Road Safety Matters

Road Safety Audit

Stage 1

for

PROPOSED MIXED USE DEVELOPMENT

AT

NEWTOWN, DROGHEDA, CO LOUTH

Date: July 2019

Report produced for: Waterman Moylan Consulting Engineers

Report produced by: Road Safety Matters

Reference: RSM/MOB/080719/NEWTOWN RSA1

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BACKGROUND INFORMATION

The report which follows is the Road Safety Audit - Stage 1 for the proposed access and internal layout of a proposed mixed use development off Marsh Road (R150), in Drogheda, Co Louth, based on the information supplied to the RSA Team as detailed below. The scheme will involve construction of a significant number of residential dwellings on a site to the north of McGrath's Lane, and development of the site to include access roads, parking and all associated ancillary services. Vehicular access will be provided via a newly constructed priority controlled junction with the R150, a newly constructed single carriageway access road (LIHAF), two additional priority controlled access points into the site and additional road upgrade works at Railway Terrace/McGraths Lane.

Table 1: Information Supplied

Item		Supplied	Comment
A	Plans / Drawings	Y	16-137-SK09-Sheet 1 of 2
			16-137-SK10-Sheet 2 of 2
			16-137-P105- Proposed Road & Watermain Layout-GA
			16-137-P106 Proposed Road & Watermain Layout-Sheet 1
			16-137-P107 Proposed Road & Watermain Layout-Sheet 2
			16-137-P108 Proposed Road & Watermain Layout-Sheet 3
			16-137-P110 - Proposed Road & Watermain Layout 1 to 2
			16-137-P111 - Proposed Road & Watermain Layout 2 to 2
			16-137-P112 Road Markings, Signage & Sightlines 1 to 2
			16-137-P113 Road Markings, Signage & Sightlines 2 to 2
			16-137-P114 Road Construction Details Sheet 1 of 2
			16-137-P115 Road Construction Details Sheet 2 of 2
			16-137-P130 Overhead Cable Diversion
B	Traffic Volume Information	N	
C	Speed Count Data	N	
D	Collision Data	N	
E	Departures from Standards	N	
F	Audit Brief	Y	RSA 1 Preliminary Design Road Safety Audit with scope as outlined on "RSA - Updated Extents" Plan
G	Other Data / Documents	N	

TABLE OF CONTENTS

1. INTRODUCTION

1.1 This report results from a Stage 1 Road Safety Audit (RSA) of the internal layout and access roads to a mixed-use development in Newtown, Drogheda, Co Louth, carried out at the request of Waterman Moylan Consulting Engineers. The site is located to the east of Drogheda, at the location shown in figure 1. The internal site layout is illustrated in figure 2. This Audit examines the road safety implications associated with construction of a number of residential dwellings on a site to the north of McGrath's Lane, and development of the site to include access roads, parking and all associated ancillary services. Vehicular access will be provided via a newly constructed priority controlled junction with the R150, a newly constructed single carriageway access road (LIHAF), two additional priority controlled access points into the site and additional road upgrade works at Railway Terrace/McGraths Lane.

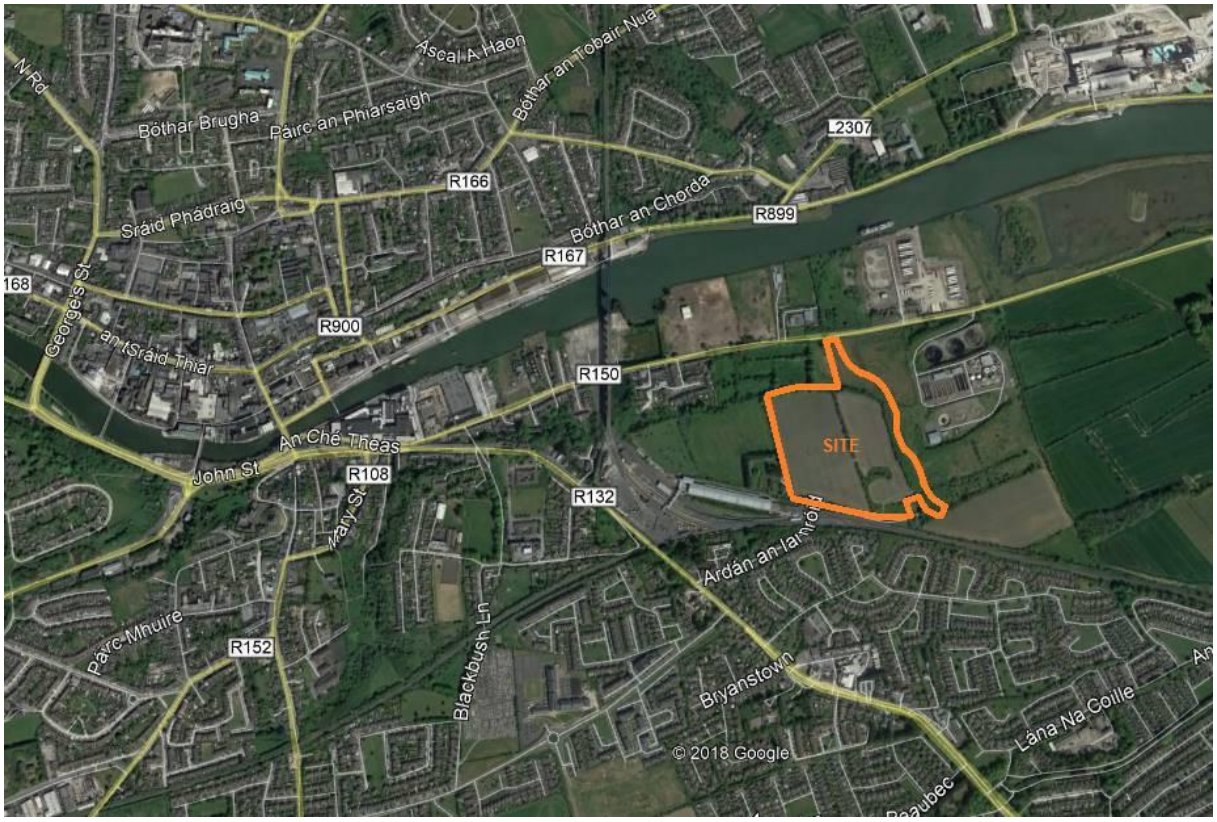


Figure 1: Site Location Plan

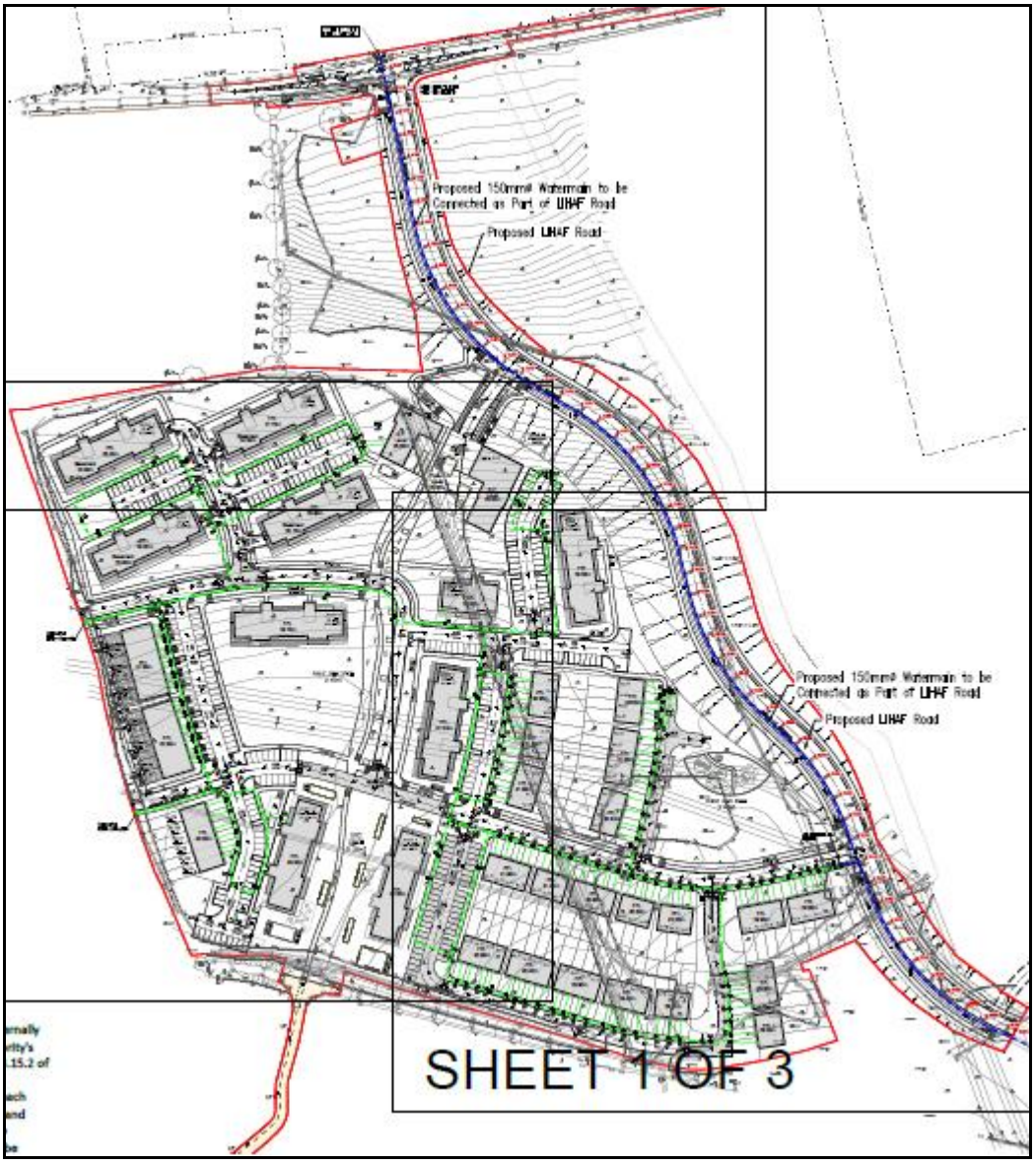


Figure 2: Proposed Internal Site Layout

1.2 The RSA was carried out during July 2019, and included a site visit by the Audit Team on Monday 8th July 2019 during daylight hours. The weather at the time of the site visit was dull and dry, and the surface of the road was predominantly dry. Traffic conditions were light, and the posted speed on the R132 to the south of the site was 50 km/hr, with a speed limit of 60 km/hr posted on Marsh Rd (R150) to the north of the site.

1.3 The Audit Team Membership was as follows;

Team Leader:	Miriam O'Brien – BE (Civil) FIHE MIEI MCIHT SoRSA CoC
Team Member:	Anthony Sumner – HNC Civil Eng, AEng, MIEI, MCIHT

1.4 The Audit took place at the offices of Road Safety Matters following the site visit by the Audit Team. The Audit was undertaken in accordance with the Design Team's Audit Brief, and comprised an examination of the plans provided by the Design Team, as listed in Background Information, Table 1.

1.5 The terms of reference of the Audit are as described in TII GE-STY-01024 Dec 2017. The team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria. Comments on potential issues arising from a safety review of the internal site layout with reference to the Design Manual for Urban Roads and Streets (DMURS) have also been included where relevant, in respect of the urban nature of the development. DMURS changes the approach to traffic safety in urban areas with the emphasis now on creating low-speed environments where it is clear to car drivers that they must give way to vulnerable road users (VRUs – including pedestrians and cyclists), thus reversing the traditional vehicle-dominated road hierarchy to favour non-motorised traffic.

1.6 Section 2 of this report contains issues raised by the Stage 1 RSA together with recommendations to be considered. Section 3 contains the Auditor Team Statement. Most issues raised in Section 2 can be cross-referenced with the scheme drawing (**Appendix C)** and photographs taken on the site visit (**Appendix B** & within Body of Report where necessary).

