ARCHITECTURAL DESIGN STATEMENT

RESIDENTIAL DEVELOPMENT AT OLD MALLOW ROAD, BLACKPOOL, CO. CORK

PREPARED BY:

DEADY GAHAN ARCHITECTS

Contents

1.0 Introduction

2.0 Site
- 2.1 Site Location
- 2.2 Site Suitability
- 2.3 Characteristics
- 2.4 Aerial Photos

3.0 Site Strategy

4.0 Design Considerations
- 4.1 Context - Boundary Conditions
- 4.2 Access and Connections (DMURS)
- 4.3 Inclusivity, Variety & Public Realm
- 4.4 Efficiency
- 4.5 Distinctiveness / Layout
- 4.6 Adaptability
- 4.7 Privacy and Amenity
- 4.8 Parking
- 4.9 Detailed Design

5.0 Site Services

1.0 Introduction

This design document for the proposed residential development on the Old Mallow Road, Blackpool, Co. Cork, has been prepared by Deady Gahan Architects to illustrate the design approach. It is proposed that the site will accommodate a total of 57 residential units. See the associated site layout drawing no. 17079-P-003 for information.

This statement summarizes the reasoning and design principles that have led to the proposed arrangement. It describes the site and its immediate and wider context and demonstrates how the design responds to its surroundings to provide an appropriate, sustainable and site-specific response.

The layout approach taken is to provide a mix of dwellings ranging from; 1/2 bed apartments, 2 bed duplex apartments and 2/3 bed townhouse units. This proposed mix will provide a good range of residential units to meet the varying requirements of the end user and satisfy housing requirements of the area.

SHEDULE OF UNITS		
HOUSE TYPE	NO OF BEDS	NO OF UNITS
A-1	2 BED	10
A-2	2 BED	2
B-1	3 BED	18
C-1	3 BED	7
D-1	2 BED	5
D-2	2 BED	5
E-1	1 BED	4
E-2	2 BED	4
E-3	2 BED	1
E-4	2 BED	1
	TOTAL UNITS	57

	AREA CALCULATIONS		
		HECTARES	ACRES
	SITE AREA	1.68	4.15
	DEVELOPABLE AREA	1.5	3.7
	(DEVELOPABLE AREA = SITE AREA MINUS PUBLIC ROAD & FOOTPATH)		
	OPEN AREA(PERCENT)	0.18(12%)	0.44(12%)
	TOTAL RESIDENTIAL UNITS	57	
		UNITS/HECTARE	UNITS/ACRE
	DENSITY (UNITS)	(57 UNITS ÷ 1.5) 38.0	15.4

2.0 Site

2.1 Site Location

The proposed development site is located in Blackpool. It is a 20 minute walk to the Blackpool Shopping Centre & Retail Park and there are a number of schools in close proximity to the site. There are frequent transport links into Cork City Centre and Mallow which are in close proximity to the site.

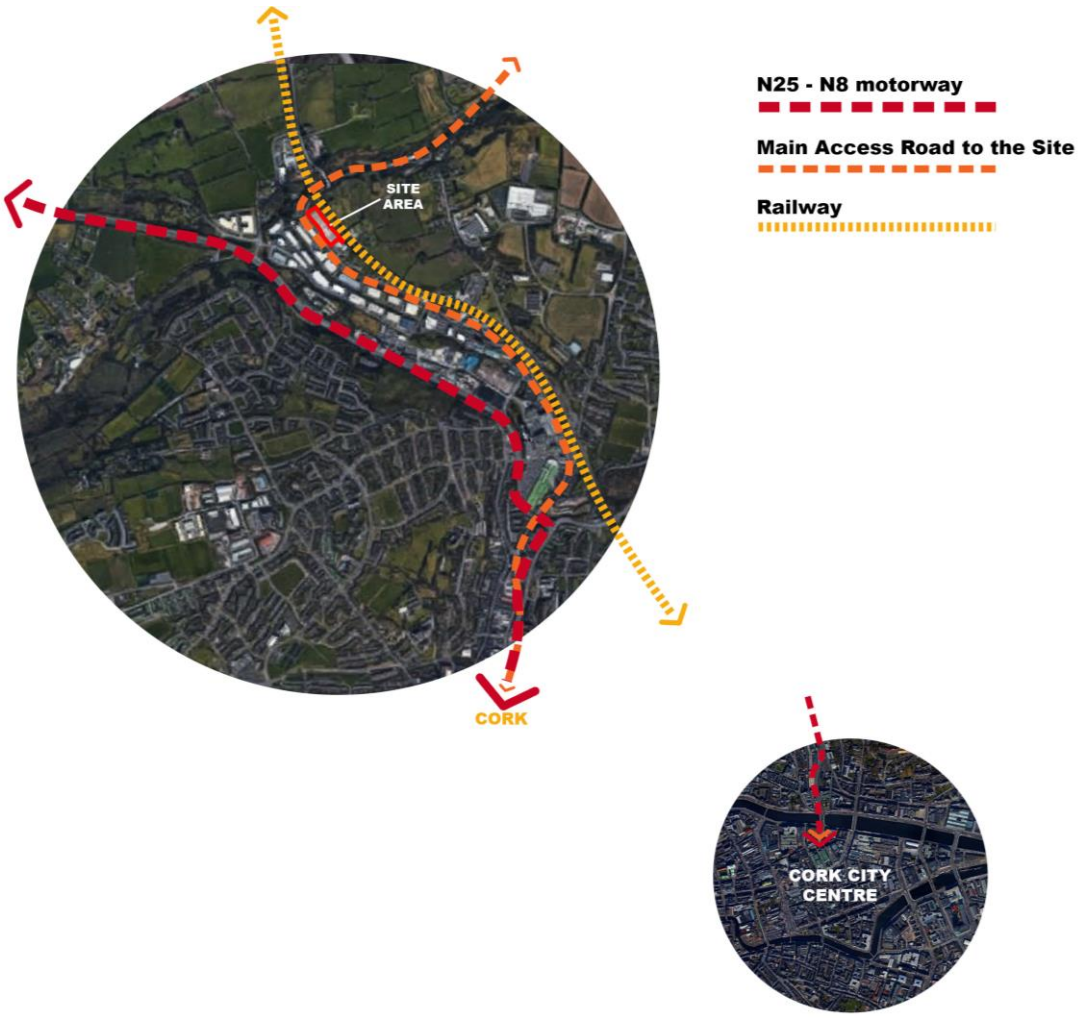
The immediate context surrounding the site consists of industrial buildings and private residential dwellings. To the North East of the site there is the railway line, green fields and a number of large 2 storey houses. To the North West and South East there are private large one off houses. To the South West are a number of industrial buildings. The Blackpool Shopping Centre & Retail Park is located to the South of the site.

2.2 Site Suitability

The site is located close to the district centre of Blackpool. There are a number of local amenities within close proximity to the site which includes Blackpool Shopping Centre & Retail Park.

The location of the site promotes cycling, walking and the use of public transport which will encourage future residence towards sustainable modes of transport as an alternative to car use. The site is approximately a 20 minute walk from Blackpool Shopping Centre & Retail Park and is located a short distance from a bus stop for the 215 bus, which provides regular services into the City Centre.

The topographical nature of the site lends itself to development with the layout a direct response to the existing natural features on site. Due to the proportions of the site the development offers a unique opportunity to create a prominent new frontage onto Old Mallow Road which will enhance the grain of the area.



2.3 Characteristics

Access to the development site is achieved from Old Mallow Road. On site there are a number of existing buildings and sheds that are to be demolished. Along the North Eastern boundary of the site is a large berm/embankment which separates the site from the adjoining railway line acting as a physical barrier mitigating any noise.

The proposed layout is designed to respond positively to the existing context of the site. The form, architecture and landscape are consistent and compatible with the area. The development will form a new identity and contribute positively to the immediate and wider context.

2.4 Aerial Photos

Aerial View – North

Aerial View – East

Aerial View – South

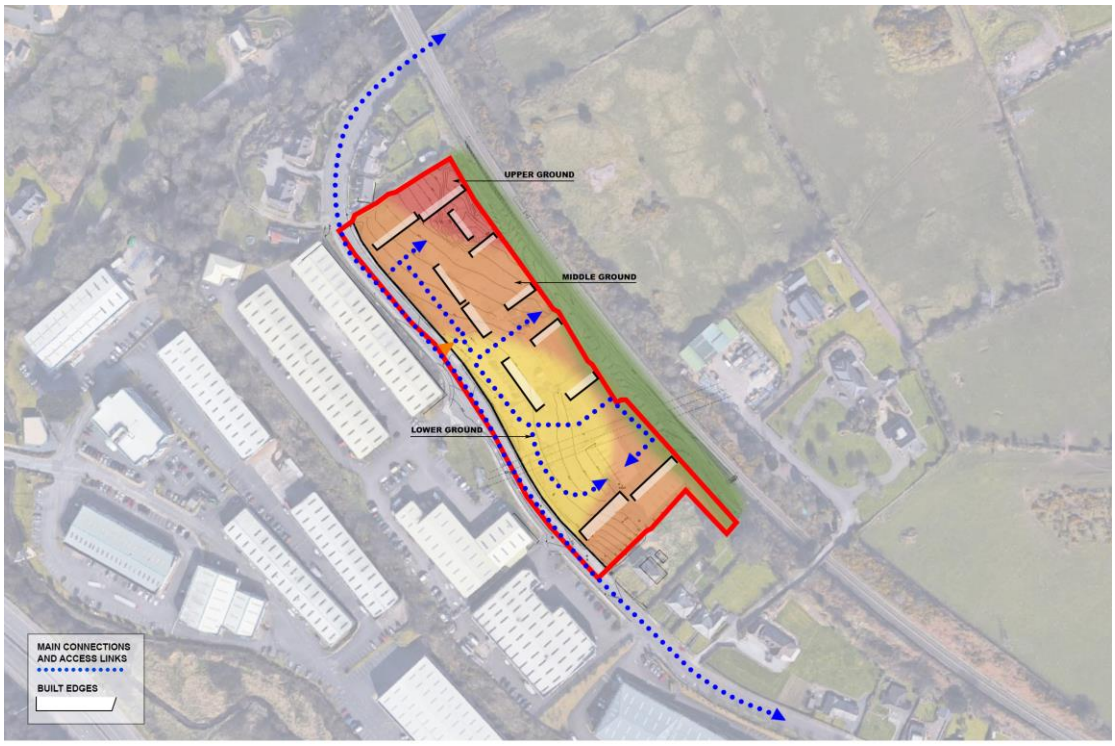
Aerial View – West

Aerial View – Directly Above

3.0 Site Strategy

The proposed layout has been designed as a direct response to the existing context and the natural features that are present on site. Pedestrian connections between the site entrance and the on-site amenities will create an inclusive development that is accessible for all.

The scheme will create a new frontage onto Old Mallow Road which will improve the visual amenity of the area. Units are positioned around the open spaces which promotes physical interaction between the residents and will create a sense of place within the development. This also allows for the passive surveillance of these amenity spaces.



4.0 Design Considerations

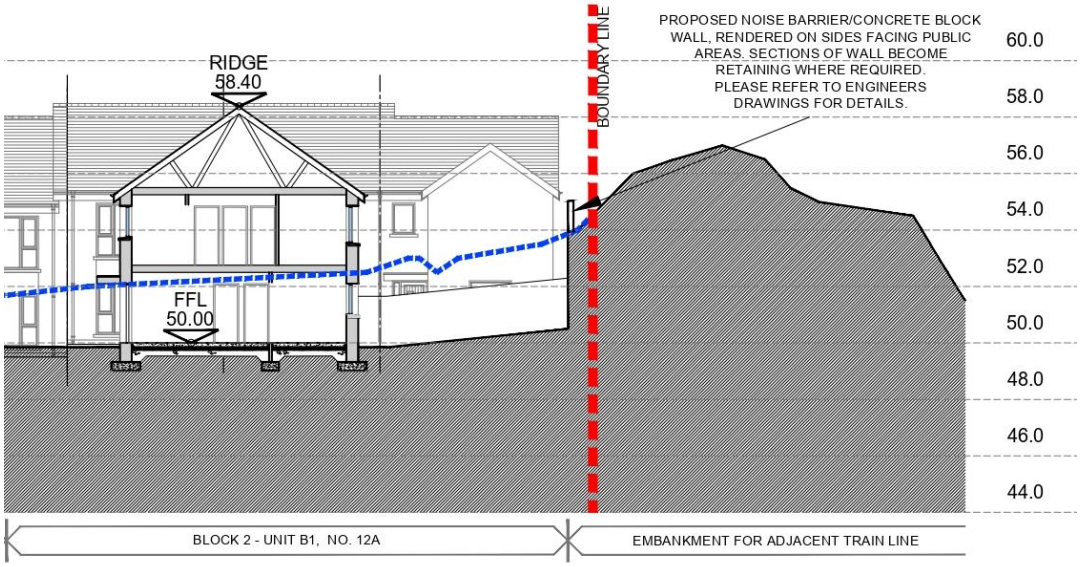
The development as designed is considered under the 12 criteria as outlined in the Urban Design Manual for residential developments.

4.1 Context - Boundary conditions

Along the north eastern boundary there is an existing berm/embankment that separates the development site from the adjoining railway line. To the north-west and south-east the existing boundaries are to be retained and supplemented to provide a 1.8m high boundary where required. To the south-west is Old Mallow Road where a new 1.1m high wall with railing above is proposed.

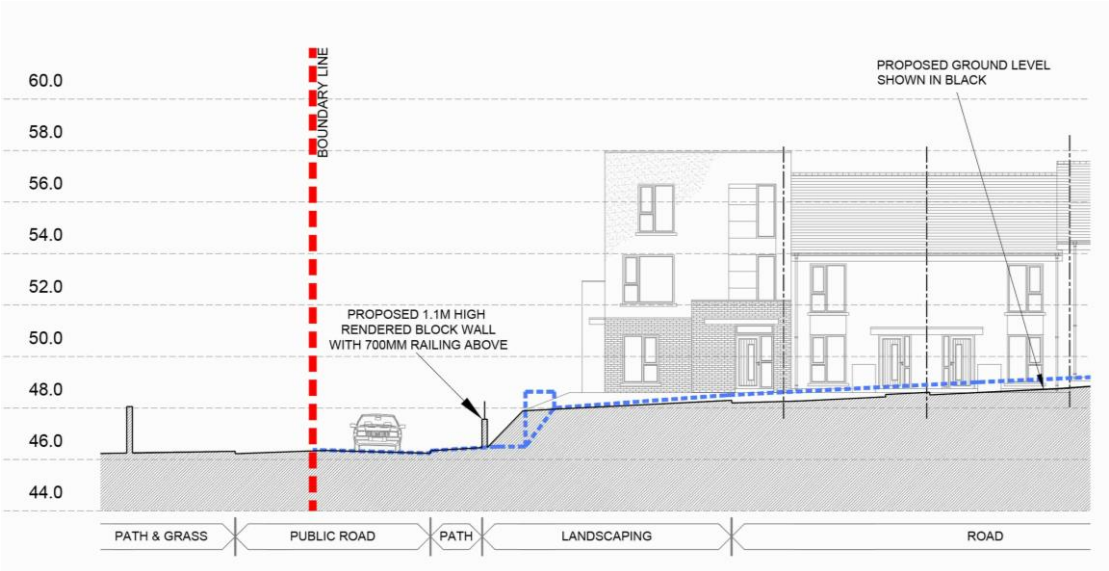
Boundary (A) Proposed Housing / Adjacent Railway Line – North Eastern Boundary

The proposed housing has been stepped back an adequate distance from the berm/embankment that runs along the north eastern boundary. A noise barrier is proposed along this boundary with sections becoming retaining in areas where cut is required.



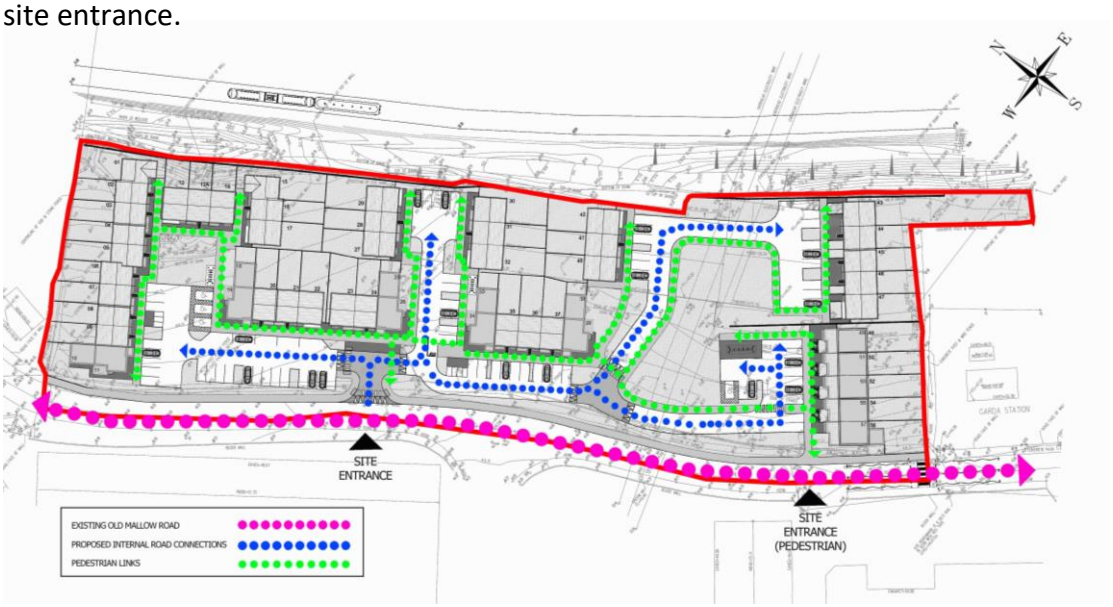
Boundary (B) Proposed Housing / Old Mallow Road– South Western Boundary

Along the south western boundary, where Old Mallow Road runs parallel to the site, a 1.1m high rendered wall with railing above is proposed. This will create a formal boundary along the edge of the site.



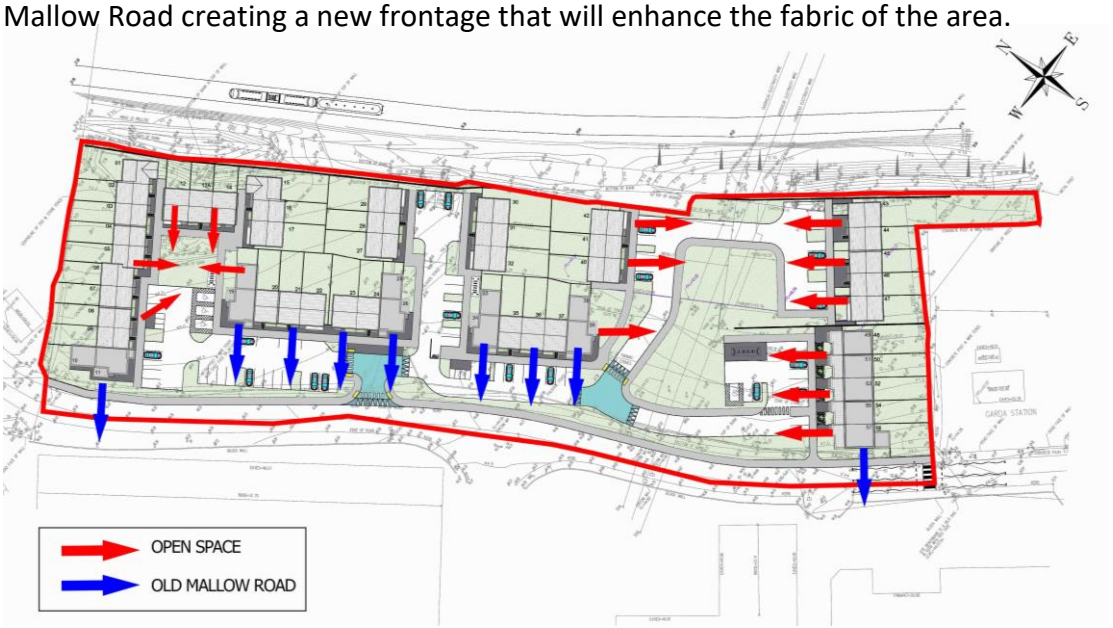
4.2 Access & Connections (DMURS) - Consideration 2

The proposed development has been designed in accordance with DMURS in order to create a development with an urban feel whilst also creating a safe environment for all road users. The proposal provides attractive connections for pedestrian, cyclists and vehicles. The proposed development is easily accessible to all amenities within the area. A series of pedestrian footpaths will connect dwellings on site to the site entrance.



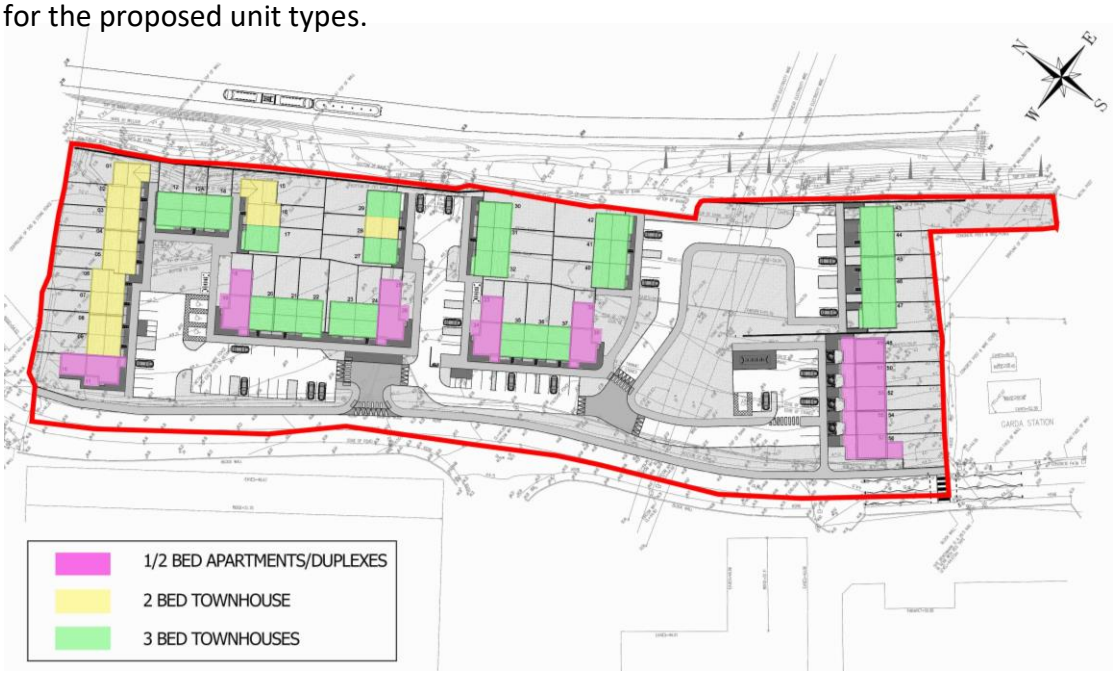
4.3 Inclusivity, Variety & Public Realm – Consideration 3/4/8

The generous design and layout of the dwellings enable easy access to all. A range of dwellings to include 1/2- bed apartments, 2-bed duplex apartments and 2/3-bed townhouses will provide a good range of residential units suitable for/required in the area. The site layout creates generous open spaces that are overlooked by adjoining dwellings. The generous landscaped open space will contribute significantly to the quality of life of the residence. The layout also ensures that units overlook Old Mallow Road creating a new frontage that will enhance the fabric of the area.



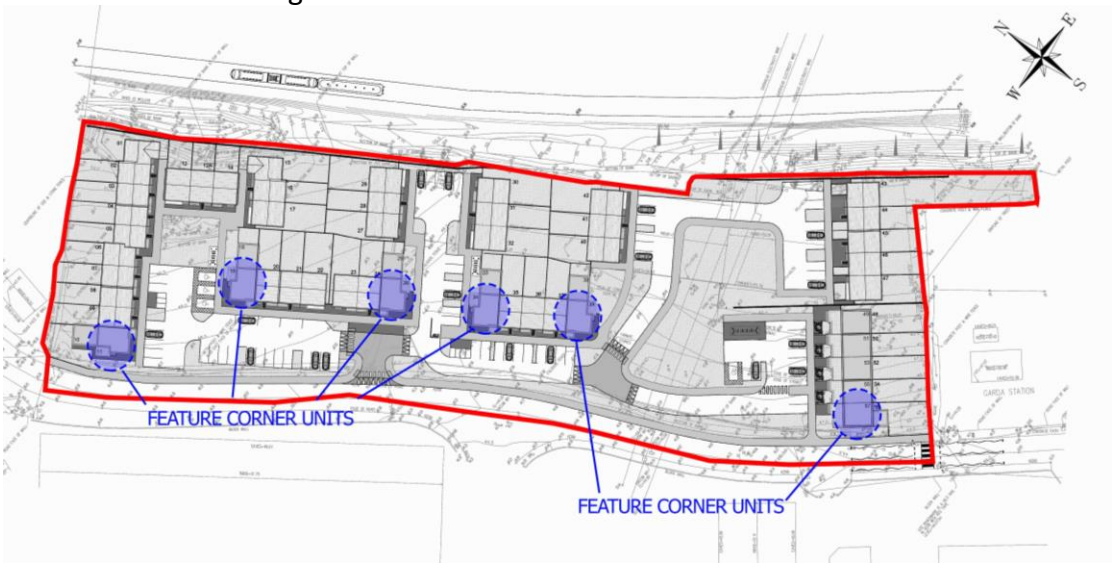
4.4 Efficiency - Consideration 5

The proposed layout considers the existing properties surrounding the site, the topographical nature of the sites natural features and the residential amenities of the proposed dwellings to provide the most efficient approach to developing the site for the proposed unit types.



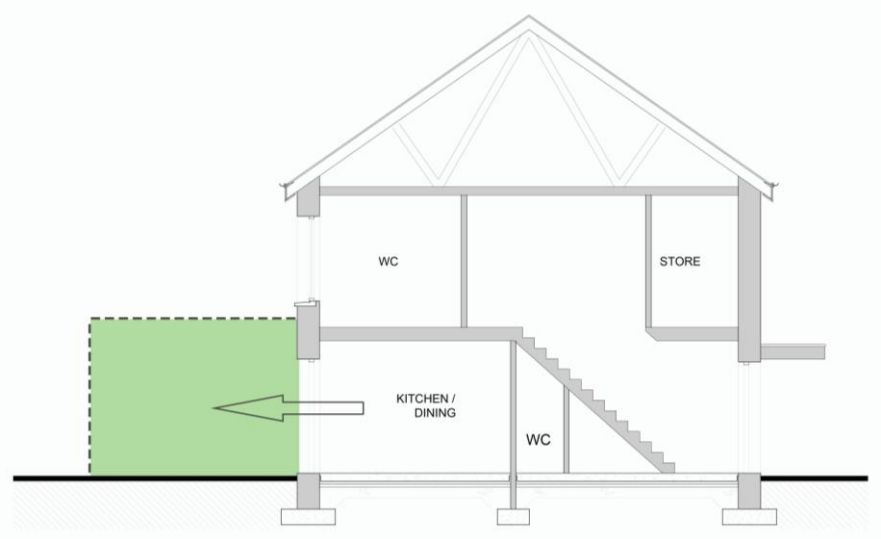
4.5 Distinctiveness/Layout - Consideration 6/7

The proposed layout is a direct response to the existing site characteristics that have been incorporate into the proposed scheme. The layout of the roads have been designed in accordance with DMURS in order to create a development with an urban feel whilst also creating a safe environment for pedestrian, cyclists and vehicles users. The layout has been organised to prevent overlooking of adjoining properties. Corner apartments/duplex units act as bookends to terrace rows. These feature units add variety and scale to the development and serve as node points as residence move throughout the site.



4.6 Adaptability - Consideration 9

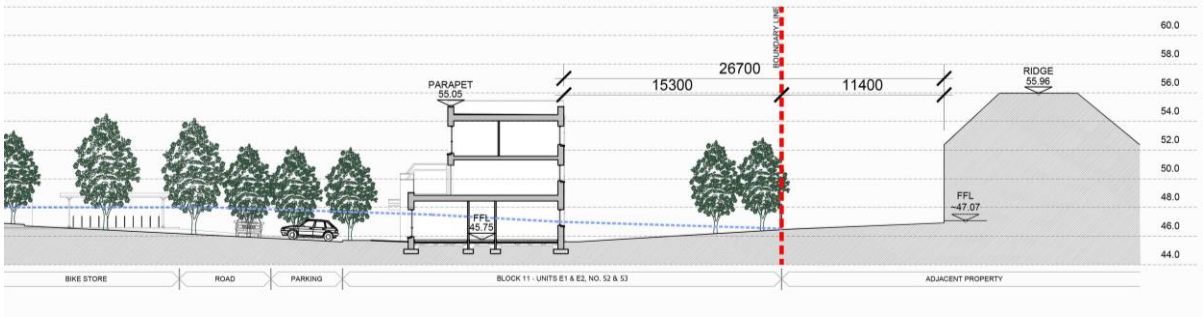
Houses in the development can be easily adapted to the future needs of the occupants. The dwellings can be extended easily if required; there is sufficient space to the back of the property to allow for future rear extension.



4.7 Privacy & Amenity - Consideration 10

Each dwelling has access to a generous private amenity space in the form of gardens for the houses and a terrace/balcony or garden for the apartments/ duplex units. Residents will also have access to the communal open space at the centre of the development which is overlooked by the surrounding dwellings.

Windows are sited to prevent overlooking into adjacent private gardens. Homes will have adequate storage areas and areas for sorting of recyclables. All units have access to the generous open spaces that are provided.



Separation distance between units on site and adjoining building to the south (former Garda Station)

4.8 Parking - Consideration 11

There are a total of 77 no. car parking spaces provided within the development with 1 no. space allocated per unit with additional visitor's spaces located throughout the site. Of the 77 no. spaces, 4 no. are disabled spaces and 7 no. can cater for Electric Vehicles. In addition to the car parking spaces, there are 7 no. motorcycle spaces provided.

In line with the 2018 Guideline 'Sustainable Urban Housing: Design Standards for New Apartments' whereby 2.5 bicycle spaces are required for a 2 bed apartment and 1.5 spaces for a 1 bed apartment (this includes the 0.5 space for visitors) a total of 46 no. bicycle spaces are required. Covered bicycle racks are scattered throughout the development in close proximity to the apartments/duplex units, which can accommodate 46 no. bicycles.

4.9 Detail Design - Consideration 12

The external materials of the dwellings make a positive contribution to the locality. A proposed mix of render, brick and pressed metal will provide for a contemporary development whilst respecting the existing buildings adjacent to the site. Generous open spaces with landscaping will enhance the overall design of the scheme. The design of the buildings and public space will facilitate easy maintenance. Care has been taken to design the location of bins and vents to prevent impact on the public amenities.

5.0 Site Services

Please refer to the accompanying report by Denis O'Sullivan & Associates (DOSA) for all information relating to site services.

1. EUROPEAN SITE DATA

Great Island Channel candidate Special Area Of Conservation (site code 001058)	
Conservation objective	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.
Qualifying interests	Annex I listed habitats: mudflats, sandflats not covered by seawater at low tide, estuaries, spartina swards, Atlantic salt meadows.
References and further information	*Conservation Objectives for Great Island Channel SAC [001058]* (NPWS), *Natura 2000 Standard Data Form* (NPWS), *Site Synopsis Great Island Channel Site Code 001058* (NPWS) (see www.npws.ie for further details)

Cork Harbour Special Protection Area (site code 004030)	
Conservation objective	To maintain or restore the favourable conservation condition of the bird species listed as special conservation interests for this SPA.
Qualifying interests	Annex I-listed bird species: bar-tailed godwit, common tern (breeding), golden plover, ruff, whooper swan. Other birds of special conservation interest include black-headed gull, black-tailed godwit, common gull, curlew, dunlin, great crested grebe, grey heron, grey plover, lapwing, lesser black-backed gull, little grebe, oystercatcher, pintail, red-breasted merganser, redshank, shelduck, shoveler, teal, and widgeon. This site is an internationally important wetland site supporting > 20,000 wintering waterfowl.
References and further information	*Conservation Objectives for Cork Harbour SPA [004030]* (NPWS), *Natura 2000 Standard Data Form* (NPWS), *Site Synopsis Cork Harbour SPA Site Code 004030* (NPWS) (see www.npws.ie for further details)

2. DETAILS OF PROPOSED DEVELOPMENT

Reference no.	Old Mallow Road
Development consent type	*Part 8 Planning Application*
Development location	*Old Mallow Road, Blackpool, Cork*
Description of development	*The development is the demolition of existing structures followed by the construction of 57 no. units and all associated ancillary works.*
Distance from cSAC	*c. 10km*
Distance from SPA	*c. 6km*
Relevant strategies or policies	*Cork City Development Plan 2015-2021*
EIA submitted?	*EIA Screening submitted, EIA N/A*

3. ASSESSMENT OF LIKELY DIRECT, INDIRECT AND CUMULATIVE EFFECTS

	Yes / No
1. Is the proposed development directly connected to or necessary for the conservation management of the SPA and/or cSAC? *(If yes, no further assessment required. If no, screening required.)*	*No*
2. Is the proposed development located within or partly within the SPA?	*No*
3. Is the proposed development located within 100m of the SPA?	*No*
4. Does the proposed project involve the development, extension or upgrade of a cycleway or walkway within 200m of the SPA?	*No*
5. Does the proposed development involve development in the intertidal or coastal zone within the potential impact zone of the SPA?	*No*
6. Could the proposed project increase the level of recreational or other use of marine or intertidal areas within the potential impact zone of the SPA?	*No*
7. Does the proposed development involve the excavation of previously undeveloped land within an area that has been identified to be at risk of flooding within the potential impact zone of the SPA?	*No*
8. Does the proposed development involve the removal of significant amounts of topsoil within 100m of the SPA?	*No*
9. Does the existing wastewater treatment system have the capacity to treat any additional loading?	*N/A*
10. Would the proposed development result in direct surface water or other discharge to water bodies in or feeding into the SPA or cSAC? Would it result in additional storm flows into a combined sewer and subsequently into a combined sewer overflow (CSO), resulting in increased frequency, quantity and/or duration of overflow from the CSO to watercourses feeding into the European sites?	*No*

3. ASSESSMENT OF LIKELY DIRECT, INDIRECT AND CUMULATIVE EFFECTS

	Yes / No
11. Would the proposed development involve dredging or could it result in the mobilisation of marine sediments in the Harbour area?	*No*
12. Could the proposed development give rise to increased risk of oil or chemical spillage or leaks within the marine environment or watercourse within the potential impact zone for the SPA or cSAC?	*No*
13. Are there relevant plans or projects which, in combination with the proposed development, are likely to give rise to any cumulative effects?	*No*

Comments or notes

The Appropriate Assessment Screening concluded that the proposed development would not be likely to have a significant effect on any Natura 2000 site.

4. SCREENING CONCLUSION STATEMENT

In view of the above it is considered that *(tick one box only)**:***

☐ **Appropriate Assessment is not required**
The proposed development is directly connected / necessary to the conservation management of a site.

X **Appropriate Assessment is not required**
It can be excluded through screening that the proposed development will have significant effects on the sites.

☐ **Further information is required**
Potential impacts have been identified through initial screening and/or there is insufficient information to enable the planning authority to screen out impacts, but on balance it is determined that the issues could be resolved through minor modifications to the proposed development or by appropriate conditions. The information required is specified below.

☐ **Appropriate Assessment is required**
Significant issues have been identified and/or significant effects are certain, likely or uncertain, and the submission of a Natura Impact Statement (NIS) is required, or the proposed development must be rejected.

Further information required / Comments or Notes

The Appropriate Assessment Screening concluded that the proposed development would not be likely to have a significant effect on any Natura 2000 site.

Please refer to Appendix A for report titled; Appropriate Assessment Screening prepared by HW Planning, dated September 2019.

Name:	Tadhg Keating
Position:	Interim Director of Service - Housing
Date:	28th July 2020

Appendix A;
Appropriate Assessment Screening Report

hw planning

Appropriate Assessment Screening Report

Proposed Residential Development at Old Mallow Road, Blackpool, Cork.

Client: Murnane & O'Shea Ltd.

September 2019

Connecting people.
Connecting places.

Contents

1

Introduction 1

Appropriate Assessment Screening 1

Appropriate Assessment Pro-Forma 2

European Site Data 2

Details of Proposed Development 3

Assessment of likely, direct, indirect and cumulative effects 4

Conclusion 6

01//

Introduction

Appropriate Assessment Screening

The Habitats Directive (Council Directive 92/43/EEC) requires that plans and projects be screened for potential impacts on Special Areas of Conservation (SACs) or Special Protection Areas (SPAs). An Appropriate Assessment (AA) Screening pro-forma is included in Appendix A of this report with relevant site information to assist Cork City Council in the completion of the AA process.

