Waterman Moylan
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DMURS Report, including DMURS Statement of Consistency

Residential Development at Broomfield SHD Lands, Malahide

April 2022

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Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015 and BS EN ISO 14001: 2015)

Issue	Date	Prepared by	Checked by	Approved by
1	30 March 2022	Robert Walpole	Mark Duignan	Mark Duignan
2	05 April 2022	Robert Walpole	Mark Duignan	Mark Duignan

Comments

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1. Introduction

1.1 Background of Report

This DMURS Report has been prepared by Waterman Moylan as part of the planning documentation for a proposed residential development on lands at Broomfield, part of the Broomfield SHD lands, Malahide, Co. Dublin.

This report assesses the guidelines and design criteria as set out by the Design Manual for Urban Roads and Streets (DMURS) and illustrates how the proposed development is in accordance with such. Also included in this report is the Quality Audit, which also comprises a Road Safety Audit, This Quality Audit has been undertaken independently by Traffico Road Safety Consultants.

1.2 Site Location and Description

The existing site access is from Back Road, 0.5km east of the junction of Back Road and Kinsealy Lane.

The overall proposed development is divided into 2 sites as indicated in *Figure 1* overleaf. The north site is located between the existing Ashwood Hall residential development to the west and the Dublin-Belfast rail line to the east. To the south is agricultural land, the north is bounded by existing residential properties fronting the Back Road.

The southern site is bound by the Hazelbrook development to the west, Brookfield residential development to the north and agricultural lands to the east. The southern boundary is formed by the Hazelbrook Stream.

The southern site is greenfield in nature. The northern site is predominantly greenfield and was the former location of a rugby club. There is a small area of hardstanding which was previously the club's car park, together with existing structures, formerly the clubhouse and outhouse. These have been extensively vandalised in the form of fire damage, and demolition of the remainder of the structures is included as part of the subject application. The subsoil in the area to the south of the former playing field is an infill area consisting of inert rubble which has been surveyed, sampled, and analysed. This rubble will be excavated and disposed of as appropriate.

A topographic survey of the area indicated that the north site generally slopes uniformly from north-east to south, from a height of 20.5m to 11.5m, with an existing static ditch system along the south-east boundary, and ditch to the south-west. The southern site also slopes from north to south from a height of 6m to 4.7m with localised high points and has an existing ditch system along its north boundary and Hazelbrook Steam along the southern boundary.

The ditch systems referenced above join the Hazelbrook stream, which in turn outfalls to the Sluice River which in turn ultimately outfalls to the sea at Baldoyle Bay, C. 2.3km south-east of the subject site.

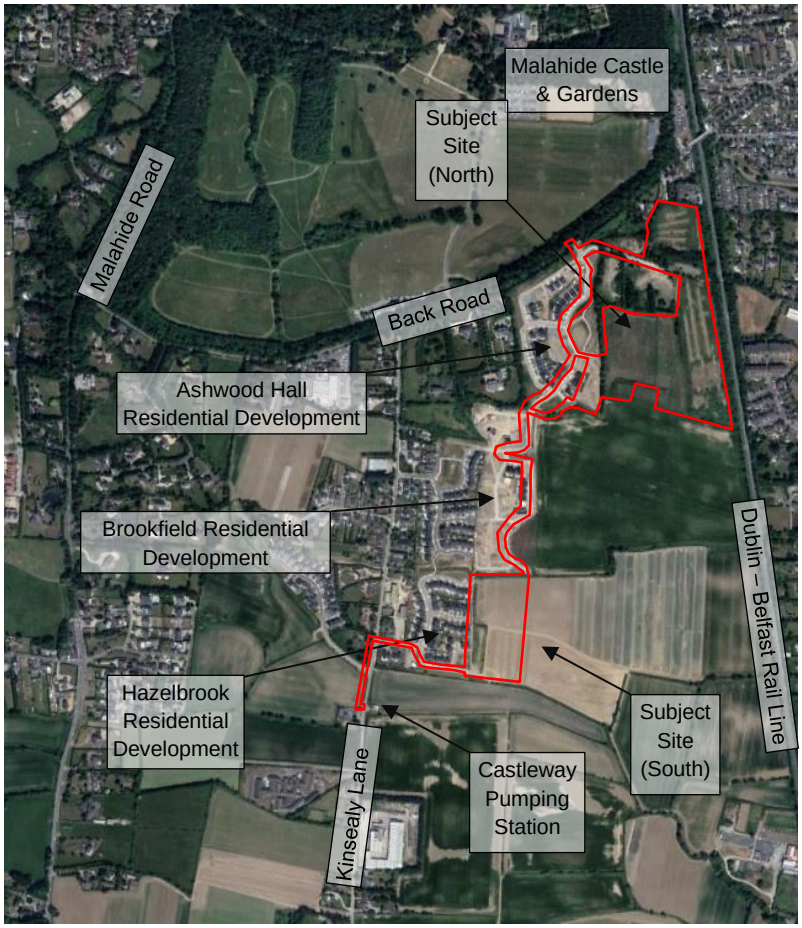


Figure 1 | *Site Location (Source: Google Earth)*

1.3 Proposed Development

The proposed development consists of a total of 415 No. residential units, comprising of 252 houses, 28 duplex units and 135 apartments as set out in the Schedule of Accommodation in *Table 1* below. The proposed development will also include the construction of a 476m² creche, projected to cater for 15 staff and 85 children.

Description	1-bed	2-bed	3-bed	4-bed	5-Bed	Total
House	-	-	192	48	12	252
Duplex	8	14	6	-	-	28
Apartment	37	93	5	-	-	135
Total	45	107	203	48	12	415

Table 1 | *Schedule of Accommodation*

The development includes all associated site works, undergrounding of overhead lines, boundary treatments, drainage, and service connections.

2. Roads and Transport Network

This section provides an overview of the existing and proposed road and transportation network in the vicinity of the site. A comprehensive Traffic and Transport Assessment and Travel Plan have been prepared by Waterman Moylan in accordance with the requirements of the Traffic and Transport Assessment Guidelines published by National Roads Authority in May 2014 and accompanies this submission under separate covers.

2.1 Existing Road Layout

Back Road is located to the north of the subject site, immediately north of Ashwood Hall, and Kinsealy Lane is located to the west of the subject site, immediately west of Castleway and Hazelbrook.

Back Road is a 2-lane carriageway with pedestrian footpaths on both sides, it has a posted speed limit of 60km/hr and extends from the Malahide Road (R107) 1.8km east to the Malahide-Donaghmede Road (R124).

2.2 Proposed Road Layout

The site will be accessed to the north off back Road, via the existing entrance serving the Ashwood Hall development.