2. ISSUES RAISED BY THE STAGE 1 ROAD SAFETY AUDIT

2.1 GENERAL

2.1.1 The designers have not advised of any departures from standard.

2.1.2 There was no information provided relating to long sections.

2.1.3 No information was provided on any existing collision statistics in the vicinity of the site. A review of the Road Safety Authority (RSA) online collision database indicates that there were a number of collisions recorded on the R150 in the vicinity of the proposed development site access between 2005 and 2015 inclusive, at the locations shown in figure 3, including a serious collision. There were a number of serious collisions also recorded at the intersection of Railway Terrace and the R132 Dublin Rd to the south of the site, with two additional clusters noted to the north and south of this location, as highlighted in figure 3. A summary of the characteristics of the collisions numbered 1-8 in figure 3 have been included in Table 2.

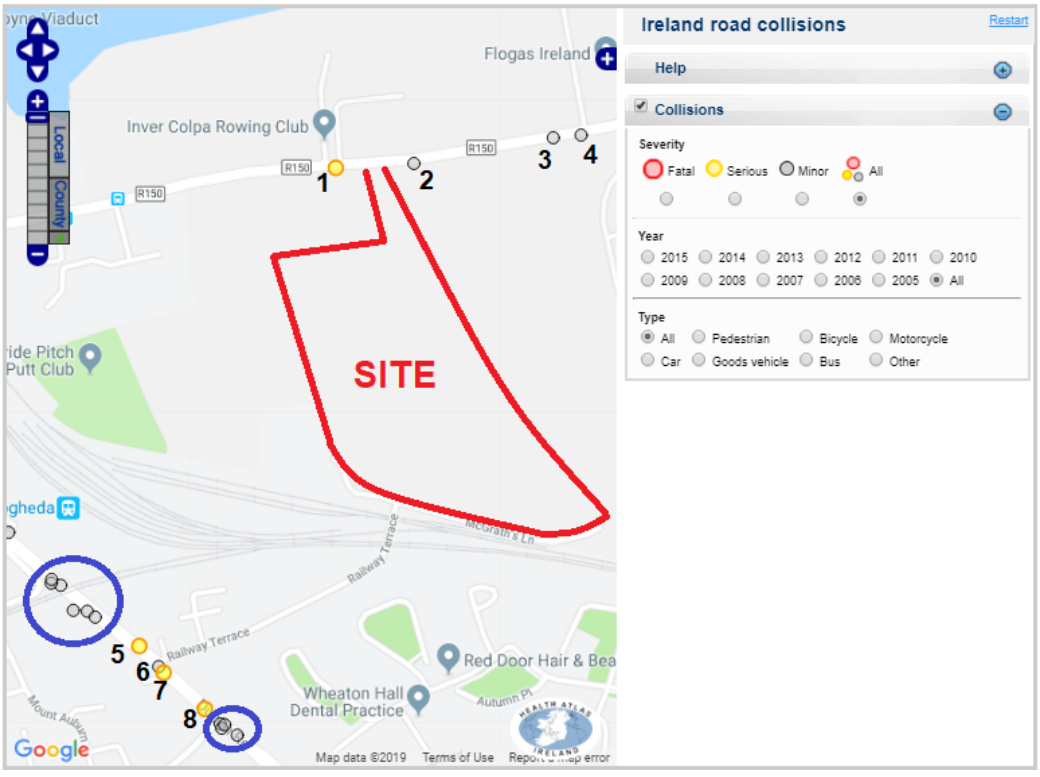


Figure 3[1]

[1] Approximate Site Boundary outline in red

Table 2: Summary of Collision Characteristics							
	SEVERITY	YEAR	VEHICLE	CIRCUMSTANCES	DAY	TIME	CASUALTIES
1	Serious	2012	Car	Single Vehicle Only	Friday	1900 - 2300	3 (1 ser, 2 min)
2	Minor	2007	Car	Single Vehicle Only	Monday	2300-0300	1
3	Minor	2007	Bicycle	Other	Thursday	1000-1600	1
4	Minor	2007	Bus	Unknown	Sunday	0300-0700	1
5	Serious	2010	Undefined	Single Vehicle Only	Monday	0700-1000	1
6	Minor	2008	Bus	Rear Shunt, Right Turn	Wednesday	1600-1900	1
7	Serious	2010	Car	Other	Thursday	1000-1600	1
8	Serious	2007	Car	Pedestrian	Monday	1900-2300	1

A cursory overview of the collisions characteristics indicates that there was a significant proportion resulting in high casualty severity, and a significant portion involving single vehicle collisions only, which can be indicative of inappropriate vehicular speeds. Two of the recorded collisions involved VRUs (Vulnerable Road Users – i.e. cyclists and pedestrians) and two of the recorded collisions involved a bus. Table 2 does not include an examination of the collision clusters recorded further north and south of the junction with Railway Terrace on the R132, however it is recommended that any potential safety issues on this link should be considered as the site design progresses, as the link and proposed shared surface on Railway Terrance is likely to be used by a relatively high proportion of VRUs travelling to and from the site and Drogheda town centre, including the railway station. It should be noted that the RSA database is not a comprehensive record of collisions, and should be reviewed in conjunction with the Local Authority / Gardaí records for the site, to include an investigation into installation criteria for the speed camera.

2.1.4 Problem – Speeds and Speed Limits Surrounding Site

There was no 85th percentile speed survey data provided for the existing links adjacent to the site, including the R150 and the R132, however the site is located between two differing speed limit zones, with a 50km/hr urban speed limit posted to the south of the site, and a 60 km/hr transition zone posted to the north, with the entrance to the transition zone area shown in figure 4. Observed speeds on the R150 appeared high at the time of the site visit, and the Audit Team noted that the 60 km/hr transition zone appeared to extend to a location significantly north of the commencement of the built up area of the town at present, with no formal entry treatment, and motorists are likely to misinterpret the nature of the link and potentially travel at inappropriate speeds. Traffic calming in the form of vertical reflection measures were installed on the R150 link

further west south, however there was no traffic calming in place in the vicinity of the proposed access onto the LIHAF Link road off the R150. Warning signage for the traffic calming (400m ahead) was installed on the westbound approach to the new access junction of the R150, as shown in figure 4.

It was noted that new 80 km/hr speed limit signage has been installed on the R150 in the vicinity of the proposed junction with the new LIHAF link road, however this signage was partially covered at the time of the site visit, as shown in figure 5. The long term proposals for speed limit signage are therefore unclear, however the Audit Team considered that a rural speed limit of 80 km/hr would be inappropriate for the site and for the roads surrounding the site, based on the scale and urban nature of this proposed residential development. Inappropriate speeds will increase the risk of collision for all road users, particularly VRUs travelling to and from the site.

Figures 5 & 6

Recommendations

A review of the location and suitability of the current speed limit on the network surrounding the site is advisable on all approaches to the site at detailed design stage, to include an extension of the 50 km/hr speed limit zone to include the access to the site off the R150, along with suitable length transition zone and entry treatment, and traffic calming as necessary. All conflicting signage should be removed.

2.1.5 Problem – Internal Site Speeds and Speed Limit

There is no provision for reduced speed limit signage (e.g. 30 km/hr) or 'Slow Zone' signage within the site. The posted speed limits of 60 km/hr and 50 km/hr on the network adjacent would be inappropriately high for the internal roads in a residential environment, where high proportions of VRUs should be anticipated, and where a number of relatively long links have been provided, with limited provision for traffic calming, e.g. figures 7 and 8, including on relatively steep access roads and links, although the design includes for raised tables/ramps at some locations on the proposed access road network throughout the site.

Figure 7

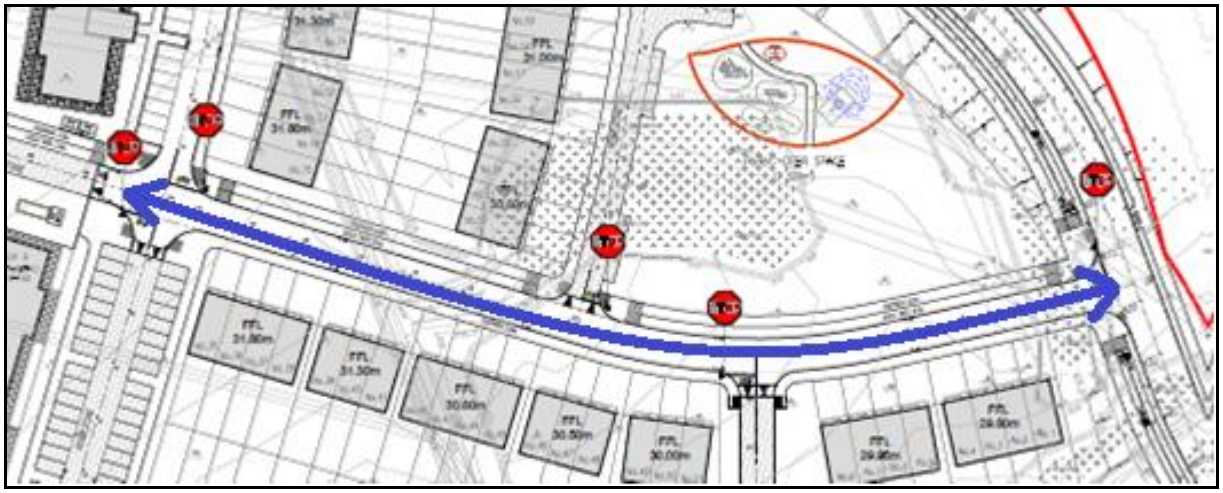


Figure 8

Recommendations

Lower advisory speed limit signage or slow zone signage is advisable on entry to the site, with additional signage as necessary in locations where child pedestrians are likely to play in the vicinity of the access roads or green areas. Supplementary and more frequent vertical deflection should also be considered where necessary on long straight links throughout the site, in addition to that shown on the preliminary layout plans, particularly on links where gradients exceed 5%.

2.1.6 Problem – Earthworks, Landscaping and Fencing/Boundary Treatments

There were no details provided for proposed landscaping/boundaries within the site and along the site boundary, and no details were provided on slopes for proposed earthworks, where embankments adjacent to the proposed playground and at the ends of relatively steep links may present a hazard to vehicles and VRUs, and where there is no provision for suitable fencing or vehicle restraint, as shown in figure 9. The provision for boundary treatment along the south of the site, to prevent vehicular access/parking, as shown in figures 11 and 12, is not clear, and the provision for boundary treatment along the widened section of Railway Terrace adjacent to the steep embankment at the railway line is also unclear.

Dense hedging and overgrown verges are currently located along a significant proportion of the site boundary on the R150 and along McGraths Lane, with some overhanging trees and vegetation on the R150 on approaches to the site leading to the potential for slippy conditions on the adjacent carriageway and footways, as well as reduced conspicuity at the proposed access onto the LIHAF, particularly the large mature tree highlighted in figure 13, which is located relatively close to the carriageway edge.