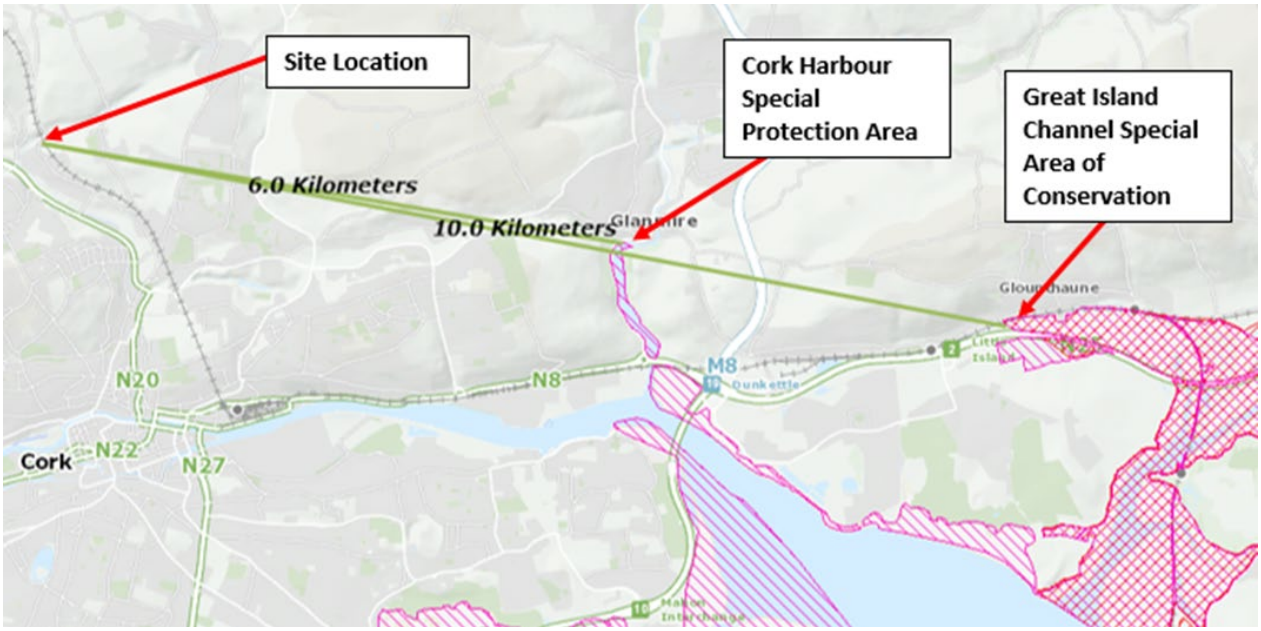


Figure 01: Site location relative to Natura 2000 sites

The map above highlights that the closest Natura 2000 site is the Cork Harbour SPA, located approximately 6 km to the east of the proposed development site and separated by other housing development, industry, utilities and road infrastructure networks. It is objectively concluded that no significant effects from the development are likely to occur in relation to identified Natura 2000 sites. The development is not part of any designated Natura 2000 site and does not overlap with them, thereby ruling out any direct habitat loss. No indirect hydrological impacts on the Natura 2000 sites are expected as a result of the proposed development due to the absence of any hydrological links. The development will not cause disturbance/displacement impacts on species that form qualifying interests of the Cork Harbour SPA due to its urban setting and distance between the development site and SPA.

02//

Appropriate Assessment Pro-Forma

European Site Data

Great Island Channel Special Area of Conservation (site code 001058)	
Conservation Objective	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.
Qualifying interests	Annex I listed habitats: [1140] Tidal Mudflats and Sandflats [1330] Atlantic Salt Meadows
References and Further Information	Conservation Objectives for Great Island Channel SAC [001058] (NPWS), Natura 2000 Standard Data Form (NPWS), Site Synopsis Great Island Channel Site Code 001058 (NPWS) (see www.npws.ie for further details)

Cork Harbour Special Protection Area (site code 004030)	
Conservation Objective	To maintain or restore the favourable conservation condition of the bird species listed as special conservation interests for this SPA.
Qualifying interests	Annex I-listed bird species: - A004 Little Grebe, A005 Great Crested Grebe, A017 Cormorant, A028 Grey Heron, A048 Shelduck, A050 Wigeon, A052 Teal, A054 Pintail, A056 Shoveler, A069 Red-breasted Merganser, A130 Oystercatcher, A140 Golden Plover, A141 Grey Plover, A142 Lapwing, A149 Dunlin, A156 Black-tailed Godwit, A157 Bar-tailed Godwit, A160 Curlew, A162 Redshank, A179 Black-headed Gull, A182 Common Gull, A183 Lesser Black-backed Gull, A193 Common Tern, A999 Wetlands
References and Further Information	Conservation Objectives for Cork Harbour SPA [004030] (NPWS), Natura 2000 Standard Data Form (NPWS),

Details of Proposed Development

Development Location	Old Mallow Road, Blackpool, Cork.
Approx Distance from cSAC	10 km
Distance from SPA	6 km
Description of development	Construction of 57 no. residential units
Relevant strategies or policies	Cork City Development Plan 2015 - 2021
EIS submitted ?	EIA Screening Report also submitted
Screening report/NIS	EIA Screening Report also submitted

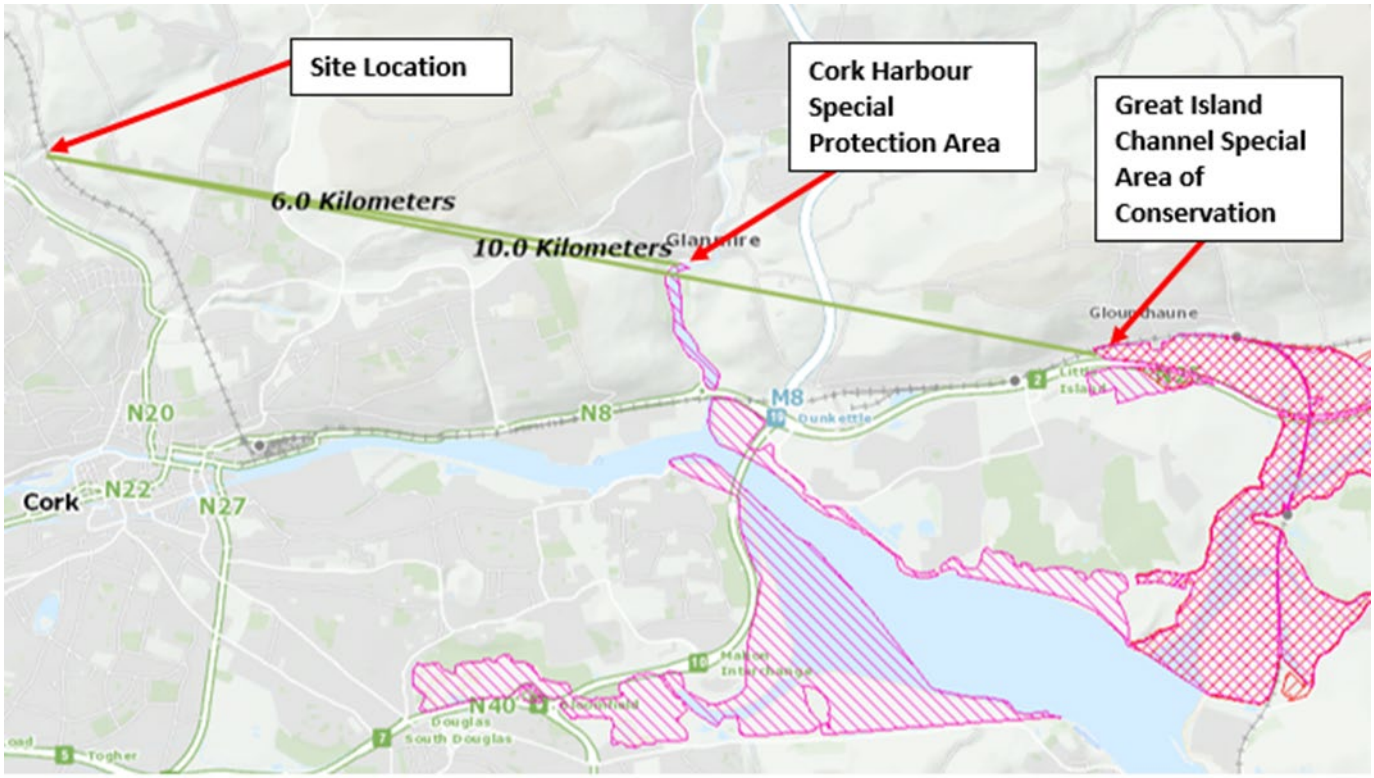


Figure 02: Site location relative to Natura 2000 sites

Assessment of likely, direct, indirect and cumulative effects

Is the proposed development directly connected to or necessary for the conservation management of the SPA and/or cSAC? (If yes, no further assessment required. If no, screening required.)	No
Is the proposed development located within or partly within the SPA?	No
Is the proposed development located within 100m of the SPA?	No
Does the proposed project involve the development, extension or upgrade of a cycleway or walkway within 200m of the SPA?	No
Does the proposed development involve development in the intertidal or coastal zone within the potential impact zone of the SPA?	No
Could the proposed project increase the level of recreational or other use of marine or intertidal areas within the potential impact zone of the SPA?	No
Does the proposed development involve the excavation of previously undeveloped land within an area that has been identified to be at risk of flooding within the potential impact zone of the SPA?	No
Does the proposed development involve the removal of significant amounts of topsoil within 100m of the SPA?	No
Does the existing wastewater treatment system have the capacity to treat any additional loading?	N/A
Would the proposed development result in direct surface water or other discharge to water bodies in or feeding into the SPA or cSAC	No
Would the proposed development involve dredging or could it result in the mobilisation of marine sediments in the Harbour area?	No
Could the proposed development give rise to increased risk of oil or chemical spillage or leaks within the marine environment or watercourse within the potential impact zone for the SPA or cSAC?	No
Are there relevant plans or projects which, in combination with the proposed development, are likely to give rise to any cumulative effects?	No

In view of the above it is considered that (tick one box only):	
☐	**Appropriate Assessment is not required.** The proposed development is directly connected / necessary to the conservation management of a site.
☒	**Appropriate Assessment is not required.** It can be excluded through screening that the proposed development will have No significant effects on the sites.
☐	**Further information is required.** Potential impacts have been identified through initial screening and/or there is insufficient information to enable the planning authority to screen out impacts, but on balance it is determined that the issues could be resolved through minor modifications to the proposed development or by appropriate conditions. The information required is specified below.
☐	**Appropriate Assessment is required**. Significant issues have been identified and/or significant effects are certain, likely or uncertain, and the submission of a Natura Impact Statement (NIS) is required, or the proposed development must be rejected.

Conclusion

The proposed development is remote from the nearest European sites and this Appropriate Assessment Screening therefore concludes that it would not be likely to have a significant effect on any Natura 2000 site.

Name: Harry Walsh

Position: Planning Consultant

Date: 12th September 2019

HW Planning
5 Joyce House,
Barrack Square,
Ballincollig, Co. Cork

www.hwplanning.ie
info@hwplanning.ie
+353 (0)21 487 3250

hw planning

SUB THRESHOLD EIA SCREENING REPORT
Old Mallow Road, Blackpool, Cork

Criteria for determining whether a development would or would not be likely to have significant effects on the environment as per the requirements of Article 120 of the Planning and Development Regulations 2001 as amended

1.	CHARACTERISTICS OF PROPOSED DEVELOPMENT
Size of Proposed Development	The construction works themselves will be confined to an area of approximately 1.68 ha and will be subject to a Construction and Environmental Management Plan to mitigate potential impacts. No significant negative impact likely.
Cumulation with other Proposed Development	The proposed development is generally compatible with the established surrounding area consisting of a variety of residential and commercial uses. There are no other known significant proposed developments in the immediate vicinity of the site. No significant negative impact likely.
The nature of any associated demolition works (* see article 8 of SI 235 of 2008)	The development involves the demolition of existing structures.
Use of Natural Resources	Energy, including electricity and fuels, will be required during both the demolition and construction phase. Construction will use various raw materials. No out of the ordinary use of natural resources is likely during the construction process. No significant negative impact likely.
Production of Waste	Waste will be generated during demolition and construction phases and these will be typical of development of this nature. A Construction and Environmental Management Plan and Waste Management Plan will be prepared which will fully assess any potential contamination from previous industrial uses on the site and the disposal of materials generated from the demolition of existing structures on the site. The Construction and Environmental Management and Waste Management Plans will be in full accordance with statutory legislation and associated guidance. This includes a suite of mitigation measures related to objectives contained in the Southern Region Waste Management Plan 2021. No significant negative impact likely.
Pollution and Nuisances	Redevelopment of site will increase traffic in the area for the duration of the construction phase. Temporary noise, dust and vibration impacts have been considered as part of a construction and environmental management plan which will be prepared. No significant negative impact likely.
Risk of Major Accidents	No negative impacts are foreseen, subject to strict compliance with standard environmental controls. No significant negative impact likely.
Risk to Human Health	Additional noise and dust from temporary construction works may be experienced by residents and other property users in the vicinity. This can be effectively managed, having regard to the nature of the project and the site's location within an urban context. On completion of works, noise and dust levels will return to background levels. No significant negative impact likely.

2.	LOCATION OF PROPOSED DEVELOPMENT
Existing Land Use	The site consists of a number of commercial premises with the northern portion of the site a vacant brownfield plot. The site currently represents an underutilised and inefficient use of lands within an established urban context. No significant negative impacts are likely.
Relative Abundance, Quality and regenerative Capacity of Natural Resources in the Area	The site is not located within any statutory designated area. An Appropriate Assessment (AA) Screening Report has been prepared in respect of the nearest designated Natura 2000 sites. This report has actively considered the potential for adverse impacts on qualifying interests, arising from the construction phase. No significant negative impact likely.
Absorption Capacity of the Natural Environment	Key principal natural resources in the area include the River Bride circa 140 metres to the west, which enters Cork Harbour downstream. Cork Harbour SPA is approximately 6 km east of the site and the Great Island SAC is approximately 6 km to the east. An Appropriate Assessment (AA) Screening Report. No significant negative impact likely

3.	CHARACTERISTICS OF POTENTIAL IMPACTS
Extent of the Impact	The site is located within an existing suburban context with a significant population in the immediate area. The proposal is not expected to produce a significant impact at either construction or operation phases. No significant impact likely.

Transfrontier nature of the Impact	No significant negative impact likely.
Magnitude and Complexity of the Impact	No significant negative impact likely.
Probability of the Impact	Some level of construction impact is highly probable, but these will be mitigated by standard best practice techniques identified in the Construction and Environmental Management Plan amd Demolition Plan to accompany the proposed development. No significant negative impact likely.
Duration, Frequency and Reversibility of the Impact	The construction impacts are expected to commence within approximately 6 months of planning approval. They will be short-term and restricted by planning conditions in terms of the hours of operation. No permanent negative impacts are anticipated as a result of the construction phase of the project. No significant negative impact likely.

SCREENING CONCLUSION STATEMENT

The Environmental Impact Assessment Screening therefore concludes that there is no real likelihood of significant effects and therefore an Environmental Impact Assessment is not required.

Please refer to Appendix A for report titled; EIA Screening prepared by HW Planning, dated September 2019.

Name:	Tadhg Keating
Position:	Interim Director of Service - Housing
Date:	28th July 2020

Appendix A;

EIA Screening

EIA Screening

Proposed Residential Development at Old Mallow Road, Blackpool, Cork.

Client: Murnane & O'Shea Ltd.

September 2019

Connecting people.
Connecting places.

Contents

Introduction **4**

1.1 Introduction 4

Project Details **6**

2.1 Characteristics of the Proposed Development 6

2.2 Description of Location of the Site 6

2.3 Description of Aspects of the Environment Likely to be significantly affected by the project 6

2.4. Expected Residues / Emissions / Production of Waste 7

2.5. Use of Natural Resources – Soil / Land / Water / Biodiversity 7

Assessment of EIA Requirement **8**

3.1. Annex III Criteria 8

Conclusions **17**

01//

Introduction

1.1 Introduction

This Environmental Impact Assessment Screening has been prepared by HW Planning on behalf of Murnane & O'Shea Ltd. to determine whether an Environmental Impact Assessment Report (EIAR) is required for a proposed residential development at Old Mallow Road, Blackpool, Cork.

Environmental Impact Assessment (EIA) is a procedure under the terms of European Directives on the assessment of the effects of certain public and private projects on the environment. In accordance with the provisions of Part X of the Planning and Development Act 2000 (as amended), an EIA shall be carried out in respect of an application for development which is specified in Schedule 5 of the Planning and Development Regulations 2001 (as amended) [the Regulations]. A mandatory EIA is required for developments which fall within the remit of Schedule 5.

In addition, a 'sub-threshold' EIA may be required, if the Planning Authority determines that the development would be likely to have significant effects on the environment. Schedule 7 of the Regulations, details the criteria for determining whether a development would, or would not be likely to have significant effects on the environment considering the characteristics of the proposed development, its location and characteristics of potential impacts.

Having regard to the above, the first step in the EIA process is to undertake a screening exercise to determine whether or not EIA is required for a particular project. This report considers same relative to European best practice guidance on such matters.

Article 4(4) of the Directive 2014/52/EU introduces a new Annex IIA to be used in the case of screening determinations. Annex IIA of Directive 2014/52/EU requires that the following information be provided by a developer in respect of projects listed in Annex II:

> *"1. A description of the project, including in particular:*
>
> *a) a description of the physical characteristics of the whole project and, where relevant, of demolition works;*
>
> *b) a description of the location of the project, with particular regard to the environmental sensitivity of geographical areas likely to be affected;*
>
> *2. A description of the aspects of the environment likely to be significantly affected by the project.*

3. A description of any likely significant effects, to the extent of the information available on such effects, of the project on the environment resulting from:

a) the expected residues and emissions and the production of waste, where relevant;

b) the use of natural resources, in particular soil, land, water and biodiversity.

4. The criteria of Annex III shall be taken into account, where relevant, when compiling the information in accordance with points 1 to 3".

02//

Project Details

2.1 Characteristics of the Proposed Development

The proposed scheme consists of the construction of 57 no. townhouse/duplex residential units contained in 11 no. blocks and consisting of 25 no. 3 bedroom units, 28 no. 2 bedroom units and 4 no. 1 bedroom units. The proposed development will be accessed via 2 no. entrances from the Old Mallow Road. The proposed development will involve the demolition of all existing structures on the site.

2.2 Description of Location of the Site

The subject site, which is c.1.68 hectares in area is located along the Old Mallow Road to the north of Blackpool and northwest of Cork City. The site is located to the western side of the main rail line serving Kent Station. The site is currently in use as the Boland Industrial Estate which contains number of commercial premises including a car sales and car tyre centre amongst others. The northern most part of the site is currently vacant brownfield land.

The character of the immediate local area is defined by a mixture of land uses including a number of residential dwelling houses to the northwest and southeast of the site and a variety of industrial /commercial uses to the west and south of the site. The site is included within the CSO small area designated as 048019004 with a total population of 304 no. people. The total housing stock was 108, of which vacant households (excluding holiday homes) numbered 5.

The site is zoned for 'Light Industry and Related Uses' in the Cork City Development Plan 2015 -2021 (CCDP).

There are no watercourses located within the site. The closest river is the River Bride circa 140m to the west.

The site is not located within a Flood Risk Zone.

The site is not located within a Zone of Archaeological Potential.

The site is not within an Architectural Conservation Area.

The subject site is generally remote from designated Natura 2000 sites, with Cork Harbour Special Protection Area (SPA) approximately 6 km to the east.

2.3 Description of Aspects of the Environment Likely to be significantly affected by the project

The most significant possible negative effects on the environment, without appropriate mitigation measures in place, are likely to be:

- Population growth resulting in increased demand for waste infrastructure, water supply and impacting potable water quality;
- Construction and operational traffic contributing to traffic congestion and road safety hazards on the local road network;
- Adverse health and amenity effects arising from noise pollution during construction and operational phases;
- Increased demand on recreation and amenity services;

- The noise generated from construction activities and related powered mechanical equipment have the potential to pose adverse noise impacts to existing surrounding sensitive receivers;
- Possible effects include a risk of inadequacy or malfunction of the sewage system resulting in contamination, odour and potential human health impacts. A lack of capacity in the water or sewer network, could result in a lack of supply to residential units;
- A lack of capacity in the electricity, gas and telecommunications networks could result in shortages, outages, and disruptions in services for local residents.
- Due to the sites history of industrial uses there may be a risk of industrial contamination on site.

2.4. Expected Residues / Emissions / Production of Waste

It is expected that there will be some normal residues/emissions during the construction stage. Standard dust and noise prevention mitigations measures as per the majority of planning applications of all scales will be employed and monitored. As such, pollution and nuisances are not considered likely to have the potential to cause significant effects on the environment. There will be some waste produced in the construction of the proposed scheme, but this will be subject to normal controls. It will be disposed of using licensed waste disposal facilities and contractors. The scale of the waste production in conjunction with the use of licensed waste disposal facilities and contractors does not cause concern for likely significant effects on the environment. Any mitigations measures to manage noise, dust and/or pollution during the construction and operational phases are subject to standard policies and practices.

2.5. Use of Natural Resources – Soil / Land / Water / Biodiversity

There will be no significant likely effects on the environment in relation to natural resources in the area. The scale of natural resources used both in construction and operation is not such that would cause concern in terms of significant likely effects on the environment. The development will not result in high demand for water use.

As outlined in the prepared Appropriate Assessment Screening, there is no likelihood of significant effects on the nearest European sites, namely the Great Island Channel SAC or the Cork Harbour SPA.

03//

Assessment of EIA Requirement

3.1. Annex III Criteria

Article 93 and Schedule 5 of the 2001 Planning and Development Regulations sets out the classes of development for which a planning application must be accompanied by an Environmental Impact Assessment Report (EIAR). Part 1 and Part 2 Schedule 5 of the Planning and Development Regulations, 2001 defines the categories and thresholds of developments requiring EIA. The subject proposal does not come under any of the stipulated categories contained in Part 1.

The proposed development for residential accommodation and ancillary works falls within the category of an 'Infrastructure Project' under Schedule 5 (10) (b) of the Planning and Development Regulations, which provides that a mandatory EIAR must be carried out for the following projects:

"b)

(i) Construction of more than 500 dwellings

(ii) Construction of a car-park providing more than 400 spaces, other than a car-park provided as part of, and incidental to the primary purpose of, a development.

(iii) Construction of a shopping centre with a gross floor space exceeding 10,000 square metres.

(iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.

(In this paragraph, "business district" means a district within a city or town in which the predominant land use is retail or commercial use.)"

The proposed development does not trigger a requirement for mandatory EIA because:

- At 57, the number of housing units falls below the threshold of 500 dwellings.
- The site area at 1.68 ha is well below the 10 ha threshold.

Schedule 7 of the Regulations details the criteria the planning authority must consider in determining whether a sub-threshold EIA should be undertaken. This schedule is a direct transposition of Annex III of EU Directive 2011/92/EU. EU Directive 2014/52/EU provides a revised Annex III and its transposition into national legislation is mandatory. Accordingly, the following provides a screening statement of the proposed development against the Annex III criteria of 2014/52/EU.

Criteria for assessment of EIA sub-threshold	Impacts during Construction Phase
1. Characteristics of proposed development The characteristics of the proposed development, in particular	
- The size of the proposed development	The construction works themselves will be confined to an area of approximately 1.68 ha and will be subject to a Construction and Environmental Management Plan to mitigate potential impacts. No significant negative impact likely.
- the cumulation with other proposed development	The proposed development is generally compatible with the established surrounding area consisting of a variety of residential and commercial uses. There are no other known significant proposed developments in the immediate vicinity of the site. No significant negative impact likely.
- the use of natural resources, in particular land, soil, water and biodiversity	Energy, including electricity and fuels, will be required during both the demolition and construction phase. Construction will use various raw materials. No out of the ordinary use of natural resources is likely during the construction process. No significant negative impact likely.
- the production of waste	Waste will be generated during demolition and construction phases and these will be typical of development of this nature. A Construction and Environmental Management Plan and Waste Management Plan will be prepared which will fully assess any potential contamination from previous industrial uses on the site and the disposal of materials generated from the demolition of existing structures on the site. The Construction and Environmental Management and Waste Management Plans will be in full accordance with statutory legislation and associated guidance. This includes a suite of mitigation measures related to objectives contained in the Southern Region Waste Management Plan 2021. No significant negative impact likely.
- pollution and nuisances	Redevelopment of site will increase traffic in the area for the duration of the construction phase. Temporary noise, dust

	and vibration impacts have been considered as part of a construction and environmental management plan which will be prepared. No significant negative impact likely.
- the risk of major accidents and/or disasters which are relevant to the project concerned, including those caused by climate change, in accordance with scientific knowledge	No negative impacts are foreseen, subject to strict compliance with standard environmental controls. No significant negative impact likely.
- the risk to human health (for example due to water contamination or air pollution)	Additional noise and dust from temporary construction works may be experienced by residents and other property users in the vicinity. This can be effectively managed, having regard to the nature of the project and the site's location within an urban context. On completion of works, noise and dust levels will return to background levels. No significant negative impact likely.
2. Location of proposed development The environmental sensitivity of geographical areas likely to be affected by proposed development, having regard to:	
- the existing land use	The site consists of a number of commercial premises with the northern portion of the site a vacant brownfield plot. The site currently represents an underutilised and inefficient use of lands within an established urban context. No significant negative impacts are likely.
- the relative abundance, quality and regenerative capacity of natural resources in the area	The site is not located within any statutory designated area. An Appropriate Assessment (AA) Screening Report has been prepared in respect of the nearest designated Natura 2000 sites. This report has actively considered the potential for adverse impacts on qualifying interests, arising from the construction phase. No significant negative impact likely.
- the absorption capacity of the natural environment, paying attention to the following areas:	Key principal natural resources in the area include the River Bride circa 140 metres to the west, which enters Cork Harbour downstream. Cork Harbour SPA is approximately 6 km east of the site and the Great Island SAC is approximately

(a) wetlands, (b) coastal zones, (c) mountain and forest areas, (d) nature reserves and parks, (e) areas classified or protected under legislation, including special protection areas designated pursuant to Directives 79/409/EEC and 92/43/EEC, (f) areas in which the environmental quality standards laid down in legislation of the EU have already been exceeded, (g) densely populated areas, (h) landscapes of historical, cultural or archaeological significance	6 km to the east. An Appropriate Assessment (AA) Screening Report. No significant negative impact likely.
3. Characteristics of potential impacts The potential significant effects of proposed development in relation to criteria set out under paragraphs 1 and 2 above, and having regard in	
- the magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected)	The site is located within an existing suburban context with a significant population in the immediate area. The proposal is not expected to produce a significant impact at either construction or operation phases. No significant impact likely.
- the nature of the impact	Potential for the human environment to be impacted negatively during the construction phase by way of traffic disruption, noise and dust issues etc. Any impacts will be localised and temporary in nature and are not deemed to be significant. These will be proactively managed alongside environmental protection measures. No significant negative impact likely.
- the transboundary nature of the impact	No significant negative impact likely.
- the intensity and complexity of the impact	The intensity and complexity of the construction phase is in keeping with modern construction projects.

	No significant negative impact likely.
- the probability of the impact	Some level of construction impact is highly probable, but these will be mitigated by standard best practice techniques identified in the Construction and Environmental Management Plan amd Demolition Plan to accompany the proposed development. No significant negative impact likely.
- the expected onset, duration, frequency and reversibility of the impact.	The construction impacts are expected to commence within approximately 6 months of planning approval. They will be short-term and restricted by planning conditions in terms of the hours of operation. No permanent negative impacts are anticipated as a result of the construction phase of the project. No significant negative impact likely.
- cumulation of the impact with the impact of other existing and/or approved projects.	There are no existing or approved projects of a significant scale identified within the vicinity of the proposed development. No significant negative impact likely.
- The possibility of effectively reducing the impact	There is a strong possibility of reducing potential impacts arising from the construction phase through appropriate project management and the application of identified best practice construction and environmental protection methods. The development will be accompanied by a Construction and Environmental Management Plan and associated documents will function as a proactive toolkit to significantly reduce the potential for adverse impacts. No significant negative impact likely.

Criteria for assessment of EIA sub-threshold	Impacts during Operational Phase
1. Characteristics of proposed development The characteristics of the proposed development, in particular	
- The size of the proposed development	Scale and height are in accordance with the prevailing pattern of development in the area. No significant negative impact likely.
- the cumulation with other proposed development	The proposed development will be generally compatible with nearby and adjacent uses. There are a number of existing residential properties along the northern side of the Old Mallow Road and an existing permission under Cork City Council reference 14/36179 for the construction of 6 no. dwelling houses at the site immediately south east of the subject site. No significant negative impact likely
- the use of natural resources, in particular land, soil, water and biodiversity	Water, consumption of electricity, energy related to the residential use. No out of the ordinary use of natural resources is likely during the operation phase. No significant negative impact likely.
- the production of waste	Domestic waste will be generated from the proposed residential development, the disposal of which will be carried out by licenced contractors in the area. No significant negative impact likely.
- pollution and nuisances	The proposal will give rise to an increase in traffic and visitor numbers to/from site. The impact of additional traffic is considered to be minimal given the scale of the development. The Traffic and Transport Assessment Guidelines indicate various thresholds above which traffic assessment s should apply. They refer to residential developments of minimum 100 units within urban areas of 30,000 population or more as being appropriate. The proposal aims to construct 57 units in an urban area of approximately 200,000. No significant negative impact likely.

- the risk of major accidents and/or disasters which are relevant to the project concerned, including those caused by climate change, in accordance with scientific knowledge	None foreseen, subject to compliance with standard environmental controls. No significant negative impacts are likely.
- the risk to human health (for example due to water contamination or air pollution)	None. The development will not involve the use, storage, transport, handling or production of substances or materials which could be harmful to people and the environment. it is considered that this proposal has the potential to have a long-term beneficial impact on human health as a consequence of facilitating sustainable urban development incorporating public and private open space areas. No significant negative impact likely.
2. Location of proposed development The environmental sensitivity of geographical areas likely to be affected by proposed development, having regard to:	
- the existing land use	The proposed development will reflect a change of use of the site from an industrial/commercial brownfield site to residential use. While the proposed development will result in a loss of industrial land, we consider that residential development represents a more efficient and sustainable use of the site. No significant negative impact likely.
- the relative abundance, quality and regenerative capacity of natural resources in the area	The proposed operational phase will not have any out of the ordinary impact on natural resources. No significant negative impact likely.
- the absorption capacity of the natural environment, paying attention to the following areas: - wetlands, - coastal zones, - mountain and forest areas,	Proposed use is compatible with the geographical area. The high quality architectural design will contribute to the urban landscape. The provision of trees and landscaping planting will assimilate the development in its local context and contribute towards an attractive environment. No significant negative impact likely.

- nature reserves and parks, - areas classified or protected under legislation, including special protection areas designated pursuant to Directives 79/409/EEC and 92/43/EEC, - areas in which the environmental quality standards laid down in legislation of the EU have already been exceeded, - densely populated areas, - landscapes of historical, cultural or archaeological significance	
3. Characteristics of potential impacts The potential significant effects of proposed development in relation to criteria set out under paragraphs 1 and 2 above, and having regard in	
- the magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected)	The proposal is for 57 units and is sub-threshold for the purposes of EIA [Schedule 5, Part 2, Section 10 (b)(iv) of 2001 Planning and Development Regulations]. Development will be compatible with its suburban context and consistent with zoning objectives. The scale of the development will be comparable to similar nearby developments in the area. No significant negative impact likely.
- the nature of the impact	Expected benefits to physical, micro and macro environments fostering the envisaged growth of Cork City as outlined in the National Planning Framework. The effects will be significant and overtly positive in nature. No significant negative impact likely.
- the transboundary nature of the impact	An Appropriate Assessment screening has been prepared which will consider the potential for significant effects on designated Natura 2000 sites, including transboundary impacts. No operational phase transboundary impacts are envisaged at this time. No significant negative impact likely.

- the intensity and complexity of the impact	The operational phase of the development is considered to be a moderate, low impact land use. No significant negative impact likely.
- the probability of the impact	The operational phase will inevitably change the local environment. Measures are in place to avoid, reduce, or mitigate any likely negative impacts. No significant negative impact likely.
- the expected onset, duration, frequency and reversibility of the impact.	Once constructed, the proposal will be permanent and non-reversible. No significant negative impact likely.
- cumulation of the impact with the impact of other existing and/or approved projects.	The redevelopment of the subject site is supported by adopted plans and policy objectives which have been subject to Strategic Environmental Assessment. There are no identified projects that are planned in the immediate area. Given that the majority of zoned lands in the area are already developed for a variety of land uses it is unlikely that any future projects will produce any significant cumulation of impact. No significant negative impact likely.
- The possibility of effectively reducing the impact	The proposal will be developed in accordance with the latest Building regulations resulting in energy efficient A-rated residential units with a relatively low carbon footprint across their lifespan. The introduction of such energy efficient housing represents an improvement in comparison to the majority of existing housing stock in the area and will ensure that the environmental impact of the development will be minimal. No significant negative impact likely.

Based on the information provided in accordance with Annex IIA and Annex III of the 2014 Directive, it is considered that a sub-threshold EIA is not required for the proposed development, as adequate measures are in place to avoid, reduce or mitigate likely impacts, such that neither the construction nor operational phase of the overall development will have a significant negative impact on the environment.

04//

Conclusions

When screened in accordance with EU Screening Guidelines, the proposed development is not a project defined by Part 1 and Part 2 Schedule 5 of the Planning and Development Regulations 2001as requiring a mandatory Environmental Impact Assessment Report (EIAR).

Having regard to the envisaged nature, extent and characteristics of likely impacts from the development, we do not consider that a sub threshold EIAR would be warranted in this case in accordance with Article 103 of the Regulations. Based on the screening assessment undertaken, it is likely that the construction phase of the project will result in a number of short-term construction related impacts of temporary duration only. A Construction Management Plan will be prepared to proactively manage and mitigate against potential impacts on natural and human environments. This comprises standard best practice construction environmental management measures.

A precautionary approach has been taken to the design of the subject proposal having regard to all identified potential environmental considerations. In relation to operational impacts, the proposed development at Blackpool will contribute positively to the realisation of a number of key policy objectives in full accordance with the proper planning and sustainable development of the area.

This Environmental Impact Assessment Screening therefore concludes that there is no real likelihood of significant effects and therefore an Environmental Impact Assessment is not required.

DOSA

DENIS O'SULLIVAN & ASSOCIATES

CONSULTING ENGINEERS

RESIDENTIAL DEVELOPMENT, FORMER BOLAND'S YARD, OLD MALLOW ROAD

FIRE CONSULTANT'S REPORT

DATE 13/09/2019

REVISION 0

JOB NO. 4828

Joyce House, Barrack Square, Ballincollig, Co. Cork

T 021 4871781 E info@dosa.ie W www.dosa.ie

DOCUMENT CONTROL

PROJECT NAME: Residential Development, Former Boland's Yard, Old Mallow Road

PROJECT NUMBER: 4828

REVISION	DATE	FILE NAME: Residential Development, Former Boland's Yard, Old Mallow Road			
0	13.09.2019	DESCRIPTION: Fire Consultant's Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	CO'S	CO'S	CO'S
		DATE	13.09.2019	13.09.2019	13.09.2019
Choose an item.	Insert Date	FILE NAME:			
		DESCRIPTION: Fire Consultant's Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	Choose an item.	Choose an item.	Choose an item.
		DATE	Insert Date	Insert Date	Insert Date
Choose an item.	Insert Date	FILE NAME: Residential Development, Former Boland's Yard, Old Mallow Road			
		DESCRIPTION: Fire Consultant's Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	CO'S	CO'S	CO'S
		DATE	Insert Date	Insert Date	Insert Date
#	Insert Date	FILE NAME:			
		DESCRIPTION: Insert description			
			PREPARED	CHECKED	APPROVED
		INITIAL	Initials	Initials	Initials
		DATE	Insert Date	Insert Date	Insert Date
#	Insert Date	FILE NAME:			
		DESCRIPTION: Insert description			
			PREPARED	CHECKED	APPROVED
		INITIAL	Initials	Initials	Initials
		DATE	Insert Date	Insert Date	Insert Date

Contents

1 Introduction 1

2 Building Regulations 1

2.1 Fire Regulations 2

2.1.1 Design Criteria 2

2.1.2 Building Classification 2

2.1.3 Outline Description of the Building 2

2.1.4 BS 9991:2015 - Fire Safety in the design, management and use of residential buildings – Code of practice 2

2.1.5 Section 2 Clause 5 General 3

2.1.6 Section 2 Clause 6 Means of escape and provision for rescue from houses 3

2.1.7 Evacuation Considerations 3

2.1.8 Section B5 – Access & Facilities for the Fire Services 4

2.2 Fire Mains 4

2.2.1 Introduction 4

2.2.2 Sources of Water for Fire Fighting 4

2.2.3 Provision of Hydrants 4

2.3 Vehicle access 4

2.3.1 Introduction 4

2.3.2 Provision of Vehicle Access 4

2.3.3 Design of Access Routes and Hardstanding's 4

2.3.4 Personnel access to building for fire fighting 4

1 Introduction

Denis O'Sullivan & Associates were engaged as Consulting Engineers for the proposed development at the former Boland's Yard, Old Mallow Road, Cork.