As requested by Fingal County Council during the SHD pre-planning process, an additional vehicular access to the site is now proposed from Kinsealy Lane, via Hazelbrook. Hazelbrook lies to the west of the proposed southern site. The Hazelbrook development is accessed from Kinsealy lane and was designed and constructed to allow for possible future connections to the subject site. This will benefit the southern site for vehicular, pedestrian and cycle access. It is considered that the route between the site entrance from the Hazelbrook residential development to the site exit on the north on the Back Road, and vice versa, will not create a short-cut / “rat-run” if there is any potential build-up of traffic at the Kinsealy Lane-Back Road junction. This is owning to the fact the layout of the proposed route is meandering, and has frequent interruptions such; as raised tables, pedestrian crossings and low radii corners which will effectively enforce a slower vehicular speed as per DMURS guidelines discussed further in the following sections.

A redesign of the creche drop-off parking was also undertaken based on details discussed with Fingal County Council following on from comments received in their Opinion Report.

The internal road network includes local access roads and “home-zones”, as shown on Waterman Moylan’s Road Surfacing Layout Drawing 18-091-P002. These homezones have been refined following guidance from An Bord Pleanála and Fingal County Council during the pre-planning process and are further described below.

The road layout is shown the following drawing numbers: Road Surfacing Layout P002, Road General Arrangement Drawing P100, Road Layout Drawings P101-103, Road Cross Sections Drawing P130 & Road Construction Details P131, included as part of the planning application package.

3. Design Manual for Urban Roads and Streets (DMURS)

3.1 Background

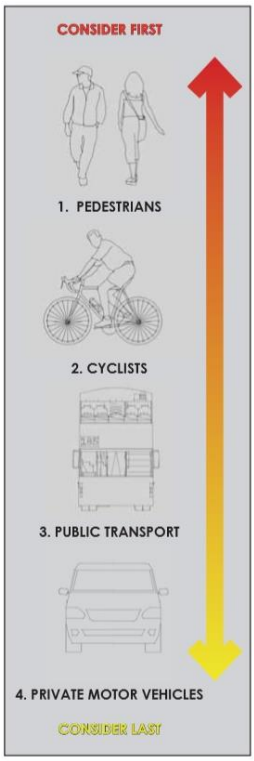
The stated objective of DMURS is to achieve better street design in urban areas. This will encourage more people to choose to walk, cycle or use public transport by making the experience safer and more pleasant. It will lower traffic speeds, reduce unnecessary car use, and create a built environment that promotes healthy lifestyles and responds more sympathetically to the distinctive nature of individual communities and places. The implementation of DMURS is intended to enhance how we go about our business, how we interact with each other, and have a positive impact on our enjoyment of the places to and through which we travel.

3.2 DMURS: Statement of Design Consistency

Waterman Moylan Consulting Engineers considers that the proposed road and street design is consistent with the principles and guidance outlined in the Design Manual for Urban Roads and Streets (DMURS). Outlined below are some of the specific design features that have been incorporated within the proposed scheme with the objective of delivering a design that is in compliance with DMURS.

3.3 Creating a Sense of Place

Four characteristics represent the basic measures that should be established in order to create people friendly streets that facilitate more sustainable neighbourhoods. These characteristics are connectivity, enclosure, active edges, and pedestrian activities/facilities.



Connectivity:

"The creation of vibrant and active places requires pedestrian activity. This in turn requires walkable street networks that can be easily navigated and are well connected."

In order of importance, DMURS prioritises pedestrians, cyclists, public transport, and private cars. This is illustrated in the adjacent image extracted from DMURS.

The proposed development has been designed with pedestrians and cyclists taking precedence over other modes of transport. In this regard, footpaths are provided throughout the development with regular pedestrian crossings along anticipated desire lines. Footpaths within the development will be 2m wide at minimum as requested by Fingal County Council, which is wide enough to allow 2 wheelchairs to pass each other without inconvenience. Vehicular access to the site is via the entrance from Back Road, with an additional access point to the south site via the Hazelbrook residential development, as requested by Fingal County Council.

Pedestrian crossings have been designed to allow pedestrians to cross the street at grade. 'Home-zones' are proposed, which provide a safe space for residents, pedestrians, and cyclists with the dominance of cars reduced. Homezones are similar in design to shared surface style streets but located in residential areas. These can be viewed on the Proposed Surfacing Layout drawing. This drawing indicates the proposed home zones and also identifies the location of pedestrian crossings. All crossings will utilise tactile paving and drop kerbing to facilitate safe crossings at grade, and have been located on elevated road surfaces, such as raised tables and the aforementioned home-zones. These elevated road surfaces can only be accessed by car via a ramp, which is one of many safety

measures implemented throughout the development, and in line with the recommendations of DMURS, to reduce the speed of vehicles. These elevated road surfaces will be of a different colour, and potentially texture, the exact composition of which is to be agreed with Fingal County Council, to further make motorists aware of the change of user priority, this being a change from a vehicle priority road to a pedestrian priority surface.

DMURS notes that cul-de-sacs should not dominate residential layouts, and their use should be limited. In particular, the number of walkable/cyclable routes between destinations should be maximised. Section 3.3.2 of DMURS notes that cul-de-sacs may be used to serve a small number of dwellings, to enable more compact/efficient forms of development. The proposed development does include some cul-de-sacs however, the proposed layout facilitates pedestrian and cyclist movement. The proposed cul-de-sacs are safe, with clear, open sightlines and passive surveillance, and have the potential to be developed in future to provide further pedestrian and cyclist connectivity should adjacent lands become developed.

Enclosure:

"A sense of enclosure spatially defines streets and creates a more intimate and supervised environment. A sense of enclosure is achieved by orientating buildings towards the street and placing them along its edge. The use of street trees can also enhance the feeling of enclosure."

The proposed development has been designed with residential units overlooking streets and pedestrian routes throughout. High quality landscaping and tree planting are proposed throughout the scheme which creates a definitive sense of place. Road widths are generally 5.5m throughout the development and ensure that a strong sense of enclosure is achieved on residential roads.

Active Edge:

"An active frontage enlivens the edge of the street creating a more interesting and engaging environment. An active frontage is achieved with frequent entrances and openings that ensure the street is overlooked and generate pedestrian activity as people come and go from buildings."

As stated in Section 2.2.1 of DMURS, an active frontage enlivens the edge of the street, creating a more interesting and engaging environment. An active frontage is achieved with frequent entrances and openings. Section 3.4.1 of DMURS further notes that designers should avoid the creation of Dendritic networks, which place heavy restrictions on movement.

The provision of pedestrian crossings will encourage and facilitate pedestrian and cyclist activity. The proposal includes strategically placed raised tables, which will promote lower vehicular speeds while enabling pedestrians to cross the street at grade, in accordance with Section 4.4.7 of DMURS.

