021	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A		✓	18	100.000
B		✓	122	100.000
C		✓	308	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	2	16
	B	0	0	122
	C	24	284	0

Vehicle Mix

HV %s

		To		
		A	B	C
From	A	0	5	5
	B	0	0	20
	C	5	20	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-AC	0.19	7.50	0.3	A
C-A				
C-B	0.44	10.87	0.9	B
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	92	712	0.129	91	0.2	6.954	A
C-A	18			18			
C-B	214	711	0.301	212	0.5	8.612	A
A-B	2			2			
A-C	12			12			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	110	711	0.154	110	0.2	7.178	A
C-A	22			22			
C-B	255	711	0.359	255	0.7	9.456	A
A-B	2			2			
A-C	14			14			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	134	710	0.189	134	0.3	7.493	A
C-A	26			26			
C-B	313	710	0.440	312	0.9	10.814	B
A-B	2			2			
A-C	18			18			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	134	710	0.189	134	0.3	7.499	A
C-A	26			26			
C-B	313	710	0.440	313	0.9	10.870	B
A-B	2			2			
A-C	18			18			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	110	711	0.154	110	0.2	7.190	A
C-A	22			22			
C-B	255	711	0.359	256	0.7	9.524	A
A-B	2			2			
A-C	14			14			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	92	712	0.129	92	0.2	6.972	A
C-A	18			18			
C-B	214	711	0.301	214	0.5	8.704	A
A-B	2			2			
A-C	12			12			

2021, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	9.32	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2021	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A		✓	10	100.000
B		✓	288	100.000
C		✓	126	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	0	10
	B	0	0	288
	C	16	110	0

Vehicle Mix

HV %s

		To		
		A	B	C
From	A	0	5	5
	B	0	0	20
	C	5	20	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-AC	0.45	10.93	1.0	B
C-A				
C-B	0.17	7.31	0.2	A
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	217	713	0.304	215	0.5	8.638	A
C-A	12			12			
C-B	83	713	0.116	82	0.2	6.842	A
A-B	0			0			
A-C	8			8			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	259	713	0.363	258	0.7	9.496	A
C-A	14			14			
C-B	99	713	0.139	99	0.2	7.036	A
A-B	0			0			
A-C	9			9			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	317	712	0.445	316	0.9	10.876	B
C-A	18			18			
C-B	121	712	0.170	121	0.2	7.306	A
A-B	0			0			
A-C	11			11			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	317	712	0.445	317	1.0	10.935	B
C-A	18			18			
C-B	121	712	0.170	121	0.2	7.309	A
A-B	0			0			
A-C	11			11			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	259	713	0.363	260	0.7	9.568	A
C-A	14			14			
C-B	99	713	0.139	99	0.2	7.046	A
A-B	0			0			
A-C	9			9			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	217	713	0.304	217	0.5	8.731	A
C-A	12			12			
C-B	83	713	0.116	83	0.2	6.858	A
A-B	0			0			
A-C	8			8			

Junctions 9

PICADY 9 - Priority Intersection Module

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Filename: Design Year With Dev.j9
Path: N:\01 Projects\2017\17-001 Little Island Recycling\Calculations\Priority Junct
Report generation date: 02/10/2018 16:10:02

»2036, AM
»2036, PM

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2036							
Stream B-AC	0.3	7.77	0.22	A	1.3	12.80	0.53	B
Stream C-B	1.3	12.70	0.52	B	0.3	7.51	0.19	A

Values shown are the highest values encountered over all time segments. Delay is the maximum value of Av. delay per arriving vehicle.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	20/04/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	NRB-004\Eoin
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Av. delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Q Percentiles	Calculate residual capacity	RFC Threshold	Av. Delay threshold (s)	Q threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2036	AM	ONE HOUR	07:45	09:15	15
D2	2036	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2036, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	10.16	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Ballytrasna Pk East		Major
B	Harbour Point Business Pk		Minor
C	Ballytrasna Pk West		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Width for right turn (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	9.50		✓	3.50	90.0		-