This response in in relation to a questionnaire issued by Cork City Council in relation to the provision of Social Housing. The following paragraphs specifically address Compliance with the Building Regulations particularly Part B (Fire).

2 Building Regulations

The Irish Building Regulations will apply in full to the proposed development as listed in the table below:

Building Regulations 1997-2014 (SI 497 of 1997 as amended – refer to www.environ.ie for latest)

Building Regulations 1997-2014 (SI 497 of 1997 as amended – refer to www.environ.ie for latest)
Part A –Structure - 2012
Part B – Fire Safety - Volume 2 – Dwelling Houses - 2017
Part C – Site preparation and resistance to moisture - 2004
Part D – Materials and workmanship - 2013
Part E – Sound - 2014
Part F –Ventilation - 2011
Part G – Hygiene - 2008
Part H – Drainage and wastewater disposal - 2016
Part J – Heat producing appliances - 2014
Part K – Stairways, ladders, ramps and guards -2014
Part L – Conservation of Fuel and Energy – Dwellings - 2017
Part M – Access and Use - 2010

For products or systems that do not fall within the scope of existing standards, or deviate from established norms, third party certification should be used to demonstrate compliance with the Irish Building Regulations.

The Contractor will comply with all relevant & applicable EN Standards & Codes of Practice. Irish Standards and British Standards (or equivalent) are applicable where no equivalent EN standard exists.

All Local Authority Codes of Practice are applicable, along with all statutory regulations appropriate to the provision of Housing will apply.

All Codes of practice, standards, and requirements of the statutory service providers (ESBN, GBN, Irish Water, Cork City Council, Eir, etc.) are applicable in full to the development.

2.1 Fire Regulations

A Fire Safety Compliance report will be developed setting out the means by which compliance with Part B (Fire Safety) of the second schedule to the Building Regulations 1997 to 2006 is to be achieved for the proposed construction of the development, particularly the apartments.

2.1.1 Design Criteria

This specification and calculations will be based on the following design guides:

- → Technical Guidance Document B- Fire (TGD 'B'), published by The Minister for the Environment under Article 7, of the Building Regulations
- → BS 9991:2015 - Fire Safety in the Design, Management and use of Residential Buildings - Code of Practice
- → BS 5588-8:1999 - Fire Precautions in the Design, Construction and use of Buildings Part 8: Code of practice for means of escape for disabled people
- → BRE 187 - External Fire Spread: Building Separation and Boundary Distances
- → I.S. 3218: 2013 - Code of Practice for Fire Detection and Alarm Systems.
- → I.S. 3217: 2013 - Code of Practice for Emergency Lighting.
- → BS 7346-8: 2013 Components for smoke control systems. Code of practice for planning, design, installation, commissioning and maintenance
- → BS 5306: Part 1: 2006 Code of practice for fire extinguishing installations and equipment on premises. Hose reels and foam inlets.

2.1.2 Building Classification

The main use of the apartments is classified as Purpose Group 1(c), Flat or Maisonette, as per Table 0.1 TGD 'B', Classification of Buildings by purpose group. Therefore, the design for horizontal and vertical escape will be assessed under BS 9991:2015 - Fire Safety in the Design, Management and use of Residential Buildings - Code of Practice

2.1.3 Outline Description of the Building

The proposed apartments are 3-storey buildings some of while are duplex apartments with own door access while the dwellings are 2 storeys. The proposed apartment buildings will be constructed with double leaf masonry walls with concrete first floors and second floors. The second floor within the duplex apartments may be constructed with either timber or concrete. The 3-storey apartment buildings will be served by a central stair core while the duplex apartments will each be serviced by a single access stair.

2.1.4 BS 9991:2015 - Fire Safety in the design, management and use of residential buildings – Code of practice

The apartment buildings will be assessed under the following sections of BS 9991:2015 – Fire safety in the design, management and use of residential buildings – Code of practice:

- Section 2: Designing means of escape
  - Clause 5 General,
  - Clause 6 Means of escape and provision for rescue from houses,

    - Clause 7 Means of escape from flats and maisonettes,
    - Clause 9 Internal planning of flats and maisonettes,
- Section 3: Active fire protection
    - Clause 14 Smoke Control
- Section 5: Stairs and final exits
    - Clause 27 Number and siting of common stairs
    - Clause 28 Width of common stairs
    - Clause 29 Enclosure of common stairs
    - Clause 30 Basement stairs
    - Clause 31 Stairs within mixed-use developments
    - Clause 32 Access lobbies and corridors to protected stairways
    - Clause 33 External stairs
    - Clause 34 Discharge from common stairs and final exits
- Section 7: Ancillary accommodation to flats and maisonettes
    - Clause 37 General recommendations for ancillary accommodation
    - Clause 45 Lift machine rooms and machinery spaces
    - Clause 46 Communal heating, ventilation and air conditioning systems
    - Clause 47 Refuse storage, disposal and incineration
- Annex D Private balconies (open or enclosed) and communal roof gardens

2.1.5 Section 2 Clause 5 General

2.1.5.1 Escape by way of doors and windows

The ground floor units will have direct access from the ground floor and as such could be treated as a house. However, the Flat corridor will be constructed with 30-minute fire resistant construction and therefore will not require the windows to be sized for escape purposes. Private balconies will be in accordance with Annex D

2.1.6 Section 2 Clause 6 Means of escape and provision for rescue from houses

2.1.6.1 Two-storey houses

The 2-storey houses will all have direct access from the ground floor and will all be treated as houses and all habitable rooms will have windows sized for escape purposes.

2.1.6.2 Inner rooms in houses

There is no habitable room which is an inner room.

2.1.7 Evacuation Considerations

2.1.7.1 General

Normal "self-help" evacuation procedures will be used in all buildings. For people with disabilities a refuge area will be provided in the escape stairs from which further evacuation can be made under less pressure of time as per BS 5588-8:1999.

2.1.7.2 Compartmentation

The buildings will be constructed so that each flat is constructed as a compartment. All floors in the building between apartments will be constructed as compartment floors. Each compartment is separated from each other by 60-minute compartment walls and floors. All dwellings will be separated by a 60-minute vertical separating wall and will be fire-stopped in accordance with TDG 'B'.

2.1.8 Section B5 – Access & Facilities for the Fire Services

2.2 Fire Mains

2.2.1 Introduction

The site receives fire-fighting water from the public mains. Fire hydrants will be located at various locations throughout the development.

2.2.2 Sources of Water for Fire Fighting

Water for firefighting purposes will be provided from the public water main (see site location map) complying with the requirements of TGD 'B'.

2.2.3 Provision of Hydrants

The location of fire hydrants will be in accordance with Diagram 30 of TGD 'B'. The water main will provide adequate flows and pressures for firefighting purposes.

2.3 Vehicle access

2.3.1 Introduction

Fire brigade vehicle access to the exterior of the building will be in accordance with TGD 'B'.

2.3.2 Provision of Vehicle Access

Fire appliances will have access to the front elevations of all building from the internal estate roads which will comply with either 'Recommendations for Site Development Works for Housing Areas' (Department of the Environment and Local Government, October 1998) or The 'Design Manual for Urban Roads and Street' (Department of Transport, Tourism and Sport and the Department of Environment, Community and Local Government) or Making Places : a design guide for residential estate development (by Melville Dunbar Associates and Cork County Council).

2.3.3 Design of Access Routes and Hardstanding's

The required minimum clear widths as shown in Diagram 32 of TGD 'B' can all be achieved for pumping appliances as the street's widths are adequate. Turning facilities for appliances will be provided in any dead-end access routes that are more than 20m long in accordance with Table 5.2 TGD 'B'.

2.3.4 Personnel access to building for fire fighting

Access to the buildings for firefighting purposes are by way of the normal exit / entrance doors.

DOSA

DENIS O'SULLIVAN & ASSOCIATES

CONSULTING ENGINEERS

INFRASTRUCTURE REPORT, OLD MALLOW ROAD, BLACKPOOL, CORK

INFRASTRUCTURE REPORT

DATE 31/03/2020

REVISION 0

JOB NO. 4828

Joyce House, Barrack Square, Ballincollig, Co. Cork

T 021 4871781 E info@dosa.ie W www.dosa.ie

DOCUMENT CONTROL

PROJECT NAME: Infrastructure Report, Old Mallow Road, Blackpool, Cork

PROJECT NUMBER: 4828

REVISION	DATE	FILE NAME: Infrastructure Report, Old Mallow Road, Blackpool, Cork			
0	12.09.2019	DESCRIPTION: Infrastructure Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	SO'G	SO'G	SO'G
		DATE	12.09.2019	12.09.2019	12.09.2019
1	31.03.2020	FILE NAME: Infrastructure Report, Old Mallow Road, Blackpool, Cork			
		DESCRIPTION: Infrastructure Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	SO'G	SO'G	SO'G
		DATE	31.03.2020	31.03.2020	31.03.2020
#	Insert Date	FILE NAME:			
		DESCRIPTION: Insert description			
			PREPARED	CHECKED	APPROVED
		INITIAL	Initials	Initials	Initials
		DATE	Insert Date	Insert Date	Insert Date
#	Insert Date	FILE NAME:			
		DESCRIPTION: Insert description			
			PREPARED	CHECKED	APPROVED
		INITIAL	Initials	Initials	Initials
		DATE	Insert Date	Insert Date	Insert Date
#	Insert Date	FILE NAME:			
		DESCRIPTION: Insert description			
			PREPARED	CHECKED	APPROVED
		INITIAL	Initials	Initials	Initials
		DATE	Insert Date	Insert Date	Insert Date

Contents

1 Introduction 1

2 Surface Water System 2

2.1 Surface Water Drainage Network 2

2.2 Stormwater Attenuation Strategy 3

2.2.1 Pre-Development Conditions 3

2.2.2 Post-Development Conditions 4

2.3 Attenuation Tank 5

2.3.1 Volume of Attenuation Tank 5

2.4 Hydrocarbon Treatment 5

2.5 Silt Control 6

3 Foul Sewer System 7

3.1 Foul Sewer Design 7

3.1.1 Development Breakdown 7

4 Water Supply 8

5 Summary of Results 9

Appendix B – Allowable Runoff QBAR Values 12

Appendix C – 1 in 2 Year Design Sheets 13

Appendix D – 1 in 100 Year Design Sheets 14

Appendix E – Foul Sewer Design Sheets 15

Appendix F – Storm Water Longitudinal Sections 16

Appendix G – Foul Sewer Longitudinal Sections 17

Appendix H – Petrol Interceptor Details 18

Appendix J – Hydrobrake Details 19

1 Introduction

Denis O'Sullivan & Associates were engaged as Consulting Engineers for the proposed development at Old Mallow Road, Blackpool, Cork.

This Report was compiled in relation to a questionnaire issued by Cork City Council in relation to the provision of social Housing.

The proposed development area comprises of approximately 1.55 hectares in total. Denis O'Sullivan & Associates carried out a number of site investigations and their findings have been incorporated to deal with solutions to:

- Surface Water Drainage Network
- Foul Drainage Network
- Water Supply

The proposals for the foul sewer & water infrastructure associated with this development were discussed with Mr. Michael Galvin Senior Design Engineer, Southern Region, Irish Water, Mr. Brian O' Mahony, Design Engineer, Southern Region, Irish Water & Mr. Brian Lyons, Design Engineer, Southern Region, Irish Water.

The proposals for the proposed stormwater infrastructure were discussed with Mr. Simon Lyons, Senior Executive Engineer, Cork CIty Council.

2 Surface Water System

Prior to submitting the Services Report we consulted with Mr. Ger Roche, Executive Technician, Cork City Council in relation to the existing drainage services in the area of the proposed development. The details of the local Cork City Council Stormwater Infrastructure are included in Appendix A of this Report.

In order to reduce the effects of the surface runoff on potential flooding, a Stormwater Management Plan will be applied to surface water discharging into sewers and adjacent watercourses. The Stormwater Management Plan can be applied to control the rate of runoff from new development. The maximum permitted surface water outflow from the new development is to be restricted to that of the existing Greenfield site.

Control of runoff by attenuation methods requires a hydraulic control to restrict the magnitude of flows passing downstream, together with an upstream storage capacity to contain the volume of runoff held back by the hydraulic control. The flows are proposed to be attenuated in the surface water system by adopting a flood storage detention tank along with a restricted outlet as the control devise. The storage volume required has been designed using the computer aided design package Windes 10.4

2.1 Surface Water Drainage Network

The surface water drainage network for the proposed development was modelled using the Microdrainage software application. The surface water pipe lengths, slopes, contributing impermeable areas, upstream invert levels, upstream cover levels and pipe diameters were entered into the model using the drawings supplied.

The global variables required for the model were the M5-60 and Rainfall Ratio. These two factors may be read from maps contained in the Wallingford procedure. They enable the program to calculate the intensity, duration and frequency characteristics of storms.

M5-60 is the rainfall depth based on a 60-minute storm of 5 years return period. Ratio R is the ratio of the 60-minute storm to the 2-day storm for the 5-year return period events. These values are as follows:

- M5-60 = 18.80mm
- Ratio R = 0.25

Microdrainage generates design storms using the principles set out in the Flood Studies Report (NERC 1975).

A summer rainfall profile was used for the design of the pipework and a winter rainfall profile was used for the design of the storm water attenuation tank to give the critical design. A summer profile gives higher rainfall intensities and results in higher runoff rates and is used to determine the required capacity of the pipework. A winter rainfall profile gives a flatter more sustained profile and results in higher runoff volumes and is used to determine the attenuation/storage requirements.

The surface water drainage network was assessed for compliance with maximum and minimum velocities, pipe length etc. The network was designed to ensure velocities in the network and pipe gradients did not exceed the maximum velocity of 4.0m/s. The minimum velocity allowed was 0.75m/s.

The design of the drainage network was assessed using events with a range of different durations to determine the critical event for each return period analysed as follows:

- 1 in 2-year return period events were used to ensure that the system did not surcharge;
- 1 in 100 year return period events were used to ensure that flooding did not occur.

The layout of the proposed storm water network is shown on the Proposed Stormwater & Foul Sewer Layout Plan 4828-4020.

NOTE: The surcharging indicated in the design sheets is directly upstream of the restricted outlet. For design purposes the tank has been replaced with a pipe and as a result surcharging occurs. This design approach is acceptable and in reality there will be no surcharging.

2.2 Stormwater Attenuation Strategy

2.2.1 Pre-Development Conditions

The area of this proposed development is 1.55 hectares (ha). For this development, the permissible outflow is calculated using the estimation method contained in the Institute of Hydrology Report No. 124: Flood estimation for small catchments.

$$QBAR = 0.00108 \times (AREA)^{0.89} \times (SAAR)^{1.17} \times (SOIL)^{2.17}$$

QBAR = The Mean Annual Peak Flow (Permissible outflow in m3.sec

AREA = Area of the Catchment (site) in km^2

SAAR = Standard Annual Average Rainfall

SOIL = Soil index

As the development is smaller than 50 ha, the analysis for determining the permissible outflow uses 50 ha in the formula and linearly interpolates the flow rate value based on the ratio of the development to 50 ha. This is a statistical based method within the Microdrainage Software utilizing the Regional Flood Frequency by Catchment Characteristics to give the Index Flood (QBAR)

Design summary sheets for the QBAR value are contained in Appendix B.

The Mean Annual Peak Flow (permissible outflow) was calculated for the particular design development areas. .

The allowable runoff estimation method utilises IH 124 and the Soil Index value taken from the Micrcodrainage Design Package mapping system gives a Soil Index of 0.3.

2.2.2 Post-Development Conditions

The area of this proposed development is approximately 1.55 (ha). The stormwater management plan adopted for the particular development involves using an attenuation tank located in the north-eastern corner of the site.

All surface water runoff arising from the paved development will be drained away from the site. The attenuation tank is designed for a 100-year storm event. The maximum discharge from the attenuation tank will be limited to calculated permissible runoff (QBAR) for the site.

Based on the proposed development design there will be a change in the land surface. Therefore, due to this proposed change a corresponding increase in the peak rate of surface runoff from the site will arise during times of high rainfall.

Fig 2.0 Catchment Plan

Contributing Area	Permissible Outflow (l/sec)
Catchment Area	7.30 l/sec

The flood peak runoff rates from the post-development grassy permeable area (Q_p grass) and the post-development impervious area (Q_p imp.) using the Rational Method (100% impermeability of hard surfaces) are calculated using Windes 10.4. The Sources Control Module of the Microdrainage Software was used to design the attenuation tank capacities. This module also provides the critical storm duration for the attenuation tank during the design process.

It should be noted that climate change has been accounted for in the design. As per volume 5 of the GDSDS a factor of 10% has been incorporated into the design.

The allowable runoff utilising IH 124 of 7.30 l/second combined from the Catchment Areas for the proposed development equates to 4.71 l/second/hectare.

2.3 Attenuation Tank

2.3.1 Volume of Attenuation Tank

The capacity of the attenuation tank is designed to cater for the capacity required for a 1 in 100 year ARI event. This capacity is summarised as follows:

Tank No.	Capacity (m^3)	Restricted Outlet (l/sec)
1	300.0	7.30 l/sec

2.4 Hydrocarbon Treatment

A petrol interceptor is a trap used to filter out hydrocarbon pollutants from rainwater runoff. It is used in construction to prevent fuel contamination of streams carrying away the runoff.

Petrol interceptors work on the premise that some hydrocarbons such as petroleum and diesel float on the top of water. The contaminated water enters the interceptor typically after flowing off roads or hardstanding areas before being deposited into the first tank inside the interceptor.

The first tank builds up a layer of the hydrocarbon as well as other scum. Typically petrol interceptors have 3 separate tanks each connected with a dip pipe, as more liquid enters the interceptor the water enters into the second tank leaving the majority of the hydrocarbon behind as it cannot enter the dip pipe, whose opening into the second tank is below the surface.

However some of the contaminants may by chance enter the second tank. This second tank will not build up as much of the hydrocarbon on its surface. As before, the water is pushed into the third tank and more water enters the second.

The third tank should be practically clear of any hydrocarbon floating on its surface. As a precaution, the outlet pipe is also a dip pipe. When the water leaves the third tank via the outlet pipe it should be contaminant free.

The hard-surfaced area that will be draining to the interceptor located between MH's SW.003 & SW.002 is approximately 6,870m^2. A Conder CSNB15s interceptor with a catchment capacity of 8,333m^2 will be provided. The hard-surfaced area that will be draining to the interceptor located

between MH's SW.020 & SW.019 is approximately 1,010m^2. A Conder CSNB3s interceptor with a catchment capacity of 1,667m^2 will be provided.

A summary of the proposed interceptor is as per the Table 2.4 below.

Table 2.4 – Petrol Interceptor Details

Catchment Reference	Petrol Interceptor Make & Model	Oil Storage Capacity (l)
SW.003 – SW.002	Conder CSNB15s	225 litres
SW.020 – SW.019	Conder CSNB3s	45 litres

2.5 Silt Control

The proposed petrol interceptors from Conder Environmental also include a silt storage capacity in addition to the oil storage capacity that allow silt to be collected in the interceptor prior to discharge to the proposed attenuation tanks. This silt build-up can then be removed from the tanks. The amount of silt storage from the proposed petrol interceptor is outlined in Table 2.5 below.

Table 2.5 – Petrol Interceptor Silt Storage Details

Catchment Reference	Petrol Interceptor Make & Model	Silt Storage Capacity (l)
SW.003 – SW.002	Conder CSNB15s	1500 litres
SW.020 – SW.019	Conder CSNB3s	300 litres

3 Foul Sewer System

3.1 Foul Sewer Design

As with the stormwater network, prior to submitting the Services Report we consulted with Mr. Ger Roche, Executive Technician, Cork City Council in relation to the existing drainage services in the area of the proposed development. The details of the local Cork City Council Foul Sewer Infrastructure are included in Appendix A of this Report. A Pre-Connection Enquiry was submitted to Irish Water. The Irish Water Reference Number for this enquiry is 4664029998. The response to this Enquiry was issued by Irish Water on 28th September 2018. This confirmed that, subject to a valid connection agreement being put in place, the proposed connection to the Irish Water network could be facilitated. The details of the Pre-Connection Enquiry response are included in Appendix A of this Report. The design proposal for the water and/or wastewater infrastructure have been submitted to Irish Water for assessment and for the purposes of obtaining a Statement of Design Acceptance. This statement is currently still pending.

The foul sewer has been designed using the System 1 and Simulation Modules of the Micro-drainage package. The foul network design addresses present day design issues and can view velocities at Full Bore, Proportional Depth and 1/3 flow.

A model of the proposed foul drainage network was built using the micro-drainage software applications. The model was analysed and amended until the results met with the design criteria specified.

The network has been designed to achieve self-cleansing velocities at 1/3 flow whilst maintaining minimum gradients.

3.1.1 Development Breakdown

51 No. Residential Units

Section 3.6 of The Irish Water Code of Practice Wastewater Infrastructure states that for the gravity sewers shall be designed to carry a minimum wastewater volume of 6 times the dry weather flow (6DWF) which is to be taken as 446 litres per dwelling

Loading = (51) (446) / (24) (60) (60) = 0.263 litres/second

6DWF = 1.578 litres/second

The layout of the proposed foul sewer network is shown on the Proposed Stormwater & Foul Sewer Layout Plan 4828-4020.

The overall quantity of wastewater for the proposed development is estimated at 22.75m^3 per day.

The foul waste within the development will be collected via an internal gravity network and will discharge to the existing public foul sewer.

All works will be in accordance with Irish Water specifications and requirements.

All works will be in accordance with Irish Water Code of Practice for Wastewater Supply & the Wastewater Infrastructure Standard Details Document Number: IW-CDS-5030-01.

4 Water Supply

As with the drainage network, a Pre-Connection Enquiry was submitted to Irish Water under Reference No. 4664029998. This confirmed that, subject to a valid connection agreement being put in place, the proposed connection to the Irish Water network could be facilitated. As with the drainage network, prior to submitting the Services Report we consulted with Mr. Leonard Goodwin, Executive Technician, Cork City Council in relation to the existing watermain services in the area of the proposed development. The details of the local Cork City Council Watermain Infrastructure are included in Appendix A of this Report. There are existing IW 100mm & 150mm cast iron watermains the Waterfall Road adjacent to the development.

It is proposed to provide a new 125mm O.D. Ø (outside diameter) HDPE connection to the public watermain with associated valves and metering requirements. Internally within the development it is proposed to have a series of 125mm O.D. branches and loops with associated hydrants, valves and metering requirements.

Water distribution supply to each building will be sized to cater for the requirements of those particular uses. Metered connections will be made to the main in accordance with Irish Water specifications and details.

The layout of the proposed watermain network is shown on the Proposed Watermain Layout Plan 4828-4030.

All works will be in accordance with Irish Water Code of Practice for Water Supply & the Water Infrastructure Standard Details Document Number: IW-CDS-5020-01.

5 Summary of Results

The storm water network was built and analysed using the Microdrainage Software application and were assessed for a 1 in 2 year storm & 1 in 100 year storm. A summary of the results is shown in Tables 5.1 below

The global variables, pipeline and manhole schedules for modelled and these show the basic pipe details such as pipe length, diameter, roughness coefficient, upstream invert, velocity, etc.

Table 5.1 Summary of Surcharge and Flooding

Attenuation Tank Reference	Storm Event	Results
Attenuation Tank No. 1	1 in 2 year	No surcharge of the stormwater network
	1 in 100 year	Surcharge

The stormwater system is designed to ensure no surcharge occurs during a 1 in 2-year return period event. The surcharging that occurs in the pipes highlighted in the summary of the design sheets are the pipes that have been replaced with tanks and hydrobrakes. For the purposes of design this is acceptable.

No flooding was predicted to occur for the 1 in 100 year return period event. Surcharging and flood risk occurred for a number of critical storm events but this is allowed and does not compromise the network.

Table 5.2 Outlet Control Summary

Attenuation Tank Reference	Hydrobrake Reference	Limiting Discharge (l/s)	Design Head (m)	Hydrobrake Diameter (mm)
Attenuation Tank No. 1	MD4	7.30 l/sec	2.00	82

Table 5.3: Storage Tank Summary

Tank No.	Storage Type	Capacity (m^3)	Invert Level (m)	Maximum Storage Level (m)
Attenuation Tank	RC Concrete	300.0	43.088	45.088

The foul water network model was built and analysed using the Micro-drainage Software application and was assessed to ensure velocities maintained a self-cleansing velocity.

The foul water network model was built and analysed using the Micro-drainage Software application and was assessed to ensure velocities maintained a self-cleansing velocity. The system will consist of an internal gravity network discharging to the existing Irish Water asset.

Appendix A –Irish Water Pre-Connection Enquiry & Records Maps

Tim Brosnan
c/o Stephen O'Grady
DOSA Engineers
Joyce House Barrack Square
Ballincollig
Co Cork
P31K984

28 September 2018

Uisce Éireann
Bosca OP 6000
Baile Átha Cliath 1
Éire

Irish Water
PO Box 6000
Dublin 1
Ireland

T: +353 1 89 25000
F: +353 1 89 25001
www.water.ie

Dear Sir/Madam,

Re: Customer Reference No 4664029998 pre-connection enquiry - Subject to contract | Contract denied
69 unit housing development at Old Mallow Road Blackpool Cork

Irish Water has reviewed your pre-connection enquiry in relation to water and wastewater connections at Old Mallow Road Blackpool Cork. Based upon the details that you have provided with your pre-connection enquiry and on the capacity currently available in the network(s), as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network(s) can be facilitated.

All infrastructure should be designed and installed in accordance with the Irish Water Codes of Practice and Standard Details. A design proposal for the water and/or wastewater infrastructure should be submitted to Irish Water for assessment. Prior to submitting your planning application, you are required to submit these detailed design proposals to Irish Water for review.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available at **www.water.ie/connections**. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities.

If you have any further questions, please contact Brian O'Mahony from the design team on 022 52205 or email *bomahony@water.ie* . For further information, visit **www.water.ie/connections**

Yours sincerely,

Maria O'Dwyer
Connections and Developer Services

Drainage Records

Legend

IW_FoulNetwork
PIPE_FUNCT
- LOCAL FOUL
- INTERCEPTOR

IW_FoulManholes
MANHOLE_
- Manhole

THE SEWERS SHOWN ON THIS MAP ARE FOR REFERENCE ONLY. THE LOCATION AND PROPERTIES OF ALL SEWERS, LEVELS, PIPESIZES, etc, MUST BE CONFIRMED ON SITE.

1:2,000

N

CORK CITY COUNCIL ENVIRONMENT DIRECTORATE
(As agents of Irish Water)

Drawn By: A. Homan

Checked by: G.R.

Date: 08/10/2018

Drainage Records

Legend
CCC_StormNetwork
PIPE_FUNCT
LOCAL STORM

THE SEWERS SHOWN ON THIS MAP ARE FOR REFERENCE ONLY. THE LOCATION AND PROPERTIES OF ALL SEWERS, LEVELS, PIPESIZES, etc, MUST BE CONFIRMED ON SITE.

1:2,000

N

CORK CITY COUNCIL ENVIRONMENT DIRECTORATE
Storm Network

Drawn By: A. Homan

Checked by: G.R.

Date: 08/10/2018

Cork City Council
Environment Directorate
Water Distribution Section

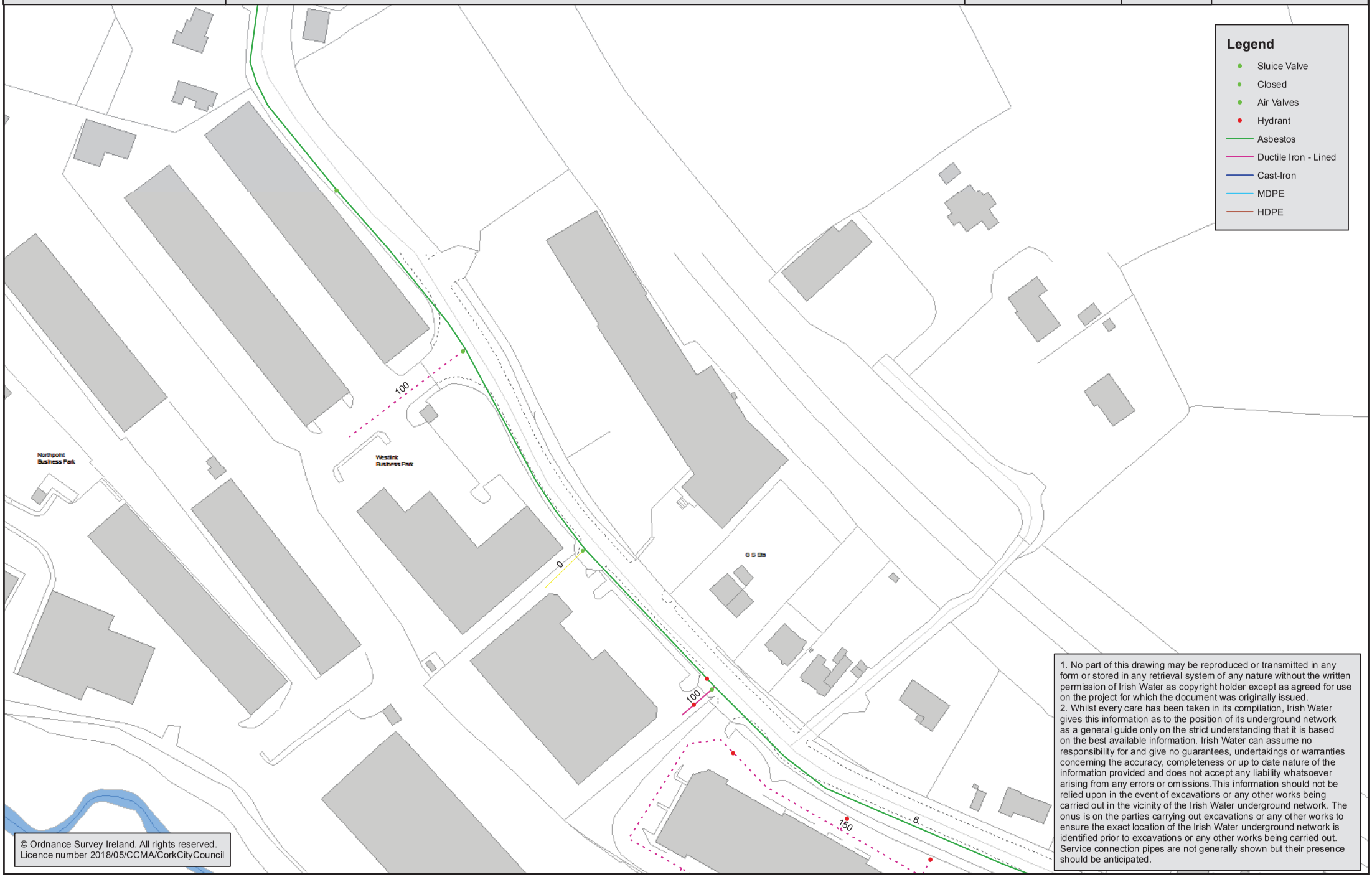
Silver Quay - Public Watermain Records

Scale (A3):
1:1,250

N

Drawn: LG

Date: 13/09/2018



Appendix B – Allowable Runoff QBAR Values

IH 124 Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	1.549	Urban	0.000
SAAR (mm)	1135	Region Number	Ireland South

Results l/s

QBAR Rural	7.3
QBAR Urban	7.3
Q100 years	13.4
Q1 year	6.2
Q2 years	7.0
Q5 years	8.7
Q10 years	9.8
Q20 years	10.9
Q25 years	11.3
Q30 years	11.6
Q50 years	12.4
Q100 years	13.4
Q200 years	14.5
Q250 years	n/a
Q1000 years	n/a

WARNING: Irish growth curves are not defined above 200 years.