There are a number of advantages to more permeable networks in regard to the management of traffic and vehicle speeds. Drivers are more likely to maintain lower speeds over shorter distances than over longer ones. Since drivers are able to access individual properties more directly from Access/Link streets (where speeds are more moderate), they are more likely to comply with lower speed limits on Local streets, as stated in Section 3.4.1 of DMURS.

Section 4.4.7 of DMURS recommends the use of horizontal and vertical deflections on straights where there is more than 70m between junctions. The internal road network of the proposed development has been designed by the Civil Engineers in conjunction with the Architects so as to ensure that this distance of 70m has not been exceeded through the development, or where longer than 70m that a suitable deflection has been introduced. On-street parking separates pedestrians from the vehicle carriageway and, as per DMURS Section 4.4.9, can calm traffic by increasing driver caution, contribute to pedestrian comfort by providing a buffer between the vehicular carriageway and footpath and provide good levels of passive security. On-street parking has been designed at selected locations to implement the DMURS recommendation.

Suitable sightlines have been provided throughout the development, ensuring that localised planting does not obscure visibility as cars make turning manoeuvres, improving the pedestrian safety at crossing points.

Pedestrian Activities/Facilities:

"The sense of intimacy, interest and overlooking that is created by a street that is enclosed and lined with active frontages enhances a pedestrian's feeling of security and well-being. Good pedestrian facilities (such as wide footpaths and well-designed crossings) also make walking a more convenient and pleasurable experience that will further encourage pedestrian activity."

As outlined in the items above, the proposed development has been designed to provide excellent pedestrian connectivity, with footpaths providing permeability throughout the site and to the Back Road.

Throughout the site, pedestrian routes are 2m wide or greater which, as mentioned previously, provides adequate space for two wheelchairs to pass one another. DMURS identifies a 1.8m wide footpath as being suitable for areas of low pedestrian activity and a 2.5m footpath as being suitable for low to moderate pedestrian activity. It is considered that a 2m wide footpath is appropriate for the proposed development and is also as per Fingal County Council's instructions.

3.4 Key Design Principles

DMURS sets out four core design principles which designers must have regard to when designing roads and streets. These four core principles are set out below together with a commentary establishing how these design principles have been incorporated into the design of the proposed development.

Design Principle 1: Pedestrian Activity/Facilities:

"To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users and in particular more sustainable forms of transport."

Streets have been designed in accordance with the alignment and curvature recommendations set out in DMURS Section 4.4.6. The road layout is generally orthogonal. Section 3.3.1 of DMURS notes that street networks that are generally orthogonal in nature are the most effective in terms of permeability (and legibility). Staggered junctions along with raised pedestrian tables/crossings at main pedestrian desire lines will encourage reduced driving speeds.

Design Principle 2: Multi-Functional Streets:

"The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment."

The road hierarchy typically comprises Local Access roads and home-zones. The local access streets comprise of 5 - 5.5m wide carriageways (i.e., 2.5m - 2.75m wide vehicle lanes) with 2m footpaths.

The proposed home-zones are streets designed primarily to meet the needs of pedestrians, cyclists, children, and residents, where the speeds and dominance of cars is reduced.

It is proposed to utilise a buff-coloured chipping / macadam or similar approved surfacing at home-zones, subject to Fingal County Council Roads and Transportation approval – Fingal County Council Roads and Transportation are currently preparing a Taking-in-Charge manual specifying allowable surface materials. Use of a shared-surface buff coloured chipping/macadam and flush kerb indicates to both drivers and pedestrians/cyclists that the road is a shared space. As stated in Section 4.4.2 of DMURS, paving materials combined with embedded kerbs can encourage a low vehicle speed shared environment.

Entry treatment to home-zones is provided in the form of a ramp up, which helps announce that a driver is entering into a home-zone. The ramp up and narrowing of the road width is to be in accordance with Figure 4.44 in Section 4.3.3 of DMURS.

It is stated in Section 4.3.4 of DMURS that shared surface streets and junctions are highly desirable where movement priorities are low and there is a high place value in promoting more liveable streets (i.e., home-zones), such as on Local streets within Neighbourhoods and Suburbs.

Design Principle 3: Pedestrian Focus:

"The quality of the street is measured by the quality of the pedestrian environment."

The design of the scheme has placed a particular focus on the pedestrian. Connectivity throughout the scheme is heavily weighted towards the pedestrian. There are excellent pedestrian links to the Back Road and its associated public transport services and amenities, especially Malahide Castle and Gardens on the northside of the Back Road, opposite the proposed development, for residents of the development.

Raised tables are provided at the internal junctions, which allow pedestrians to continue at grade. The raised tables also promote lower vehicle speeds. Stop signs and road markings will provided prior to the raised table, to give pedestrians priority.

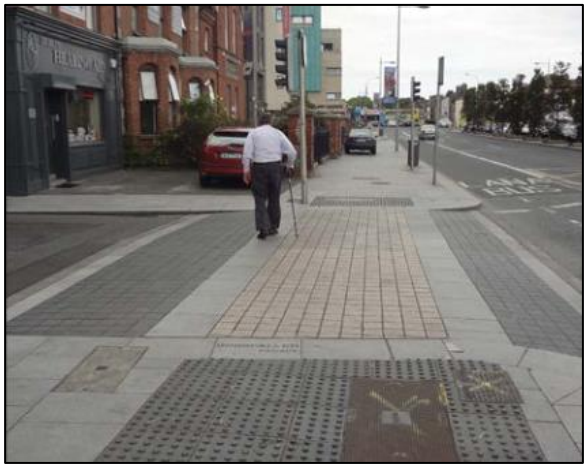


Figure 2 | *Extract from DMURS Figure 4.69*

Design Principle 4: Multi-Disciplinary Approach:

"Greater communication and co-operation between design professionals through promotion plan led multidisciplinary approach to design."

The design of the proposed scheme has been developed through the design team working closely together. The proposed development design is led by MCORM Architects working together with multiple disciplines including Waterman Moylan Consulting Engineers, Downey Planning Consultants and Kevin Fitzpatrick Landscape Architecture.

Public areas fronting and within the proposed development have been designed by a multidisciplinary design team to accommodate pedestrians and cyclists in accordance with the appropriate principles and guidelines set out in DMURS. In particular the vehicular access and public footways within the remit of the development will incorporate the relevant DMURS requirements and guidelines as set out above.

3.5 Traffic and Transport Assessment

As noted above, a comprehensive Traffic and Transport Assessment, and a Travel Plan, has been prepared by Waterman Moylan and accompanies this submission under separate covers.

4. Quality Audit

4.1 Quality Audit Background

Accompanying this report is an independent Quality Audit in accordance with the guidance set out in DMURS. The Quality Audit also includes a Road Safety Audit.