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.50	90	90

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	580	0.090	0.226	0.142	0.323
1	B-C	715	0.093	0.235	-	-
1	C-B	715	0.235	0.235	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2036	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A		✓	22	100.000
B		✓	139	100.000
C		✓	364	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	2	20
	B	0	0	139
	C	29	335	0

Vehicle Mix

HV %s

		To		
		A	B	C
From	A	0	5	5
	B	0	0	20
	C	5	20	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-AC	0.22	7.77	0.3	A
C-A				
C-B	0.52	12.70	1.3	B
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	105	711	0.147	104	0.2	7.107	A
C-A	22			22			
C-B	252	711	0.355	250	0.6	9.317	A
A-B	2			2			
A-C	15			15			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	125	710	0.176	125	0.3	7.376	A
C-A	26			26			
C-B	301	710	0.424	300	0.9	10.519	B
A-B	2			2			
A-C	18			18			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	153	709	0.216	153	0.3	7.758	A
C-A	32			32			
C-B	369	709	0.520	367	1.3	12.580	B
A-B	2			2			
A-C	22			22			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	153	709	0.216	153	0.3	7.766	A
C-A	32			32			
C-B	369	709	0.520	369	1.3	12.696	B
A-B	2			2			
A-C	22			22			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	125	710	0.176	125	0.3	7.386	A
C-A	26			26			
C-B	301	710	0.424	303	0.9	10.645	B
A-B	2			2			
A-C	18			18			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	105	711	0.147	105	0.2	7.128	A
C-A	22			22			
C-B	252	711	0.355	253	0.7	9.460	A
A-B	2			2			
A-C	15			15			

2036, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	10.65	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2036	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A		✓	12	100.000
B		✓	340	100.000
C		✓	144	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	0	12
	B	0	0	340
	C	20	124	0

Vehicle Mix

HV %s

		To		
		A	B	C
From	A	0	5	5
	B	0	0	20
	C	5	20	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-AC	0.53	12.80	1.3	B
C-A				
C-B	0.19	7.51	0.3	A
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	256	713	0.359	253	0.7	9.356	A
C-A	15			15			
C-B	93	713	0.131	93	0.2	6.962	A
A-B	0			0			
A-C	9			9			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	306	712	0.429	305	0.9	10.579	B
C-A	18			18			
C-B	111	712	0.157	111	0.2	7.188	A
A-B	0			0			
A-C	11			11			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	374	712	0.526	373	1.3	12.684	B
C-A	22			22			
C-B	137	712	0.192	136	0.3	7.505	A
A-B	0			0			
A-C	13			13			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	374	712	0.526	374	1.3	12.800	B
C-A	22			22			
C-B	137	712	0.192	137	0.3	7.511	A
A-B	0			0			
A-C	13			13			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	306	712	0.429	307	0.9	10.710	B
C-A	18			18			
C-B	111	712	0.157	112	0.2	7.196	A
A-B	0			0			
A-C	11			11			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	256	713	0.359	257	0.7	9.503	A
C-A	15			15			
C-B	93	713	0.131	94	0.2	6.982	A
A-B	0			0			
A-C	9			9			

APPENDIX E

LiNSiG Simulation Model Output Results
CCC Part 8 Junction Layout

Improved R623/Ballytrasna Park Signals – Summary Linsig Results, Worst Case Weekday AM and PM Commuter Peak Hours 2021 and 2036 - WITH ALL PROPOSED Development (Using Robust and Onerous Traffic Generation Rates for Development)

Modelled Scenario	Max DoS (%)
2021 AM Peak Hour	55.1
2021 PM Peak Hour	89.3
2036 AM Peak Hour	65.7
2036 PM Peak Hour	85.2