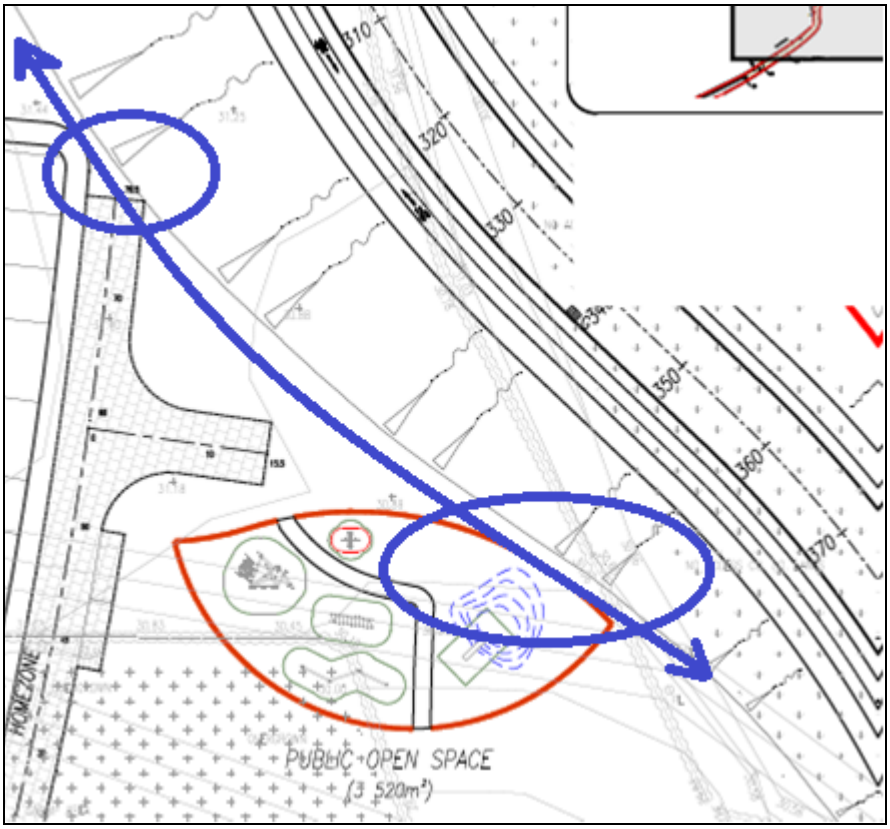


Figure 9

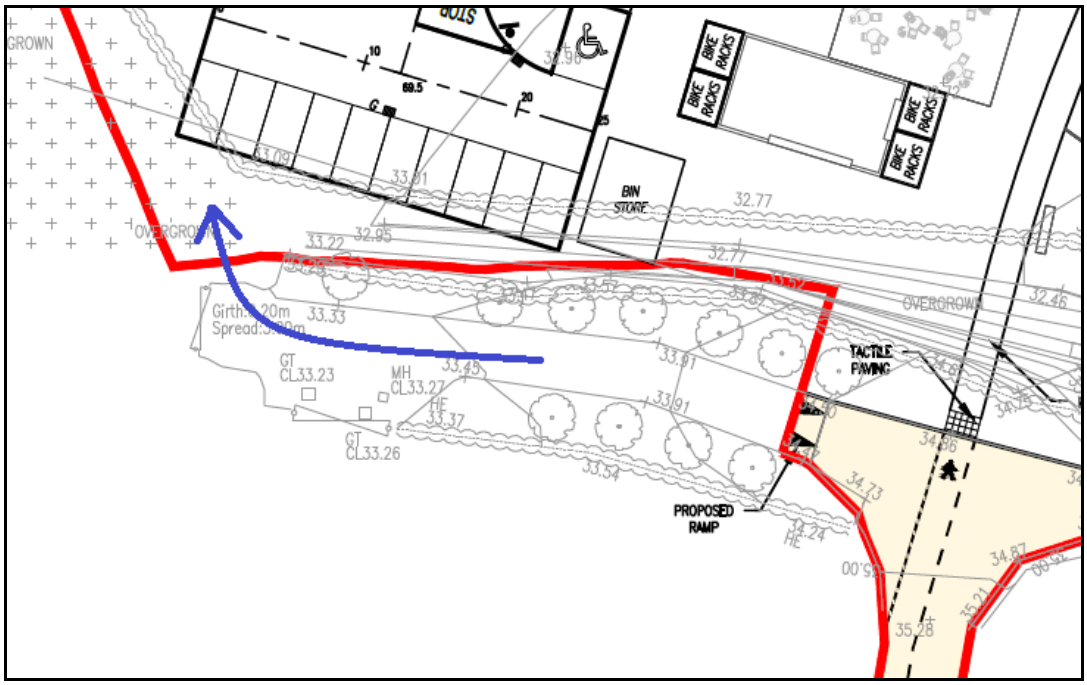


Figure 10

Figure 11

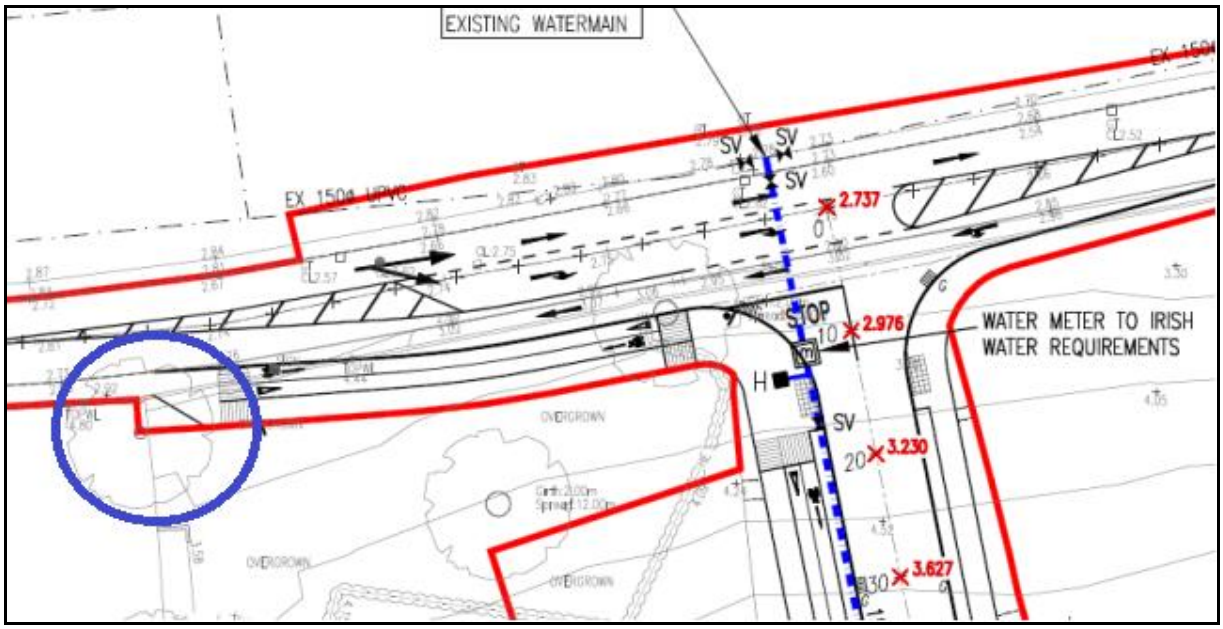


Figure 12

Figure 13: Dense vegetation/mature trees overhanging carriageway on R150

Figure 14: Dense vegetation/mature trees overhanging carriageway on R150

Inappropriately located landscaping or boundaries exceeding 1.05m in height along the site frontage or along any of the links throughout the site, particularly in the vicinity of junctions or

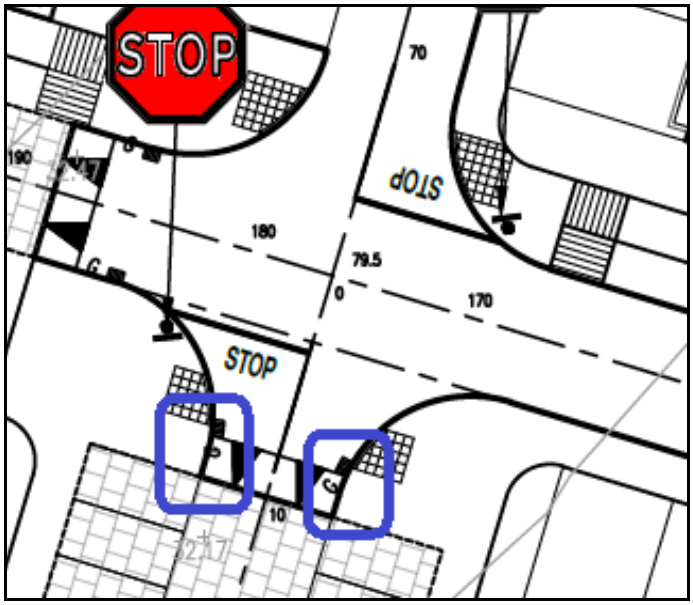
curved sections of road, may compromise visibility splays and sightlines, and may compromise intervisibility between pedestrians or motorists, or to and from vehicles reversing from perpendicular parking spaces within the site. Trees and landscaping located adjacent to pedestrian routes and footways can cause slippy conditions due to fallen leaves and can also compromise street lighting.

Recommendations

Landscaping proposals should be clarified at detailed design stage, with all trees and landscaping to be located away from positions which could increase the risk of conflict or have a negative impact on intervisibility at VRU desire lines, or where shedding leaves may cause slip/trip hazards. Proposed or existing landscaping and boundary treatments throughout and surrounding the site, should be located outside visibility splays or provided at a height less than 1.05m above ground level. Internal boundaries, walls and landscaping should also be offset a safe distance from the edge of carriageway, and forward visibility and stopping sight distance on all links throughout and surrounding the site should be clear and unobstructed in accordance with traffic speeds. Earthworks proposals to be clarified at detailed design stage to include details of slope and heights, with provision for suitable fencing and vehicle restraint where necessary throughout the site. Demands for vehicular access from the south should be assessed to determine suitability of access proposals and requirements for boundary treatment.

2.1.7 Problem – Drainage

The preliminary design layout includes provision for gullies adjacent to kerbs throughout the site, however gullies have been provided on pedestrian desire lines at some locations, where they will present a hazard to pedestrians, with examples shown on figures 15 and 16. There were no gullies provided at some locations at the end of relatively steep gradients on links, where ponding may arise, including at ramps to basement car parking. Externally, the provision for gullies on the new shared surface along railway terrace is unclear, and there are no gullies provided along the new kerbline on the southern side of the R150, where the widened cross section will effect the current crossfall.



Figures 15 & 16

. The new layout will need to be adequately drained to minimise the risk of ponding and build-up of surface water, which can increase risks for all road users and increase the risk of skidding and loss of control.

Recommendations

The detailed design drawings should include drainage details along all shared surfaces and along new kerblines of the R150, and throughout the site at locations where there are steep gradients, including access links into basement carparking. All new gullies throughout the site and on approaches to the site should be flush with the surrounding pavement, and placed in a location which is outside the desire line for pedestrians and two-wheeled vehicles.

2.1.8 Problem – Carriageway Proposals

There were no long sections provided for new links throughout the site or along the new link road, and no details were provided on the extent of new carriageway construction on the R150. The proposals at the new site access will involve carriageway widening, which may result in the creation of longitudinal joints between old and new surfacing, which are prone to cracking and ingress of water, leading to an increased risk of ponding and the creation of hazards in the

wheeltracks, particularly for two-wheeled vehicles. Existing joints in the carriageway at this location, which are shown in figures 17 and 18, will present hazards within the centre of the new narrower lanes at this location. It was noted that poor carriageway condition on Railway Terrace, which is shown in figure 19, should be addressed through provision of a new shared surface at this location along most of the length of the link, which should be clearly identifiable as a shared surface, with VRU priority, as with all of the homezones throughout the site.

Figures 17 & 18

Figure 19

Recommendations

Detailed design should include for long sections showing vertical design for all new links throughout the site and details of all new surfacing and carriageway construction and widening along the R150, with longitudinal joints between old and new carriageway to be avoided at any locations where the existing road is being widened. Suitable high friction surfacing should also be provided where necessary on all links throughout the site where gradients are relatively steep, particularly on the approaches to points of conflict.

2.1.9 Problem – Insufficient Clearance to Hazards

It was noted that existing solid boundary walls are located immediately adjacent to the running lane on Railway Terrace, as shown in figure 20, and particularly at the railway overbridge and there is no provision for a suitable offset on the proposed layout at these locations, presenting a risk that the walls will be stuck by passing vehicles, or pedestrians will be vulnerable at locations where two vehicles are attempting to pass on the narrow cross section. New lighting columns have also been provided on the shared link, once again immediately adjacent to the running lane with no safe clearance or suitable kerbing provided. It was noted that the bridge parapet is cracked at present, as shown in figures 21 and 22, and the walls appear unstable, which will resent additional risks to passing vehicles and VRUs.