A Quality Audit, which incorporates a Road Safety Audit, has been undertaken by Traffico Road Safety Engineering, and is included as Appendix A. This audit identified 8 issues relating to pedestrian access from parking bays to residential units, reversing movements from private parking bays to junctions, demarcation of shared surfaces, footpath widths, corner radii, & pedestrian crossing provision for enhanced connectivity, and provided recommendations on how to address the issues satisfactorily.

The items raised have been accepted by the engineers. Solutions to the issues have been coordinated between the engineers and architects in conjunction with the recommendation of the Traffic Audit Team, with the affected areas redesigned in order to address the items raised. The revised proposals have been accepted by the independent safety consultants, Traffico.

The 8 items are detailed in full below and include the method whereby the issue was resolved to the satisfaction of the safety consultants.

4.1.1 Item 1

Location: Various locations.

Issue: Some parking spaces will require vehicle occupants to walk across an unbound grass surface to get to the dwelling entrance. This could lead to slips, trips, and progression issues for the mobility impaired.

Recommendation: A paved footpath link should be provided between all parking spaces and their respective dwelling entrances.

Response: The issue was accepted. All parking spaces were reviewed throughout the development. All parking bays now have a clearly defined pathway to the unit entrance. These pathways will be permanents surfaces to the Landscape Architects details. Please refer to Drawing number: 18-091-P002 Surfacing Layout.

4.1.2 Item 2

Location: Dual parking spaces near junctions

Issue: Drivers are likely to reverse into the junction, across a formal pedestrian crossing. This could lead to an increased risk of conflicts between vulnerable road users and vehicles.

Recommendation: The parking spaces should be reorientated to mitigate the described risk.

Response: The issue was accepted. These areas where this issued occurred were redesigned so that the private parking bays were either reorientated or relocated and now will no longer have a reversing movement into the junctions.

4.1.3 Item 3

Location: All shared streets.

Issue: Drivers will be required to transition between homezone streets which have footpaths, and shared streets which do not have footpaths. As shared streets are a relatively new concept in Ireland this could lead to conflicts between pedestrians and general traffic.

Recommendation: Shared streets should be designed to minimise vehicle speeds and include distinctive features which differentiate them from other streets within the development. Such features might include distinguishing paving materials (which might be unique to shared streets), gateway signage or in lane roundels and road markings.

Response: The issue was accepted. Shared streets are proposed to be incorporated to following roads; Road 2, The cul-de-sac at the end of Road 3, Road 3.1, Road 3.4, Road 5.1, Road 6.1, and Road 9. All shared streets, with the exception of road 5.1 & 9, are cul-de-sacs which will ensure low vehicular speed. Drivers will be forced to reduce speed prior to entry of all shared streets by design, the reasons for this being that all shared streets are accessed via a ramp to an elevated surface and require a turning movement at the same time, either rounding a corner or via turning from an access road at a junction. The elevated surface is intended to be a buff colour macadam as a visual sign of a change in vehicular priority to motorists. This buff colour macadam may also be of a different texture to the standard road surfacing. Use of this buff colour macadam is subject to agreement with Fingal County Council. Signage will be provided advising motorists of the change to vehicular priority. It is believed that the above items are all in accordance with DMURS. The recommendation for the insertion of road level roundels is noted and will be incorporated to the design if requested by Fingal County Council as part of a Road Marking drawing.

4.1.4 Item 4

Location: T-junction – Road layout Sheet 1 of 3

Issue: Failure to slow vehicles and guide pedestrians across the junction safely could lead to an increased risk of collision between general traffic and pedestrians.

Recommendation: Provisions to slow vehicles and guide pedestrians across the junction safely should be made in a consistent manner with the other junctions within the development.

Response: A raised table and pedestrian crossing have been introduced at this location. The pedestrian crossing will connect to the footpath of the adjacent development which has been granted planning permission by Reg ref: Fingal County Council: F13A/0459 & ABP: Pl06F.243863. Final decision to grant date: 10/03/2015 by ABP.

4.1.5 Item 5

Location: T-junctions – Road layout Sheet 2 of 3

Issue: Failure to provide for the crossing desire lines could lead to an increased risk of collisions between general traffic and pedestrians

Recommendation: The crossing desire lines (highlighted in the report) should be formally provided for at the junctions.

Response: The issue was accepted. Pedestrian crossings have been incorporated at the specified locations, with the parking bays having been relocated to accommodate the pedestrian crossing. A grass verge has been provided between the relocated parking bays and the pedestrian crossing so as to enhance motorist visibility of pedestrians intending to utilise the crossings. Due to alterations to the layout, the solution to this issue has been incorporated to further locations throughout the site in order to enhance pedestrian connectivity and safety.

4.1.6 Item 6

Location: Alignment on internal road – Road layout sheet 2 of 3

Issue: The relatively low radius horizontal curves will require quite abrupt changes in directions for drivers negotiating this section of road. This could result in opposing vehicles striking each other.

Recommendation: A vehicle swept path analysis should be undertaken to establish the appropriateness of the geometry, with the radii increased if required.

Response: The issue was accepted. The road alignment geometry has been revised and swept path analysis undertaken shows no issues for cars navigating the area.

4.1.7 Item 7

Location: Section 7-7 of road cross sections drawing.

Issue: The narrow footpath will be encroached upon by car doors opening, leading to door strikes and to pedestrians being forced to step into unbound grassed areas.

Recommendations The footpath should be widened to mitigate the described risk.

Response: The issue was accepted. In line with a request from Fingal County Council, all footpaths throughout the development are now at least 2m wide. This 2m width is sufficient to allow pedestrians to manoeuvre around open car doors without having to use unbound surfaces, at locations where parallel parking bays are adjacent to the footpath.