Basic Results Summary

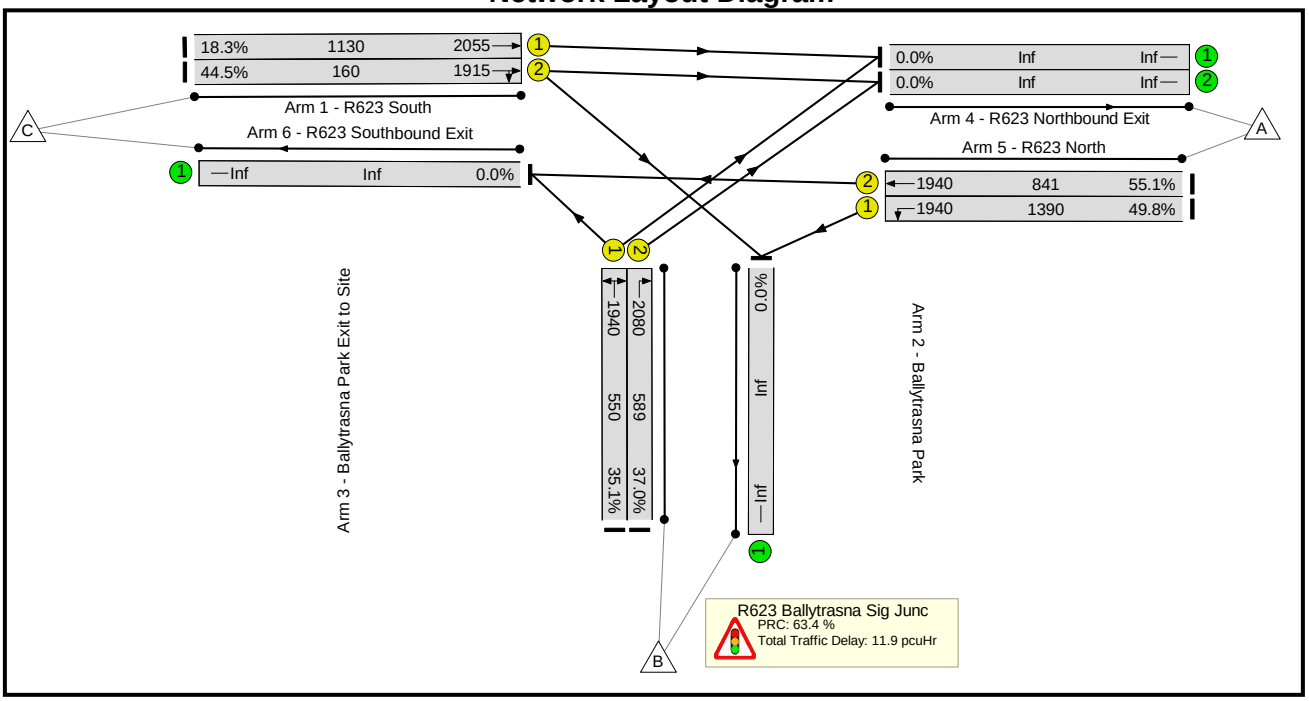
Ballytrasna Rd/R623 - Traffic Signals LiNSiG Results Summary

User and Project Details

Project:	**Little Island**
Title:	**R623/Ballytrasna Part 8 Junction Lalout**
Location:	17-011 Calculations Folder
File name:	Traffic Signs R623 Oct 2018.lsg3x
Author:	ER
Company:	NRB Consulting Engineers Ltd
Address:	Unit 8 Leopardstown Business Centre, Ballyogan Ave, D18 TR24
Notes:	

Scenario 1: '2021 AM Peak' (FG1: '2021 AM Peak with All Development', Plan 1: 'Signal Plan No. 1')