Figure 20

Figures 21 & 22

Recommendations

All potential hazards throughout the site and on approaches to the site should be located at a sufficient offset from carriageway edges, particularly solid boundary walls, to minimise the risk that the hazard will be struck by passing vehicles. A recommended 600mm clearance should be provided to all solid boundaries within the site from the edge of carriageway, with a minimum 450mm clearance to be provided to all other boundaries, street furniture and signage. The alignment and integrity of the railway overbridge should also be examined in conjunction with the development of this site, with improvements to be made to safety and sightlines to address the likely increase in pedestrian flows on this link, arising as a direct result of the site proposals, and the resultant increased risk of conflict with vehicles.

2.1.10 Problem – Parking Generally

There was no information provided to the Audit Team on the cumulative parking demand for the development site to determine any issues arising. Any demand for on street parking will limit safe two-way access along internal links, as occurs at present on Railway Terrace (Figure 20). Vehicles parked on street in close proximity to junctions are also likely to restrict available space for turning manoeuvres.

It was noted that a significant number of internal parking spaces are configured as perpendicular spaces, and are located in close proximity to junctions where vehicles will be queuing and turning, and where vehicles parked are likely to present obstructions in visibility splays, with examples of where this may occur shown in figures 23-25. Obstructions in visibility splays increase the risk of pulling out and right angled collisions. Vehicles parked adjacent to pedestrian desire lines can also restrict intervisibility between approaching motorists and pedestrians waiting to cross, increasing the risk of pedestrian/VRU conflict.

Figures 23-25: Perpendicular Parking near Junctions

Recommendations

Total parking demands for the site should be assessed, with on street parking to be removed or restricted adjacent to all junction visibility splays and at locations where intervisibility between road users could be compromised, and with visibility splays throughout the site, and on all approaches, to be clear and unobstructed at all times in accordance with traffic speeds. Parking configuration to be parallel where possible, with perpendicular parking and the potential for reversing manoeuvres to be avoided adjacent to junctions and likely pedestrian desire lines to cross the carriageway. Any parking demands on street should be closely monitored to ensure vehicles do not obstruct the safe passageway of pedestrians or restrict the turning movements and visibility of other vehicles.

2.1.11 Observation – Cumulative Traffic Volumes and access junction proposals

There was no information provided on existing and anticipated traffic volumes to determine any potential safety issues arising from the proposed geometry for each of the access junctions into

the site, as well as all internal junctions. The design for the access off the R150 includes provision for a right turn reservoir into the site, as shown in figure 26, through which all vehicular access will be achieved, although the provision for vehicular access to the south of the site is unclear, as outlined previously in paragraph 2.1.6. It was noted that there are proposals for committed development immediately southeast of the site (133 units) which will also require access from the same junction off the R150.

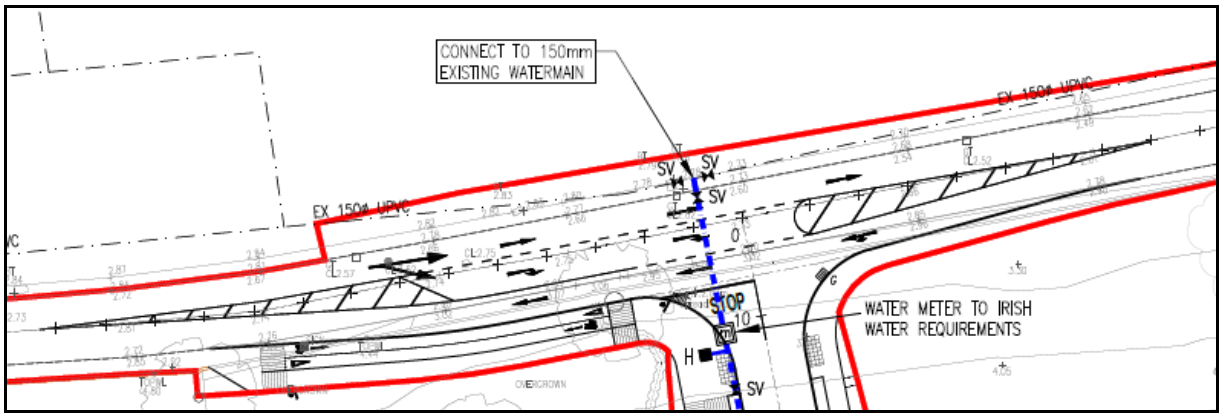


Figure 26

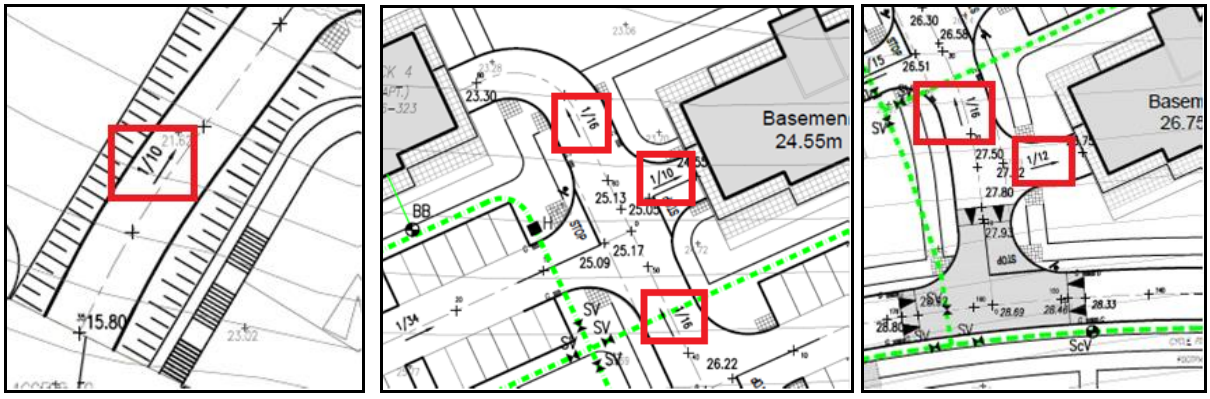
Recommendations

A TTA should be produced for the site to show the cumulative impact of all committed developments in the locality, and to demonstrate that the proposed geometry of all junctions will accommodate anticipated turning movements and vehicle sizes. The Designer should demonstrate that the total demand for right turners into the site off the R150 is satisfied by the proposed right turn reservoir length, and that traffic queuing to enter the development site will not obstruct the movement of through traffic on the regional road. The lane widths at the new access junction should also cater safely for all anticipated vehicle sizes, including HGVs and two wheeled vehicles. The minimum length of right turn reservoir should ideally be at least 35m, to allow for deceleration and suitable taper, with a longer length and taper required for higher approach speeds, and the reservoir length increased to allow for queuing traffic. The demand for right turners out of the junction should also be assessed in conjunction with examination of the AADTs on the major road, to determine any issues arising in respect of increased risk of right angled collision, with queuing vehicles within the reservoir obstructing visibility towards the left, towards vehicles approaching in the nearside lane eastbound.

2.2 JUNCTION LAYOUT AND LINK ALIGNMENT/CROSS SECTION

2.2.1 Problem – Steep Gradients and alignments

The proposed vertical alignment on the LIHAF will result in gradients of almost 7%, which will present difficulties for some vehicles and for some VRUs in wet and icy conditions. Steeper gradients were noted on a number of other links throughout the site, including gradients exceeding 10%, which is a departure from standard. Examples of such locations are shown in figures 27-30. Figure 31 shows a location where the shallow gradient may cause drainage issues, as there is no provision for gullies along the link. Steep gradients were also noted on approaches to junctions/intersection points, which increases the risk of vehicular conflict and vehicular/VRU conflict at these locations. There was no horizontal or vertical alignment design provided with the preliminary design layout to determine any issues in respect of Stopping Sight Distance (SSD).



Figures 27, 28 & 29

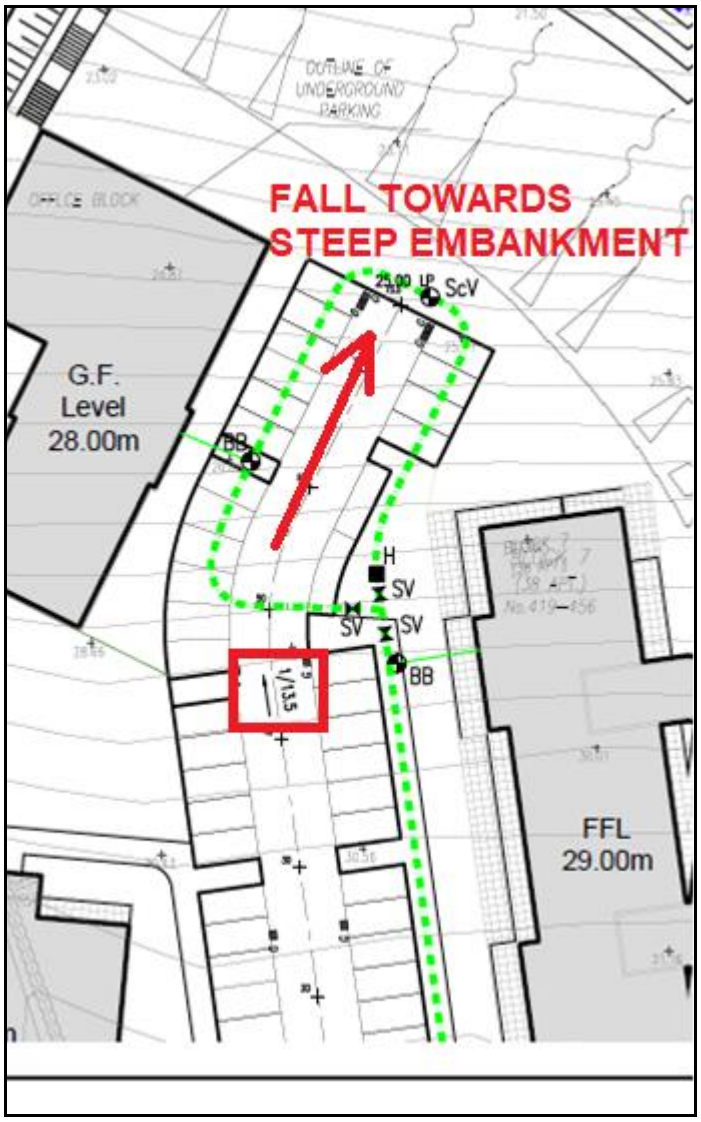


Figure 30

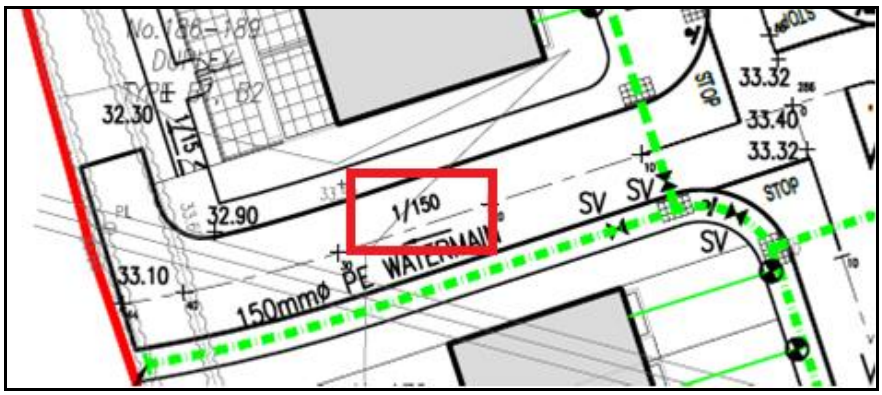


Figure 31

Recommendations

Horizontal and vertical design proposals should be included on detailed design plans, with long and cross sections, to demonstrate that the proposed alignments will safely accommodate anticipated traffic volumes and speeds with suitable sightlines and gradients. Gradients exceeding 5% should be avoided on routes to be used by VRUs, with gradients exceeding 7% (absolute maximum 8%) to be avoided. A relatively level dwell area (2.5-3% maximum) should be provided on the approach to all junctions and access points for a suitable distance back from the stop line/channel line to minimise the risk of larger vehicles overturning or overshooting the stopline, as well as rear shunt collision risk and collision with VRUs potentially crossing junction mouths.