4.1.8 Item 8

Location: T-junction and Apartment block D – Road layout Sheet 3 of 3

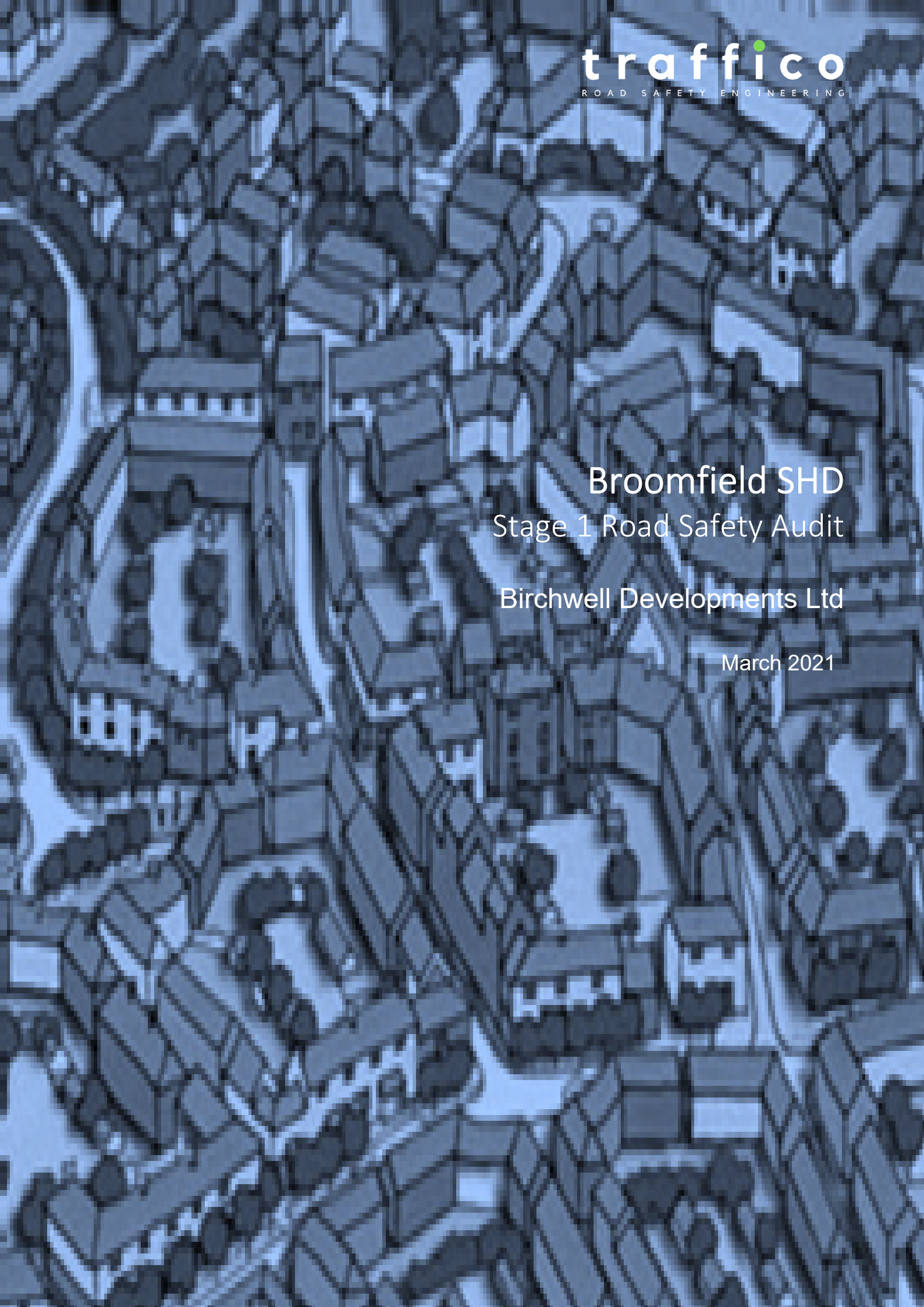
Issue: Failure to provide for the crossing desire lines could lead to an increased risk of collisions between general traffic and pedestrians.

Recommendation: The crossing desire lines (highlighted in the report) should be formally provided for at the junctions

Response: The issue was accepted. The locations highlighted have undergone a total redesign for an unrelated reason. Provision of formal pedestrian crossings along desire lines has been incorporated to the redesign.

Appendices

A. Quality Audit



traffico
ROAD SAFETY ENGINEERING

Broomfield SHD

Stage 1 Road Safety Audit

Birchwell Developments Ltd

March 2021

traffico

Broomfield SHD

Stage 1 Road Safety Audit

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Document History

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0	Draft Issue	MD	CP	MD	MD	Friday 26th March 2021
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date

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1. Introduction

1.1 Report Context

This report describes the findings of a Stage 1 Road Safety Audit associated with the proposed Broomfield SHD.

The Audit has been completed by Traffico Ltd on behalf of Birchwell Developments Ltd.

1.2 Details of Site Inspection

Date	Daylight / Darkness	Weather & Road Conditions
Friday 19th March 2021	Daylight	Clear, sunny. Roads Dry.

Table 1.1 – Site Inspection Details

1.3 The Road Safety Audit Team

The members of the Road Safety Audit Team (listed following), have been authorised by Transport Infrastructure Ireland (TII) to carry out Road Safety Audits in accordance with TII Publication GE-STY-01024 Road Safety Audit:

Status	Name / Qualifications	TII Auditor Reference No:
Audit Team Leader (ATL)	**Martin Deegan** BEng(Hons) MSc CEng MIEI	MD101312
Audit Team Member (ATM)	**Colin Prendeville** BEng(Hons) CEng MIEI CIHT	CP3369500
Audit Trainee (AT)	-	-

Table 1.2 – Audit Team Details

1.4 Design Drawings Examined as Part of the Audit Process

The following drawing(s) was examined as part of the Road Safety Audit (RSA) process:

Drawing No.	Drawing Title	Revision
P100	General Roads Arrangement	-
P101	Road Layout Sheet 1 of 3	-
P102	Road Layout Sheet 2 of 3	-
P103	Road Layout Sheet 3 of 3	-
P002	Road Surfacing Layout	-
P130	Road Cross Sections	-

Table 1.3 – Designers Drawing List

1.5 Road Safety Audit Compliance

Procedure and Scope

This Road Safety Audit has been carried out in accordance with the procedures and scope set out in TII publication number GE-STY-01024 - Road Safety Audit.

As part of the road safety audit process, the Audit Team have examined only those issues within the design which relate directly to road safety.

Compliance with Design Standards

The road safety audit process is not a design check, therefore verification or compliance with design standards has not formed part of the audit process.

Minimizing Risk of Collision Occurrence

All problems described in this report are considered by the Audit Team to require action in order to improve the safety of the scheme and minimise the risk of collision occurrence.

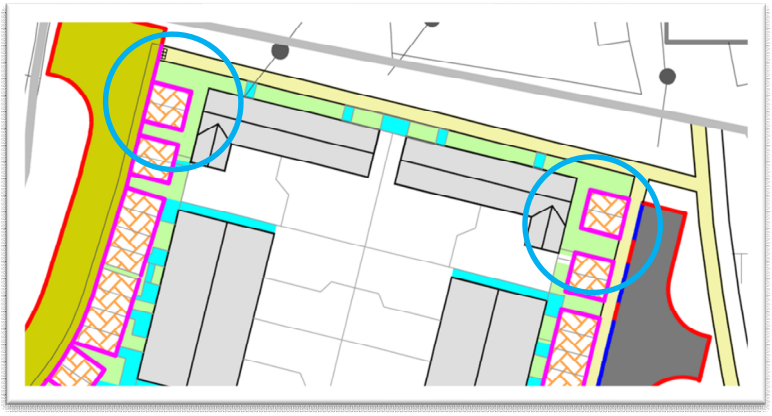
2. Road Safety Issues Identified

2.1 Problem: Paved Link Between Parking Spaces and Dwellings

Location: Various Locations

Some parking spaces will require vehicle occupants to walk across an unbound grass surface to get to the dwelling entrance. This could lead to slips, trips and progression issues for the mobility impaired.