Network Layout Diagram



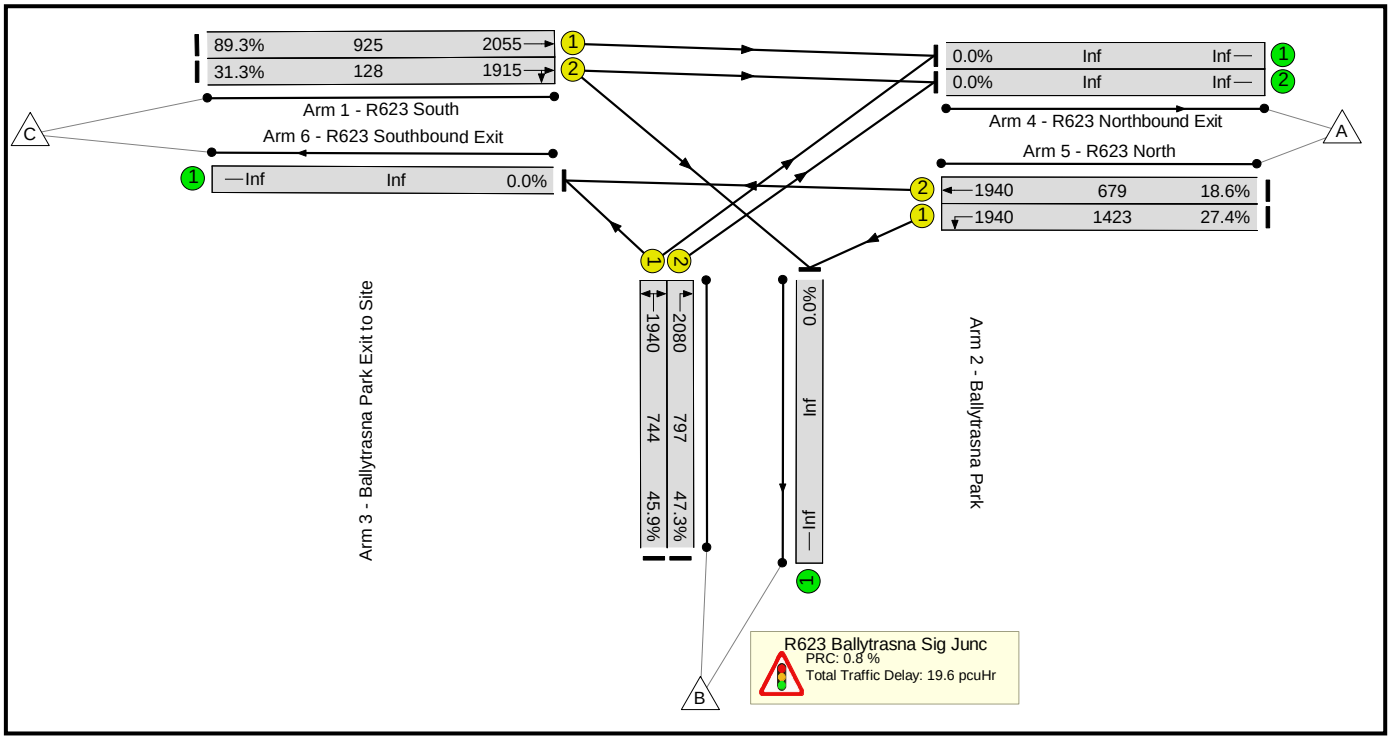
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**55.1%**	**0**	**0**	**0**	**11.9**	**-**	**-**
R623 Ballytrasna Sig Junc	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**55.1%**	**0**	**0**	**0**	**11.9**	**-**	**-**
1/1	R623 South Ahead	U	B		1	65	-	207	2055	1130	18.3%	-	-	-	0.9	15.5	3.6
1/2	R623 South Right Ahead	U	F		1	9	-	71	1915	160	44.5%	-	-	-	1.4	72.5	2.6
2/1	Ballytrasna Park Right Left	U	G		1	33	-	193	1940	550	35.1%	-	-	-	2.1	39.3	5.4
2/2	Ballytrasna Park Right	U	D		1	33	-	218	2080	589	37.0%	-	-	-	2.4	39.3	6.1
5/1	R623 North Left	U	A		2	84	-	692	1940	1390	49.8%	-	-	-	1.2	6.3	5.7
5/2	R623 North Ahead	U	E		1	51	-	463	1940	841	55.1%	-	-	-	3.9	30.1	12.1