2.2.2 Existing Alignment and visibility along Railway Terrace

The current alignment on Railway Terrace is relatively straight, however a right hand curve with a relatively tight radius over the railway bridge and high bridge abutment walls to each side of the carriageway restrict forward visibility and SSD, as shown in figures 32-34, which will lead to an increased risk of collision with pedestrians or other vehicles using the link to access the site. The preliminary design does not include for alignment or SSD improvements at this location.

Figure 32

Figure 33

Figure 34

Recommendations

Suitable forward visibility and SSD should be provided along Railway Terrace and on all links through the site, including towards the rear of any anticipated queues at any of the proposed junctions and access points. Intervisibility between pedestrians and motorists should be clear and unobstructed at all times, especially on the shared surface links. Additional speed control and traffic calming measures should be installed at any locations where suitable SSD cannot be achieved.

2.2.3 Problem – Proposed Geometry at Junctions and internal links generally

There was no swept path analysis provided to demonstrate that the proposed geometry at the R150 junction and at all internal junctions and access points, and along all internal links will safely accommodate the turning manoeuvres of all anticipated vehicle sizes without encroachment into the path of oncoming vehicles, or potential side swipe and head on collision risk. A number of the internal links are narrow, and there is no provision for widening on curves with limited opportunity for safe two-way movements. There are also a number of internal links where no provision has been made for turning circles, and where vehicles will need to undertake multiple reversing manoeuvres which resents risks for all road users, and particularly VRUs, including child pedestrians. It was also noted that a number of the internal junctions have been configured as crossroads, rather than staggered junctions. Crossroads configurations typically exhibit higher collision rates.

Recommendations

The design should include swept path analysis to demonstrate that the proposed geometry at each access point will safely accommodate the anticipated turning manoeuvres of all vehicle sizes with adequate margins of safety, on all permissible movements. The proposed geometry should allocate sufficient roadspace for the benefit of VRUs throughout the site to ensure the potential for encroachment of vehicles into the footway and VRU areas has been minimised. The proposed geometry should safely accommodate safe simultaneous two way movements at all times for frequent vehicle types, such as SUVs, and crossroads configurations should be avoided

at internal junctions. Vehicles waiting to turn from internal junctions should not obstruct entry for other vehicles, including at the entry to/from basement car park levels.

2.2.4 Problem – Proposed Give way arrangement on Railway Terrace

The design proposals show provision for a yield arrangement for vehicles entering Railway Terrace from the direction of the R132 to give way to vehicles exiting from the direction of the site, as shown in figure 35.

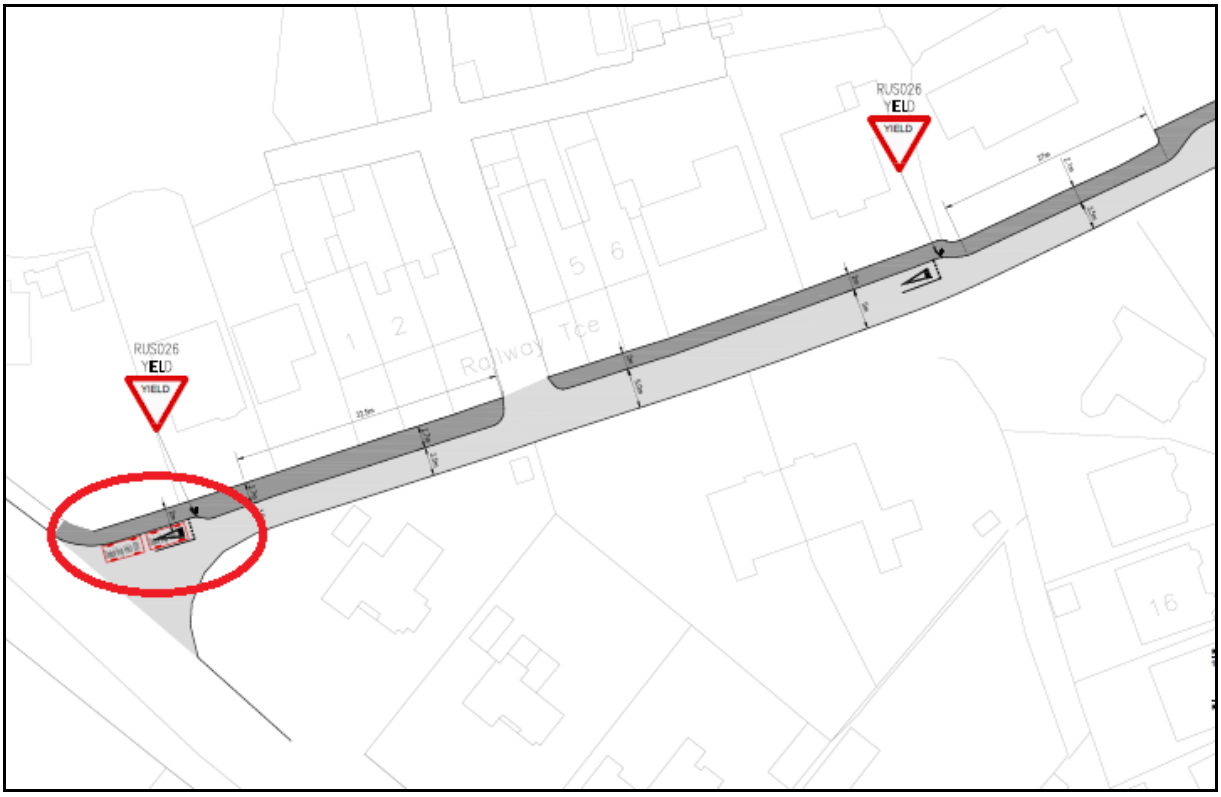


Figure 35

The Audit Team are concerned that there is a limited space for vehicles to wait at this location, with an increased risk of blocking back to the intersection with the R132. Visibility towards the rear of any queues forming will be compromised for vehicles travelling from the direction of the town centre (north) wishing to turn left onto Railway Terrace due to the nearside boundary treatment at this location (high wall and hedging), leading to a risk of rear shunt collision. Forward visibility towards the east along Railway Station at this point is also constrained by the vertical alignment and parked vehicles as well as the high boundary

walls on the offside, to which there is no safe clearance provided, as outlined previously and as shown in figures 37 and 38. There were a significant number of parked vehicles noted along this street at the time of the site visit, which will impact on the safe operation of the proposed yield arrangements along the link, and which will also compromise clear forward visibility and safe two-way movement along the link, as well as increased risk to VRUs, particularly since many of the parked vehicles are currently partially obstructing existing footways along the link.

Figure 36: Visibility eastbound on Railway Tce for vehicles who have turned right from the R132

Figure 37

Figure 38

Figure 39

Figure 40

Figure 41

The proposals along this link include for for widening through removal of some of the vegetation within the verge(s), which is shown in figure 42, which should improve scope for safe passing, however the design proposals do not include allowance for the existing on street parking at this location.

Figure 42

Recommendations

The layout of the link should be examined along with the location of the proposed yield arrangements to ensure clear forward visibility can be provided to and from oncoming traffic at all times and towards the rear of any queues forming. Where on-street parking is compromising safe two way movement and forward visibility, parking should ideally be restricted and suitable replacement parking provided to cater for the demand. Clear signage should also be provided to limit vehicular access on this link.

2.2.5 Problem – Ambiguous rights of way

It was noted that there is no provision for guidance on the priority movement and rights of way at McGrath's Lane/Railway Terrace to the north of the railway overbridge, where sightlines are poor due to the height of the bridge walls, as shown in figure 43, and where provision has been made for pedestrians to cross the centre of the junction, as shown in figure 45. There is no provision for form of control at a number of internal junctions/intersection points, and one of the internal crossroads has been marked with a stop line on each arm, as shown in figure 46, which will lead to ambiguity and uncertainty regarding rights of way.

Figure 43

Figure 44

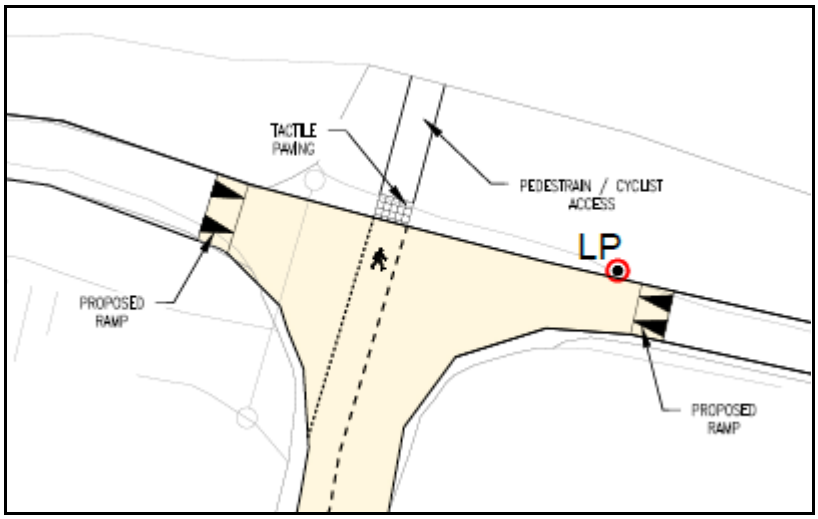


Figure 45

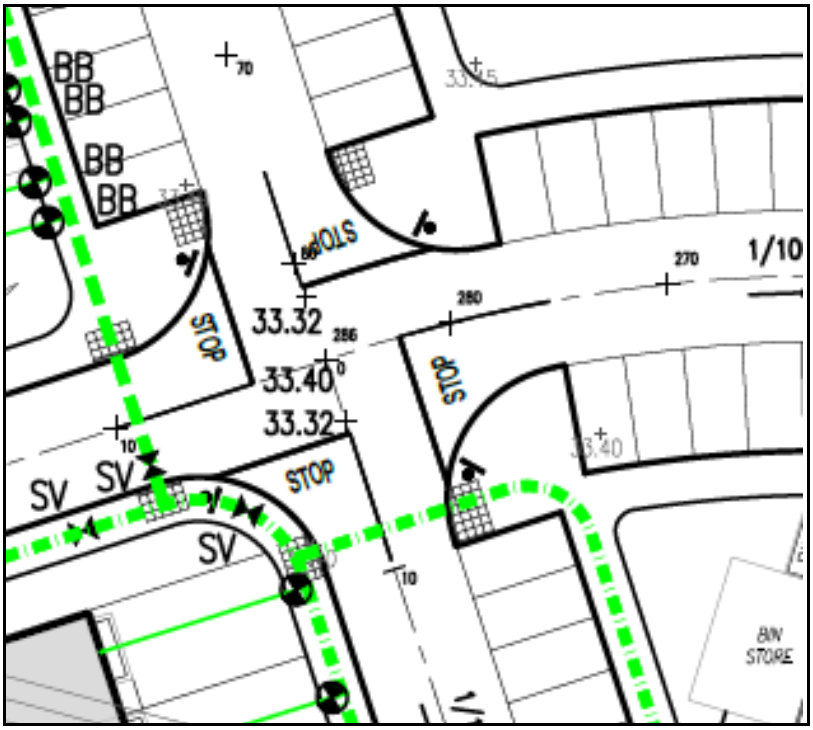


Figure 46

Recommendations

The priority and rights of way at all potential conflict points should be clear to all road users to prevent ambiguity and confusion, and to minimise the risk of conflict. An investigation should be made into improving sightlines in the vicinity of the railway bridge to the south of the site.

2.3 NON-MOTORISED USER PROVISION

2.3.1 Problem – Pedestrian Provision Generally

There was no information provided on anticipated pedestrian and cyclist demands and desire lines, however a site of this size in relatively close proximity to Drogheda Town Centre is likely to generate a significant demand for access on foot. There were a number of issues noted in respect of current and proposed pedestrian and cyclist accessibility to and from and within the site, which can be summarised as follows:

- Inappropriate levels and relatively steep gradients exceeding 5% on links within the site are likely to present difficulties for wheelchair access or for access for those with buggies or for elderly pedestrians.