Appendix C – 1 in 2 Year Design Sheets

Denis O'Sullivan & Associates		Page 1
Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Residential Development Old Mallow Rd Cork	
Date 21/10/2019 File Storm Water Model...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.429	4-8	0.385

Total Area Contributing (ha) = 0.814

Total Pipe Volume (m^3) = 21.727

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	14.550	0.450	32.3	0.031	5.00	0.0	0.600	o	225
S1.001	5.900	0.217	27.2	0.010	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.11	48.850	0.031	0.0	0.0	0.0	2.31	91.8	4.2
S1.001	50.00	5.14	48.400	0.041	0.0	0.0	0.0	2.52	100.2	5.6

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S2.000	13.450	0.081	166.0	0.029	5.00	0.0	0.600	o	225
S2.001	14.300	0.086	166.3	0.015	0.00	0.0	0.600	o	225
S1.002	30.400	1.183	25.7	0.110	0.00	0.0	0.600	o	225
S1.003	67.500	1.800	37.5	0.120	0.00	0.0	0.600	o	225
S3.000	45.000	1.750	25.7	0.113	5.00	0.0	0.600	o	225
S1.004	7.700	0.039	200.0	0.000	0.00	0.0	0.600	o	300
S1.005	44.150	0.221	200.0	0.096	0.00	0.0	0.600	o	300
S4.000	23.500	0.118	200.0	0.045	5.00	0.0	0.600	o	225
S4.001	19.650	0.837	23.5	0.023	0.00	0.0	0.600	o	225
S4.002	26.050	1.046	24.9	0.023	0.00	0.0	0.600	o	225
S4.003	4.500	0.400	11.3	0.000	0.00	0.0	0.600	o	225
S1.006	16.400	0.082	200.0	0.000	0.00	0.0	0.600	o	375
S1.007	13.700	0.134	102.2	0.010	0.00	0.0	0.600	o	375

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.000	50.00	5.22	48.350	0.029	0.0	0.0	0.0	1.01	40.2	3.9
S2.001	50.00	5.46	48.269	0.044	0.0	0.0	0.0	1.01	40.2	6.0
S1.002	50.00	5.65	48.183	0.195	0.0	0.0	0.0	2.59	103.0	26.4
S1.003	50.00	6.18	47.000	0.315	0.0	0.0	0.0	2.14	85.2	42.7
S3.000	50.00	5.29	46.950	0.113	0.0	0.0	0.0	2.59	103.0	15.3
S1.004	50.00	6.29	45.200	0.428	0.0	0.0	0.0	1.11	78.3	58.0
S1.005	50.00	6.96	45.162	0.524	0.0	0.0	0.0	1.11	78.3	71.0
S4.000	50.00	5.43	48.100	0.045	0.0	0.0	0.0	0.92	36.6	6.1
S4.001	50.00	5.55	47.983	0.068	0.0	0.0	0.0	2.71	107.8	9.2
S4.002	50.00	5.71	47.146	0.091	0.0	0.0	0.0	2.63	104.7	12.3
S4.003	50.00	5.73	46.100	0.091	0.0	0.0	0.0	3.92	156.0	12.3
S1.006	50.00	7.17	44.941	0.615	0.0	0.0	0.0	1.28	141.1	83.3
S1.007	50.00	7.30	44.859	0.625	0.0	0.0	0.0	1.79	197.9	84.6

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.008	5.700	0.029	200.0	0.005	0.00	0.0	0.600	o	375
S5.000	24.800	1.350	18.4	0.097	5.00	0.0	0.600	o	225
S5.001	12.650	1.050	12.0	0.000	0.00	0.0	0.600	o	225
S5.002	12.650	0.200	63.3	0.087	0.00	0.0	0.600	o	225
S5.003	13.725	0.069	198.9	0.000	0.00	0.0	0.600	o	225
S5.004	1.000	0.005	200.0	0.000	0.00	0.0	0.600	o	225
S1.009	2.000	0.008	250.0	0.000	0.00	0.0	0.600	o	375
S1.010	19.650	0.079	250.0	0.000	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.008	50.00	7.37	44.725	0.630	0.0	0.0	0.0	1.28	141.1	85.3
S5.000	50.00	5.13	48.500	0.097	0.0	0.0	0.0	3.07	122.0	13.1
S5.001	50.00	5.19	45.650	0.097	0.0	0.0	0.0	3.79	150.7	13.1
S5.002	50.00	5.32	44.600	0.184	0.0	0.0	0.0	1.65	65.5	24.9
S5.003	50.00	5.57	44.400	0.184	0.0	0.0	0.0	0.92	36.7	24.9
S5.004	50.00	5.58	44.331	0.184	0.0	0.0	0.0	0.92	36.6	24.9
S1.009	50.00	7.40	43.088	0.814	0.0	0.0	0.0	1.14	126.1	110.2
S1.010	50.00	5.40	43.080	0.000	7.3	0.0	0.0	0.82	32.7	7.3

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SSW.011	50.350	1.500	1050	S1.000	48.850	225				
SSW.010	49.900	1.500	1050	S1.001	48.400	225	S1.000	48.400	225	
SSW.013	49.850	1.500	1050	S2.000	48.350	225				
SSW.012	49.850	1.581	1050	S2.001	48.269	225	S2.000	48.269	225	
SSW.009	49.850	1.667	1050	S1.002	48.183	225	S1.001	48.183	225	
							S2.001	48.183	225	
SSW.008	48.500	1.500	1050	S1.003	47.000	225	S1.002	47.000	225	
SSW.014	48.450	1.500	1050	S3.000	46.950	225				
SSW.007	46.700	1.500	1050	S1.004	45.200	300	S1.003	45.200	225	
							S3.000	45.200	225	
SSW.006	46.850	1.689	1050	S1.005	45.162	300	S1.004	45.162	300	
SSW.018	49.600	1.500	1050	S4.000	48.100	225				
SSW.017	49.550	1.568	1050	S4.001	47.983	225	S4.000	47.983	225	
SSW.016	48.650	1.505	1050	S4.002	47.146	225	S4.001	47.146	225	
SSW.015	47.600	1.501	1050	S4.003	46.100	225	S4.002	46.100	225	
SSW.005	47.200	2.259	1350	S1.006	44.941	375	S1.005	44.941	300	
							S4.003	45.700	225	609
SSW.004	46.700	1.841	1350	S1.007	44.859	375	S1.006	44.859	375	
SSW.003	46.300	1.575	1350	S1.008	44.725	375	S1.007	44.725	375	
SSW.023	50.000	1.500	1050	S5.000	48.500	225				
SSW.022	49.250	3.600	1200	S5.001	45.650	225	S5.000	47.150	225	1500
SSW.021	46.500	1.900	1200	S5.002	44.600	225	S5.001	44.600	225	
SSW.020	45.900	1.500	1050	S5.003	44.400	225	S5.002	44.400	225	
SSW.019	46.250	1.919	1200	S5.004	44.331	225	S5.003	44.331	225	
SSW.002	46.250	3.162	1350	S1.009	43.088	375	S1.008	44.696	375	1608
							S5.004	44.326	225	1088
SSW.001	46.250	3.170	1350	S1.010	43.080	225	S1.009	43.080	375	
SExis SWMH	44.660	1.659	0		OUTFALL		S1.010	43.001	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SSW.011	50.350	48.850	1.275	1050
S1.001	o	225	SSW.010	49.900	48.400	1.275	1050
S2.000	o	225	SSW.013	49.850	48.350	1.275	1050
S2.001	o	225	SSW.012	49.850	48.269	1.356	1050
S1.002	o	225	SSW.009	49.850	48.183	1.442	1050
S1.003	o	225	SSW.008	48.500	47.000	1.275	1050
S3.000	o	225	SSW.014	48.450	46.950	1.275	1050
S1.004	o	300	SSW.007	46.700	45.200	1.200	1050
S1.005	o	300	SSW.006	46.850	45.162	1.389	1050
S4.000	o	225	SSW.018	49.600	48.100	1.275	1050
S4.001	o	225	SSW.017	49.550	47.983	1.343	1050
S4.002	o	225	SSW.016	48.650	47.146	1.280	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	14.550	32.3	SSW.010	49.900	48.400	1.275	1050
S1.001	5.900	27.2	SSW.009	49.850	48.183	1.442	1050
S2.000	13.450	166.0	SSW.012	49.850	48.269	1.356	1050
S2.001	14.300	166.3	SSW.009	49.850	48.183	1.442	1050
S1.002	30.400	25.7	SSW.008	48.500	47.000	1.275	1050
S1.003	67.500	37.5	SSW.007	46.700	45.200	1.275	1050
S3.000	45.000	25.7	SSW.007	46.700	45.200	1.275	1050
S1.004	7.700	200.0	SSW.006	46.850	45.162	1.389	1050
S1.005	44.150	200.0	SSW.005	47.200	44.941	1.959	1350
S4.000	23.500	200.0	SSW.017	49.550	47.983	1.343	1050
S4.001	19.650	23.5	SSW.016	48.650	47.146	1.280	1050
S4.002	26.050	24.9	SSW.015	47.600	46.100	1.276	1050

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S4.003	o	225	SSW.015	47.600	46.100	1.276	1050
S1.006	o	375	SSW.005	47.200	44.941	1.884	1350
S1.007	o	375	SSW.004	46.700	44.859	1.466	1350
S1.008	o	375	SSW.003	46.300	44.725	1.200	1350
S5.000	o	225	SSW.023	50.000	48.500	1.275	1050
S5.001	o	225	SSW.022	49.250	45.650	3.375	1200
S5.002	o	225	SSW.021	46.500	44.600	1.675	1200
S5.003	o	225	SSW.020	45.900	44.400	1.275	1050
S5.004	o	225	SSW.019	46.250	44.331	1.694	1200
S1.009	o	375	SSW.002	46.250	43.088	2.787	1350
S1.010	o	225	SSW.001	46.250	43.080	2.945	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S4.003	4.500	11.3	SSW.005	47.200	45.700	1.276	1350
S1.006	16.400	200.0	SSW.004	46.700	44.859	1.466	1350
S1.007	13.700	102.2	SSW.003	46.300	44.725	1.200	1350
S1.008	5.700	200.0	SSW.002	46.250	44.696	1.179	1350
S5.000	24.800	18.4	SSW.022	49.250	47.150	1.875	1200
S5.001	12.650	12.0	SSW.021	46.500	44.600	1.675	1200
S5.002	12.650	63.3	SSW.020	45.900	44.400	1.275	1050
S5.003	13.725	198.9	SSW.019	46.250	44.331	1.694	1200
S5.004	1.000	200.0	SSW.002	46.250	44.326	1.699	1350
S1.009	2.000	250.0	SSW.001	46.250	43.080	2.795	1350
S1.010	19.650	250.0	SExis SWMH	44.660	43.001	1.434	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.010	SExis SWMH	44.660	43.001	43.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.250		

Online Controls for Storm

Hydro-Brake® Manhole: SSW.001, DS/PN: S1.010, Volume (m³): 4.6

Design Head (m) 2.000 Hydro-Brake® Type Md4 Invert Level (m) 43.080
Design Flow (l/s) 7.3 Diameter (mm) 82

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.5	1.200	5.7	3.000	9.1	7.000	13.9
0.200	3.7	1.400	6.2	3.500	9.8	7.500	14.3
0.300	3.2	1.600	6.6	4.000	10.5	8.000	14.8
0.400	3.4	1.800	7.0	4.500	11.1	8.500	15.3
0.500	3.7	2.000	7.4	5.000	11.7	9.000	15.7
0.600	4.1	2.200	7.8	5.500	12.3	9.500	16.2
0.800	4.7	2.400	8.1	6.000	12.8		
1.000	5.2	2.600	8.4	6.500	13.4		

Storage Structures for Storm

Tank or Pond Manhole: SSW.001, DS/PN: S1.010

Invert Level (m) 43.080

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	150.0	2.000	150.0

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	2	0%					
S1.001	15 Winter	2	0%					
S2.000	15 Winter	2	0%					
S2.001	15 Winter	2	0%					
S1.002	15 Winter	2	0%					
S1.003	15 Winter	2	0%					
S3.000	15 Winter	2	0%					
S1.004	15 Winter	2	0%					
S1.005	15 Winter	2	0%					
S4.000	15 Winter	2	0%					
S4.001	15 Winter	2	0%					
S4.002	15 Winter	2	0%					
S4.003	15 Winter	2	0%					
S1.006	15 Winter	2	0%					
S1.007	15 Winter	2	0%					
S1.008	15 Winter	2	0%					
S5.000	15 Winter	2	0%					
S5.001	15 Winter	2	0%					
S5.002	15 Winter	2	0%					
S5.003	15 Winter	2	0%					
S5.004	15 Winter	2	0%					
S1.009	480 Winter	2	0%	2/15 Winter				
S1.010	480 Winter	2	0%	2/15 Summer				

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SSW.011	48.885	-0.190	0.000	0.06	0.0	4.7	OK
S1.001	SSW.010	48.446	-0.179	0.000	0.09	0.0	5.9	OK
S2.000	SSW.013	48.403	-0.172	0.000	0.12	0.0	4.3	OK
S2.001	SSW.012	48.333	-0.161	0.000	0.18	0.0	6.2	OK
S1.002	SSW.009	48.263	-0.145	0.000	0.27	0.0	26.0	OK
S1.003	SSW.008	47.113	-0.112	0.000	0.50	0.0	41.0	OK
S3.000	SSW.014	47.013	-0.162	0.000	0.17	0.0	16.8	OK
S1.004	SSW.007	45.439	-0.061	0.000	0.99	0.0	57.6	OK
S1.005	SSW.006	45.393	-0.069	0.000	0.93	0.0	68.1	OK
S4.000	SSW.018	48.169	-0.156	0.000	0.20	0.0	6.6	OK
S4.001	SSW.017	48.030	-0.178	0.000	0.10	0.0	9.6	OK
S4.002	SSW.016	47.199	-0.171	0.000	0.13	0.0	12.5	OK
S4.003	SSW.015	46.156	-0.169	0.000	0.14	0.0	12.5	OK
S1.006	SSW.005	45.175	-0.141	0.000	0.71	0.0	79.6	OK
S1.007	SSW.004	45.061	-0.172	0.000	0.56	0.0	80.5	OK
S1.008	SSW.003	45.005	-0.095	0.000	0.91	0.0	81.5	OK
S5.000	SSW.023	48.554	-0.171	0.000	0.13	0.0	14.6	OK
S5.001	SSW.022	45.700	-0.175	0.000	0.11	0.0	14.4	OK
S5.002	SSW.021	44.707	-0.118	0.000	0.45	0.0	25.4	OK
S5.003	SSW.020	44.554	-0.071	0.000	0.80	0.0	25.7	OK
S5.004	SSW.019	44.491	-0.065	0.000	0.86	0.0	25.6	OK
S1.009	SSW.002	44.071	0.608	0.000	0.24	0.0	21.2	SURCHARGED
S1.010	SSW.001	44.070	0.765	0.000	0.18	0.0	5.2	SURCHARGED

Appendix D – 1 in 100 Year Design Sheets

Denis O'Sullivan & Associates		Page 1
Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Residential Development Old Mallow Rd Cork	
Date 31/03/2020 File Storm Water Model...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.429	4-8	0.385

Total Area Contributing (ha) = 0.814

Total Pipe Volume (m^3) = 21.727

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	14.550	0.450	32.3	0.031	5.00	0.0	0.600	o	225
S1.001	5.900	0.217	27.2	0.010	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.11	48.850	0.031	0.0	0.0	0.0	2.31	91.8	4.2
S1.001	50.00	5.14	48.400	0.041	0.0	0.0	0.0	2.52	100.2	5.6

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S2.000	13.450	0.081	166.0	0.029	5.00	0.0	0.600	o	225
S2.001	14.300	0.086	166.3	0.015	0.00	0.0	0.600	o	225
S1.002	30.400	1.183	25.7	0.110	0.00	0.0	0.600	o	225
S1.003	67.500	1.800	37.5	0.120	0.00	0.0	0.600	o	225
S3.000	45.000	1.750	25.7	0.113	5.00	0.0	0.600	o	225
S1.004	7.700	0.039	200.0	0.000	0.00	0.0	0.600	o	300
S1.005	44.150	0.221	200.0	0.096	0.00	0.0	0.600	o	300
S4.000	23.500	0.118	200.0	0.045	5.00	0.0	0.600	o	225
S4.001	19.650	0.837	23.5	0.023	0.00	0.0	0.600	o	225
S4.002	26.050	1.046	24.9	0.023	0.00	0.0	0.600	o	225
S4.003	4.500	0.400	11.3	0.000	0.00	0.0	0.600	o	225
S1.006	16.400	0.082	200.0	0.000	0.00	0.0	0.600	o	375
S1.007	13.700	0.134	102.2	0.010	0.00	0.0	0.600	o	375

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.000	50.00	5.22	48.350	0.029	0.0	0.0	0.0	1.01	40.2	3.9
S2.001	50.00	5.46	48.269	0.044	0.0	0.0	0.0	1.01	40.2	6.0
S1.002	50.00	5.65	48.183	0.195	0.0	0.0	0.0	2.59	103.0	26.4
S1.003	50.00	6.18	47.000	0.315	0.0	0.0	0.0	2.14	85.2	42.7
S3.000	50.00	5.29	46.950	0.113	0.0	0.0	0.0	2.59	103.0	15.3
S1.004	50.00	6.29	45.200	0.428	0.0	0.0	0.0	1.11	78.3	58.0
S1.005	50.00	6.96	45.162	0.524	0.0	0.0	0.0	1.11	78.3	71.0
S4.000	50.00	5.43	48.100	0.045	0.0	0.0	0.0	0.92	36.6	6.1
S4.001	50.00	5.55	47.983	0.068	0.0	0.0	0.0	2.71	107.8	9.2
S4.002	50.00	5.71	47.146	0.091	0.0	0.0	0.0	2.63	104.7	12.3
S4.003	50.00	5.73	46.100	0.091	0.0	0.0	0.0	3.92	156.0	12.3
S1.006	50.00	7.17	44.941	0.615	0.0	0.0	0.0	1.28	141.1	83.3
S1.007	50.00	7.30	44.859	0.625	0.0	0.0	0.0	1.79	197.9	84.6

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.008	5.700	0.029	200.0	0.005	0.00	0.0	0.600	o	375
S5.000	24.800	1.350	18.4	0.097	5.00	0.0	0.600	o	225
S5.001	12.650	1.050	12.0	0.000	0.00	0.0	0.600	o	225
S5.002	12.650	0.200	63.3	0.087	0.00	0.0	0.600	o	225
S5.003	13.725	0.069	198.9	0.000	0.00	0.0	0.600	o	225
S5.004	1.000	0.005	200.0	0.000	0.00	0.0	0.600	o	225
S1.009	2.000	0.008	250.0	0.000	0.00	0.0	0.600	o	375
S1.010	19.650	0.079	250.0	0.000	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.008	50.00	7.37	44.725	0.630	0.0	0.0	0.0	1.28	141.1	85.3
S5.000	50.00	5.13	48.500	0.097	0.0	0.0	0.0	3.07	122.0	13.1
S5.001	50.00	5.19	45.650	0.097	0.0	0.0	0.0	3.79	150.7	13.1
S5.002	50.00	5.32	44.600	0.184	0.0	0.0	0.0	1.65	65.5	24.9
S5.003	50.00	5.57	44.400	0.184	0.0	0.0	0.0	0.92	36.7	24.9
S5.004	50.00	5.58	44.331	0.184	0.0	0.0	0.0	0.92	36.6	24.9
S1.009	50.00	7.40	43.088	0.814	0.0	0.0	0.0	1.14	126.1	110.2
S1.010	50.00	5.40	43.080	0.000	7.3	0.0	0.0	0.82	32.7	7.3

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SSW.011	50.350	1.500	1050	S1.000	48.850	225				
SSW.010	49.900	1.500	1050	S1.001	48.400	225	S1.000	48.400	225	
SSW.013	49.850	1.500	1050	S2.000	48.350	225				
SSW.012	49.850	1.581	1050	S2.001	48.269	225	S2.000	48.269	225	
SSW.009	49.850	1.667	1050	S1.002	48.183	225	S1.001	48.183	225	
							S2.001	48.183	225	
SSW.008	48.500	1.500	1050	S1.003	47.000	225	S1.002	47.000	225	
SSW.014	48.450	1.500	1050	S3.000	46.950	225				
SSW.007	46.700	1.500	1050	S1.004	45.200	300	S1.003	45.200	225	
							S3.000	45.200	225	
SSW.006	46.850	1.689	1050	S1.005	45.162	300	S1.004	45.162	300	
SSW.018	49.600	1.500	1050	S4.000	48.100	225				
SSW.017	49.550	1.568	1050	S4.001	47.983	225	S4.000	47.983	225	
SSW.016	48.650	1.505	1050	S4.002	47.146	225	S4.001	47.146	225	
SSW.015	47.600	1.501	1050	S4.003	46.100	225	S4.002	46.100	225	
SSW.005	47.200	2.259	1350	S1.006	44.941	375	S1.005	44.941	300	
							S4.003	45.700	225	609
SSW.004	46.700	1.841	1350	S1.007	44.859	375	S1.006	44.859	375	
SSW.003	46.300	1.575	1350	S1.008	44.725	375	S1.007	44.725	375	
SSW.023	50.000	1.500	1050	S5.000	48.500	225				
SSW.022	49.250	3.600	1200	S5.001	45.650	225	S5.000	47.150	225	1500
SSW.021	46.500	1.900	1200	S5.002	44.600	225	S5.001	44.600	225	
SSW.020	45.900	1.500	1050	S5.003	44.400	225	S5.002	44.400	225	
SSW.019	46.250	1.919	1200	S5.004	44.331	225	S5.003	44.331	225	
SSW.002	46.250	3.162	1350	S1.009	43.088	375	S1.008	44.696	375	1608
							S5.004	44.326	225	1088
SSW.001	46.250	3.170	1350	S1.010	43.080	225	S1.009	43.080	375	
SExis SWMH	44.660	1.659	0		OUTFALL		S1.010	43.001	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SSW.011	50.350	48.850	1.275	1050
S1.001	o	225	SSW.010	49.900	48.400	1.275	1050
S2.000	o	225	SSW.013	49.850	48.350	1.275	1050
S2.001	o	225	SSW.012	49.850	48.269	1.356	1050
S1.002	o	225	SSW.009	49.850	48.183	1.442	1050
S1.003	o	225	SSW.008	48.500	47.000	1.275	1050
S3.000	o	225	SSW.014	48.450	46.950	1.275	1050
S1.004	o	300	SSW.007	46.700	45.200	1.200	1050
S1.005	o	300	SSW.006	46.850	45.162	1.389	1050
S4.000	o	225	SSW.018	49.600	48.100	1.275	1050
S4.001	o	225	SSW.017	49.550	47.983	1.343	1050
S4.002	o	225	SSW.016	48.650	47.146	1.280	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	14.550	32.3	SSW.010	49.900	48.400	1.275	1050
S1.001	5.900	27.2	SSW.009	49.850	48.183	1.442	1050
S2.000	13.450	166.0	SSW.012	49.850	48.269	1.356	1050
S2.001	14.300	166.3	SSW.009	49.850	48.183	1.442	1050
S1.002	30.400	25.7	SSW.008	48.500	47.000	1.275	1050
S1.003	67.500	37.5	SSW.007	46.700	45.200	1.275	1050
S3.000	45.000	25.7	SSW.007	46.700	45.200	1.275	1050
S1.004	7.700	200.0	SSW.006	46.850	45.162	1.389	1050
S1.005	44.150	200.0	SSW.005	47.200	44.941	1.959	1350
S4.000	23.500	200.0	SSW.017	49.550	47.983	1.343	1050
S4.001	19.650	23.5	SSW.016	48.650	47.146	1.280	1050
S4.002	26.050	24.9	SSW.015	47.600	46.100	1.276	1050

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S4.003	o	225	SSW.015	47.600	46.100	1.276	1050
S1.006	o	375	SSW.005	47.200	44.941	1.884	1350
S1.007	o	375	SSW.004	46.700	44.859	1.466	1350
S1.008	o	375	SSW.003	46.300	44.725	1.200	1350
S5.000	o	225	SSW.023	50.000	48.500	1.275	1050
S5.001	o	225	SSW.022	49.250	45.650	3.375	1200
S5.002	o	225	SSW.021	46.500	44.600	1.675	1200
S5.003	o	225	SSW.020	45.900	44.400	1.275	1050
S5.004	o	225	SSW.019	46.250	44.331	1.694	1200
S1.009	o	375	SSW.002	46.250	43.088	2.787	1350
S1.010	o	225	SSW.001	46.250	43.080	2.945	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S4.003	4.500	11.3	SSW.005	47.200	45.700	1.276	1350
S1.006	16.400	200.0	SSW.004	46.700	44.859	1.466	1350
S1.007	13.700	102.2	SSW.003	46.300	44.725	1.200	1350
S1.008	5.700	200.0	SSW.002	46.250	44.696	1.179	1350
S5.000	24.800	18.4	SSW.022	49.250	47.150	1.875	1200
S5.001	12.650	12.0	SSW.021	46.500	44.600	1.675	1200
S5.002	12.650	63.3	SSW.020	45.900	44.400	1.275	1050
S5.003	13.725	198.9	SSW.019	46.250	44.331	1.694	1200
S5.004	1.000	200.0	SSW.002	46.250	44.326	1.699	1350
S1.009	2.000	250.0	SSW.001	46.250	43.080	2.795	1350
S1.010	19.650	250.0	SExis SWMH	44.660	43.001	1.434	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.010	SExis SWMH	44.660	43.001	43.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.250		

Online Controls for Storm

Hydro-Brake® Manhole: SSW.001, DS/PN: S1.010, Volume (m³): 4.6

Design Head (m) 2.000 Hydro-Brake® Type Md4 Invert Level (m) 43.080
Design Flow (l/s) 7.3 Diameter (mm) 82

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.5	1.200	5.7	3.000	9.1	7.000	13.9
0.200	3.7	1.400	6.2	3.500	9.8	7.500	14.3
0.300	3.2	1.600	6.6	4.000	10.5	8.000	14.8
0.400	3.4	1.800	7.0	4.500	11.1	8.500	15.3
0.500	3.7	2.000	7.4	5.000	11.7	9.000	15.7
0.600	4.1	2.200	7.8	5.500	12.3	9.500	16.2
0.800	4.7	2.400	8.1	6.000	12.8		
1.000	5.2	2.600	8.4	6.500	13.4		

Storage Structures for Storm

Tank or Pond Manhole: SSW.001, DS/PN: S1.010

Invert Level (m) 43.080

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	150.0	2.000	150.0

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 100
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	100	0%					
S1.001	15 Winter	100	0%	100/15 Winter				
S2.000	15 Winter	100	0%	100/15 Summer				
S2.001	15 Winter	100	0%	100/15 Summer				
S1.002	15 Winter	100	0%	100/15 Summer				
S1.003	15 Winter	100	0%	100/15 Summer				
S3.000	15 Winter	100	0%					
S1.004	15 Winter	100	0%	100/15 Summer				
S1.005	15 Winter	100	0%	100/15 Summer				
S4.000	15 Winter	100	0%					
S4.001	15 Winter	100	0%					
S4.002	15 Winter	100	0%					
S4.003	15 Winter	100	0%					
S1.006	15 Winter	100	0%	100/15 Summer				
S1.007	15 Winter	100	0%	100/15 Summer				
S1.008	960 Winter	100	0%	100/15 Summer				
S5.000	15 Winter	100	0%					
S5.001	15 Winter	100	0%					
S5.002	960 Winter	100	0%	100/15 Summer				
S5.003	960 Winter	100	0%	100/15 Summer				
S5.004	960 Winter	100	0%	100/15 Summer				
S1.009	960 Winter	100	0%	100/15 Summer				
S1.010	960 Winter	100	0%	100/15 Summer				

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SSW.011	48.906	-0.169	0.000	0.14	0.0	11.2	OK
S1.001	SSW.010	48.674	0.049	0.000	0.21	0.0	13.8	SURCHARGED
S2.000	SSW.013	48.694	0.119	0.000	0.27	0.0	9.5	SURCHARGED
S2.001	SSW.012	48.682	0.188	0.000	0.50	0.0	17.7	SURCHARGED
S1.002	SSW.009	48.666	0.258	0.000	0.68	0.0	65.0	SURCHARGED
S1.003	SSW.008	48.366	1.141	0.000	0.98	0.0	81.1	FLOOD RISK
S3.000	SSW.014	47.051	-0.124	0.000	0.41	0.0	40.4	OK
S1.004	SSW.007	46.645	1.145	0.000	2.01	0.0	116.2	FLOOD RISK
S1.005	SSW.006	46.437	0.976	0.000	1.89	0.0	138.6	SURCHARGED
S4.000	SSW.018	48.211	-0.114	0.000	0.47	0.0	15.9	OK
S4.001	SSW.017	48.060	-0.148	0.000	0.25	0.0	24.4	OK
S4.002	SSW.016	47.237	-0.133	0.000	0.34	0.0	33.0	OK
S4.003	SSW.015	46.195	-0.129	0.000	0.37	0.0	32.7	OK
S1.006	SSW.005	45.611	0.296	0.000	1.49	0.0	167.2	SURCHARGED
S1.007	SSW.004	45.428	0.194	0.000	1.18	0.0	169.5	SURCHARGED
S1.008	SSW.003	45.335	0.235	0.000	0.24	0.0	21.1	SURCHARGED
S5.000	SSW.023	48.586	-0.139	0.000	0.31	0.0	35.0	OK
S5.001	SSW.022	45.730	-0.145	0.000	0.27	0.0	34.6	OK
S5.002	SSW.021	45.340	0.515	0.000	0.11	0.0	6.2	SURCHARGED
S5.003	SSW.020	45.337	0.712	0.000	0.19	0.0	6.1	SURCHARGED
S5.004	SSW.019	45.334	0.778	0.000	0.20	0.0	6.0	SURCHARGED
S1.009	SSW.002	45.333	1.870	0.000	0.31	0.0	26.7	SURCHARGED
S1.010	SSW.001	45.332	2.027	0.000	0.27	0.0	7.9	SURCHARGED

Appendix E – Foul Sewer Design Sheets

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	446.00	Maximum Backdrop Height (m)	1.500
Persons per House	1.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F1.000	11.950	0.350	34.1	0.000	4	0.0	1.500	o	150
F1.001	6.100	0.102	59.8	0.000	0	0.0	1.500	o	150
F2.000	10.800	0.180	60.0	0.000	3	0.0	1.500	o	150
F2.001	16.350	0.273	59.9	0.000	0	0.0	1.500	o	150
F1.002	30.300	1.597	19.0	0.000	8	0.0	1.500	o	150
F1.003	70.000	1.800	38.9	0.000	7	0.0	1.500	o	225
F3.000	42.700	1.750	24.4	0.000	6	0.0	1.500	o	150

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	49.200	0.000	0.0	4	0.0	8	0.36	1.50	26.6	0.1
F1.001	48.850	0.000	0.0	4	0.0	9	0.30	1.13	20.0	0.1
F2.000	48.700	0.000	0.0	3	0.0	8	0.27	1.13	20.0	0.1
F2.001	48.520	0.000	0.0	3	0.0	8	0.27	1.13	20.0	0.1
F1.002	48.247	0.000	0.0	15	0.0	12	0.68	2.02	35.7	0.5
F1.003	46.650	0.000	0.0	22	0.0	16	0.56	1.84	73.3	0.7
F3.000	46.600	0.000	0.0	6	0.0	9	0.46	1.78	31.4	0.2

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F1.004	6.800	0.045	150.0	0.000	0	0.0	1.500	o	225
F1.005	41.600	0.277	150.0	0.000	7	0.0	1.500	o	225
F4.000	19.650	0.900	21.8	0.000	3	0.0	1.500	o	150
F4.001	26.000	1.100	23.6	0.000	0	0.0	1.500	o	150
F4.002	3.000	0.150	20.0	0.000	0	0.0	1.500	o	150
F1.006	17.200	0.115	150.0	0.000	0	0.0	1.500	o	225
F1.007	34.000	0.763	44.6	0.000	0	0.0	1.500	o	225
F5.000	24.800	1.350	18.4	0.000	5	0.0	1.500	o	150
F5.001	12.650	0.633	20.0	0.000	0	0.0	1.500	o	150
F5.002	18.650	0.600	31.1	0.000	0	0.0	1.500	o	150
F1.008	14.700	0.098	150.0	0.000	0	0.0	1.500	o	225

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.004	44.850	0.000	0.0	28	0.0	24	0.38	0.94	37.2	0.9
F1.005	44.805	0.000	0.0	35	0.0	27	0.41	0.94	37.2	1.1
F4.000	47.700	0.000	0.0	3	0.0	6	0.38	1.88	33.2	0.1
F4.001	46.800	0.000	0.0	3	0.0	6	0.37	1.81	31.9	0.1
F4.002	45.700	0.000	0.0	3	0.0	6	0.39	1.96	34.7	0.1
F1.006	44.527	0.000	0.0	38	0.0	28	0.42	0.94	37.2	1.2
F1.007	44.413	0.000	0.0	38	0.0	21	0.64	1.72	68.5	1.2
F5.000	48.150	0.000	0.0	5	0.0	7	0.48	2.05	36.2	0.2
F5.001	44.883	0.000	0.0	5	0.0	8	0.46	1.97	34.7	0.2
F5.002	44.250	0.000	0.0	5	0.0	8	0.40	1.58	27.8	0.2
F1.008	43.650	0.000	0.0	43	0.0	29	0.44	0.94	37.2	1.3

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
FFS.010	50.350	1.150	1050	F1.000	49.200	150				
FFS.009	49.900	1.050	1050	F1.001	48.850	150	F1.000	48.850	150	
FFS.012	49.850	1.150	1050	F2.000	48.700	150				
FFS.011	49.850	1.330	1050	F2.001	48.520	150	F2.000	48.520	150	
FFS.008	49.850	1.603	1050	F1.002	48.247	150	F1.001	48.748	150	501
							F2.001	48.247	150	
FFS.007	48.500	1.850	1200	F1.003	46.650	225	F1.002	46.650	150	
FFS.013	48.450	1.850	1200	F3.000	46.600	150				
FFS.006	46.700	1.850	1200	F1.004	44.850	225	F1.003	44.850	225	
							F3.000	44.850	150	
FFS.005	46.850	2.045	1200	F1.005	44.805	225	F1.004	44.805	225	
FFS.016	49.550	1.850	1200	F4.000	47.700	150				
FFS.015	48.650	1.850	1200	F4.001	46.800	150	F4.000	46.800	150	
FFS.014	47.550	1.850	1200	F4.002	45.700	150	F4.001	45.700	150	
FFS.004	47.400	2.873	1200	F1.006	44.527	225	F1.005	44.527	225	
							F4.002	45.550	150	948
FFS.003	46.700	2.287	1200	F1.007	44.413	225	F1.006	44.413	225	
FFS.019	50.000	1.850	1200	F5.000	48.150	150				
FFS.018	49.250	4.367	1200	F5.001	44.883	150	F5.000	46.800	150	1917
FFS.017	46.500	2.250	1200	F5.002	44.250	150	F5.001	44.250	150	
FFS.002	45.500	1.850	1200	F1.008	43.650	225	F1.007	43.650	225	
							F5.002	43.650	150	
FFS.001	44.730	1.178	0		OUTFALL		F1.008	43.552	225	

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	o	150	FFS.010	50.350	49.200	1.000	1050
F1.001	o	150	FFS.009	49.900	48.850	0.900	1050
F2.000	o	150	FFS.012	49.850	48.700	1.000	1050
F2.001	o	150	FFS.011	49.850	48.520	1.180	1050
F1.002	o	150	FFS.008	49.850	48.247	1.453	1050
F1.003	o	225	FFS.007	48.500	46.650	1.625	1200
F3.000	o	150	FFS.013	48.450	46.600	1.700	1200
F1.004	o	225	FFS.006	46.700	44.850	1.625	1200
F1.005	o	225	FFS.005	46.850	44.805	1.820	1200
F4.000	o	150	FFS.016	49.550	47.700	1.700	1200
F4.001	o	150	FFS.015	48.650	46.800	1.700	1200
F4.002	o	150	FFS.014	47.550	45.700	1.700	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	11.950	34.1	FFS.009	49.900	48.850	0.900	1050
F1.001	6.100	59.8	FFS.008	49.850	48.748	0.952	1050
F2.000	10.800	60.0	FFS.011	49.850	48.520	1.180	1050
F2.001	16.350	59.9	FFS.008	49.850	48.247	1.453	1050
F1.002	30.300	19.0	FFS.007	48.500	46.650	1.700	1200
F1.003	70.000	38.9	FFS.006	46.700	44.850	1.625	1200
F3.000	42.700	24.4	FFS.006	46.700	44.850	1.700	1200
F1.004	6.800	150.0	FFS.005	46.850	44.805	1.820	1200
F1.005	41.600	150.0	FFS.004	47.400	44.527	2.648	1200
F4.000	19.650	21.8	FFS.015	48.650	46.800	1.700	1200
F4.001	26.000	23.6	FFS.014	47.550	45.700	1.700	1200
F4.002	3.000	20.0	FFS.004	47.400	45.550	1.700	1200

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.006	o	225	FFS.004	47.400	44.527	2.648	1200
F1.007	o	225	FFS.003	46.700	44.413	2.062	1200
F5.000	o	150	FFS.019	50.000	48.150	1.700	1200
F5.001	o	150	FFS.018	49.250	44.883	4.217	1200
F5.002	o	150	FFS.017	46.500	44.250	2.100	1200
F1.008	o	225	FFS.002	45.500	43.650	1.625	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.006	17.200	150.0	FFS.003	46.700	44.413	2.062	1200
F1.007	34.000	44.6	FFS.002	45.500	43.650	1.625	1200
F5.000	24.800	18.4	FFS.018	49.250	46.800	2.300	1200
F5.001	12.650	20.0	FFS.017	46.500	44.250	2.100	1200
F5.002	18.650	31.1	FFS.002	45.500	43.650	1.700	1200
F1.008	14.700	150.0	FFS.001	44.730	43.552	0.953	0

Free Flowing Outfall Details for Foul - Main

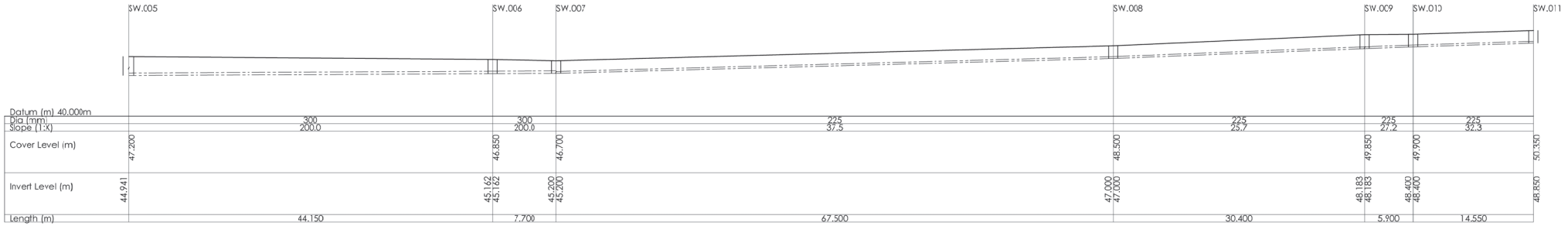
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
F1.008	FFS.001	44.730	43.552	43.050	0	0

Simulation Criteria for Foul - Main

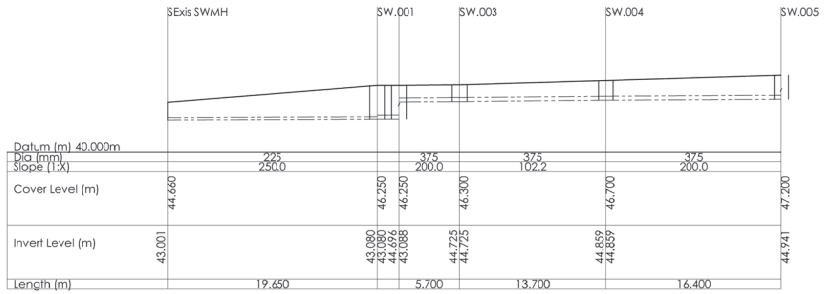
Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

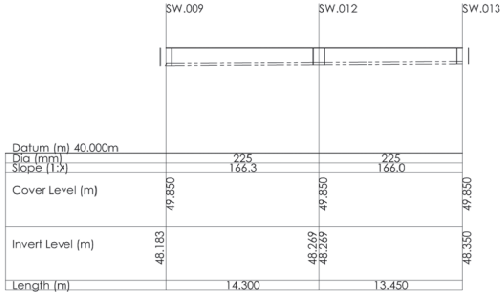
Appendix F – Storm Water Longitudinal Sections