C1 PRC for Signalled Lanes (%): 63.4 Total Delay for Signalled Lanes (pcuHr): 11.89 Cycle Time (s): 120
PRC Over All Lanes (%): 63.4 Total Delay Over All Lanes(pcuHr): 11.89

Scenario 2: '2021 PM Peak' (FG2: '2021 PM Peak with All Development', Plan 1: 'Signal Plan No. 1')

Network Layout Diagram



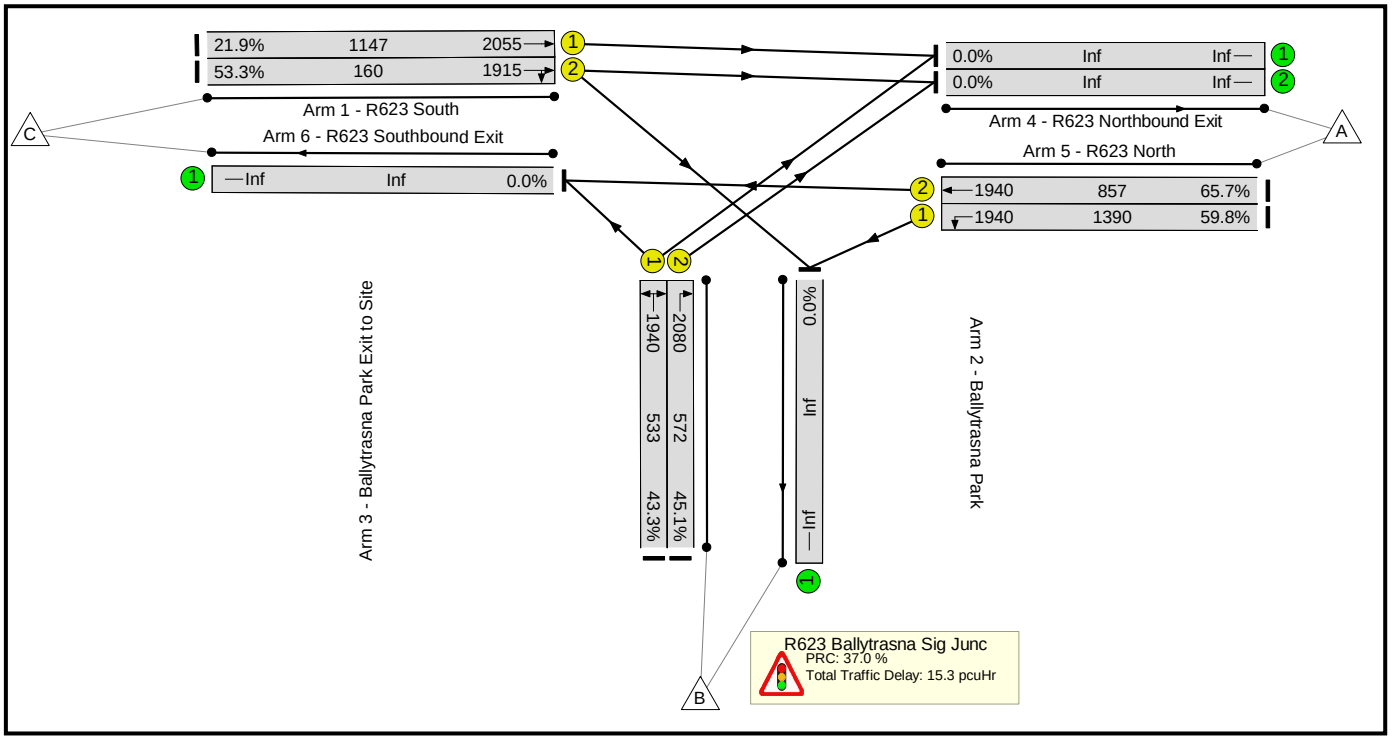
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.3%**	**0**	**0**	**0**	**19.6**	**-**	**-**
R623 Ballytrasna Sig Junc	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.3%**	**0**	**0**	**0**	**19.6**	**-**	**-**
1/1	R623 South Ahead	U	B		1	53	-	826	2055	925	89.3%	-	-	-	10.8	47.3	17.1
1/2	R623 South Right Ahead	U	F		1	7	-	40	1915	128	31.3%	-	-	-	0.8	73.9	1.5
2/1	Ballytrasna Park Right Left	U	G		1	45	-	341	1940	744	45.9%	-	-	-	3.0	32.1	8.9
2/2	Ballytrasna Park Right	U	D		1	45	-	377	2080	797	47.3%	-	-	-	3.4	32.1	9.9
5/1	R623 North Left	U	A		2	86	-	390	1940	1423	27.4%	-	-	-	0.5	4.4	2.4
5/2	R623 North Ahead	U	E		1	41	-	126	1940	679	18.6%	-	-	-	1.1	30.4	3.0