Figure 2.1 – Example of Parking Not linked to Dwelling with Footpath



Recommendation

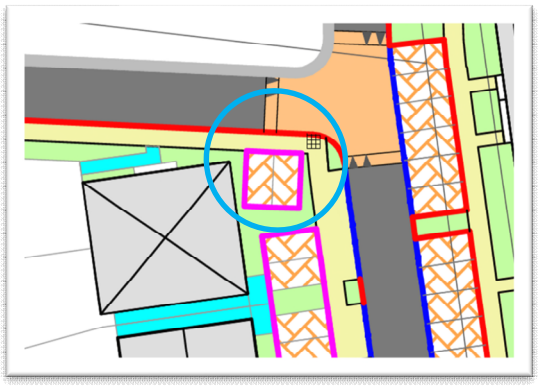
A paved footpath link should be provided between all parking spaces and their respective dwelling entrances.

2.2 Problem: Reversing into Junction

Location: Dual Parking Spaces Near Junction – Road Layout Sheet 2 of 3

Drivers are likely to reverse into the junction, across a formal pedestrian crossing. This could lead to an increased risk of conflicts between vulnerable road users and vehicles.

Figure 2.2 – Reversing into Desire Line



Recommendation

The parking spaces should be re-orientated to mitigate the risk described.

2.3 Problem: Conflicts Between Vehicles & Vulnerable Road Users

Location: All Shared Streets

Drivers will be required to transition between home zone streets which have footpaths and shared streets, which do not have footpaths. As shared streets are a relatively new concept in Ireland, this could lead to conflicts between pedestrians and general traffic.

Recommendation

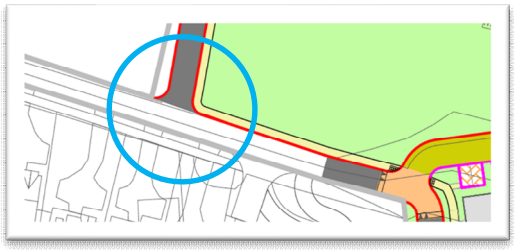
Shared streets should be designed to minimize vehicle speeds and include distinctive features which differentiate them from other streets within the development. Such features might include distinguishing paving materials (which might be unique to shared streets), gateway signage or in-lane roundels and road markings.

2.4 Problem: Providing for Pedestrians Crossing

Location: T-Junction – Road Layout Sheet 1 of 3

Failure to slow vehicles and guide pedestrians across the junction safely could lead to an increased risk of collisions between general traffic and pedestrians.

Figure 2.3 – Absence of Pedestrian Facilities



Recommendation

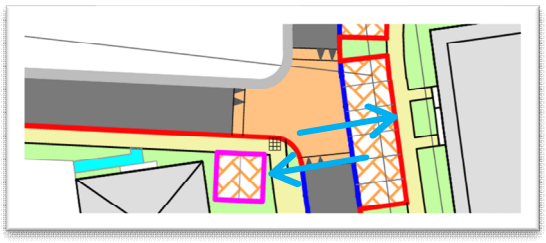
Provisions to slow vehicles and guide pedestrians across the junction safely should be made in a consistent manner with the other junctions within the development.

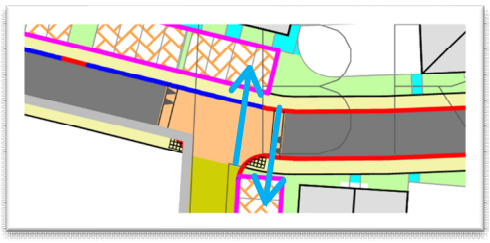
2.5 Problem: Providing for Pedestrians Crossing

Location: T-Junctions – Road Layout Sheet 2 of 3

Failure to provide for the crossing desire lines could lead to an increased risk of collisions between general traffic and pedestrians.

Figure 2.4 – Crossing Desire Lines





Recommendation

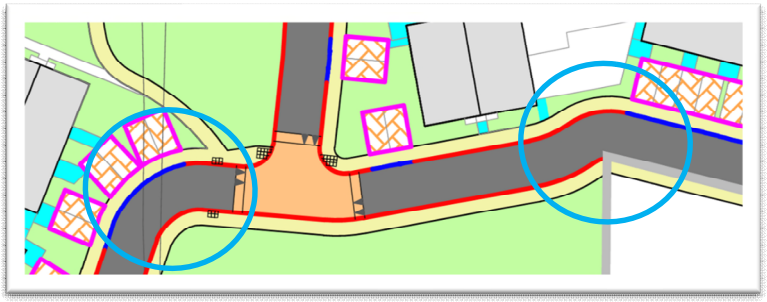
The crossing desire lines (highlighted) should be formally provided for at the junctions.

2.6 Problem: Low Radii Curves Leading to Opposition Conflicts

Location: Alignment of Internal Road – Road Layout Sheet 2 of 3

The relatively low radius horizontal curves will require quite abrupt changes in direction for drivers negotiating this section of road. This could result in opposing vehicles striking each other.

Figure 2.5 – Low Radii Curves



Recommendation

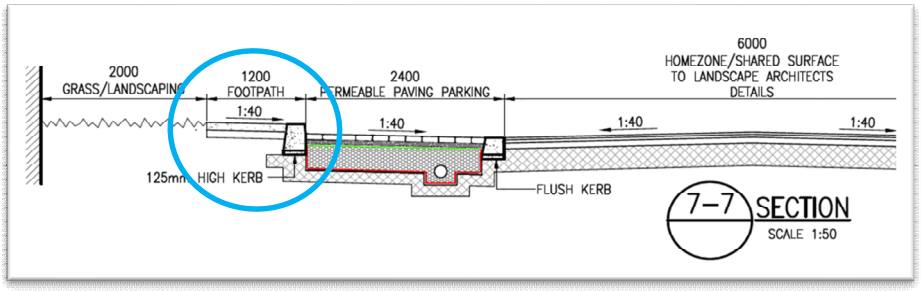
A vehicle swept path analysis should be undertaken to establish the appropriateness of the geometry, with the radii increased if required.

2.7 Problem: Narrow Footpath Encroached by Car Door Swing

Location: Section 7–7 of Road Cross Sections Drawing

The narrow footpath will be encroached upon by car doors opening, leading to door strikes and to pedestrians being forced to step into unbound grassed areas.