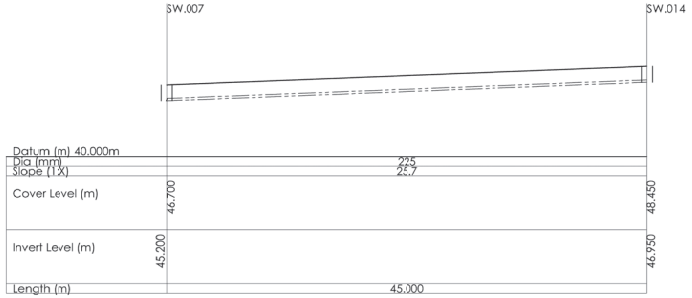
Longitudinal Storm Sewer Section MH's S.005 - S.011
Scale 1:250



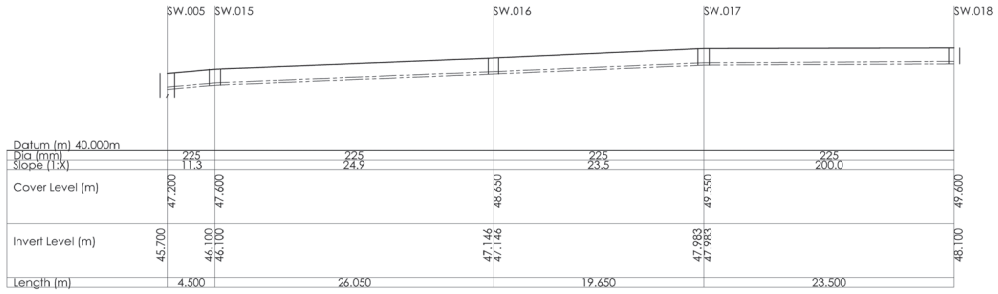
Longitudinal Storm Sewer Section MH's S.001 - S.005
Scale 1:250



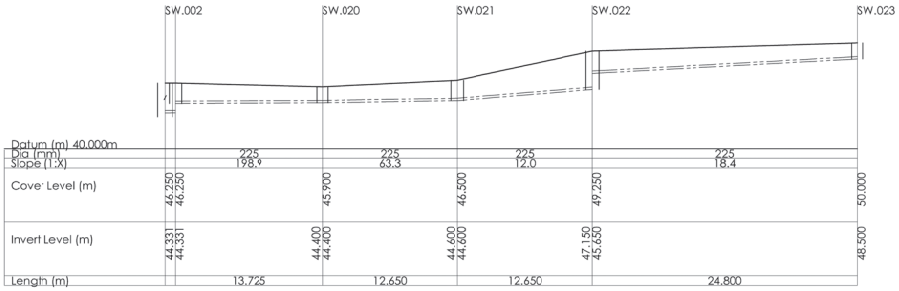
Longitudinal Storm Sewer Section MH's S.009 - S.013
Scale 1:250



Longitudinal Storm Sewer Section MH's S.007 - S.014
Scale 1:250



Longitudinal Storm Sewer Section MH's S.005 - S.018
Scale 1:250



Longitudinal Storm Sewer Section MH's S.002 - S.023
Scale 1:250

DOSA
DENIS O'SULLIVAN & ASSOCIATES
CONSULTING ENGINEERS

Joyce House
Barrack Square
Ballincollig
Co Cork
P31 KP84

021 4871781
info@dosa.ie
www.dosa.ie

REV.	DRAWN	CHKD	APPRVD	DATE	DETAILS
B	G.S.	S.O'G	C.O'S	20.02.20	Revised & Reissued for Planning
A	G.S.	S.O'G	C.O'S.	22.10.19	Issued for Planning

CLIENT

PROJECT: Residential Dev. at Old Mallow Road, Blackpool, Cork

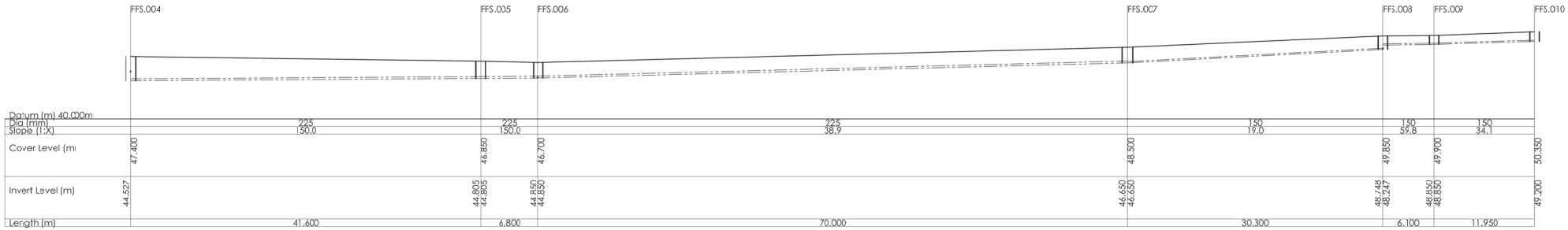
DRAWING TITLE: Proposed Storm Sewer Longitudinal Sections

SHEET: A1

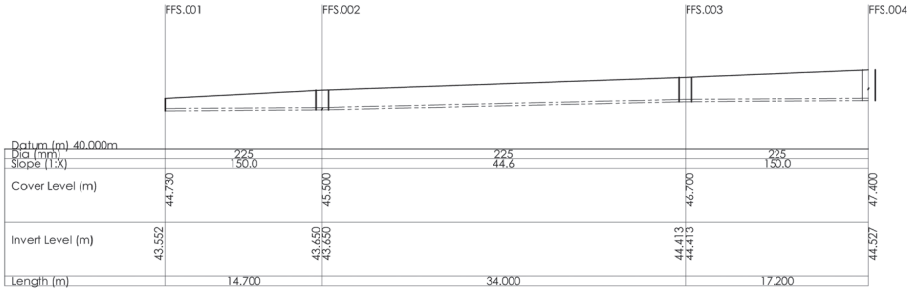
SCALE: 1:250

PROJECT NO. 4828 _ DRAWING NO. 4070 _ STATUS/ISSUE B

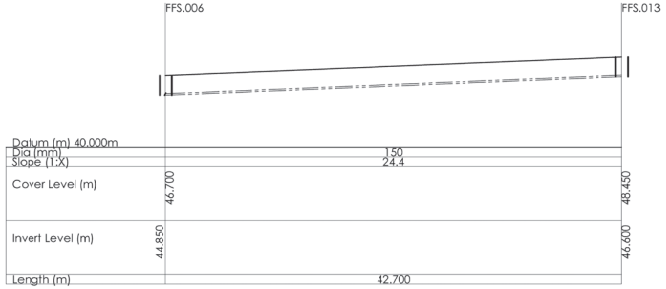
Appendix G – Foul Sewer Longitudinal Sections



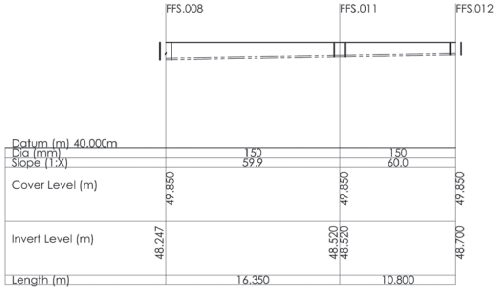
Longitudinal Storm Sewer Section MH's S.004 - S.010
Scale 1:250



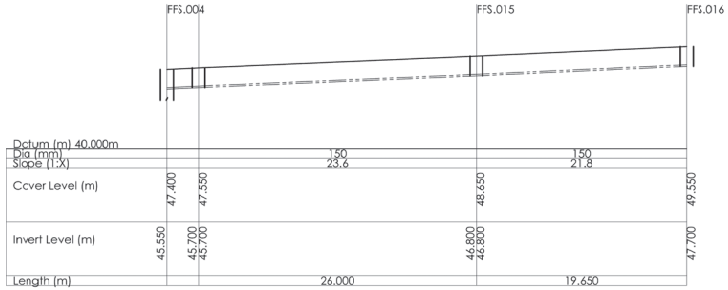
Longitudinal Storm Sewer Sectior MH's S.001 - S.004
Scale 1:250



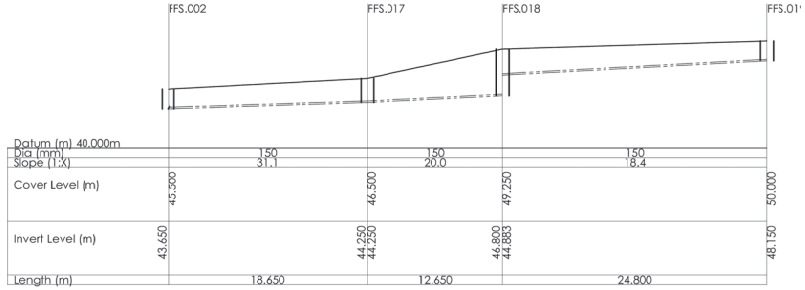
Longitudinal Storm Sewer Section MH's S.006 - S.013
Scale 1:250



Longitudinal Storm Sewer Section MH's S.008 - S.012
Scale 1:250



Longitudinal Storm Sewer Section MH's S.004 - S.016
Scae 1:250



Longitudinal Storm Sewer Section MH's S.002 - S.019
Scale 1:250

DOSA
DENIS O'SULLIVAN & ASSOCIATES
CONSULTING ENGINEERS

Joyce House
Barrack Square
Ballincollig
Co Cork
P31 KP84

021 4871781
info@dosa.ie
www.dosa.ie

REV.	DRAWN	CHKD	APPRVD	DATE	DETAILS
B	G.S.	S.O'G	C.O'S	20.02.20	Revised & Reissued for Planning
A	G.S.	S.O'G	C.O'S.	22.10.19	Issuec for Planning

CLIENT

PROJECT
Residential Dev. at Old Mallow Road, Blackpool, Cork

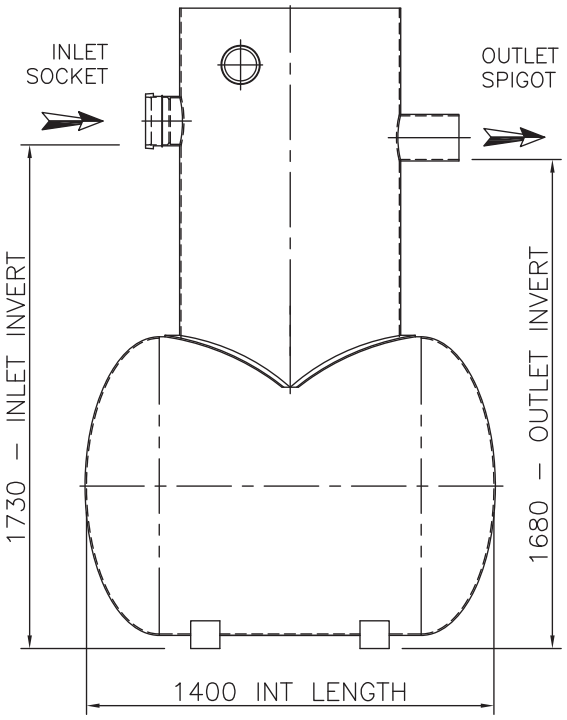
DRAWING TITLE
Proposed Foul Sewer Longitudinal Sections

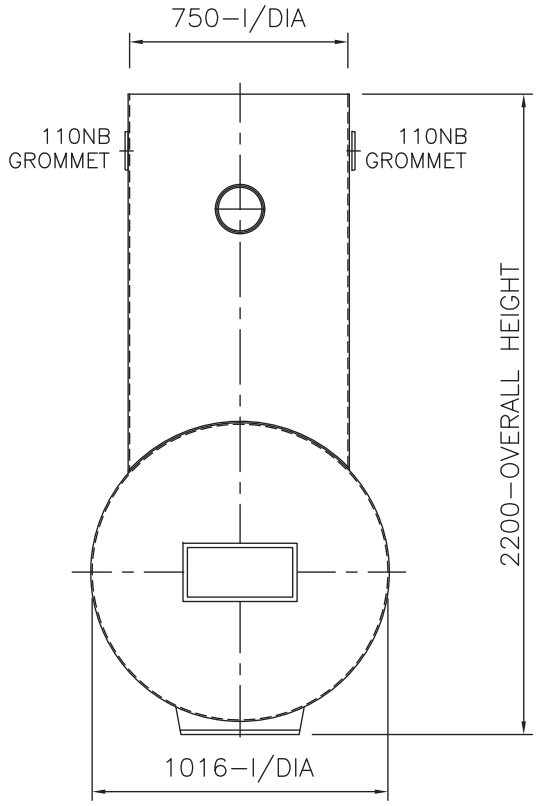
SHEET
A1

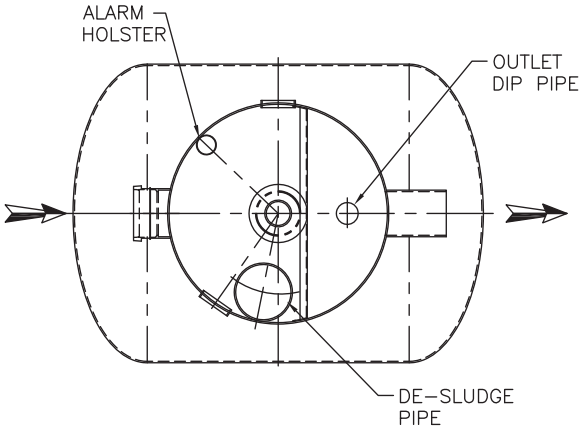
SCALE
1:250

PROJECT NO. 4828 _ DRAWING NO. 4060 _ STATUS/ISSUE B

Appendix H – Petrol Interceptor Details







IMPORTANT NOTE

DUE TO THE COMPACT DESIGN AND EASE OF INSTALLATION, CONDER SEPARATORS ARE NOW SUPPLIED AS STANDARD WITH AN IN LINE CONFIGURATION.

PIPE SIZE VARIANTS

100, 150, 225 PVC

300 GRP

NOTES:

1. PRODUCT INFORMATION

The Conder range of light liquid separators is produced from high grade GRP. Inlets are provided as sockets and outlets as spigots, Connections may be made by steel-banded flexible couplings, nitrile seal joints, rope-seal and mortar or any other appropriate jointing method.

Ventilation specifications should be in accordance with Local Authority requirements. Vent pipework from multiple chambers must never be manifolded below ground level.

2. PERFORMANCE CHARACTERISTICS

Separators are based on the requirements stated in European Standard EN858-1 and Environment Agency guideline PPG3, in particular:-

a. The nominal size has been established from performance tests where the residual oil at the outlet is less than 5mg/l for class 1 separators and less than 100mg/l for class 2 separators.

3. MAINTENANCE AND USE

It is important to recognise that light liquid separators require regular maintenance. The period between maintenance operations can vary depending on the location and use of the separator, therefore routine inspections shall be undertaken at least every six months and a log maintained of inspection date, depth of oil, depth of silt and any cleaning that is undertaken.

A Conder Alarm should be fitted to every separator to give automatic warning that the light liquid capacity has been reached.

Access to the separator should be kept clear and not used for storage.

4. PRODUCT DEVELOPMENT

In line with our policy of constant improvement and development, we reserve the right to change specification without prior notice.

IMPORTANT INVERT LEVEL NOTE (RIBBED TANKS ONLY!):

The inlet and outlet Invert Level(IL) shown on this drawing is to internals of the shell unless otherwise stated. For Invert level to the outside of the shell ribs, see the conversion below:

Ø1.0m, 1.2m, 1.5m, 1.8m, 2.5m IL+50mm ('X')

Ø3.0m,4.0m IL+75mm ('X')

TANKS SUPPLIED WITH LOOSE SHAFTS DO NOT COME SUPPLIED WITH A FIXING KIT.
THIS IS THE RESPONSIBILITY OF THE SITE CONTRACTOR.

PREMIER TECH AQUA

1ST ANGLE PROJECTION

TITLE

CNSB3S/21/SALES BYPASS SEPARATOR

REV.	DATE	BY	CHKD.	APPD.	DESCRIPTION
5	15.08.11	RU	DG	RU	FEET ADDED

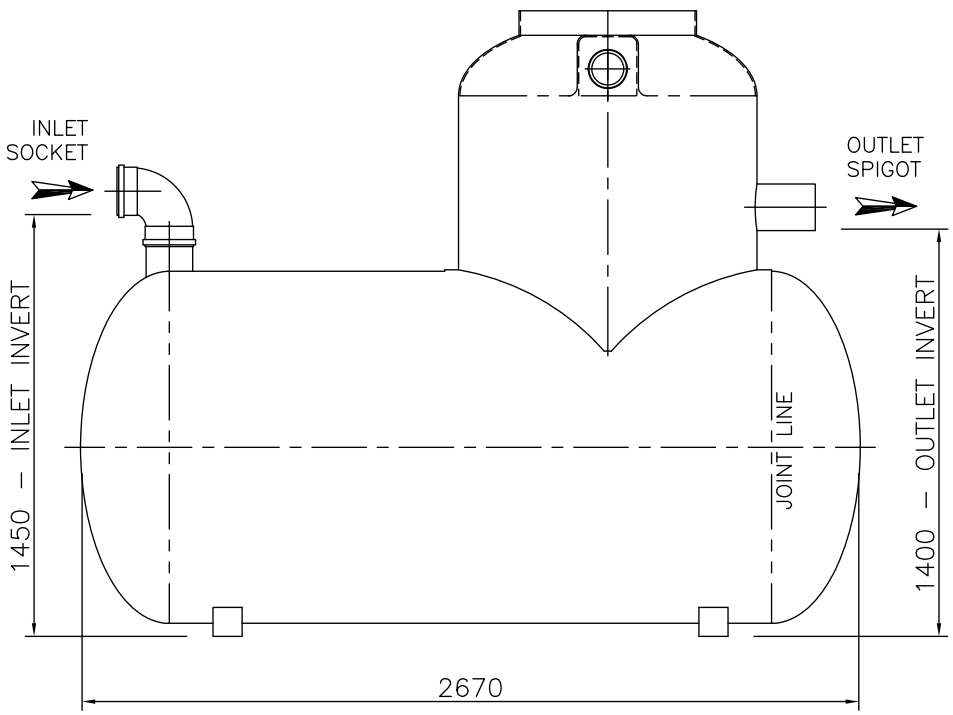
A3

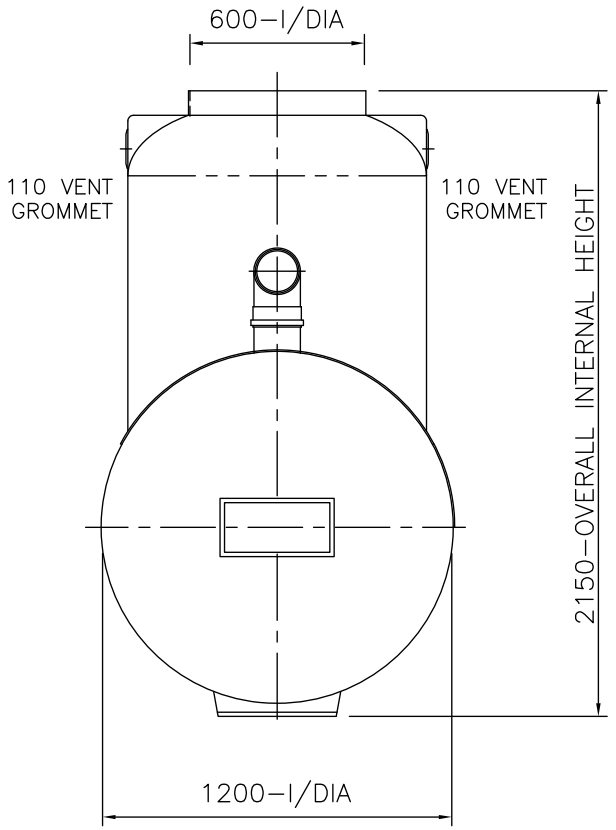
DO NOT SCALE
IF IN DOUBT ASK
ALL DIMENSIONS IN MM

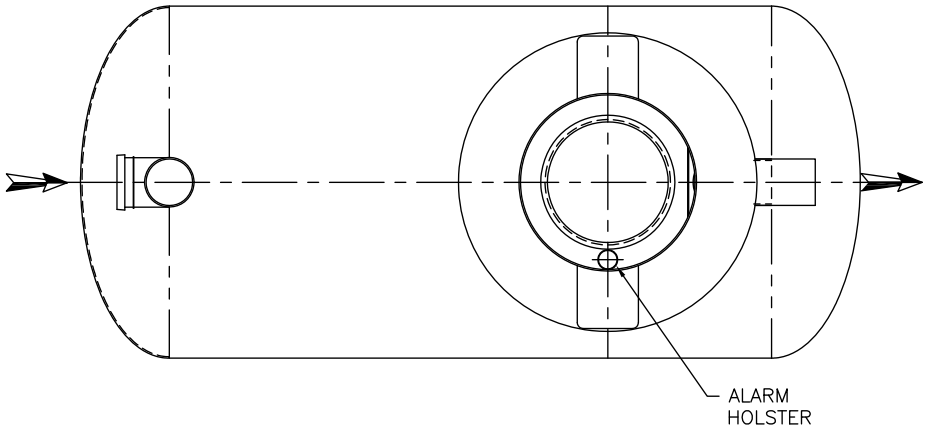
GENERAL TOLERANCES (unless noted otherwise)

GRP FABRICATED	LINEAR	± 5mm	ANGLE	±0.5°
MACHINED		± 2mm ± 0.5mm		±0.2° ±0.1°

DRAWN BY	CHKD.	APPD.	SCALE	DRAWING No.	REVISION
RU	PB	RP	NTS	CNSB3S/21 SALES	5
DATE 03.10.05	DATE 03.10.05	DATE 03.10.05			







IMPORTANT NOTE

DUE TO THE COMPACT DESIGN AND EASE OF INSTALLATION, CONDER SEPARATORS ARE NOW SUPPLIED AS STANDARD WITH AN IN LINE CONFIGURATION.

PIPE SIZE VARIANTS

100, 150, 225 PVC

300, 375 GRP

NOTES:

1. PRODUCT INFORMATION

The Conder range of light liquid separators is produced from high grade GRP. Inlets are provided as sockets and outlets as spigots, Connections may be made by steel-banded flexible couplings, nitrile seal joints, rope-seal and mortar or any other appropriate jointing method.
Ventilation specifications should be in accordance with Local Authority requirements. Vent pipework from multiple chambers must never be manifolded below ground level.

2. PERFORMANCE CHARACTERISTICS

Separators are based on the requirements stated in European Standard EN858-1 and Environment Agency guideline PPG3, in particular:-
a. The nominal size has been established from performance tests where the residual oil at the outlet is less than 5mg/l for class 1 separators and less than 100mg/l for class 2 separators.

3. MAINTENANCE AND USE

It is important to recognise that light liquid separators require regular maintenance. The period between maintenance operations can vary depending on the location and use of the separator, therefore routine inspections shall be undertaken at least every six months and a log maintained of inspection date, depth of oil, depth of silt and any cleaning that is undertaken.
A Conder Alarm should be fitted to every separator to give automatic warning that the light liquid capacity has been reached.
Access to the separator should be kept clear and not used for storage.

4. PRODUCT DEVELOPMENT

In line with our policy of constant improvement and development, we reserve the right to change specification without prior notice.

IMPORTANT INVERT LEVEL NOTE (RIBBED TANKS ONLY!):
The inlet and outlet Invert Level(IL) shown on this drawing is to internals of the shell unless otherwise stated.
For Invert level to the outside of the shell ribs, see the conversion below:
ø1.0m, 1.2m, 1.5m, 1.8m, 2.5m IL+50mm ('X')
ø3.0m,4.0m IL+75mm ('X')

TANKS SUPPLIED WITH LOOSE SHAFTS DO NOT COME SUPPLIED WITH A FIXING KIT.
THIS IS THE RESPONSIBILITY OF THE SITE CONTRACTOR.

PREMIER TECH AQUA

1ST ANGLE PROJECTION

TITLE

CNSB15S/21/SALES BYPASS SEPARATOR

REV.	DATE	BY	CHKD.	APPD.	DESCRIPTION
7	11.04.13	DG	KB	RP	PIPE SIZE VARIANTS AMENDED

A3	DO NOT SCALE IF IN DOUBT ASK ALL DIMENSIONS IN MM	GENERAL TOLERANCES (unless noted otherwise)					
		GRP FABRICATED MACHINED	LINEAR	± 5mm ± 2mm ± 0.5mm	ANGLE	±0.5° ±0.2° ±0.1°	

DRAWN BY	CHKD.	APPD.	SCALE	DRAWING No.	REVISION
RU	PB	RP	NTS	CNSB15S/21 SALES	7
DATE 23.03.09	DATE 23.03.09	DATE 23.03.09			

Appendix J – Hydrobrake Details

Hydro-Brake® Flow Control

Modelling Guide

Unit Selection Design Guide

Overview

Hydro-Brake® Flow Controls restrict the flow in surface/storm water or foul/combined sewer systems by inducing a vortex flow pattern in the water passing through the device, having the effect of increasing back-pressure.

Their 'hydrodynamic' rather than 'physical restriction' based operation provides flow regulation whilst maintaining larger clearances than most other types of flow control, making them less susceptible to blockage. Their unique "S"-shaped head-flow characteristic also enables them to pass greater flows at lower heads, which can enable more efficient use of upstream storage facilities.

This document provides guidance relating to the selection and use of Hydro-Brake® Flow Controls for use in surface/storm water and foul/combined sewer systems.

The information provided here is intended for the purposes of general guidance only - individual application requirements may differ. If in doubt, or to enquire about new product additions, please contact HRD Technologies Ltd.

STH Range of Hydro-Brake® Flow Controls

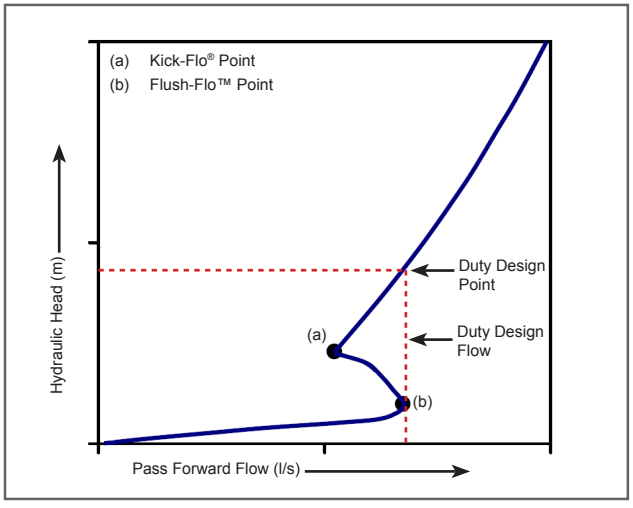
BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4599

See back cover for details.

Hydraulic Characteristics and Specification

Hydro-Brake® Flow Controls should be selected such that the duty/design flow is not exceeded at any point on the head-flow curve, see illustration right. If this is not achievable using the initially selected unit, it may be appropriate to select an alternative option (see selection guidance overleaf).

While the primary aim of a flow control is to provide a particular flow rate at a given upstream head (giving a design/duty point), it is important to note that secondary opportunities, such as potential for optimised storage use, derive from consideration of the full hydraulic characteristic. It is therefore important to ensure that the same flow control, or one confirmed to provide equivalent hydraulic performance, is implemented in any final installation.



Typical Hydro-Brake® Head Versus Flow Characteristics

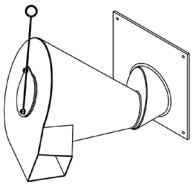
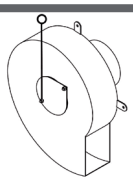
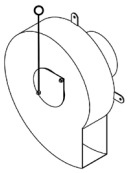
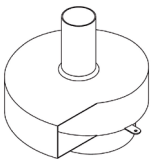
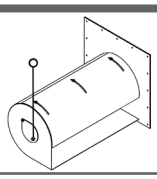
To ensure correct implementation a multiple design-point specification, defining the main hydraulic features of the selected flow control, can be provided by HRD Technologies Ltd. This should include at least the following information:

- outlet size and model of Hydro-Brake® Flow Control
- definition of the duty/design point (head and flow)
- definition of the Flush-Flo™ point (head and flow)
- definition of the Kick-Flo® point (head and flow)

To ensure that a drainage system performs as designed, it is strongly recommended that this information is reproduced on any technical specifications.

Hydro-Brake® Flow Control Models Supported in Micro Drainage

The Table below provides a summary of the Hydro-Brake® Flow Control models currently supported by the Micro Drainage programs, including details of unit styles, applications and design/installation considerations. Advice regarding unit selection is provided in subsequent sections.

WinDes® Reference Code	Style / Typical Shape	Application	Design / Installation Notes
Md1 Md2 Md4 Md14	**Conical** 	Foul / combined and surface / storm water.	With the exception of the Md14, conical units require benching into the intake (the Md14 has a piped intake). They generally require larger manholes than equivalent sump-type units.
Md5 Md6 Md7 Md12	**Sump-Type** 	Surface / storm water only.	Sump-type units require the provision of a sump to accommodate the flow control. As this will always be full of water, sump-type units are unsuitable for use in foul / combined systems.
Md13	**Sump-Type** BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE No 08/4599 STH Range of Hydro-Brake® Flow Controls 	Surface / storm water only.	The Md13 (STH) unit will always have an outlet size in excess of 75 mm and can always be fitted to a 225 mm diameter outlet pipe or larger.
Md8 Md9 Md11	**Vertical Discharge** 	Foul / combined and surface / storm water.	Vertical discharge units require a chamber design to accommodate the vertically directed outlet. They do not have S-shaped head / discharge curves and are for special applications only - please refer to HRD Technologies Ltd for advice.
Md10	**Tubular** 	Foul / combined and surface / storm water.	Tubular units require benching into the intake. They do not have S-shaped head / discharge curves and are for special applications only - please refer to HRD Technologies Ltd for advice.

Note: For system modelling using other software packages, HRD Technologies Ltd can provide individual unit head / flow characteristics in an appropriate format.

General Advice

Selection of the most appropriate Hydro-Brake® Flow Control for a particular application depends on a number of considerations, including the type of sewer system, the hydraulic characteristic of the device, device clearances and overall physical dimensions. The Micro Drainage programs provide outputs for hydraulic characteristic and outlet size.

The table opposite provides general selection guidance taking into account the considerations of type of sewer system, device clearances and overall physical dimensions. This should be considered along with other information provided here and in conjunction with the advice contained within the software design program that is being used.

The Table should be followed from the top, using the left hand column for surface/storm water applications and the right hand column for foul/combined applications. The 'general comments' provided are relevant to both applications.

HRD Technologies Ltd offer a free design service and can assist with unit selection.

General Guidance on Unit Selection

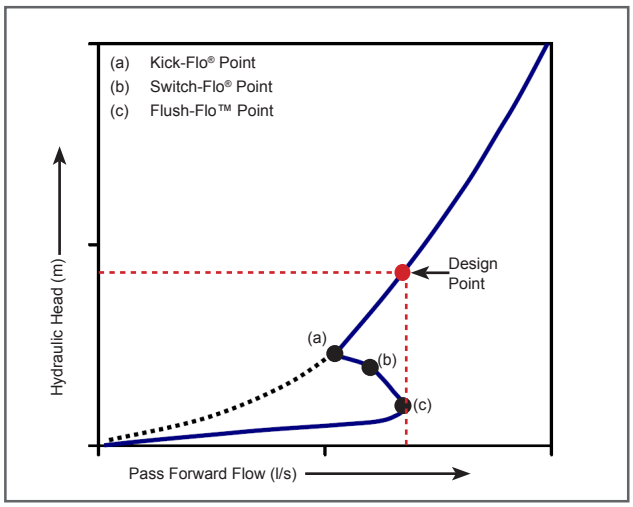
Surface / Storm Water Applications	Foul / Combined Applications
1) Select sump-type Md13 (STH) initially. This is a British Board of Agrément (BBA) approved product that is currently only available in certain sizes – if a size is not available for the specified duty/ design point go to 2) otherwise use Md13 (STH). The Md13 (STH) has a minimum outlet size in excess of 75 mm and can always be fitted to a 225 mm diameter outlet pipe (or greater).	1) Select conical-type Md4 (CX) initially provided the required outlet >150 mm. If the required manhole/ chamber size is too large go to 2) otherwise use Md4 (CX).
2) Select sump-type Md6 (SXH) initially provided the required outlet >75 mm (please seek advice if outlet <75 mm). If required outlet >200 mm go to 3) otherwise use Md6 (SXH).	2) Select conical-type Md2 (CH) provided the required outlet >150 mm. If the required manhole/chamber size is too large go to 3) otherwise use Md2 (CH).
3) Select sump-type Md5 (SH) or Md12 (SMXH) provided the required outlet >75 mm (please seek advice if outlet <75 mm). If required outlet >250 mm (Md5 - SH) or >300 mm (Md12 - SMXH) go to 4) otherwise use Md5 (SH) /Md12 (SMXH).	3) Select conical-type Md1 (C) provided the required outlet >429 mm. If the required manhole/chamber size is too large go to 4) otherwise use Md1 (C).
4) Select conical-type Md4 (CX) provided the required outlet >100 mm. This unit does not require a sump arrangement but requires benching into the intake. If the required manhole/ chamber size is too large go to 5), otherwise use Md4 (CX).	4) Vertical discharge units Md8 (SV), Md9 (SMV) and Md11 (SXV) can be considered if their outlets are >150 mm. Their physical dimensions should be considered - the Md9 (SMV) is typically used when the diameter of the Md8 (SV) and Md11 (SXV) >200 to 250 mm. If none of these units are suitable go to 5).
5) Select conical-type Md2 (CH) unit provided the required outlet >100 mm. This unit does not require a sump arrangement but requires benching into the intake. If the required manhole/ chamber size is too large go to 6), otherwise use Md2 (CH).	5) Select tubular-type Md10 (TH) provided the required outlet >333 mm. This is sometimes the only option that will meet a certain head/discharge relationship (eg. low head, low flow situations). It should only be used when there is no other alternative.
6) Select conical-type Md1 (C) provided the required outlet >285 mm. This unit does not require a sump arrangement but requires benching into the intake. If the required manhole/chamber size is too large go to 7), otherwise use Md1 (C).	For design assistance for any Hydro-Brake® Flow Control please call: **01-4013964** or **e-mail: enquiries@hrdtec.com**
7) Select sump-type Md7 (SMH) provided the required outlet >75 mm. If the required outlet >300 mm then go to 8), otherwise use Md7 (SMH).	
8) Vertical discharge units Md8 (SV), Md9 (SMV) and Md11 (SXV) can be considered provided the required outlet >75 mm. Their physical dimensions should be considered - the Md9 (SMV) is typically used when the diameter of the Md8 (SV) and Md11 (SXV) >200 to 250 mm. If none of these units are suitable go to 9).	
9) Select tubular-type Md10 (TH) provided the required outlet >222 mm. This is sometimes the only option that will meet a certain head/discharge relationship (eg. low head, low flow situations). It should only be used when there is no other alternative.	
General Comments: The minimum sizes quoted for Hydro-Brake® Flow Controls represent sizes based on experience as offering significant reduction in risk of blockage and hence maintenance and derive from general practice in flow control selection in the UK and Ireland. Sizes below the minimum recommended can be specified though it should be recognised these might incur increased risks of blockage and associated maintenance. Sizes above the maximum recommended can also be specified though may require oversized manholes/chambers. For the larger units, refer to HRD Technologies Ltd for advice.	

The information provided here is intended for the purposes of general guidance only - individual application requirements may differ. **If in doubt, please contact HRD Technologies Ltd.**

STH Type Hydro-Brake® Flow Control with BBA Approval

Now included in Win*Des*® W.12.6!

The new STH type Hydro-Brake® Flow Control range has a unique head / discharge performance curve which introduces a very important feature - the Switch-Flo® Point. This point illustrates the unique performance feature of the STH range which can lead to further savings in upstream storage, whilst also enabling increased inlet / outlet size to further reduce the risk of blockage.



Typical STH Head Versus Flow Characteristics

Kick-Flo® (a) - the point at which the vortex has initiated and at which the curve begins to return back to follow the orifice curve and reach the same design point or desired head / flow condition.

NEW Switch-Flo® (b) - marks the transition between the Kick-Flo® and Flush-Flo™, from vortex initiation to stabilisation. This point adds a new layer of resolution to the Hydro-Brake® curve that has implications to upstream storage savings.