C1 PRC for Signalled Lanes (%): 0.8 Total Delay for Signalled Lanes (pcuHr): 19.61 Cycle Time (s): 120
PRC Over All Lanes (%): 0.8 Total Delay Over All Lanes(pcuHr): 19.61

Scenario 3: '2036 AM Peak' (FG3: '2036 AM Peak with All Development ', Plan 1: 'Signal Plan No. 1')

Network Layout Diagram



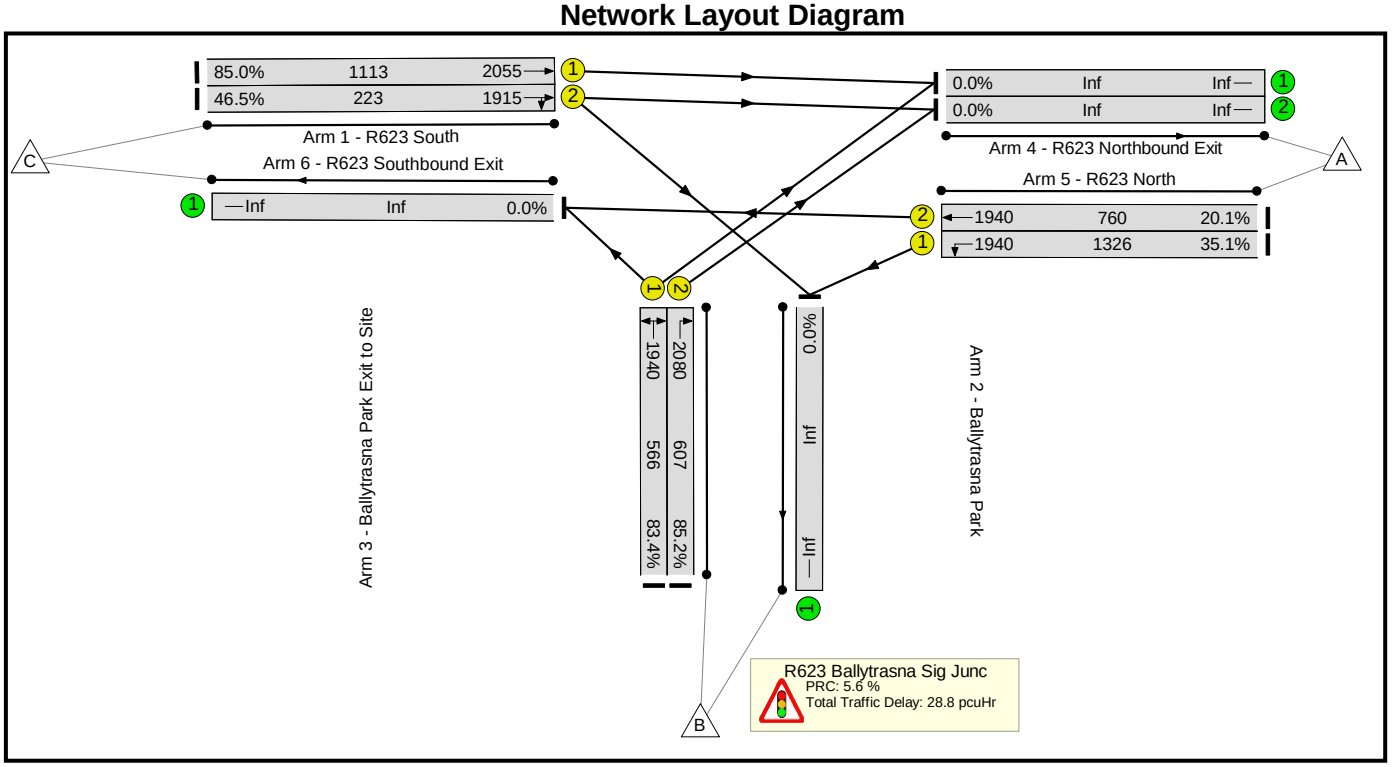
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**65.7%**	**0**	**0**	**0**	**15.3**	**-**	**-**
R623 Ballytrasna Sig Junc	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**65.7%**	**0**	**0**	**0**	**15.3**	**-**	**-**
1/1	R623 South Ahead	U	B		1	66	-	251	2055	1147	21.9%	-	-	-	1.1	15.3	4.3
1/2	R623 South Right Ahead	U	F		1	9	-	85	1915	160	53.3%	-	-	-	1.8	76.5	3.3
2/1	Ballytrasna Park Right Left	U	G		1	32	-	231	1940	533	43.3%	-	-	-	2.7	41.7	6.7
2/2	Ballytrasna Park Right	U	D		1	32	-	258	2080	572	45.1%	-	-	-	3.0	41.7	7.5
5/1	R623 North Left	U	A		2	84	-	831	1940	1390	59.8%	-	-	-	1.7	7.4	7.9
5/2	R623 North Ahead	U	E		1	52	-	563	1940	857	65.7%	-	-	-	5.1	32.4	13.7