- There were insufficient details provided for links throughout the site to determine any potential issues in terms of trip hazards or kerb heights, which may also present difficulties for mobility and visually impaired pedestrians.

- Pedestrian connectivity into the site at McGrath's lane is unclear, with just one potential access point shown. Pedestrian activity was observed along the length of McGrath's lane at the time of the site visit, and more direct desire lines from different sections of the site are likely to emerge, particularly to the south, along the boundary shown in figures 47 and 48. At present the surface of McGrath's Lane is uneven, with multiple trip and slip hazards observed. Intervisibility on the approach to the bridge is also poor due to the high bridge parapet, as shown in figure 49, and as outlined previously.

Figure 47

Figure 48

Figure 49

- Provision has been made for a shared pedestrian/cyclist route into the site from McGrath's Lane, however the width indicated on this facility is too narrow for shared use, pedestrians will be more vulnerable to conflict with cyclists at this location.

- A number of proposed signs throughout the site appear to be located at or adjacent to pedestrian desire lines and dwell areas, and at locations where they may restrict VRU movement. Such signs should ideally be moved to the back of footway and installed on a cranked pole if necessary, provided the sign can be clearly seen by approaching motorists, or alternatively footway widths should be increased at pinch points, with a minimum 450mm clearance to be provided from the edge of signface to the kerb edge.

- The proposed cross sections on Railway Terrace will provide a 4m wide carriageway with 1.8m footways on the shared space in the vicinity of the railway bridge, reducing to a 3.5m wide carriageway with 2.1m wide footway along a distance of 27m, which will be very restrictive and will constrain movements for road users, and result in increased risks for VRUs. A consistent footway width of 2m should ideally be provided along the link, with provision for safe passing width for two way traffic and clear visibility towards oncoming vehicles and pedestrians within the shared space at all times. Where this cannot be achieved, consideration should be given to restricting movement on this link to one way only, and to restricting vehicular access to the narrow sections of the link.

- Elsewhere throughout the site there is also no provision for verges between the narrow carriageways and the footways on most of the inks, although verges have been provided at some locations where they provide a buffer zone and lateral clearance between VRUs and passing vehicles. VRUs will be more vulnerable at locations where there is no separation distance and limited footway widths. VRUs will be particularly vulnerable on the shared surfaces, including those who are mobility and visually impaired.

- Provision has been made for tactile paving/informal crossing points at most of the internal junctions throughout the site, however no provision has been made for dropped kerbs for the benefit of mobility impaired road users, and tactile paving is also missing from some desire lines to cross at junctions, as shown in figure 50.

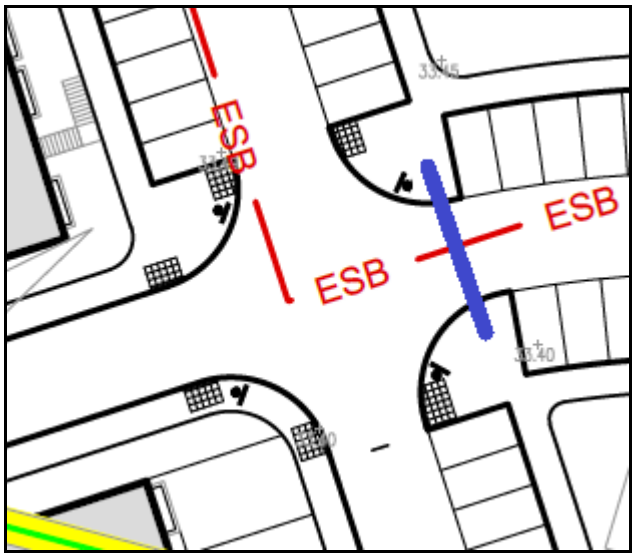


Figure 50

- Tactile paving has been provided at the southern link to the site at the intersection with McGrath's Lane, as shown in figure 51, which leads visually and mobility impaired pedestrians directly into the centre of the carriageway, on a shared surface where rights of way and priority are unclear, and where the risk of conflict with moving vehicles is higher. This will occur at a location where intervisibility is compromised by the bridge crest, and abutment walls, as shown in figure 52.

- There is no provision for tactile paving at the top and bottom of steps within the site to alert visually impaired pedestrians to the presence of the hazards.

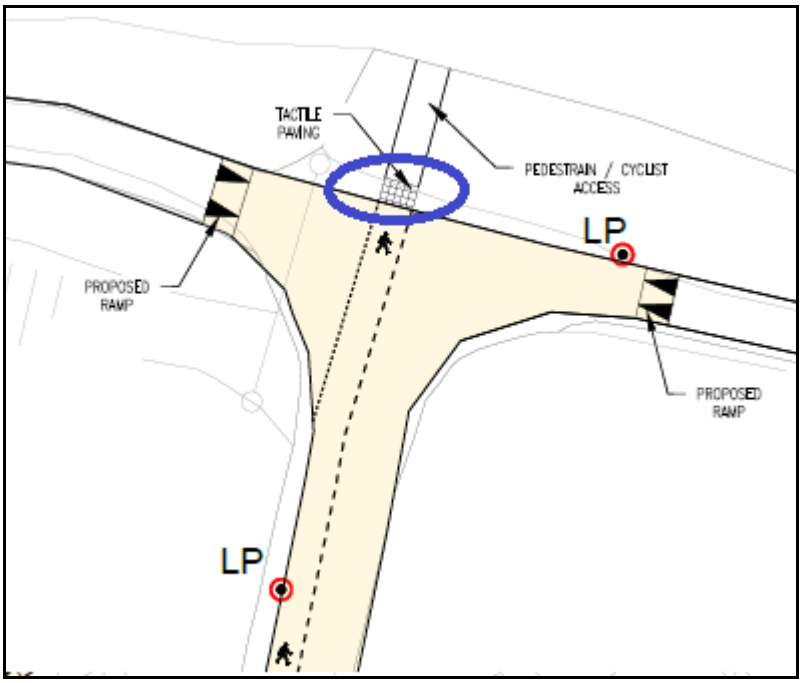


Figure 51

Figure 52

- Gradients throughout the site and access points to and from the basement car park areas will present difficulties for some road users, including adjacent to the proposed playground, where provision should be made for suitable fencing/regrading where

necessary to protect children from potentially steep slopes and height differences at this location.

- It was noted that existing footways on the R150 are dark due to overhanging trees, with debris and potentially slippy conditions noted, as shown in figure 53. These existing pedestrian facilities are also narrow, on both sides of the carriageway, including directly opposite the proposed site access, as shown in figure 54. Pedestrian flows and desire lines to use these footways and to cross the R150 carriageway are likely to increase significantly as a direct result of the development proposals. There is no provision for a safe controlled crossing facility on this link on approaches to the site, and high traffic volumes at peak times, or high traffic speeds at off peak times, may present difficulties for some pedestrians to cross safely.

Figure 53

Figure 54

- The existing footway on the R150 terminates abruptly to the west of the proposed site access with no provision for safe connectivity to the footway on the opposing side of the carriageway.

- The proposed footway and cycleway along the northern boundary of the site terminates abruptly, tying in to an existing overgrown verge, as shown in figures 55 and 56, with a mature tree located in close proximity to the carriageway edge at the tie-in point, as shown in figure 56, which would obstruct the movement of pedestrians and cyclists and force them out onto the carriageway, where there is no provision for a safe crossing facility onto the narrow footway on the opposing side of the carriageway, as outlined previously.

- provision has been made for an informal pedestrian crossing point to the west of the proposed site access on the R150, where the existing footway is narrow on the northern side and discontinuous on the southern side. Clear forward visibility to and from both sides of the crossing from a point 2m back from the kerbline will be required at this location.

Figure 55

Figure 56

- Manhole covers were noted within the footways adjacent to the proposed site access off the R150, which can present a slip hazard to VRUs. A number of manhole covers

throughout the site will also be located within VRU desire lines where they may present a hazard.

Figure 57

- It was noted that there is no provision for tactile paving/dropped kerbs at the mouth of the junction with Railway Terrace/R132 as shown in figures 58 and 59. The pavement is also cracked with potential trip hazards at this location. These existing issues will resent risks to any pedestrians accessing the site from this direction.

Figure 58

Figure 59

Recommendations

Pedestrian activity, desire lines and demands should be considered both within the site, at tie-in points, and on routes used to access the site, with detailed design layout to be finalised taking into account all issues raised above. Details of all kerb heights throughout the site to be clarified at detailed design stage, with a maximum kerb upstand of 6mm to be installed on all desire lines to cross the carriageway across the path of moving vehicles, and dropped kerbs ideally flush with the adjacent road surface. Footways should be continuous, clear and unobstructed at all times, with a minimum continuous width of 2m to be provided in an urban zone, and a minimum controlled crossing width of 2.4m to be provided on the R150 subject to a review of pedestrian and vehicular volumes, to be increased to 4m if the crossing is to be shared with cyclists. All street furniture should be located to the rear of the footways where possible in a location which does not compromise the footway width to less than the absolute minimum desirable width of 1.2m on isolated sections. Overhanging trees should be cut back to minimise slip hazards arising from fallen leaves and to improve lighting conditions and VRU conspicuity. All chamber covers and gullies should be flush with the surrounding pavement and ideally located outside pedestrian and cyclist desire lines. Intervisibility at all crossing points within the site and surrounding the site should be clear and unobstructed at all times in accordance with traffic speeds.

2.3.2 Problem - Cyclist Provision Generally

There was no information provided on anticipated cyclist demands and desire lines to and from the site, and there are no formal cycling facilities on the surrounding road network, and no provision for cyclists within the proposed design layout for the site. Cyclists will be expected to shared carriageway space with vehicles on relatively narrow cross sections and lane widths at some locations, including at the access junction onto the LIHAF off the R150, where the proposed segregated cycle lane terminates abruptly, as shown in figure 61, and where there is no clear provision for cycleway continuity for cyclists travelling in both directions from the east and west. A number of other potential safety issues were noted in respect of cyclist accessibility throughout the site, which can be summarised as follows:

- Gradients are exceeding 3% on new dedicated cycling facilities, as shown in figure 60, which is a departure from standard, with a gradient of 8% on the new LIHAF and gradients exceeding 10% on links into basement carparking.