Figure 2.6 – Narrow Footpath



Recommendation

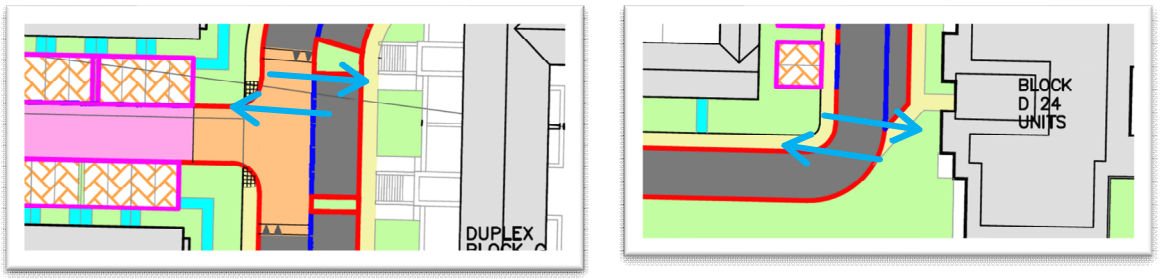
The footpath should be widened to mitigate the risk described.

2.8 Problem: Providing for Pedestrians Crossing

Location: **T-Junction and Apartment Block D – Road Layout Sheet 3 of 3**

Failure to provide for the crossing desire lines could lead to an increased risk of collisions between general traffic and pedestrians.

Figure 2.7 – Crossing Desire Lines



Recommendation

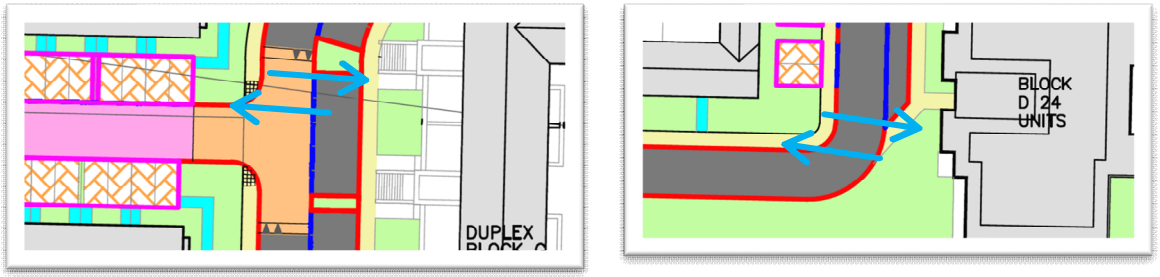
The crossing desire lines (highlighted) should be formally provided for at the junctions.

2.9 Problem: Providing for Pedestrian Crossing

Location: **T-Junction – Road Layout Sheet 3 of 3**

Failure to provide for the crossing desire lines could lead to an increased risk of collisions between general traffic and pedestrians.

Figure 2.8 – Crossing Desire Lines



Recommendation

The crossing desire lines (highlighted) should be formally provided for at the junctions.

3. Audit Team Statement

3.1 Certification & Purpose

We certify that we have examined the drawing(s) listed in Chapter 1 of this Report.

Sole Purpose of the Road Safety Audit

The Road Safety Audit has been carried out with the sole purpose of identifying any features of the design which could be removed or modified to improve the road safety aspects of the scheme.

3.2 Implementation of RSA Recommendations

The problems identified herein have been noted in the Report together with their associated recommendations for road safety improvements.

We (the Audit Team) propose that these recommendations should be studied with a view to implementation.

Audit Team's Independence to the Design Process

No member of the Audit Team has been otherwise involved with the design of the measures audited.

3.3 Road Safety Audit Team Sign-Off

Martin Deegan
Audit Team Leader
Road Safety Engineering Team
traffico

Signed: 

Date: 26th March 2021

Colin Prendiville
Audit Team Member
Road Safety Engineering Team
traffico

Signed: 

Date: 26th March 2021

4. Designers Response

4.1 How the Designer Should Respond to the Road Safety Audit

The Designer should prepare an Audit Response for each of the recommendations using the Road Safety Audit Feedback Form attached in Appendix A.

When completed, this form should be signed by the Designer and returned to the Audit Team for consideration. See flow-chart following for further description.

Figure 4.1 – Road Safety Audit Sign-Off and Completion Process

4.2 Returning the Completed Feedback Form

The Designer should return the completed Road Safety Audit Feedback Form attached in Appendix A of this report to the following email address:

- Email address: martin@traffico.ie
- Telephone: 087 948 3535

The Audit Team will consider the Designer's response and reply indicating acceptance or otherwise of the Designers response to each recommendation.

Triggering the Need for an Exception Report

Where the Designer and the Audit Team cannot agree on an appropriate means of addressing an underlying safety issue identified as part of the audit process, an Exception Report must be prepared by the Designer on each disputed item listed in the audit report.