C1 PRC for Signalled Lanes (%): 37.0 Total Delay for Signalled Lanes (pcuHr): 15.34 Cycle Time (s): 120
PRC Over All Lanes (%): 37.0 Total Delay Over All Lanes(pcuHr): 15.34

Scenario 4: '2036 PM Peak' (FG4: '2036 PM Peak with All Development', Plan 1: 'Signal Plan No. 1')

Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.2%**	**0**	**0**	**0**	**28.8**	**-**	**-**
R623 Ballytrasna Sig Junc	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.2%**	**0**	**0**	**0**	**28.8**	**-**	**-**
1/1	R623 South Ahead	U	B		1	64	-	946	2055	1113	85.0%	-	-	-	8.9	33.8	19.3
1/2	R623 South Right Ahead	U	F		1	13	-	104	1915	223	46.5%	-	-	-	1.9	64.5	3.7
2/1	Ballytrasna Park Right Left	U	G		1	34	-	472	1940	566	83.4%	-	-	-	7.6	58.0	17.1
2/2	Ballytrasna Park Right	U	D		1	34	-	517	2080	607	85.2%	-	-	-	8.5	59.0	18.9
5/1	R623 North Left	U	A		2	80	-	465	1940	1326	35.1%	-	-	-	0.8	6.1	3.9
5/2	R623 North Ahead	U	E		1	46	-	153	1940	760	20.1%	-	-	-	1.2	27.1	3.5

C1 PRC for Signalled Lanes (%): 5.6 Total Delay for Signalled Lanes (pcuHr): 28.77 Cycle Time (s): 120
PRC Over All Lanes (%): 5.6 Total Delay Over All Lanes(pcuHr): 28.77