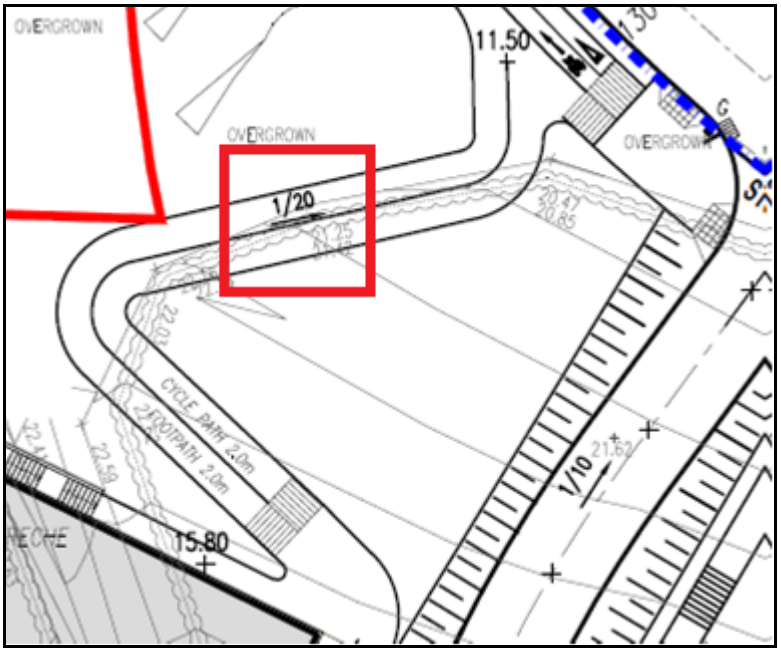


Figure 60

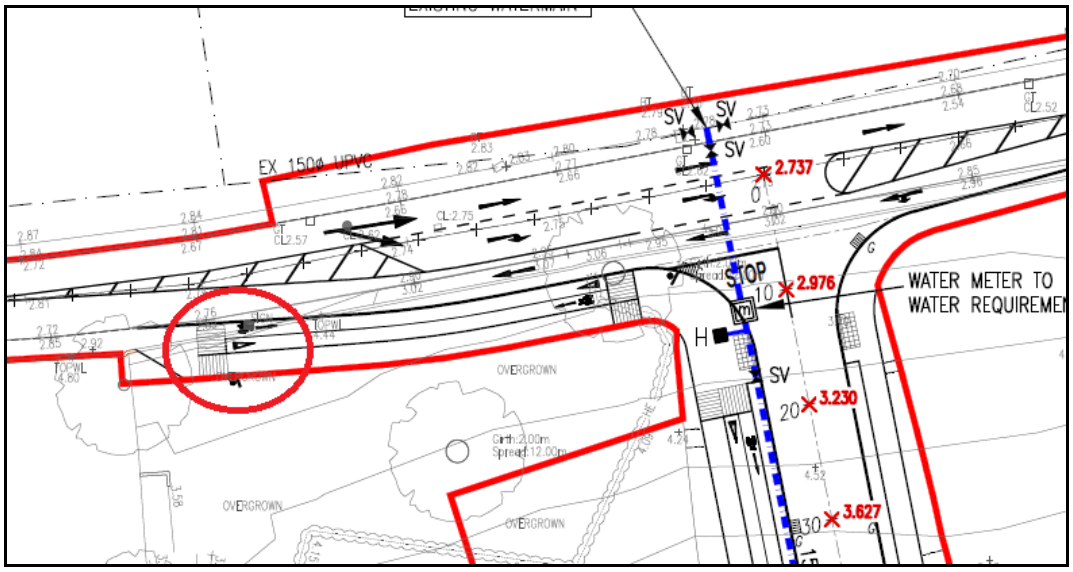
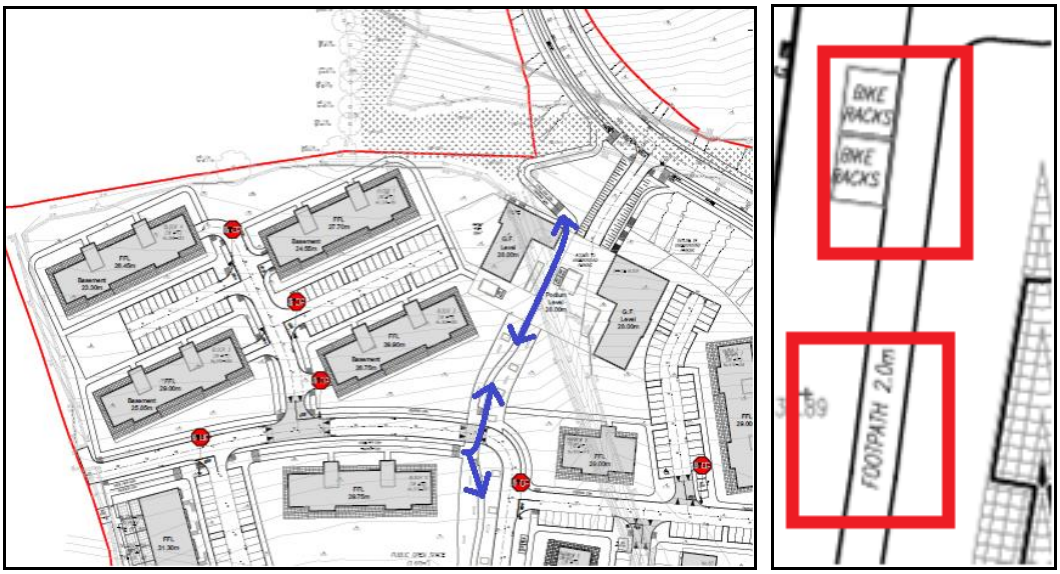


Figure 61

- The shared cycleway/footway at the south of the site (McGrath's Lane) is too narrow for shared use, and the continuity of the route for cyclists on Railway Terrace and on the R132 is unclear. Cyclists will be more vulnerable at these locations.

- Continuity for cyclists is unclear elsewhere throughout the site, as highlighted in figure 62. Bike racks have also been provided at a number of locations adjacent to footways throughout the site, with an example shown in figure 63, where there is no clear provision for dropped kerbs to facilitate transfer from on to off road facilities, and where there is insufficient space provided on the footways for safe shared use.



Figures 62 & 63

Recommendations

Likely cyclist volumes and desire lines should be considered in enhancing accessibility to and from and within the site, in line with the aspirations of DMURS in an urban environment. All cycling facilities should be sufficiently wide to accommodate safe two way cycling where possible, and where this is not possible, safe provision should be made for cyclists approaching from the opposite direction. Connectivity should also be provided to the surrounding network, with discontinuous facilities to be avoided, and with clear signage to be provided at the start and end of all facilities, with provision for suitable dropped kerbs where necessary to facilitate transfer from on to off road facilities, and vice versa.

2.4 ROAD SIGNS, MARKINGS AND LIGHTING

2.4.1 Problem – Lighting

There were no proposed lighting details provided for the internal site. Inappropriate lighting can increase the risk of conflict during the hours of darkness, and inappropriately located lighting columns can obstruct footways and VRU movements, and can also present a hazard to errant vehicles if located too close to the carriageway edge. It was noted that a number of lighting columns will be provided along Railway Terrace within the proposed footway, as shown in figure

64, where they may obstruct the movement of VRUs and present a strike hazard to passing vehicles on a limited cross section. The columns on the railway bridge, highlighted in figure 65, may also, if struck, present a hazard on the railway line underneath.

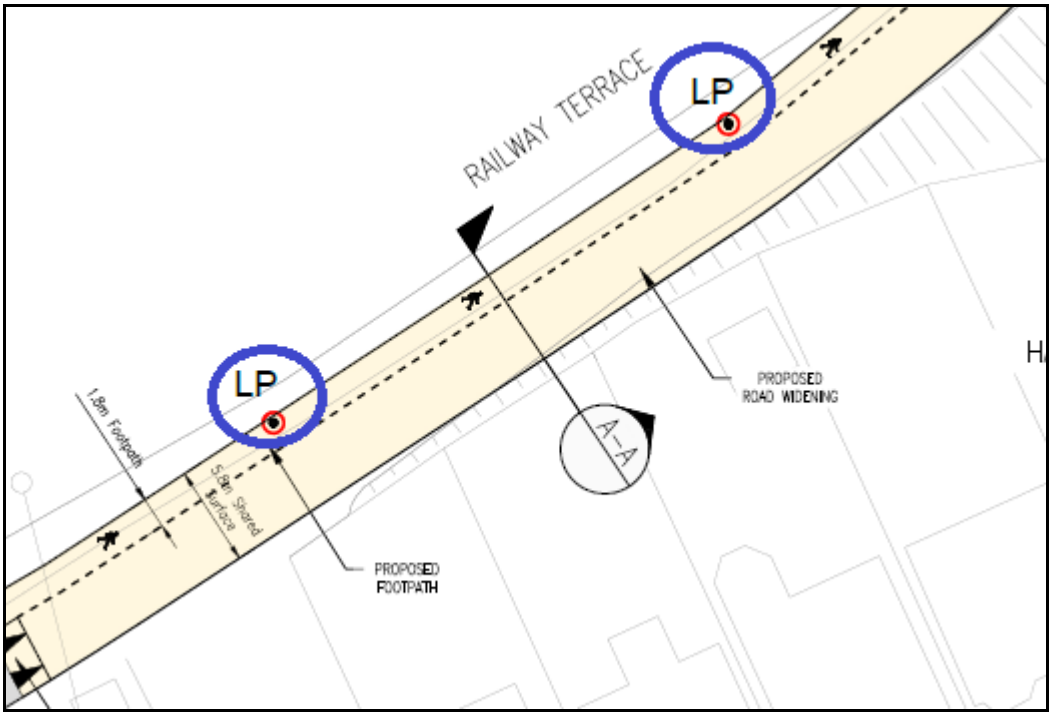


Figure 64

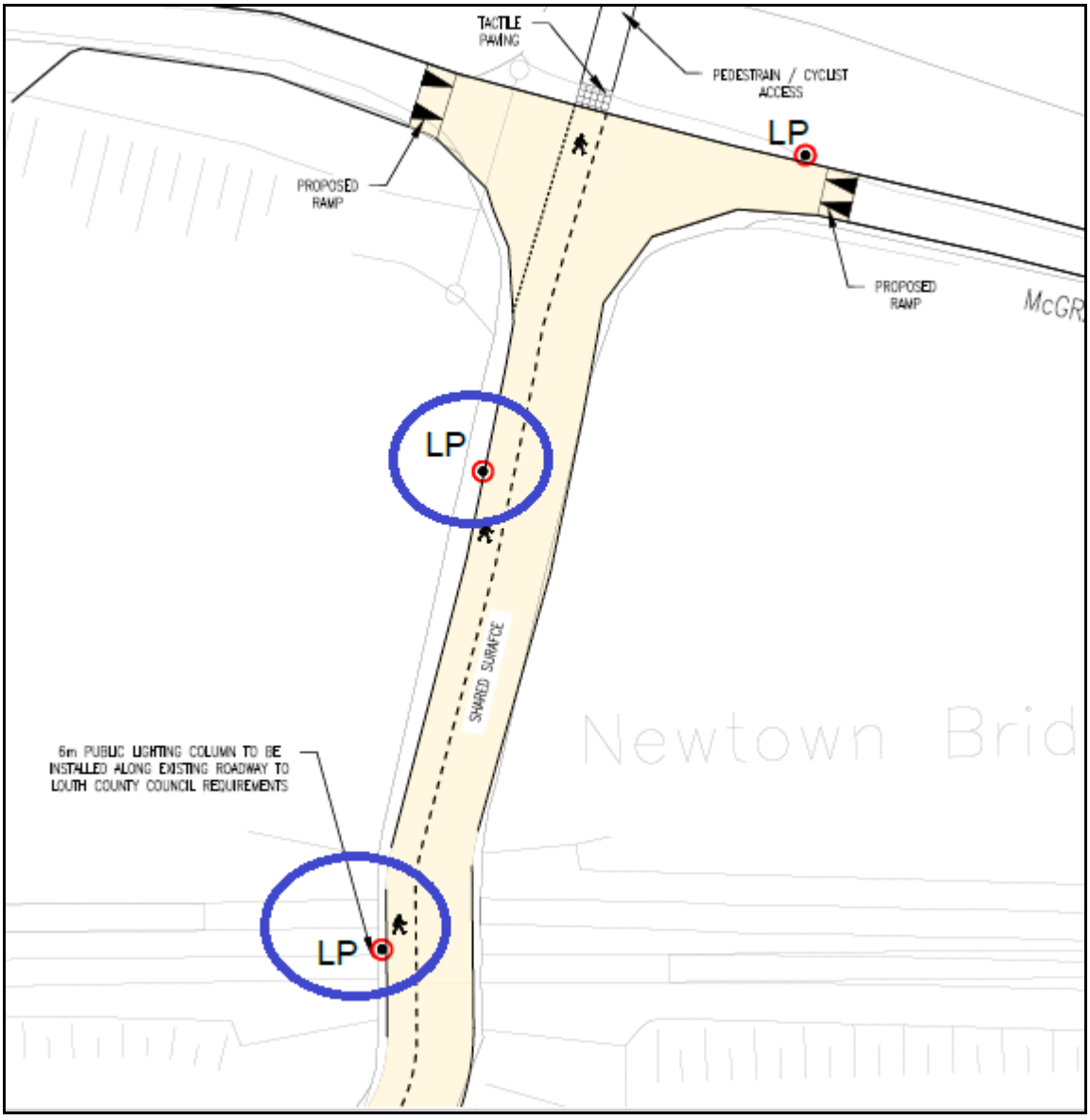


Figure 65

Recommendations

Detailed design should include for new lighting proposals throughout the site and along the site frontage. All lighting columns should be placed to the rear of footway where possible in a position which does not obstruct the movement of VRUs, with all columns throughout the site to be located at a minimum offset of 450mm from the carriageway edge and away from areas where vehicles may wish to park, to avoid being struck by passing, turning and reversing vehicles. Lighting design should ensure there is no potential for dazzle or interference with lighting on the

adjacent public road network or railway line, and the column location on the railway overbridge should be reviewed to ensure all safety risks have been minimised.