Flush-Flo™ (c) - the point at which the vortex begins to initiate and have a throttling effect. This point on the Hydro-Brake® curve is usually much nearer to the maximum design flow (Design Point), than other vortex flow controls leading to more water passing through the unit during the earlier stages of a storm, thus reducing the amount of water that needs to be stored upstream.

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4599

STH Range of Hydro-Brake® Flow Controls

The STH Hydro-Brake® Flow Control is the only vortex flow control available today that has been given the prestigious BBA Approval Certificate. The BBA assessment procedure entails rigorous assessment of production and manufacturing standards, and confirms that the hydraulic performance of the Hydro-Brake® Flow Control matches the data given to designers by HRD Technologies with their head / discharge curves.

A worked example showing the steps to model a Hydro-Brake® Flow Control and associated Stormcell® Storage System within Micro Drainage Win*Des*® is available on our website:

www.hrdtec.com

Take a Look at Our New Stormwater Web Resource

Engineering Nature's Way™

www.engineeringnaturesway.co.uk

Engineering Nature's Way is a brand new resource for people working with Sustainable Drainage and flood management in the UK.

The site provides an opportunity to share news, opinion, information and best practice for people working in local and central Government; developers, consulting engineers and contractors. Do you have something to share? We would be delighted to receive your contributions.

turning water around ...®

HRD Technologies Ltd

HRD Technologies Ltd • Tootenhill House • Rathcoole • Co. Dublin • Ireland
Tel: +353 (0) 1 4013964 • Fax: +353 (0) 1 4013978 • www.hrdtec.com
HRD Technologies Ltd is a subsidiary of Hydro International plc

DATE:	**29 October 2019**
DESIGNER:	**Declan Doyle**
PROJECT No:	**KE/RE/OMR/01**
PROJECT NAME:	**Old Mallow road Blackpool**

Residential Lighting To Class P3, Main road lighting to class P2,
Entrance (conflict zone) lighting to class C3
Dimming to 2A Regime, S/P Ratio 1.47

A) CREE XSPME B Type 3SH DY2, 4.00klm, 26w CLO
B) CREE XSPHO 1 Type 2SH DY14, 6.38klm, 42w CLO

C/W Nema 7 Pin Socket & Field Adjuster (DQ-N/Y-N)
6m Columns - Estate, 8m columns main road

Results: Estate: Eav 6.34lux, Emin 1.53, Uo 0.24
Estate entrance: Eav 16.20lux, Emin 8.68, Uo 0.54
Main road: Eav 9.18lux, Emin 1.96, Uo 0.21

Outdoor Lighting Report

PREPARED BY:

Astrotek lighting ltd.,
M50 Business park,
Ballymount,
Dublin 12.

Tel: 01 4568009
Email: declan.doyle@rexel.ie
Web: www.astrotek.ie

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1	70.74	23.20	256.65	120.63	1.49	1.49
2	Grid 2	75.26	48.07	123.77	20.47	1.49	1.46
3	Grid 3	260.25	39.55	60.38	19.89	1.47	1.42
4	Grid 4	194.74	49.64	65.86	20.15	1.50	1.44
5	Grid 5	158.27	57.17	18.01	11.93	1.50	1.49

Luminaires

Luminaire A Data

Supplier	
Type	XSPME - B - Type 3SH - DY2 4K
Lamp(s)	3MD-SA1400 M DY2 4K
LampFlux(klm)/Colour	4.00 4000/70
File Name	XSPME023SHB40K_24DY2-PL12371-012A .LDT
Maintenance Factor	0.76
Imax70,80,90(cd/klm)	334.5, 193.4, 0.0
Lamp S/P Ratio	1.47
No. in Project	21

Luminaire B Data

Supplier	
Type	XSPE022SHH40K_24-#14
Lamp(s)	5MDA1400#34K
Lamp Flux (klm)	6.38
File Name	XSPE022SHH40K_24-14-PL11703-029.IES
Maintenance Factor	0.84
Lum. Int. Class	G4
Lamp S/P Ratio	1.47
No. in Project	7

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	116.40	102.34	6.00	88.00	0.00	0.00	0.00			
2	A	116.39	102.34	6.00	270.00	0.00	0.00	0.00			
3	A	105.80	82.28	6.00	1.00	0.00	0.00	0.00			
4	A	130.96	72.84	6.00	90.00	5.00	0.00	0.00			
5	A	159.45	72.85	6.00	90.00	5.00	0.00	0.00			
6	A	177.59	110.20	6.00	359.00	5.00	0.00	0.00			
7	A	188.78	99.31	6.00	180.00	5.00	0.00	0.00			
8	A	172.19	70.40	6.00	211.00	5.00	0.00	0.00			
9	A	185.66	80.35	6.00	271.00	5.00	0.00	0.00			
10	A	209.76	79.82	6.00	269.00	5.00	0.00	0.00			
11	A	273.17	124.05	6.00	1.00	5.00	0.00	0.00			
12	A	273.83	103.03	6.00	4.00	5.00	0.00	0.00			
13	A	252.51	122.04	6.00	272.00	5.00	0.00	0.00			
14	A	236.74	112.85	6.00	0.00	5.00	0.00	0.00			
15	A	235.22	95.37	6.00	336.00	5.00	0.00	0.00			
16	A	225.45	79.16	6.00	323.00	5.00	0.00	0.00			

7743365122

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
17	A	240.85	73.33	6.00	255.00	5.00	0.00	0.00			
18	A	260.08	71.93	6.00	276.00	5.00	0.00	0.00			
19	A	261.48	85.08	6.00	5.00	5.00	0.00	0.00			
20	A	273.68	74.87	6.00	4.00	5.00	0.00	0.00			
21	B	200.35	67.96	8.00	264.00	5.00	0.00	1.50			
22	B	167.47	56.97	8.00	90.00	5.00	0.00	1.50			
23	B	135.31	66.96	8.00	270.00	5.00	0.00	1.50			
24	B	94.87	66.08	8.00	263.00	5.00	0.00	1.50			
25	B	236.19	61.78	8.00	258.00	5.00	0.00	1.50			
26	B	276.54	57.85	8.00	273.00	5.00	0.00	1.50			
27	B	312.12	60.65	8.00	276.00	5.00	0.00	1.50			
28	A	182.46	125.51	6.00	270.00	5.00	0.00	0.00			

Horizontal Illuminance (lux)

Grid 1

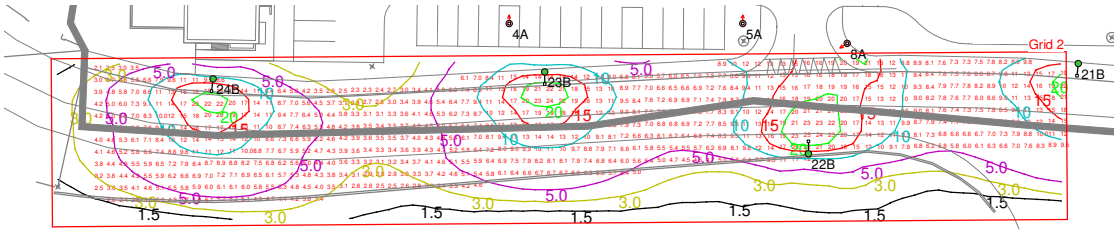
Results

Eav	6.34
Emin	1.53
Emax	20.55
Emin/Emax	0.07
Emin/Eav	0.24

7743365122

Horizontal Illuminance (lux)

Grid 2



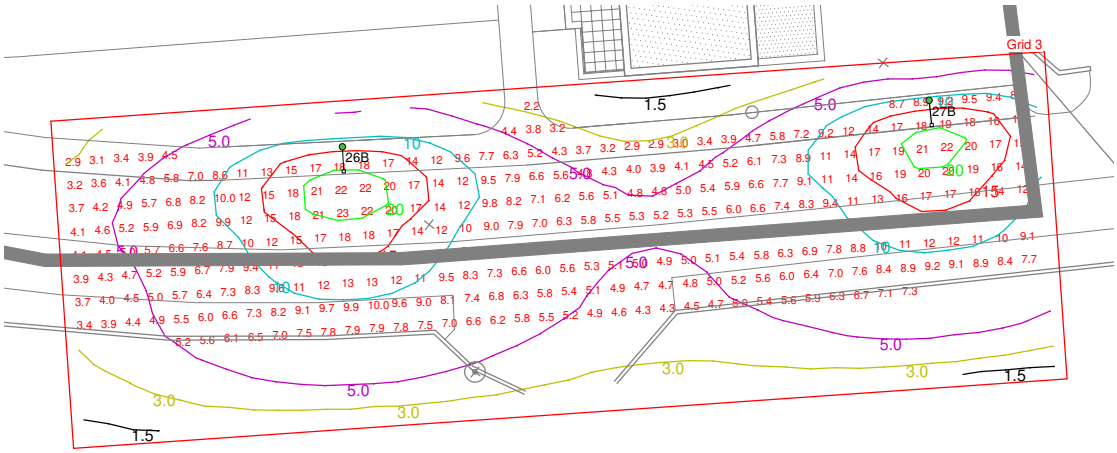
Results

Eav	9.18
Emin	1.96
Emax	24.54
Emin/Emax	0.08
Emin/Eav	0.21

7743365122

Horizontal Illuminance (lux)

Grid 3



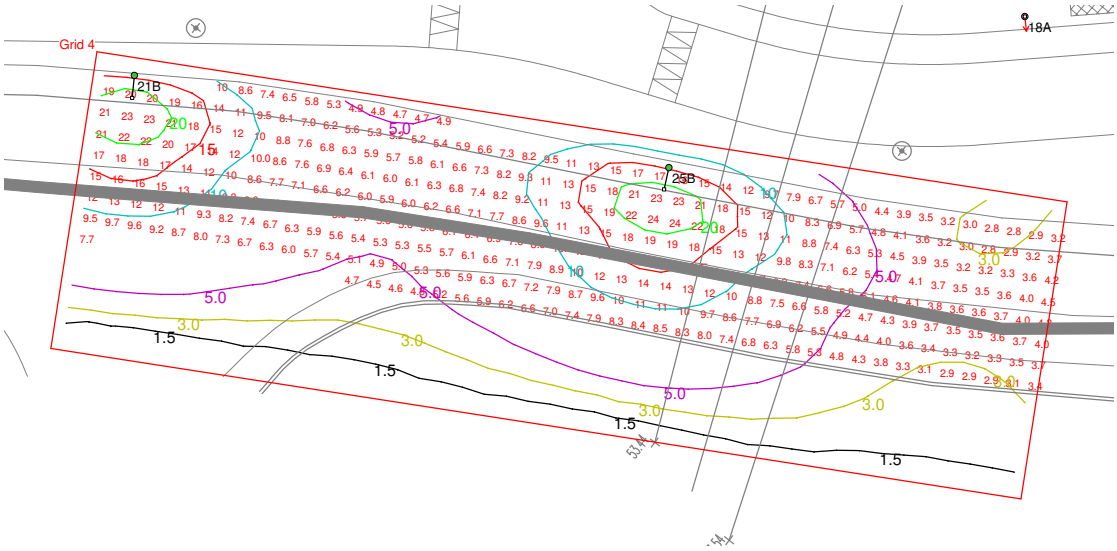
Results

Eav	8.99
Emin	2.23
Emax	22.50
Emin/Emax	0.10
Emin/Eav	0.25

7743365122

Horizontal Illuminance (lux)

Grid 4



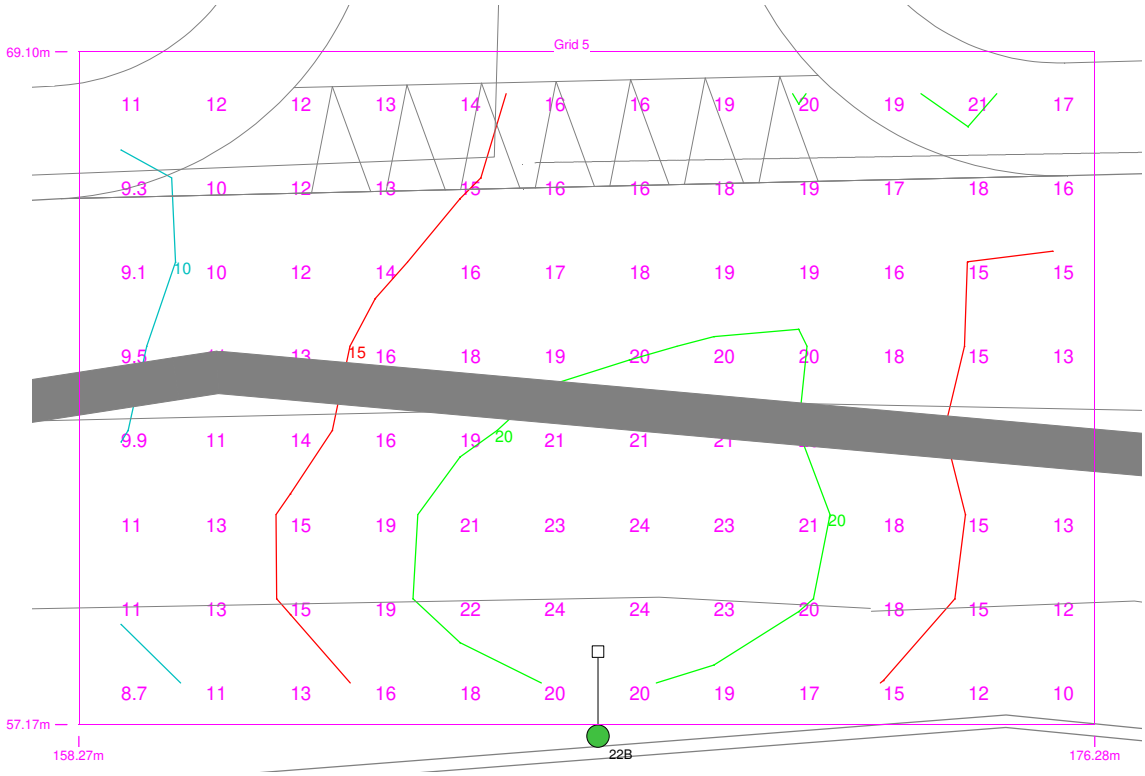
Results

Eav	8.73
Emin	2.79
Emax	23.73
Emin/Emax	0.12
Emin/Eav	0.32

7743365122

Horizontal Illuminance (lux)

Grid 5



Results

Eav	16.20
Emin	8.68
Emax	24.36
Emin/Emax	0.36
Emin/Eav	0.54

7743365122

Murnane & O'Shea Ltd.

Residential Housing Development,
Old Mallow Road, Blackpool, Co Cork

Traffic and Transport Assessment

December 2019

`

MHL & Associates Ltd.
Consulting Engineers

Document Control Sheet

Client	Murnane & O'Shea Ltd.
Project Title	Residential Housing Development, Old Mallow Road, Blackpool, Co. Cork
Document Title	Traffic and Transport Assessment
Document No.	MOS_TTA_P01
Job No.	19070TT

Revision	Status	Author	Reviewed By	Approved By	Date
01	Internal Draft	G.Whelton	K.Manley	K.Manley	28/11/19
02	Client Issue	G.Whelton	K.Manley	K.Manley	04/12/19
03	Final Client Issue	G.Whelton	K.Manley	K.Manley	04/12/19

M.H.L. & Associates Ltd.
Consulting Engineers
Carraig Mór House,
10 High Street,
Douglas Road,
Cork.
Tel 021-4840214 Fax: 021-4840215
E-Mail: info@mhl.ie

Table of Contents

1. NON – TECHNICAL SUMMARY 4

2. EXISTING CONDITIONS 5

2.1 LOCAL ROAD NETWORK 5

2.2 RECORDED TRAFFIC FLOWS 6

3.0 PROPOSED DEVELOPMENT 8

4. TRAFFIC GENERATION 9

4.1 EXISTING TRAFFIC FLOWS 9

4.2 MODAL CHOICE 9

4.3 PROPOSED DEVELOPMENT TRAFFIC GENERATION 10

4.4 TRIP DISTRIBUTION 10

5. ASSIGNMENT OF DEVELOPMENT TRAFFIC 11

5.1 EXISTING TRAFFIC FLOWS 11

6. ASSESSMENT YEARS 14

7. TRAFFIC MODELLING RESULTS 15

7. 1 JUNCTION 9 ANALYSIS 15

7.2 LINSIG ANALYSIS - JUNCTION 1 17

7. 3 ROAD IMPACT CONCLUSIONS 25

8.0 CUMALATIVE IMPACTS 26

9. ROAD SAFETY 27

9.1 ROAD SAFETY 27

10. ENVIRONMENTAL IMPACT 27

11. INTERNAL LAYOUT & PARKING PROVISIONS 28

12. PEDESTRIANS / CYCLISTS / PEOPLE WITH DISABILITIES 28

13. PUBLIC TRANSPORT 28

14. REFERENCES 29

APPENDICES 30

APPENDIX A – TRAFFIC MODEL OUTPUTS 31

APPENDIX B– LINSIG 32

APPENDIX C– TRAFFIC SURVEYS 33

1. NON – TECHNICAL SUMMARY

MHL Consulting Engineers have been engaged by Murnane & O'Shea Ltd. to prepare a Traffic Impact Assessment (TIA) as part of an application for planning permission to complete the proposed Residential Housing Development, Old Mallow Road, Blackpool, Co Cork.

The scope of this study has been agreed with Cork City Council's Traffic & Transportation Department and includes two junctions, Junction 1: Old Mallow Road/ Fitz's Boreen junction and Junction 2: Commons Road (N20)/ Fitz's Boreen junction. It was agreed that 12-hour junction turning count surveys be carried out at each of these junctions on Thursday 10th October 2019. The junction counts will form the basis for analysing the affected junctions for the identified peak periods.

The proposed development consists of the construction of 57 no. dwelling houses. In accordance with the Council's request for Further Information this TIA assesses the impact the proposed development will have on the surrounding roads network.

The proposed development is due for completion by 2021. A review of the traffic count information confirms that the Old Mallow Road/ Fitz's Boreen is the main desire line for residents exiting and entering the development during the morning and evening peak periods. Connectivity in this direction is paramount for all modes of travel.

As part of this assessment, Junction 1: 'Old Mallow Road/ 'Fitz's Boreen' and Junction 2: 'Commons Road (N20)/ 'Fitz's Boreen', were analysed for current flows, for future year scenarios with development traffic in place. The results are presented for both with/without scenarios.
The Junction 9 software was used to analyse junction 1 whilst the LINSIG software package was used to analyse junction 2.

The opening year is the year of expected completion for the development and is taken to be 2021. In accordance with the NRA's "Traffic and Transport Assessment Guidelines", a traffic analysis is required to be undertaken for the, **Base Year – 2019, Opening Year – 2021, Opening Year +5 – 2026 and Opening Year +15 – 2036.**

The traffic modelling results show that with the completion of the proposed residential development, the impact on the two junctions assessed is minimal and will experience a continuation of the current trend.

In terms of capacity Junction 1, is seen to operate within capacity currently but with a reduced level of service in future years. This happens both with and without development traffic.

Junction 2 is operating within capacity and will experience minor reductions as a result of the development, but this will not result in significant delay. This holds true up to the design year 2036 when evening peak capacity reduces to negative figures. This happens both with and without development traffic.

The location of the development within the urban area and in close proximity to public transport provision implies that the TTA concludes that the proposed development, in traffic and transportation terms is acceptable, and there are no traffic and transportation reasons that should prevent the Planning Authority from recommending approval of this application.

This report has been prepared in accordance with the NRA's 2014 publication "Traffic and Transport Assessment Guidelines" and the "Guidelines for Traffic Impact Assessments" as published by the Institution of Highways & Transportation U.K. in 1994. The purpose of a TTA is to assess the traffic impact of a development on the existing road network and propose any necessary mitigation measures to best accommodate the expected traffic volumes generated by the proposed development.

2. EXISTING CONDITIONS

Figure 2.1 presents the proposed site with reference to the identified critical junctions the subject of the traffic modelling.

Figure 2.1: Site Location Map

2.1 LOCAL ROAD NETWORK

Junction 1 is a 'T' Junction between the 'Old Mallow Road' and Fitz's Boreen. This junction provides for traffic bound for the West Link Business Park/ Blackpool and local access to the N20.

Junction 2 is a signalised 'T' Junction between the 'Commons Road (N20)/ and Fitz's Boreen'. This junction provides for traffic bound for the West Link Business Park and N20 East and Westbound traffic. It also provides local access to the rural hinterland including the villages of Whitechurch and Carrignavar. This signalised junction includes an on-demand pedestrian phase.

On-site measurements were taken at each of the junction locations to feed directly into the Junction 9.0 traffic models to build the base year models (2019). These measurements included turning radii, carriageway widths and vehicle speeds.

2.2 RECORDED TRAFFIC FLOWS

The following figures present the recorded traffic flows at both Junction 1 and Junction 2 over a 12-hour time period (Thursday 10th October). Evident from these graphs are the recorded peak hours for both morning and afternoon. The morning peak hour extends from 07:30-09:00 with the afternoon peak hours ranging from 15:45 to 18:45. These peak periods are mirrored at both junctions. When both junctions are considered the refined peak hours are 08:00-09:00 and 17:00-18:00. These periods will be used to assess the impact of development traffic at these locations.

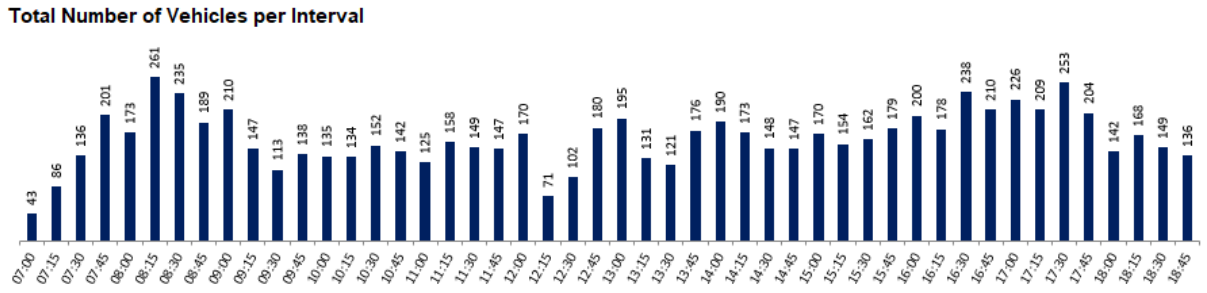


Figure 2.2: 12 Hour traffic profile for junction 1.

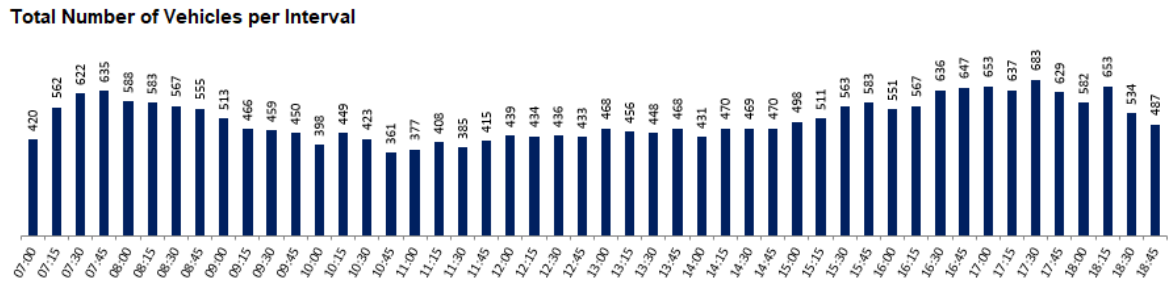


Figure 2.3: 12 Hour traffic profile for junction 2.

The following graphics present the morning and evening traffic peak turning movements at each of the junctions being assessed.

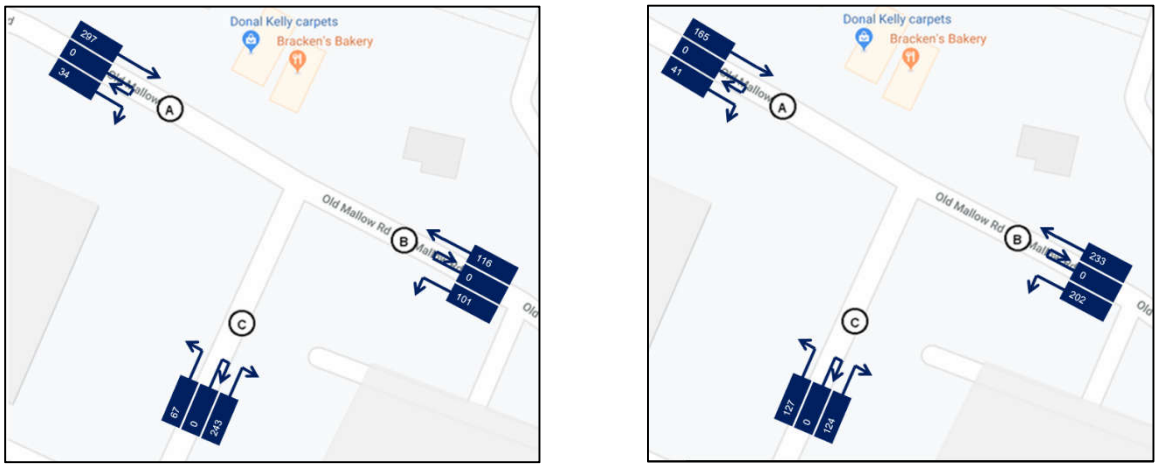


Figure 2.6: Junction 1 Recorded Turning Movements 2019. (AM and PM Peak)

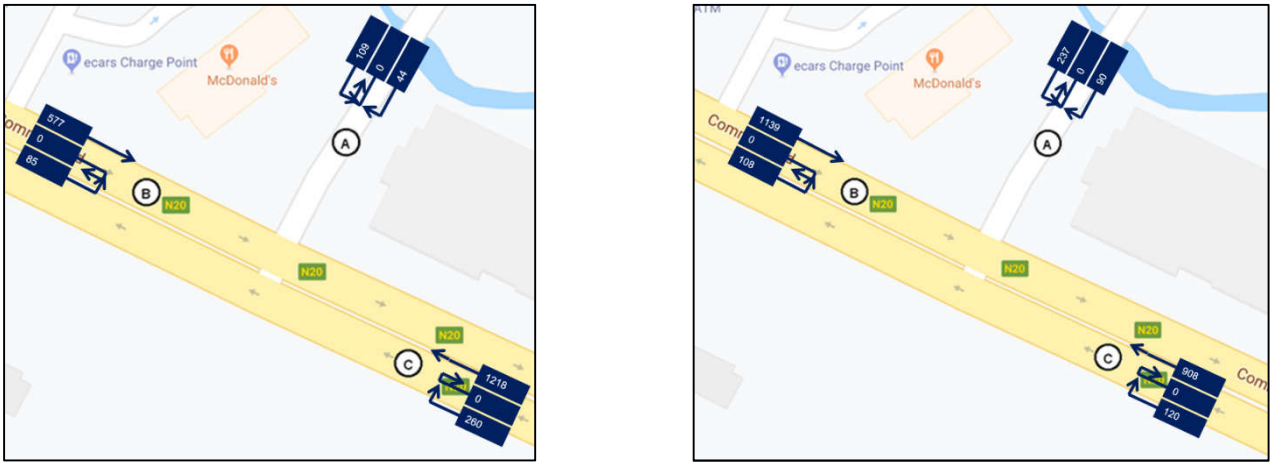


Figure 2.7: Junction 2, Recorded Turning Movements 2019. (AM and PM Peak)

3.0 PROPOSED DEVELOPMENT

The following figure presents the layout for the 57 residential units of the proposed development. The proposed layout has been developed using the principals as outlined in DMURS with internal estate road being designed to restrict speed whilst facilitating pedestrian connectivity throughout the site.

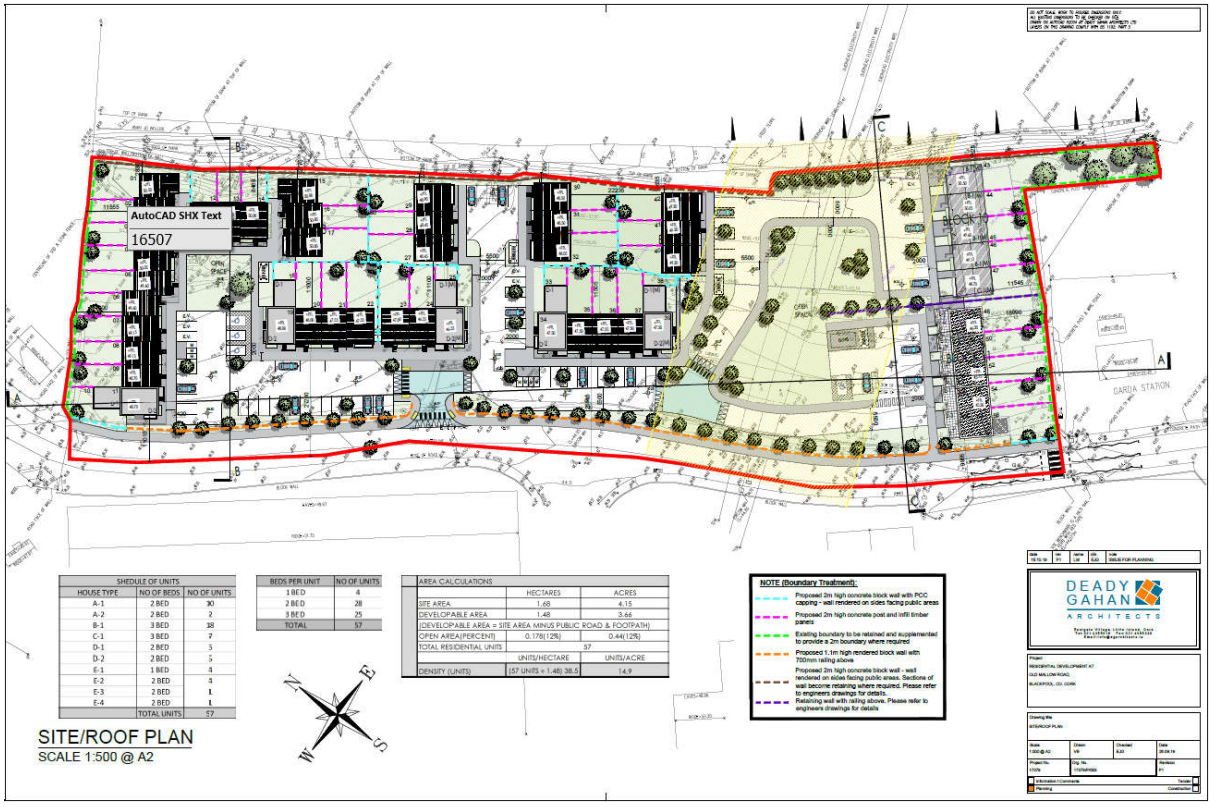
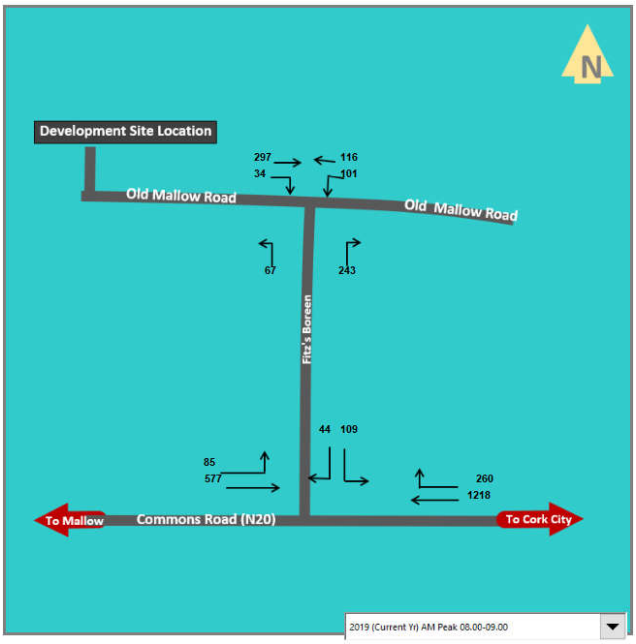


Figure 3.1: Site Layout Proposed

4. TRAFFIC GENERATION

4.1 EXISTING TRAFFIC FLOWS

Traffic flows were recorded over 12-hour intervals at each of the junctions previously identified. The extent of the traffic survey was agreed with Cork City Council, Transport Department. In addition to vehicular turning movements, queue length surveys at each junction were also recorded.



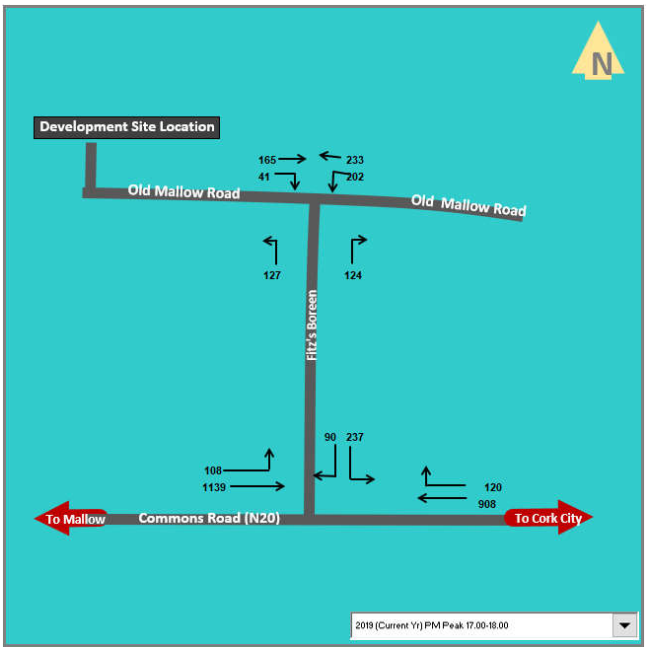


Fig 4.1: 2019, Base year 2019, AM & PM Peak Hour Flows

4.2 MODAL CHOICE

To predict the level of traffic that will be generated by the proposed development, the means of transport (modal choice) and quantity of traffic generated (trip attraction) must be considered. In this instance the traffic generated by the proposed development will be based on the TRICS database.

4.3 PROPOSED DEVELOPMENT TRAFFIC GENERATION

The following table presents the expected increase in site generated traffic when the residential development is complete:

Proposed Residential Housing Site	**57**	**units**	

	AM PEAK		PM PEAK	
	Arrivals	Departures	Arrivals	Departures
Residential Estate: Complete Construction (2019)				
Peak Trics Trip Rates ***(per Residential Unit)***	*0.13*	*0.29*	*0.39*	*0.56*
Peak Trips ***for 236 Residential Units***	*7*	*17*	*22*	*32*
Total Trips Generated	**24**		**54**	

Table 4.1: Traffic Generation for the proposed 57 residential units

4.4 TRIP DISTRIBUTION

The current distribution of traffic on the existing roads network will be used to determine directional split to and from the proposed development. This peak hour directional split pattern is assumed to remain constant with the passage of time.

5. ASSIGNMENT OF DEVELOPMENT TRAFFIC

5.1 EXISTING TRAFFIC FLOWS

The proposed development will generate traffic as outlined in Section 4, Traffic Generation. The distribution of generated traffic is as outlined in the following Figures.