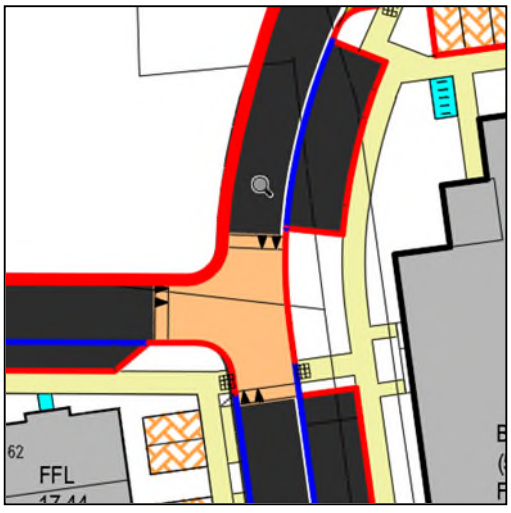
Appendix A

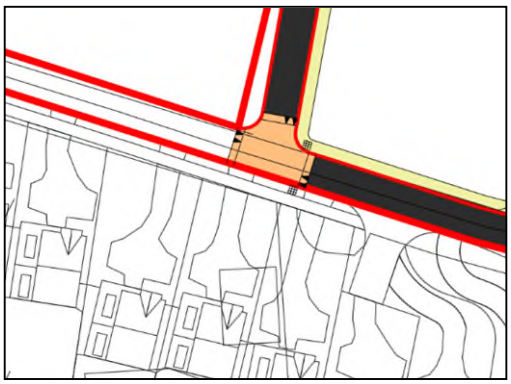
A.1 Road Safety Audit Feedback Form

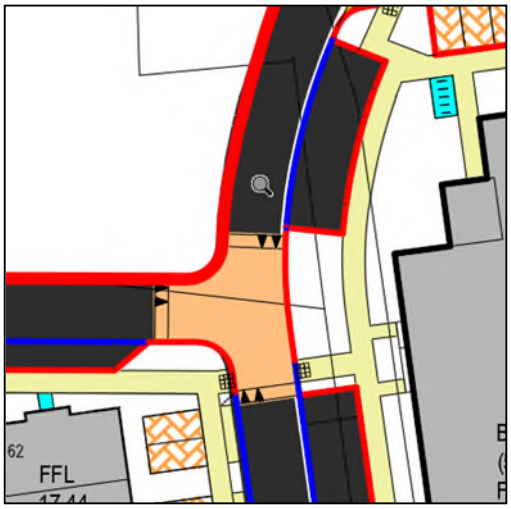
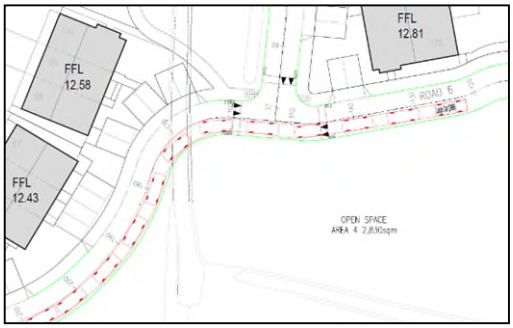
Road Safety Audit Feedback Form

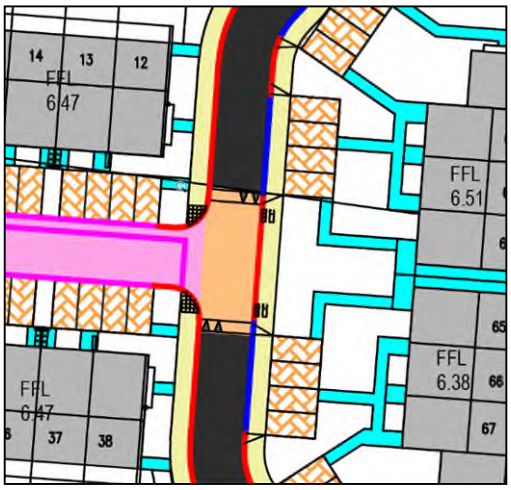
Scheme: Broomfield SHD

Audit Stage: Stage 1 Road Safety Audit | **Audit Date:** 28th January 2022

Problem Reference (Section 2)	Designer Response Section			Audit Team Response Section
	Problem Accepted (yes / no)	Recommended Measure Accepted (yes / no)	Alternative Measures or Comments	Alternative Measures Accepted (yes / no)
2.1	Yes	Yes	All parking spaces throughout the development have been reviewed and now have a clearly defined pathway to the dwelling entrance. These pathways will be permanent surfaces to the Landscape Architects Details.	*Noted with thanks.*
2.2	Yes	Yes	These areas where this issued occurred were redesigned so that the parking bays were either reorientated of relocated and now will no longer have a reversing movement into the junctions. Extract of road surfacing layout: 	*Noted with thanks.*
2.3	Yes	Yes	Shared streets are proposed to be incorporated to the following roads: Road 2, the cul-de-sac at the end of Road 3, Road 3.1, Road 3.4, Road 5.1, Road 6.1 & Road 9. All shared streets with the exceptions of Roads 5.1 & 9 are cul-de-sacs which will ensure low vehicular speed. Drivers will be further forced to reduce speed prior to entry of all shared surfaces by design. The reasons for this	*Noted with thanks.*

Problem Reference (Section 2)	Designer Response Section			Audit Team Response Section
	Problem Accepted (yes / no)	Recommended Measure Accepted (yes / no)	Alternative Measures or Comments	Alternative Measures Accepted (yes / no)
			being that shared streets are typically accessed via a ramp to an elevated surface and all entries require a turning movement, whether rounding a corner or via turning off from an access road at a junction. The elevated surface is intended to be a buff colour macadam as a visual sign of a change to vehicular priority to the motorist. This buff colour macadam may also be of a different texture to the standard road surfacing. Use of this buff colour macadam is subject to agreement with FCC. Signage will be provided advising motorists of the change in vehicular priority. All these items are in accordance with DMURS. The recommendation for the insertion of road level roundels is noted and will be incorporated to the design if so requested by FCC planning and with agreement from FCC maintenance sections.	
2.4	Yes	Yes	A raised table and pedestrian crossing, identified by blister tactile paving, has been incorporated to the design at this location. Extract from surfacing layout: 	*Noted with thanks.*
2.5	Yes	Yes	Pedestrian crossings have been incorporated at the specified locations, with parking bays having been relocated to accommodate the crossings. A grass verge has been provided between the relocated bays and the crossings so as to enhance motorist visibility of pedestrians approaching the crossings. Due to alterations to the layout, the solution has been incorporated to further locations throughout the site in order to enhance	*Noted with thanks.*

Problem Reference (Section 2)	Designer Response Section			Audit Team Response Section
	Problem Accepted (yes / no)	Recommended Measure Accepted (yes / no)	Alternative Measures or Comments	Alternative Measures Accepted (yes / no)
			pedestrian connectivity and safety. Sample extract from Road surfacing drawing: 	
2.6	Yes	Yes	A swept path analysis was undertaken at this location and confirmed the issue. The roads geometric alignment at this location was reviewed and redesigned with larger radii curves introduced. A swept path analysis was again undertaken for a large family car/van size vehicle which now shows no lane crossing following on from the redesign. Extract from swept path analysis: 	*Noted with thanks.*
2.7	Yes	Yes	In line with the findings of the Audit & FCC requests, footpaths throughout the development have now been increased in width and are at least 2m wide at all locations. This 2m width is sufficient to allow pedestrians to manoeuvre around open car doors without having to use unbound surfaces, at locations where	*Noted with thanks.*

Problem Reference (Section 2)	Designer Response Section			Audit Team Response Section
	Problem Accepted (yes / no)	Recommended Measure Accepted (yes / no)	Alternative Measures or Comments	Alternative Measures Accepted (yes / no)
			parallel parking bays are adjacent to the footpath.	
2.8	Yes	Yes	The locations highlighted have undergone a total redesign for an unrelated reason. The redesign has incorporated the recommendation for the provision of pedestrian crossings along desire lines. Sample extract from road surfacing layout: 	Noted with thanks.

**The Designer should complete the Designer Response Section above, then fill out the designer details below and return the completed form to the Road Safety Audit Team for consideration and signing.*

Designer's Name:	Robert Walpole	Designer's Signature:	Robert Walpole	Date:	27/01/2022
Audit Team's Name:	Martin Deegan	Audit Team's Signature:		Date:	28th January 2022

traffico

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UK and Ireland Office Locations