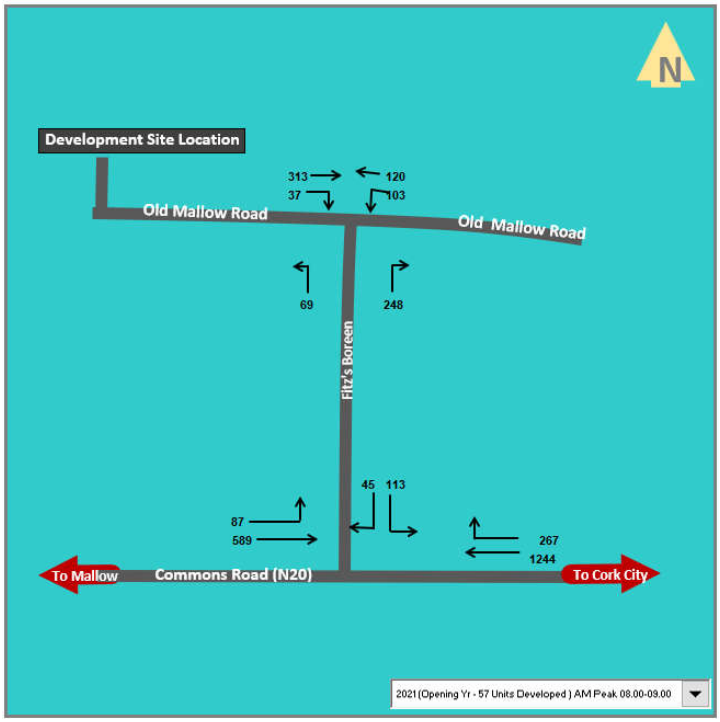


Fig 5.1: 2021, Opening year AM Peak Hour Flows (With 57 Units Developed)

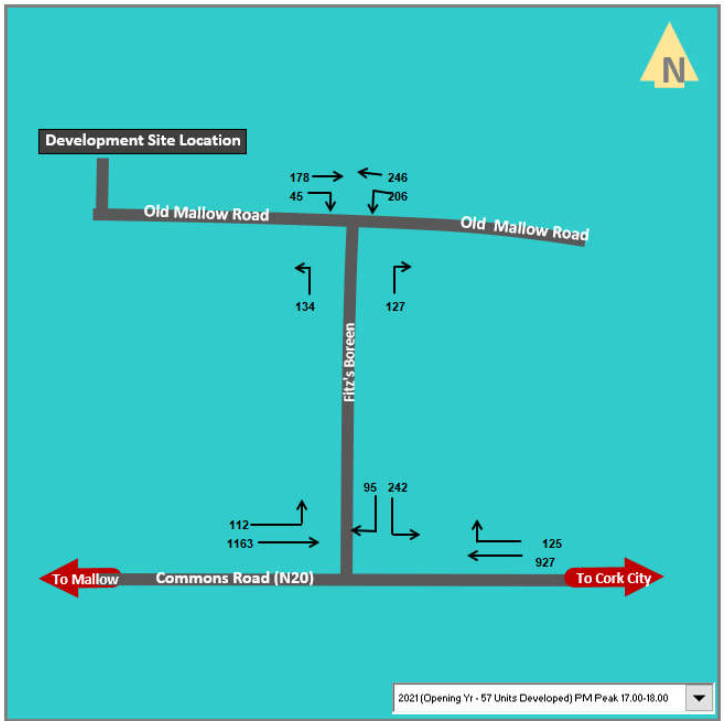


Fig 5.2: 2021, Opening year PM Peak Hour Flows (With 57 Units Developed)

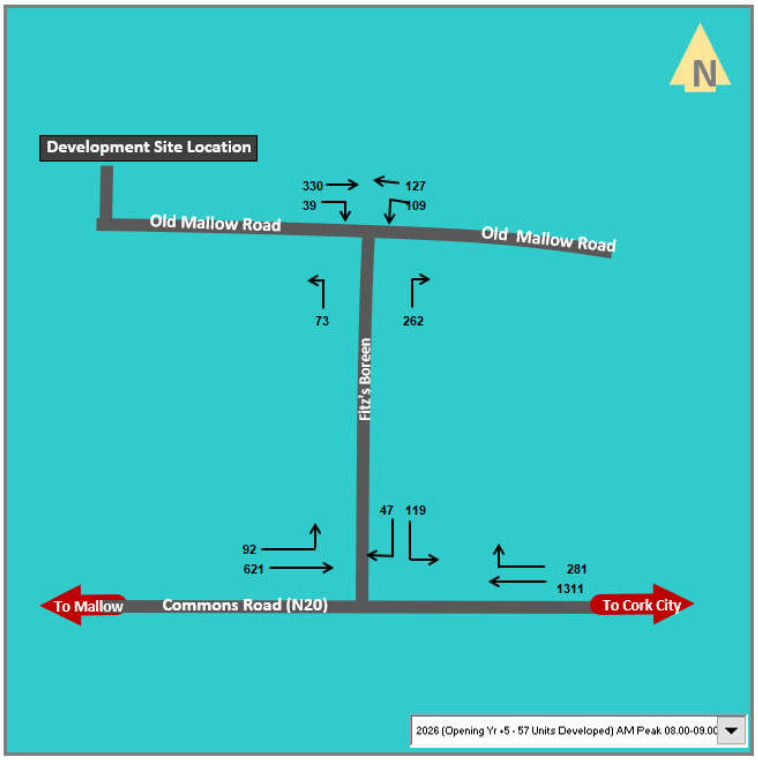


Fig 5.3: 2026, Opening year + 5 Years, AM Peak Hour Flows (With 57 Units Developed)

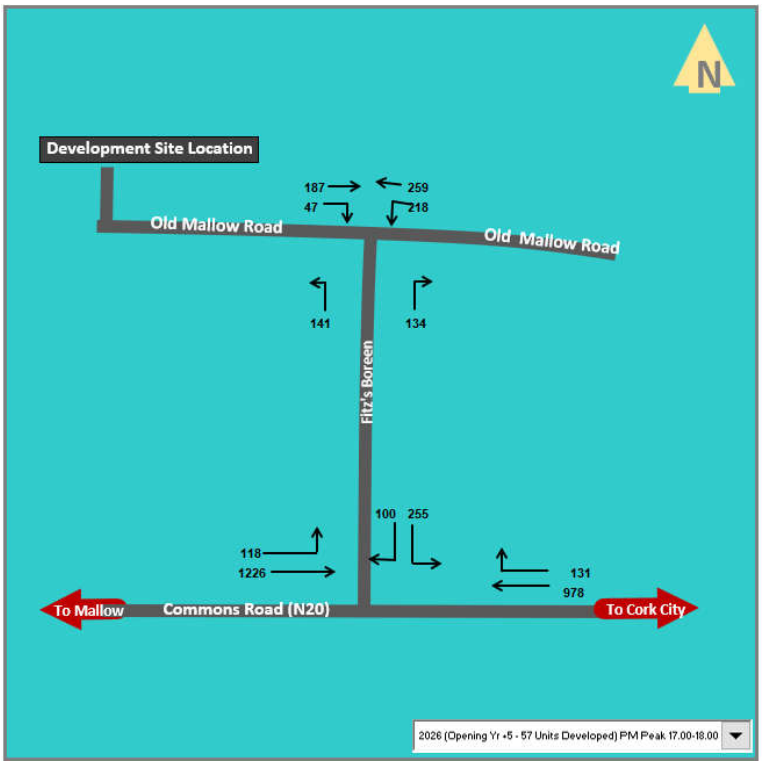


Fig 5.4: 2026, Opening year + 5 Years, PM Peak Hour Flows (With 57 Units Developed)

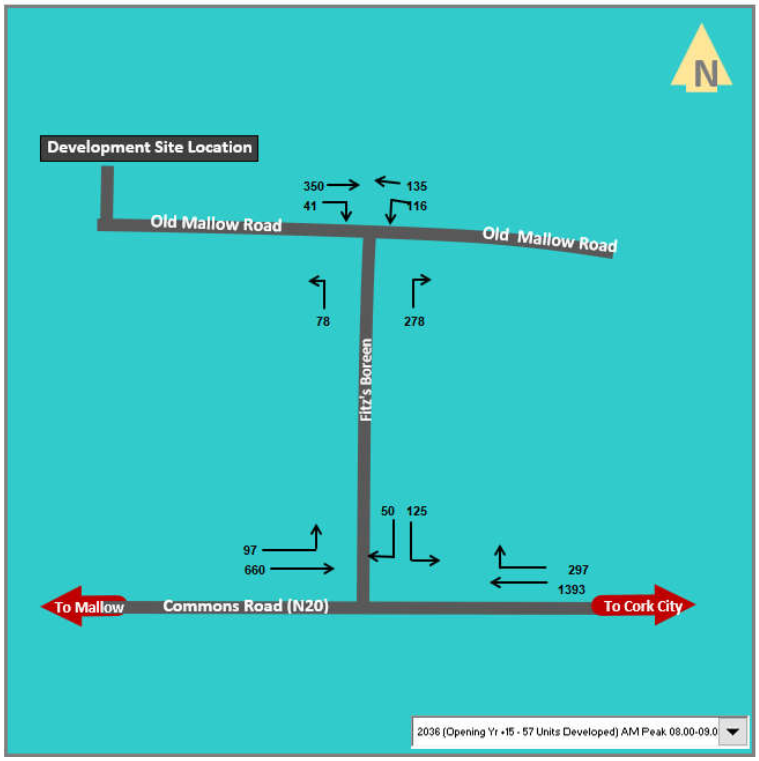


Fig 5.5: 2036, Opening year + 15 Years, AM Peak Hour Flows (With 57 Units Developed)

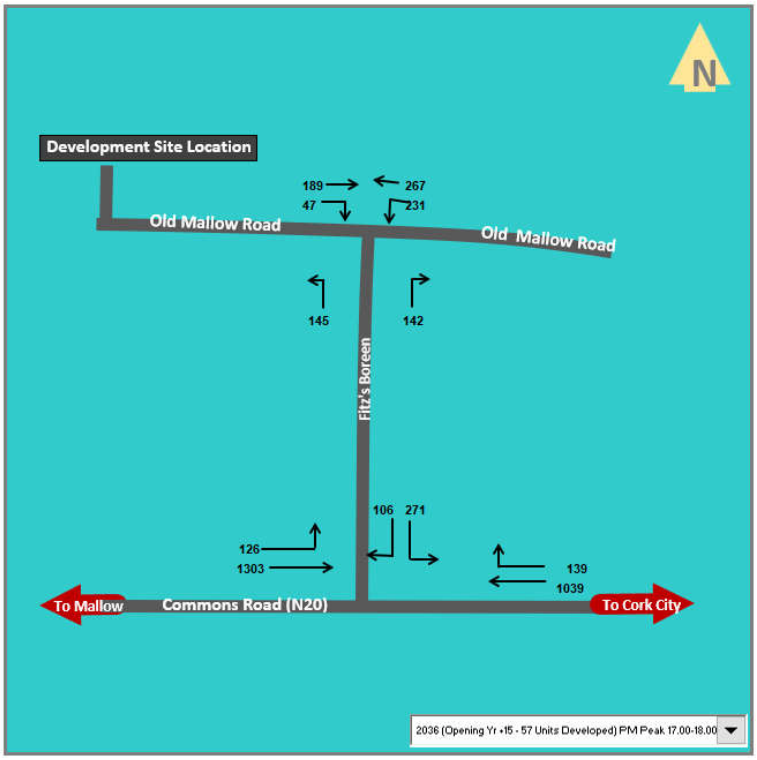


Fig 5.6: 2036, Opening year + 15 Years, PM Peak Hour Flows (With 57 Units Developed)

6. ASSESSMENT YEARS

The opening year is the year of expected completion for the development and is taken to be 2021. In accordance with the Guidelines for Traffic and Transportation Assessments as published by TII, a traffic analysis is required to be undertaken for the Opening Year – 2021 plus five and fifteen years from this date i.e., Opening year +5 – 2026 and Opening year +15 - 2036.

The growth of traffic from within the development will be expected to remain stagnant over the period 2021 to 2036. This is assumed because no new development will take place within the site.

The Transport Infrastructure Ireland "Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections – PE-PAG-02017, October 2016" was used to calculate growth factors for the existing road network traffic. Table 6.1 below shows the calculated growth factors to convert from 2019 to 2021, 2021 to 2026 and from 2026 to 2036.

			Cars/LGV	HGV	Combined
Count %			97%	3%	
2019	**to**	**2021**	1.021	1.048	**1.021**
2019	**to**	**2026**	1.074	1.178	**1.077**
2019	**to**	**2036**	1.136	1.416	**1.144**

TII Project Appraisal Guidelines for National Roads Unit 5.3
Travel Demand Projections (PE-PAG-0217)

Table 6.1: Future Growth Rates for Base Year, Opening year, Opening year +5 (2021 to 2026) & Opening Year +15 (2021 to 2036)

The effects of traffic growth on the existing network plus the additional traffic generated by the proposed development have been compiled to build junction diagrams of the two affected junctions. The purpose of this Traffic and Transport Assessment is to determine if the capacity of the existing road network is sufficient to cater for the traffic generated by the proposed development.

7. TRAFFIC MODELLING RESULTS

The Junction 9 traffic modelling software package was used to assess the existing priority 'T' junctions for the following scenarios;

- 2019 – Base year (AM & PM)
- 2021 – Opening year (AM & PM) Without Development
- 2021 – 57 Units constructed (AM & PM)
- 2026 – Opening year +5 (AM & PM) Without Development
- 2026 – 57 Units constructed (AM & PM)
- 2036 – Opening year +15 (AM & PM) Without Development
- 2036 – 57 Units constructed (AM & PM)

7. 1 JUNCTION 9 ANALYSIS

The following diagrams are of Junctions 1 (AM and PM peak) included in the analysis with flow streams shown for each of the turning movements described in the summary of junction performance Table (Table 7.1).

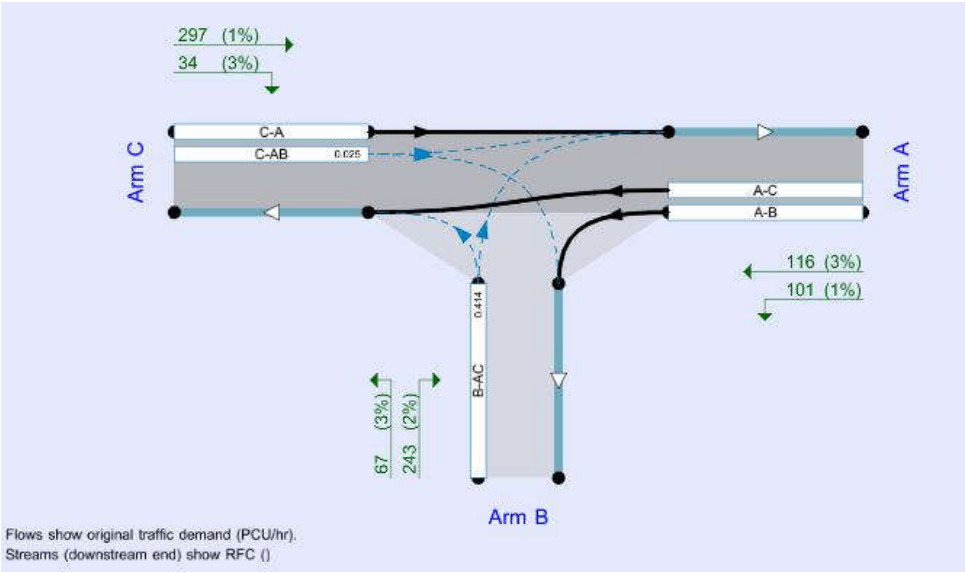


Fig 7.1: Junction 1 (AM - Peak Traffic)

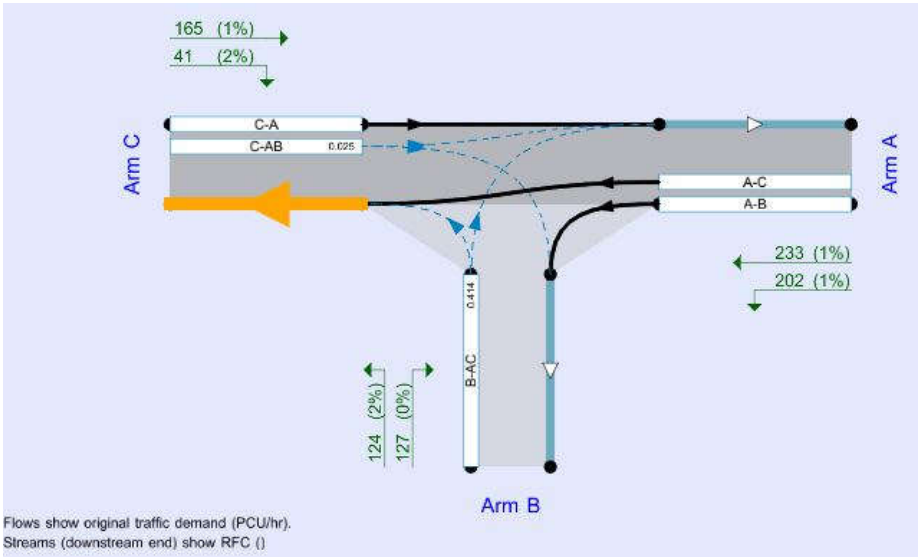


Fig 7.2: Junction 1 (PM - Peak Traffic)

Summary of Junction 1 performance

	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
	Old Mallow Road / Fitz's Boreen (J1) - 2019							
Stream B-AC	2.7	29.97	0.74	D	1.3	17.23	0.57	C
Stream C-AB	0.2	5.23	0.08	A	0.2	6.32	0.10	A
	Old Mallow Road / Fitz's Boreen (J1) - 2021 (Opening)							
Stream B-AC	3.0	32.24	0.76	D	1.4	18.02	0.59	C
Stream C-AB	0.2	5.22	0.09	A	0.2	6.34	0.10	A
	Old Mallow Road / Fitz's Boreen (J1) - 2021(57 Units)							
Stream B-AC	3.1	33.27	0.77	D				
Stream C-AB	0.2	5.21	0.09	A				
	Old Mallow Road / Fitz's Boreen (J1) - 2021 (57 Units)							
Stream B-AC					1.5	18.71	0.60	C
Stream C-AB					0.2	6.35	0.11	A
	Old Mallow Road / Fitz's Boreen (J1) - 2026							
Stream B-AC	4.0	41.10	0.81	E	1.6	20.27	0.63	C
Stream C-AB	0.2	5.19	0.09	A	0.2	6.37	0.11	A
	Old Mallow Road / Fitz's Boreen (J1) - 2026 [57 Units)							
Stream B-AC	4.1	42.54	0.82	E	1.7	21.15	0.64	C
Stream C-AB	0.2	5.18	0.10	A	0.2	6.38	0.12	A
	Old Mallow Road / Fitz's Boreen (J1) - 2036							
Stream B-AC	5.8	58.05	0.88	F	2.0	23.70	0.68	C
Stream C-AB	0.2	5.16	0.10	A	0.2	6.42	0.12	A
	Old Mallow Road / Fitz's Boreen (J1) - 2036 (57 Units)							
Stream B-AC	6.1	60.90	0.89	F				
Stream C-AB	0.2	5.15	0.11	A				
	Old Mallow Road / Fitz's Boreen (J1) - 2036 (57Units)							
Stream B-AC					2.1	24.91	0.69	C
Stream C-AB					0.2	6.44	0.13	A

Table 7.1: Traffic Modelling Results for all Junctions AM/PM: 2019, 2021, 2026 & 2036 (With & Without development).

Table 7.1 presents the results of the traffic model analysis for the peak hours 08:00 – 09:00 & 17:00-18:00 for the base year (2019), opening year (2021), opening year +5 (2026) and opening year +15 (2036) for the junction 1 (Old Mallow Road/ Fitz's Boreen) modelled with the development in place.

The results indicate that Junction 1 is currently operating close to capacity on the Fitz's Boreen approach with a level of service (LOS) D. The delay experienced by traffic turning onto the Old Mallow Road the morning peak is

on average 29.97 seconds/vehicle. Significant flows on the Old Mallow Road are the main cause. When medium growth factors are applied to existing traffic flows and with the inclusion of the development traffic the Level of Service (LOS) on Fitz's Boreen approach deteriorates significantly. As previously outlined current directional splits were used when applying development traffic implying that the impact of the development traffic on the operation of junction 1 will be minimal.
Evident is that the proposed development has minimal impact on the operation of the junction with similar LOS occurring for both with/without scenarios.

7.2 LINSIG ANALYSIS - JUNCTION 1

Junction 2 is a signalised junction and was modelled using the LINSIG software package. LINSIG is a computer software program dealing with capacities, mean max queue lengths (pcu) and delays at uncontrolled and signalised junctions.

The output results sheets from LINSIG consist of tables of demand flow, capacities, queues and delays for the morning and evening peak hour analysis, for each arm of the junction. These tables contain start and finish times for each arm, traffic demand, Degree of Saturated Flow (DOS %), start queue length and queuing delay. The DOS provides the basis for judging the acceptability of junction design and the capacity of existing junctions. In general, a DOS of 85% is deemed acceptable for uncontrolled junctions and a DOS of 90% is acceptable for signalised junctions.

The LINSIG Analysis is shown below as follows,

Fig 7.3: Scenario 1 AM 2019 (Base Year)
Fig 7.4: 'Scenario 2 PM 2019 (Base Year)
Fig 7.5: 'Scenario 3 AM 2021 (Without Development)
Fig 7.6: 'Scenario 4 PM 2021 (Without Development)
Fig 7.7: 'Scenario 5 AM 2021 (With 57 Units)
Fig 7.8: 'Scenario 6 PM 2021 (With 57 Units)
Fig 7.9: 'Scenario 7 AM 2026 (Without Development)
Fig 7.10: 'Scenario 8 PM 2026 (Without Development)
Fig 7.11: 'Scenario 9 AM 2026 (With 57 Units)
Fig 7.12: 'Scenario 10 PM 2026 (With 57 Units)
Fig 7.13: 'Scenario 11 AM 2036 (Without Development)
Fig 7.14: 'Scenario 12 PM 2036 (Without Development)
Fig 7.15: 'Scenario 13 AM 2036 (With 57 Units)
Fig 7.16: 'Scenario 14 PM 2036 (With 57 Units)

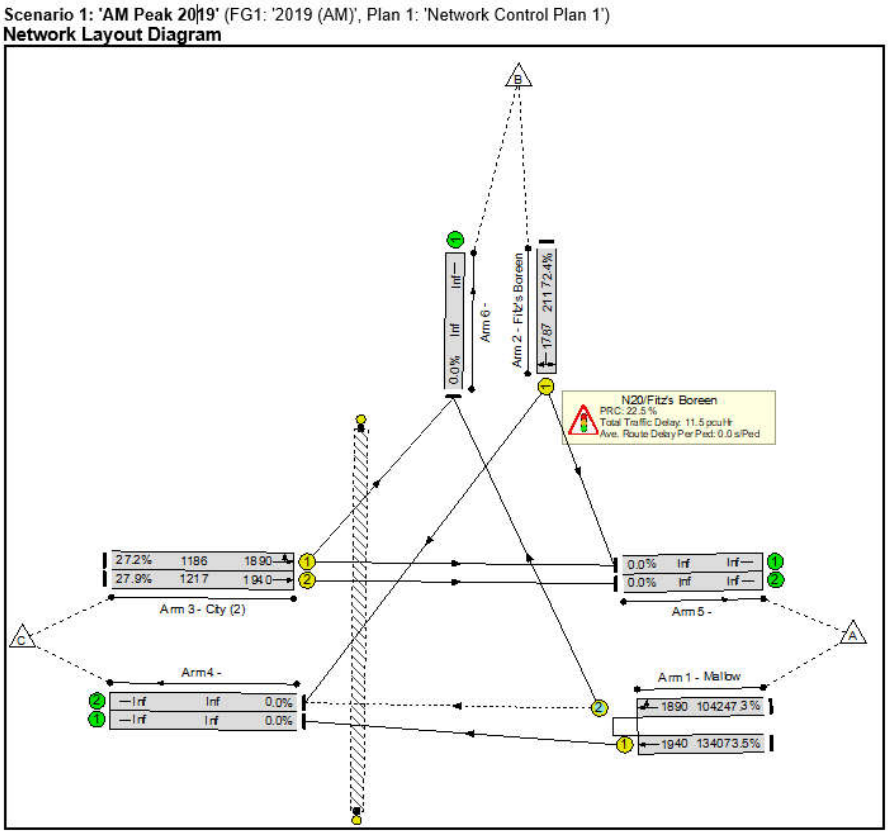


Fig 7.3: Scenario 1: 2019 – AM (Base Year)

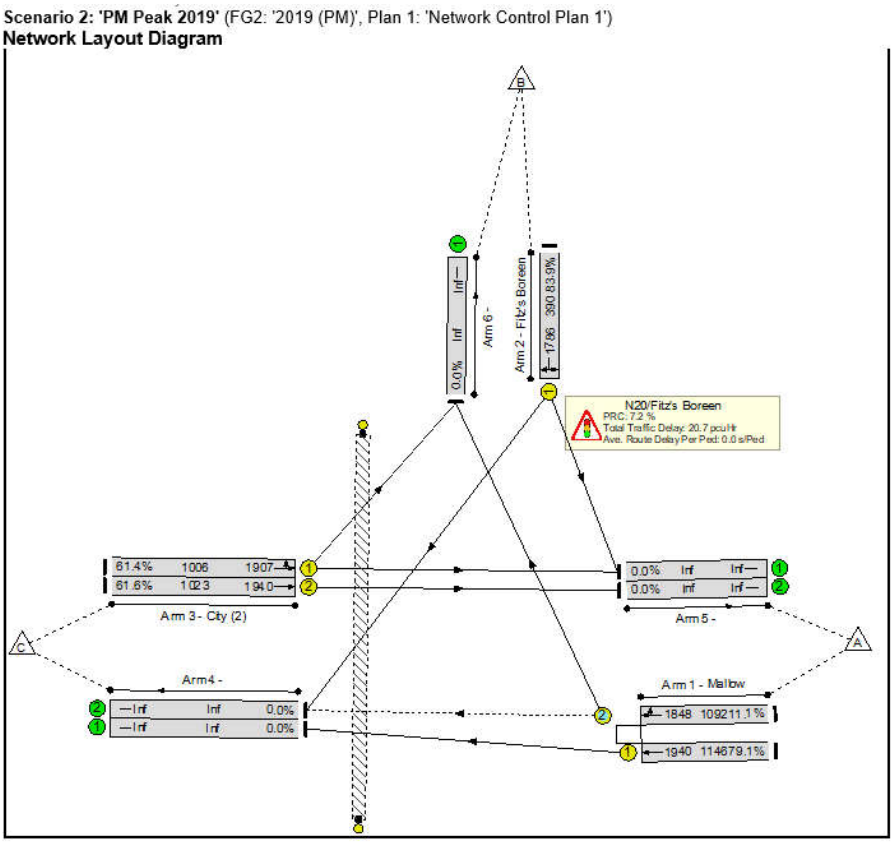


Fig 7.4: Scenario 2: 2019 - PM (Base Year)

Scenario 3: '2021 AM Without' (FG3: '2021 AM Without', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

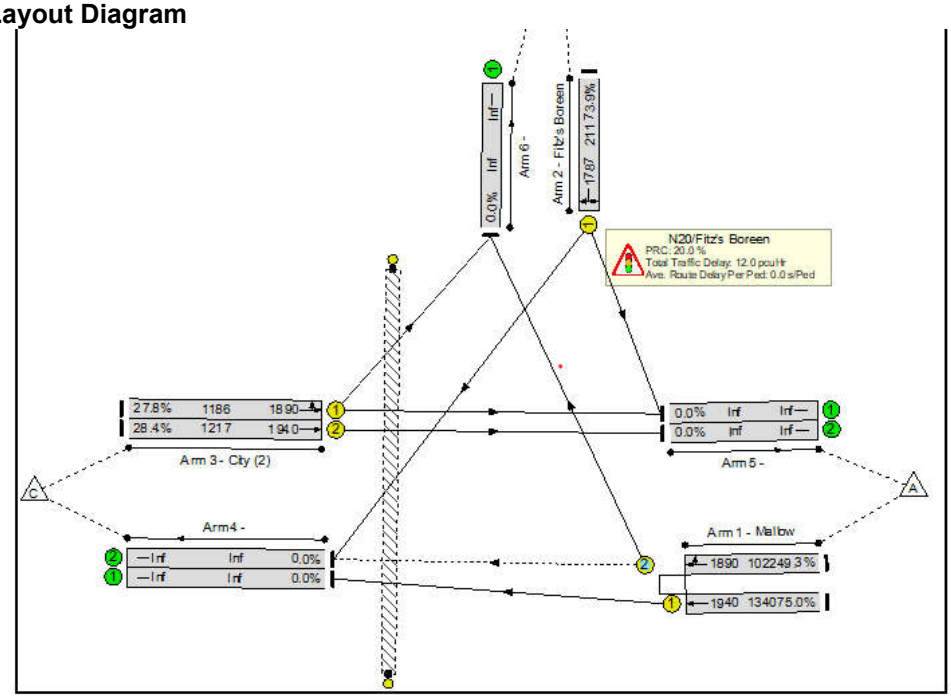


Fig 7.5: Scenario 3: 2021 - AM (Without Development)

Scenario 4: '2021 PM Without' (FG4: '2021 PM Without', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

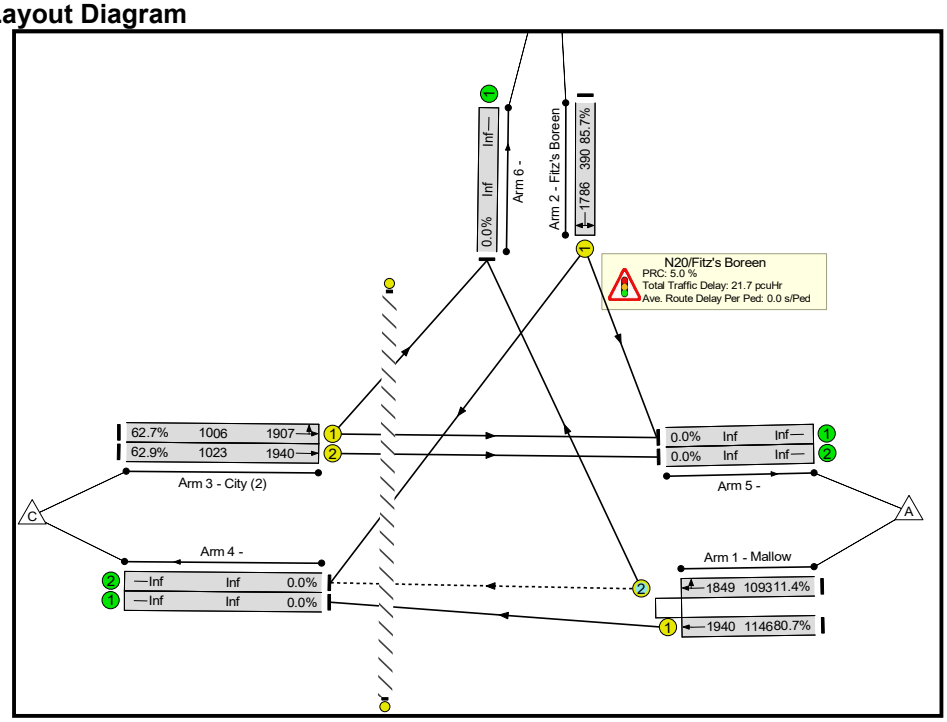


Fig 7.6: Scenario 4: 2021 - PM (Without Development)

Scenario 5: '2021 AM With' (FG5: '2021 AM With (57 Units)', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

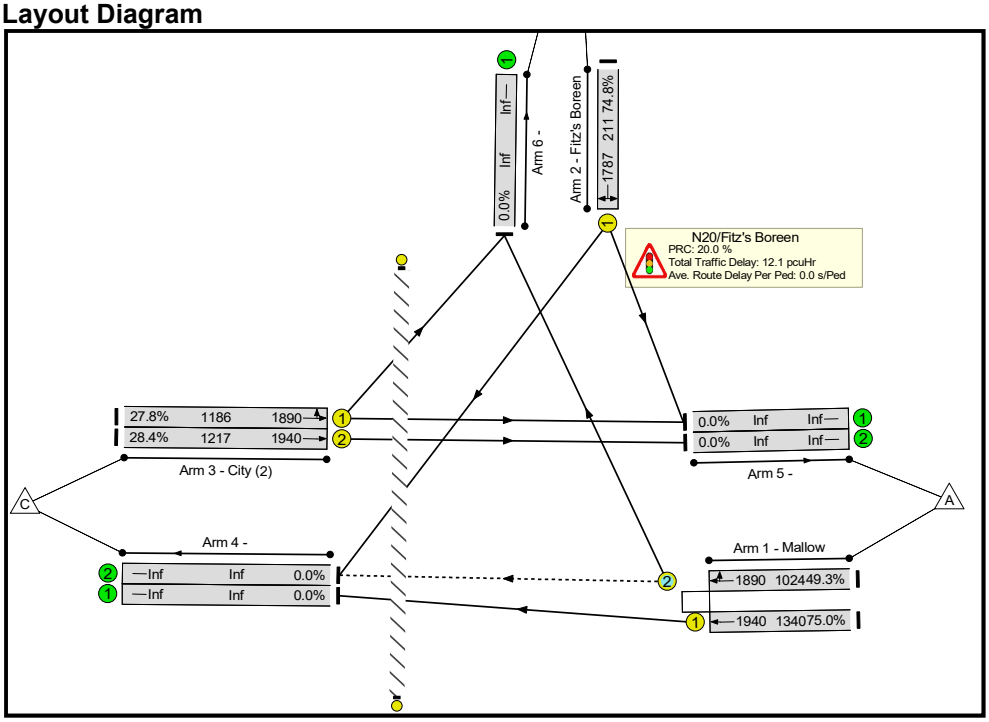


Fig 7.7: Scenario 5: 2021 - AM (With 57 Units Developed)

Scenario 6: '2021 PM With' (FG6: '2021 PM With (57 Units)', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

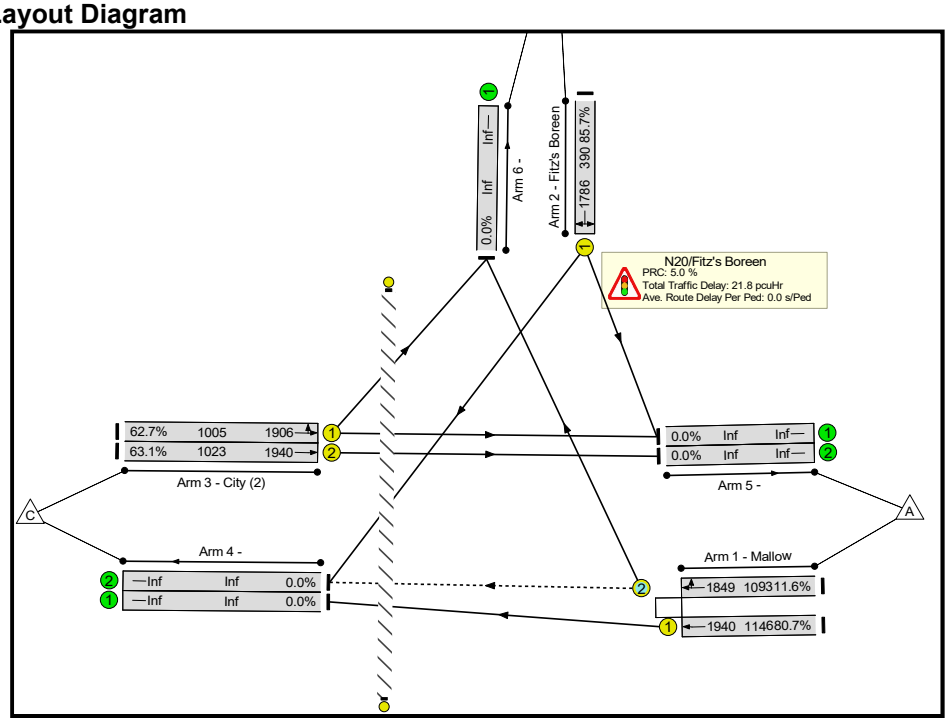


Fig 7.8: Scenario 6: 2021 - PM (With 57 Units Developed)

Scenario 7: '2026 AM Without' (FG11: '2026 AM Without', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

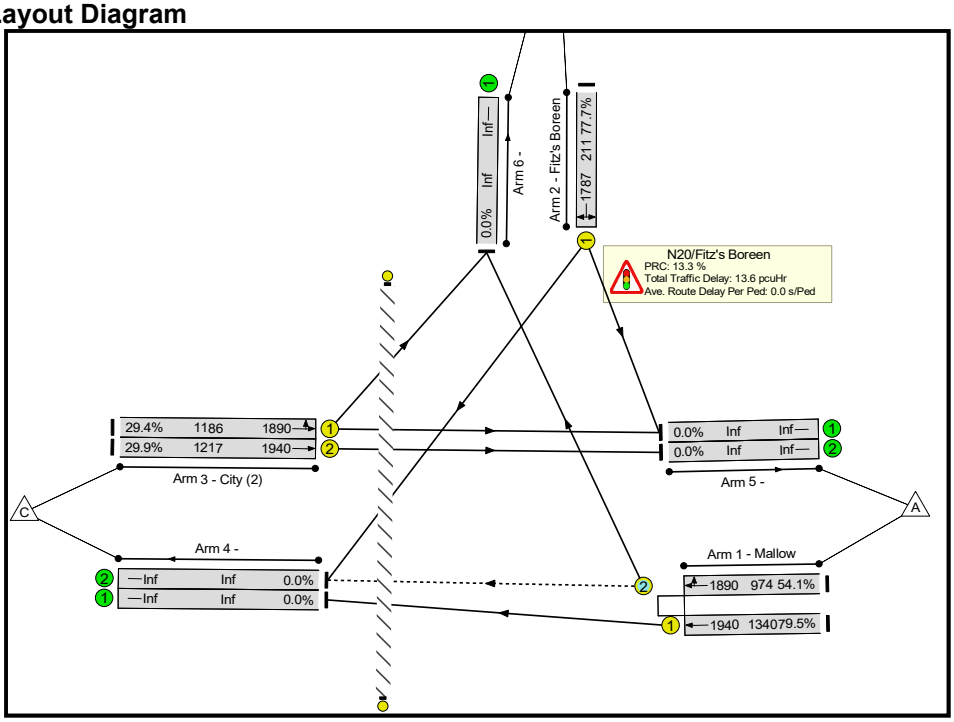


Fig 7.9: Scenario 7: 2026 - AM (Without Development)

Scenario 8: '2026 PM Without' (FG12: '2026 PM Without', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

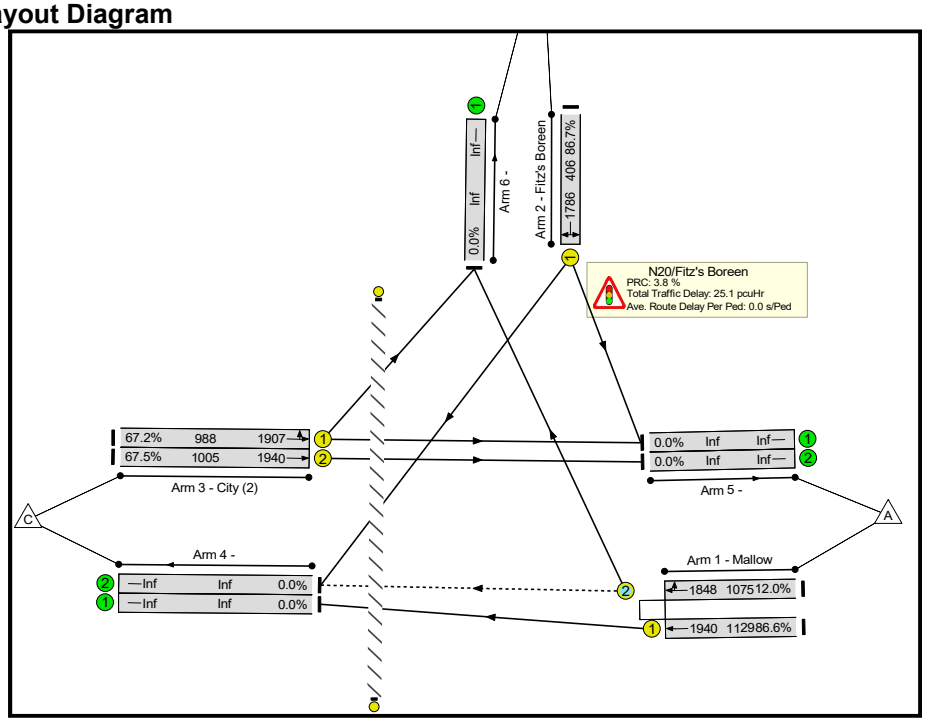


Fig 7.10: Scenario 8: 2026 - PM (Without Development)

Scenario 9: '2026 AM With' (FG13: '2026 AM With (57 Units)', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

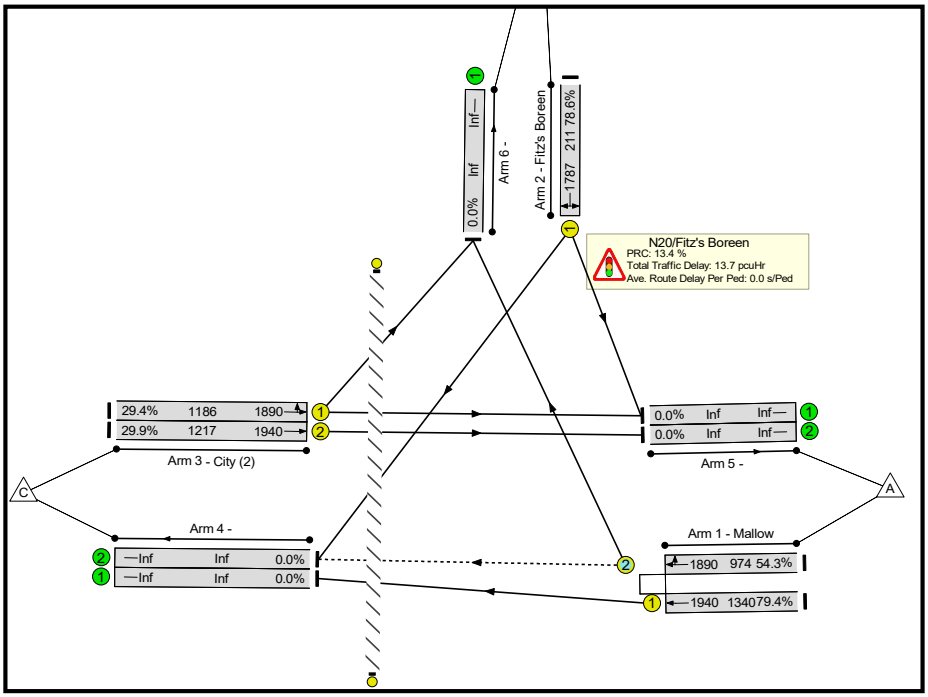


Fig 7.11: Scenario 9: 2026 - AM (With 57 Units Developed)

Scenario 10: '2026 PM With' (FG14: '2026 PM With (57 Units)', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

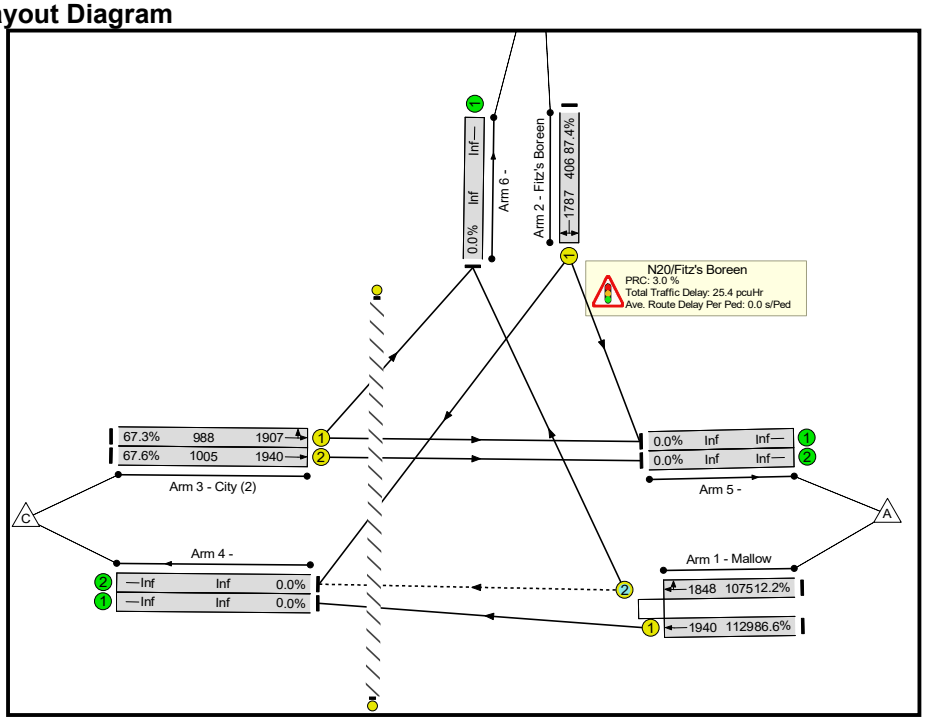


Fig 7.12: Scenario 10: 2026 - PM (With 57 Units Developed)

Scenario 11: '2036 AM Without' (FG15: '2036 AM Without', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

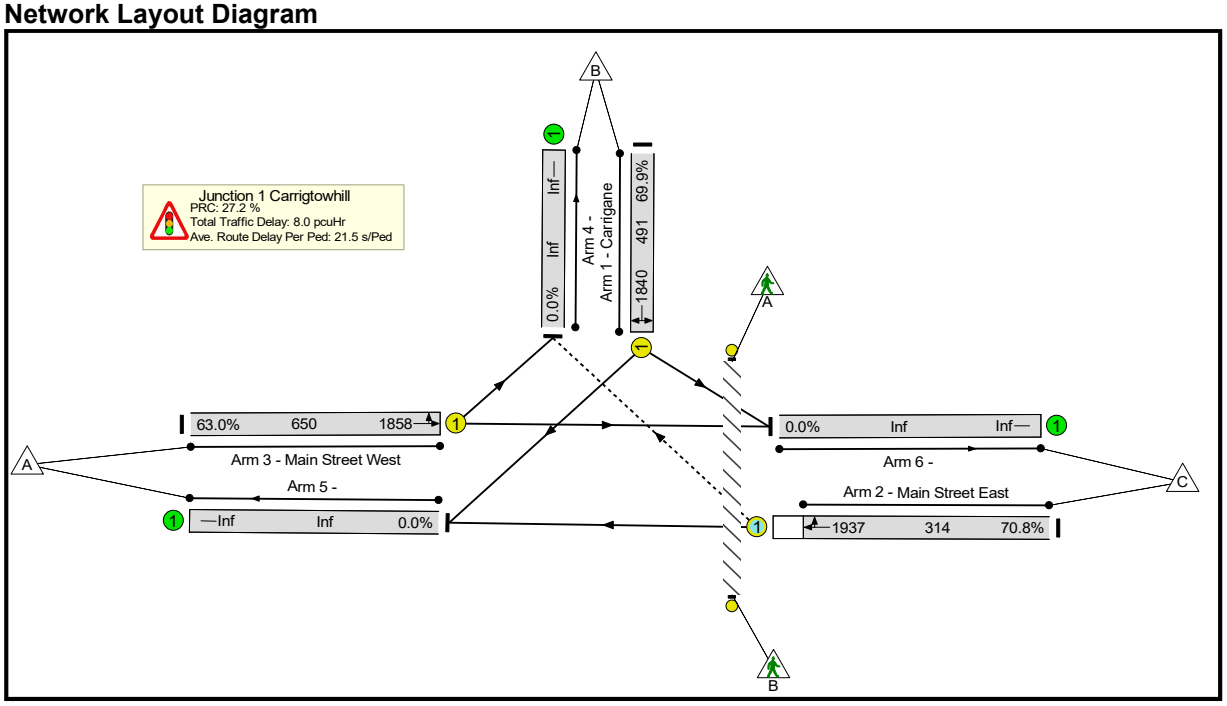


Fig 7.13: Scenario 11: 2036 - AM (Without Development)

Scenario 12: '2036 PM Without' (FG16: '2036 PM Without', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

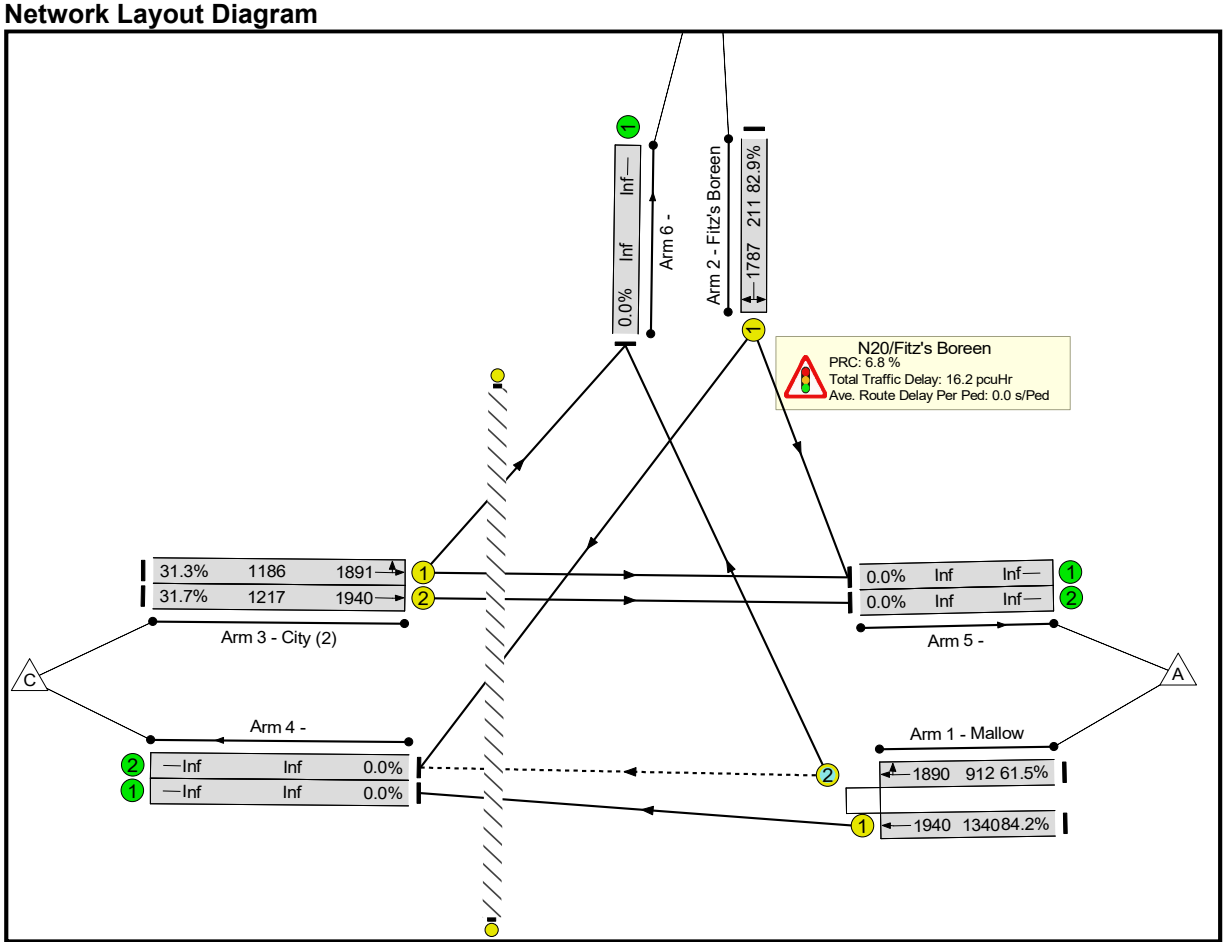


Fig 7.14: Scenario 12: 2036 - PM (Without Development)

Scenario 13: '2036 AM With' (FG17: '2036 AM With (57 Units)', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

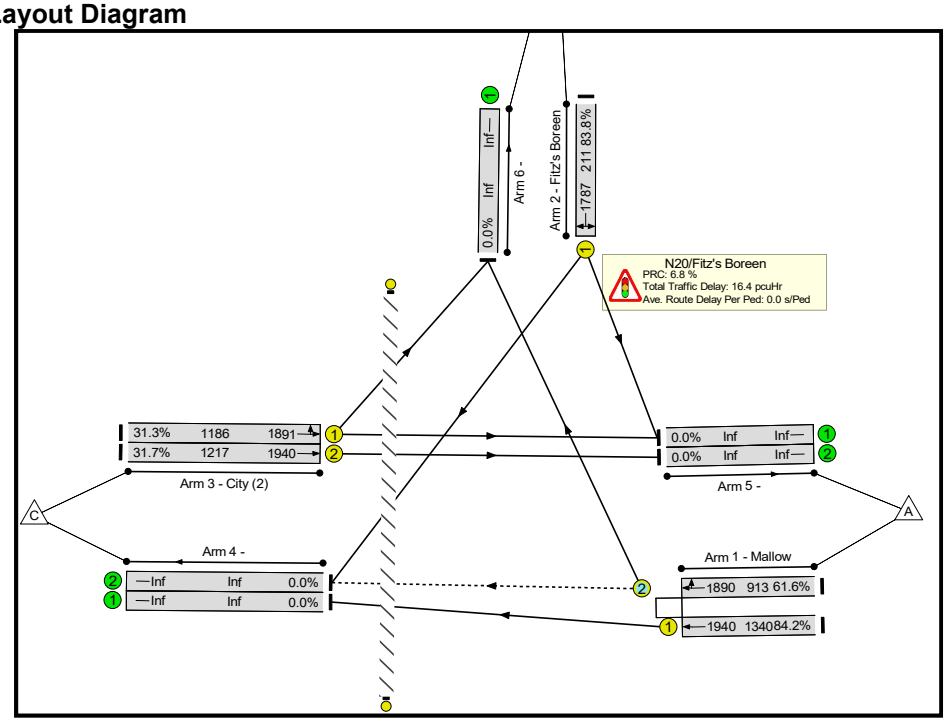


Fig 7.15: Scenario 13: 2036 – AM (With 57 units Developed)

Scenario 14: '2036 PM With' (FG18: '2036 PM With (57 Units)', Plan 1: 'Network Control Plan 1')
Network Layout Diagram

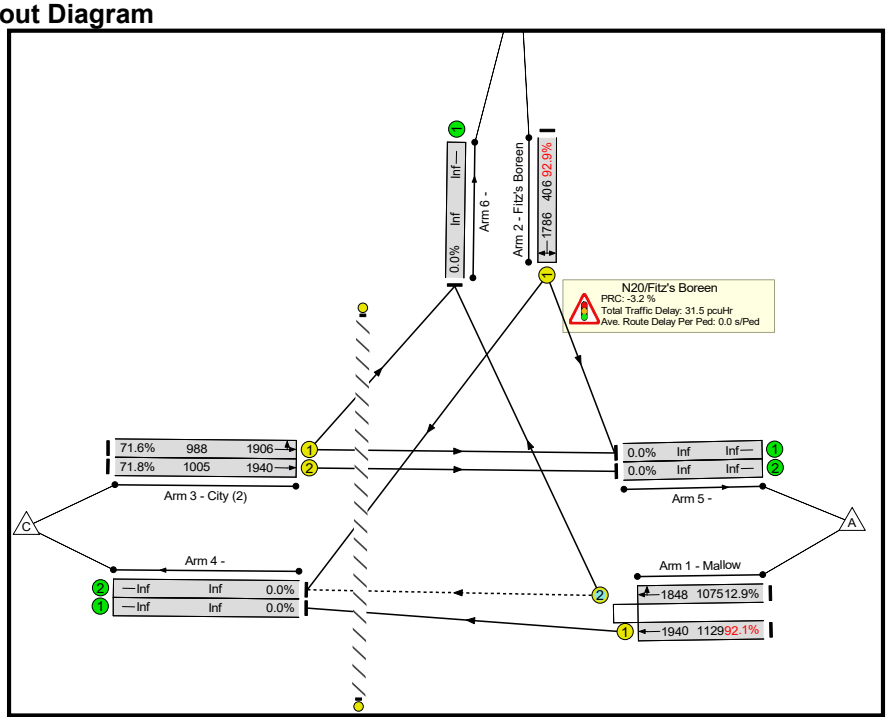


Fig 7.16: Scenario 14: 2036 - PM (With 57 Units Developed)

Junction 2: Commons Road (N20)/ Fitz's Boreen		No Development		With Development	
		PRC %	Delay (pcuHr)	PRC %	Delay (pcuHr)
2019	AM	22.5	11.45	N/A	N/A
	PM	7.2	20.67	N/A	N/A
2021	AM	20.0	11.97	20.0	12.00
	PM	5.0	21.73	5.0	21.76
2026	AM	13.3	13.63	13.4	13.74
	PM	3.8	25.14	3.0	25.37
2036	AM	6.8	16.2	6.8	16.35
	PM	-2.4	31.05	-3.2	31.46
Junction Signal Controlled with Pedestrian Crossing and 110 sec cycle time for all AM and PM periods					

Table 7.3 – PRC% and Delay (pcuHr) for future years with and without the development

Table 7.3 presents the results of the traffic modelling carried out on a signal-controlled Junction 2 for both with/without development in place in terms of Practical Reserve Capacity (PRC) and Delay in pcuHr.

In more easy to understand terms the Linsig traffic analysis shows that the maximum degree of saturation for the morning peak occurs on Arm 1 N20 West at 84.2% with mean maximum queue (PCU) of 28.0 and an average delay of 20.9 s/pcu for the **morning peak hour** 08.00-09.00 in the design year 2036 both with/without 57 units developed. Refer to Appendix A for full results.

The Linsig traffic analysis shows that the maximum degree of saturation occurs for the evening peak on Arm 1 and 2 (N20 West and Fitz's Boreen) at 92.1% with mean maximum queue (PCU) of 33.8 and 15.7 respectively. The average delay of 85.4 s/pcu for the **evening peak hour** 17:00-18:00 in the design year 2036 with 57 units developed is observed on Arm 2 (Fitz's Boreen). Refer to Appendix A for full results.

To provide pedestrian connectivity between the N20 and Fitz's Boreen a 10 second pedestrian phase is factored into each and every cycle. In reality this would be demand activated implying that the analysis carried out includes a significant factor of safety.

In overall terms the network is operating within capacity for each of the design years 2021, 2026 and 2036 for the morning peak hour and evening peak hours. The assessment demonstrates that the junction operates below a Degree of Saturation (DOS) of 90% for all future year morning peaks and evening peaks up to 2036 with the inclusion of traffic generated for the proposed 57-unit development it is deemed as acceptable. However, the junction exceeds 90% Degree of Saturation for evening peak in the year 2036 with and without the inclusion of development traffic.

7. 3 ROAD IMPACT CONCLUSIONS

Junction 1 is operating close to capacity, currently working at a Level of Service D, implying significant delay can be incurred at peak periods (on the Fitz's Boreen Approach). With the addition of development traffic, the network will continue to operate as it is currently with minimal increase in delay at the critical junctions and a deterioration in the level of service.

Junction 2 is currently operating below capacity and operates with a high level of efficiency even with the inclusion of development traffic. However, with the inclusion of standard growth factors to existing traffic volumes the junction exceeds 90% Degree of Saturation (DOS) for the year 2036, evening peak. This suggests that the functionality of the junction with become unacceptable and Cork City Council will be required to provide improvement works in the future.

8.0 CUMALATIVE IMPACTS

As outlined in Section 6.0 of this report, industry standard growth rates have been applied to background traffic for future year assessments. These growth rates make allowance for modal shift targets as set by national policy but do not take account of site-specific measures that may be implemented to mitigate against traffic generation from a particular development. The development benefits from good pedestrian connectivity to public transport options including a bus stop located adjacent to the development. The following figures outline the various routes to and from these options including an average walk time.

Fig 8.1: Possible route from site to bus stop. (Bus route to development)

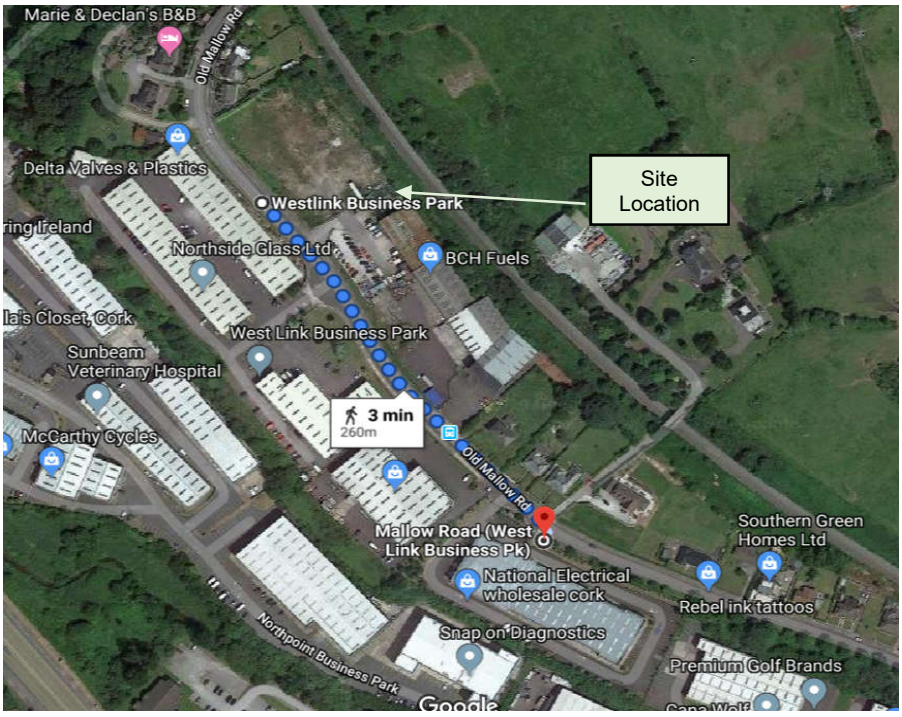


Fig 8.2: Possible route from site to bus stop (Route 234). (Walking route from development)

9. ROAD SAFETY

9.1 ROAD SAFETY

From accessing Ireland's road collisions database produced from the RSA it can be seen that there have been a small number of minor road traffic incidents in the general area of the proposed development. A number of minor accidents have occurred at both junctions being assessed.

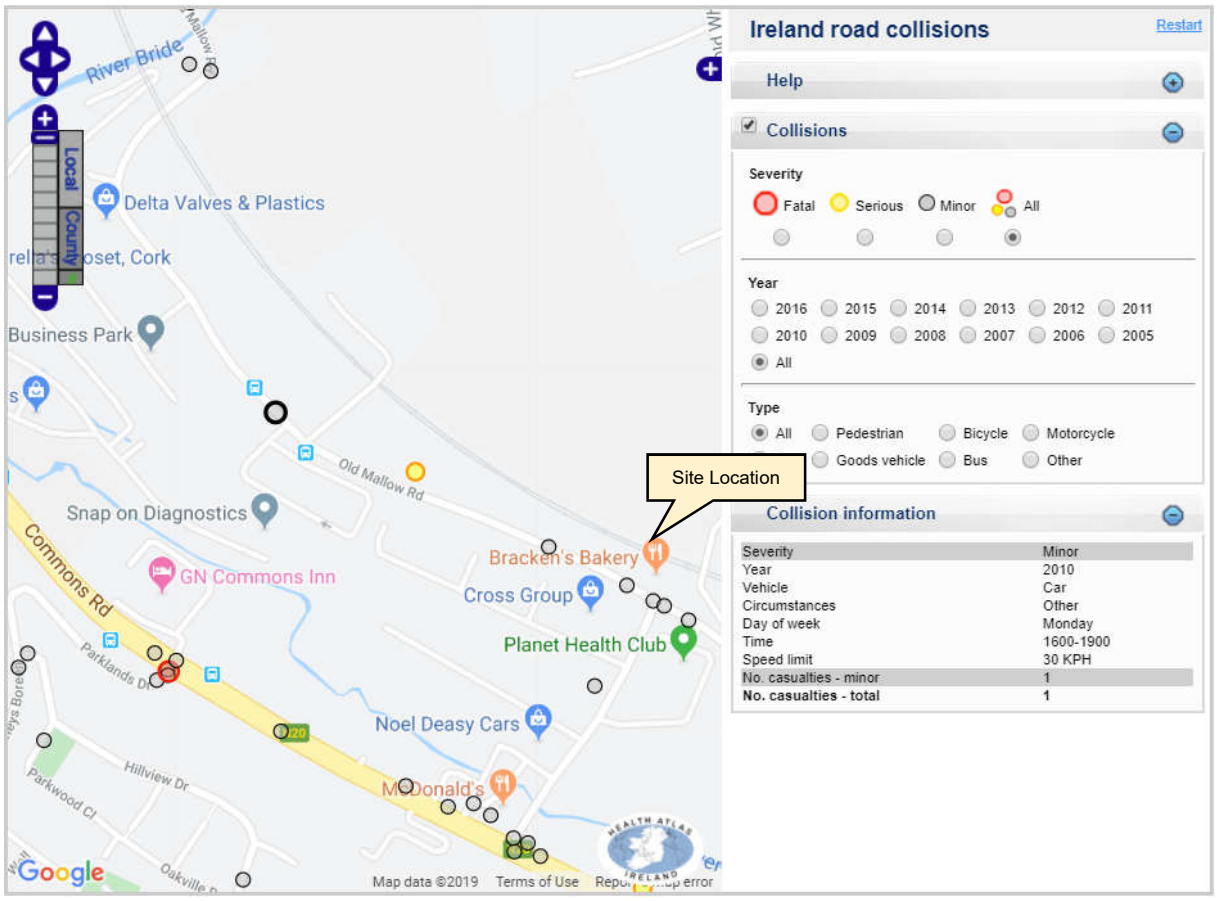


Fig 9.1: RSA Road Collisions database

10. ENVIRONMENTAL IMPACT

The environmental impact of the proposed development is minor and relates directly to the resulting increase in traffic generation to the site. It is suggested that given the location of the scheme and its potential for future connections using sustainable transport solutions the environmental impact of developing this site for housing would be positive.

11. INTERNAL LAYOUT & PARKING PROVISIONS

The proposed layout has been developed using the principals as outlined in DMURS with internal estate road being designed to restrict speed whilst facilitating pedestrian connectivity throughout the site. The parking provision per unit has been agreed with Cork County Council.

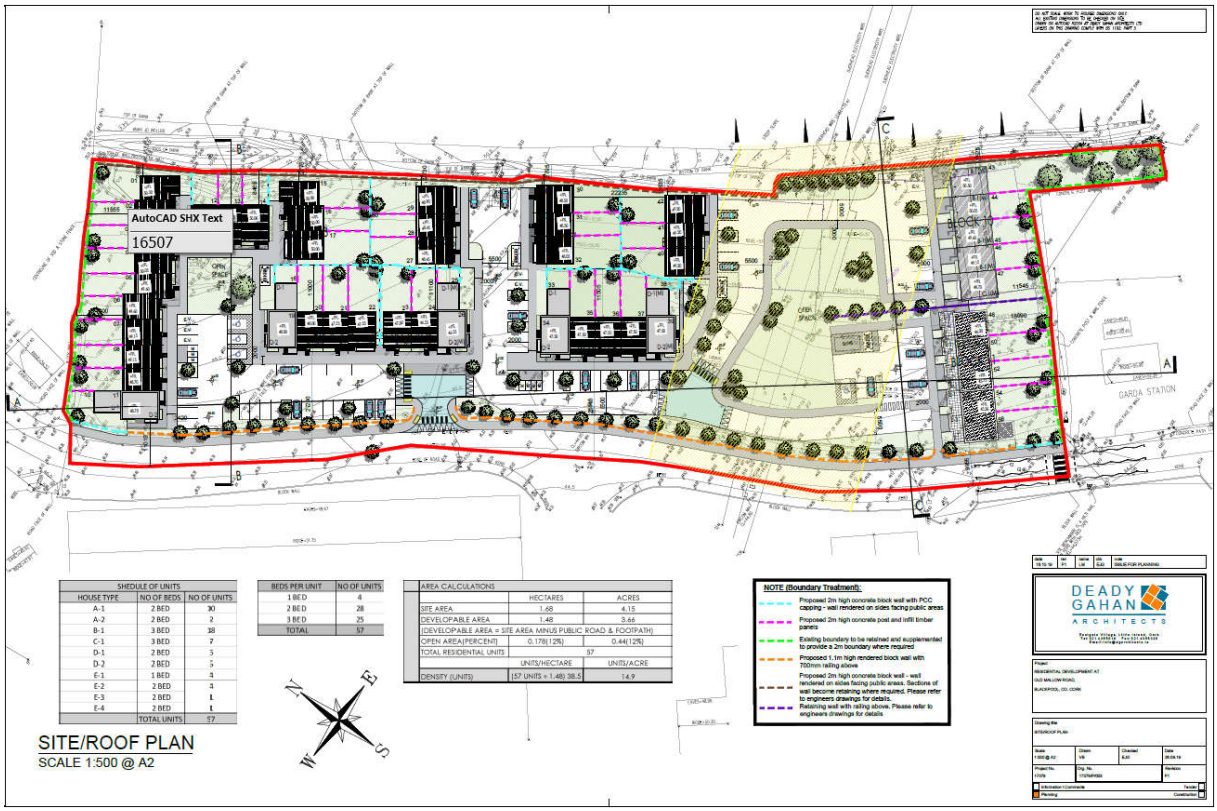


Figure 11.1: Proposed Site Layout for Phase 1

12. PEDESTRIANS / CYCLISTS / PEOPLE WITH DISABILITIES

The internal layout of the site is designed to accommodate all road users and will adhere to national guidelines regarding people with disabilities. Pedestrian access and permeability through the site have been carefully designed to encourage residents to walk to schools, shops and public transport nodes. The site is serve by public footpaths in the direction of the City and towards public transport provision.

13. PUBLIC TRANSPORT

Blackpool is currently served by several bus services and the proposed development is within 300m of the nearest bus stop, providing a direct service to Cork City centre.

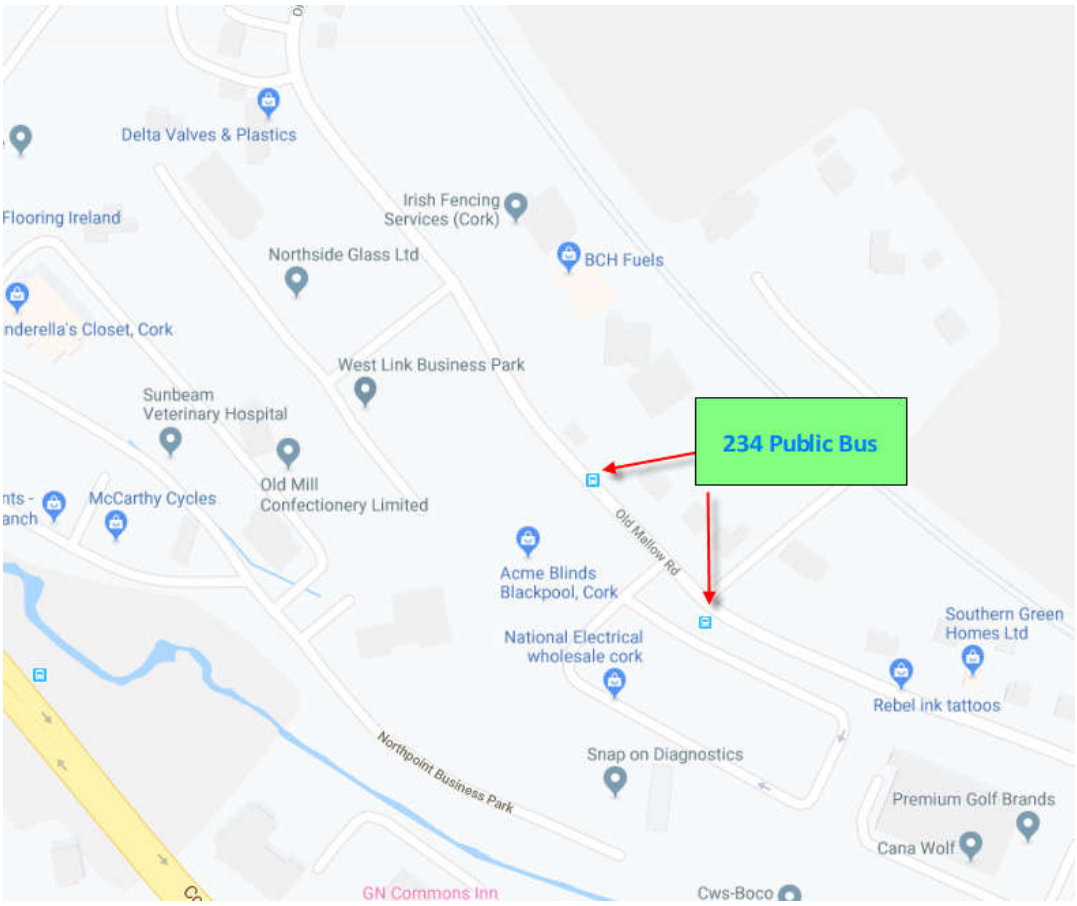


Figure 13.1: Local Bus Stops (300m from site)

14. REFERENCES

National Roads Authority (May 2014) Traffic and Transport Assessment Guidelines NRA, Dublin

Institution of Highways & Transportation (1994) Guidelines for Traffic Impact Assessment IHT, London

National Roads Authority (2000) Road Geometry Handbook NRA, Dublin

National Roads Authority (revised 2003) Design Manual for Roads and Bridges NRA, Dublin

National Roads Authority (November 2004) Draft Traffic and Transport Assessment Guidelines NRA, Dublin

RSA Ireland Road Collisions

http://www.rsa.ie/RSA/Road-Safety/Our-Research/Ireland-Road-Collisions/

APPENDICES

APPENDIX A – TRAFFIC MODEL OUTPUTS

APPENDIX B– TRICS

TRICS OUTPUT
(available on request from MHL Consulting Engineers)

APPENDIX C– TRAFFIC SURVEYS

(available on request from MHL Consulting Engineers)