2.4.2 Problem – Signing and Lining

There was no signing and lining schedule provided to accompany the design, however a number of potential lining and signing issues were noted on the preliminary design layout as follows:

- There are no centrelines at present on the R150, however there are double yellow lines on both sides of the carriageway, which have not been shown on the preliminary design layout. These markings should be reinstated on the new layout, and at any location where parked vehicles will present safety issues. Provision should also be made for solid centrelines on approaches to the junction with the R150 to ensure vehicles do not attempt to overtake on approaches to the point of multiple potential conflict.

- It was noted that there is no provision for a stopline or stop sign at the junction with the R132, as shown in figure 66, where there is a history of collisions occurring resulting in high casualty severity. Risks may increase at this location as a result of increased demands for pedestrian/cyclists and vehicular access to and from this direction.

Figure 66

- A chicane arrangement has been provided on one of the internal links, however there is insufficient lining and signing provided for traffic approaching from both directions to ensure rights of way and priority are clear.

- Stop control has been provided on all 4 arms of one of the internal crossroads within the site, which will increase risks for all road users, as outlined previously. The layout at this location should be reviewed with a safer configuration to be provided. There is no form of control shown at a number of other junctions/access points throughout the site, leading to increased collision risks and misinterpretation regarding rights of way.

- Junction ahead warning signs will be required at a suitable location on approaches to the new access junction to the site. They should be placed at a safe location where clear forward visibility towards any other relevant signage is not compromised.

- The provision for relocation/replacement of existing signage on the R150 which will be displaced by the proposed works has not been shown on the preliminary design layout.

- There is no provision for warning signage in advance of any raised tables / ramps throughout the site.

- There is no provision for reduced speed limit signage/slow zone signage or children at play signs within the site.

- The mounting height and location of existing signs on the R150 is likely to present a hazard to VRUs if retained in their current location.

Recommendations

A signing and lining schedule should be produced at detailed design stage taking into account issues raised above, to include details of all proposed signs and lines throughout the site. Signs should be posted in full view of motorists in a safe location with a minimum offset of 450mm from the sign face to the carriageway edge, in a location which does not obstruct the movement of pedestrians. The lowest edge of all signs should be set at a height of 2.1m or higher over footway and at 2.4m or higher over a surface which may be used by cyclists. All road markings and signage to be highly reflective material to ensure visibility during the hours of darkness.

3. AUDIT TEAM STATEMENT

We certify that we have visited the site and examined the drawings and information supplied. This examination has been carried out with the sole purpose of identifying any features of the design that could be removed or modified to improve the safety of the scheme. The problems identified have been noted within the report, together with suggestions for improvements which are recommended to be studied for implementation. No one on the Audit Team has been otherwise involved with the design of the measures audited. This audit has been carried out in accordance with TII GE-STY-01024 December 2017.

Signed: _____ Date: 31/7/19

MIRIAM O'BRIEN

Signed: _____ Date: 31/7/19

ANTHONY SUMNER

APPENDIX A – ROAD SAFETY AUDIT BRIEF CHECKLIST

Have the following been included in the audit brief?: (*if 'No', reasons should be given below)*

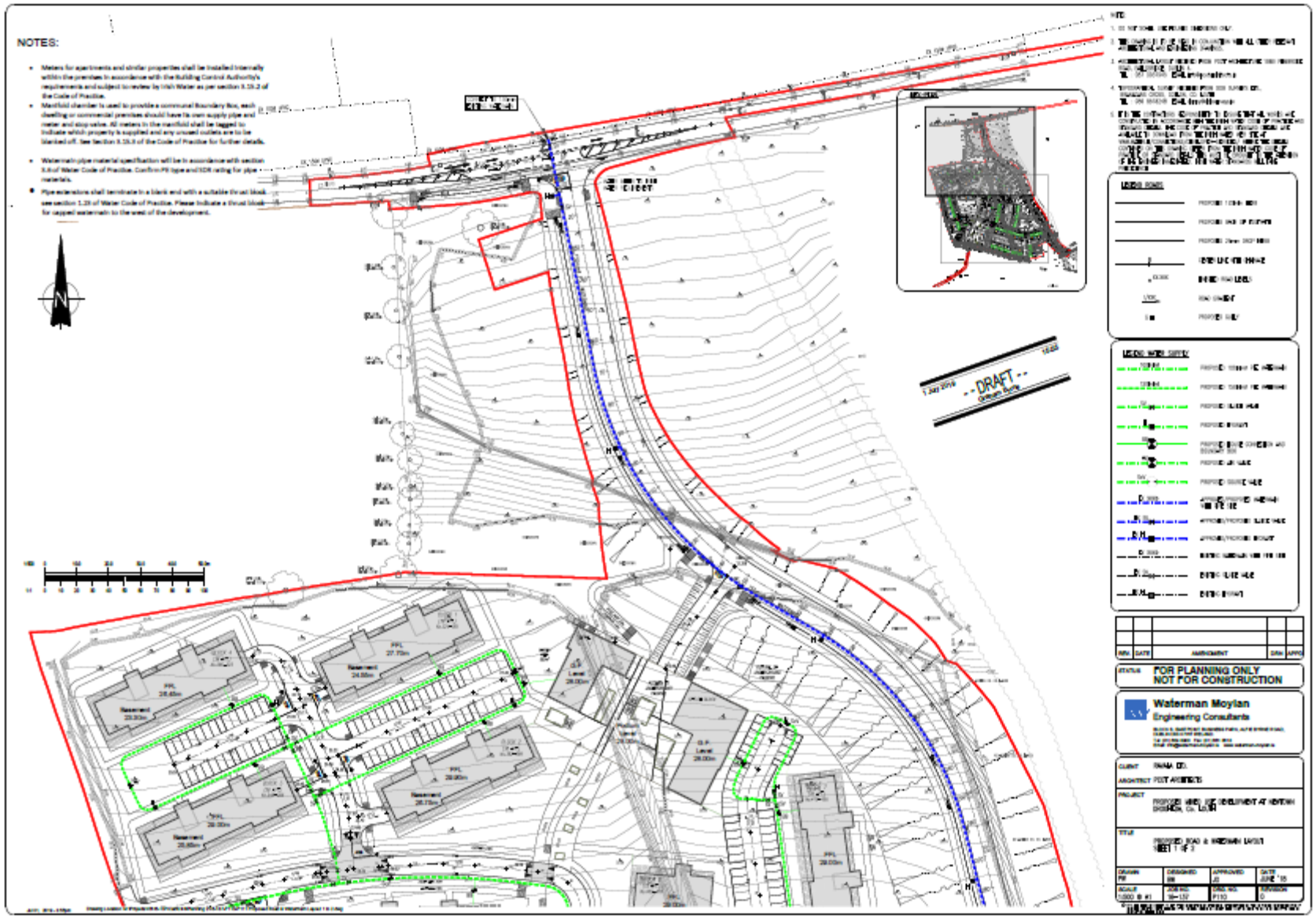
	Yes	No
1. The Design Brief	☑	☐
2. Departures from Standard	☐	☑
3. Scheme Drawings	☑	☐
4. Scheme Details (e.g. signs schedules, traffic signal staging)	☐	☑
5. Collision data for existing roads affected by scheme	☐	☑
6. Traffic surveys	☐	☑
7. Previous Road Safety Audit Reports and Designer Responses/Feedback Form	☐	☑
8. Previous Exception Reports	☐	☑
9. Start date for construction and expected opening date	☐	☑
10. Any elements to be excluded from audit	☐	☑

Any other information? ☐ ☑

APPENDIX B – SITE PHOTOGRAPHS


60
60

Road Safety Matters
Urlingford Rd, Johnstown
Co Kilkenny, Ireland E41 W721
Tel +353 (0)56 883 8428
mobrien@roadsafetymatters.net
www.roadsafetymatters.net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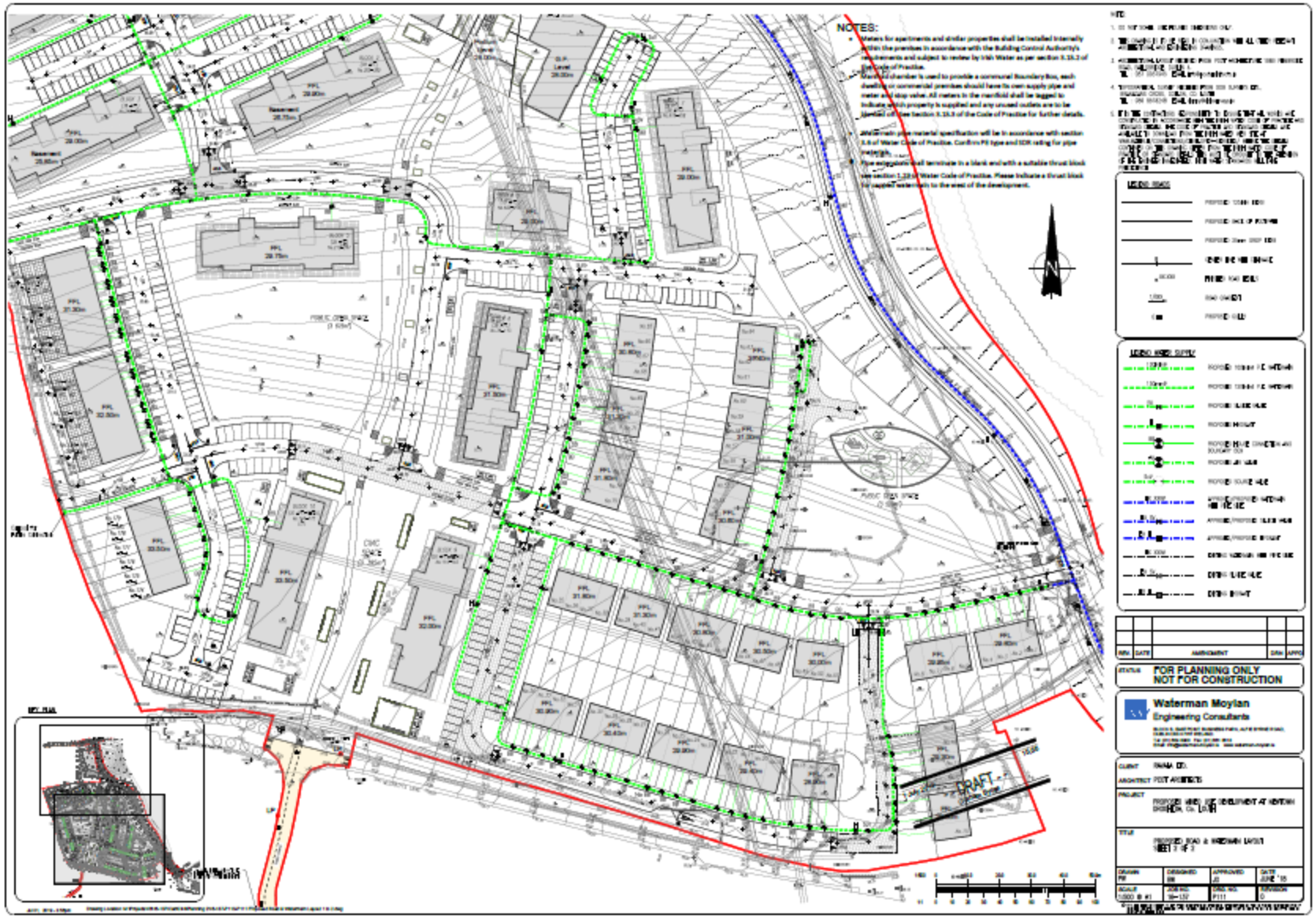
DRAFT
FOR PLANNING ONLY
NOT FOR CONSTRUCTION
Waterman Moylan
Engineering Consultants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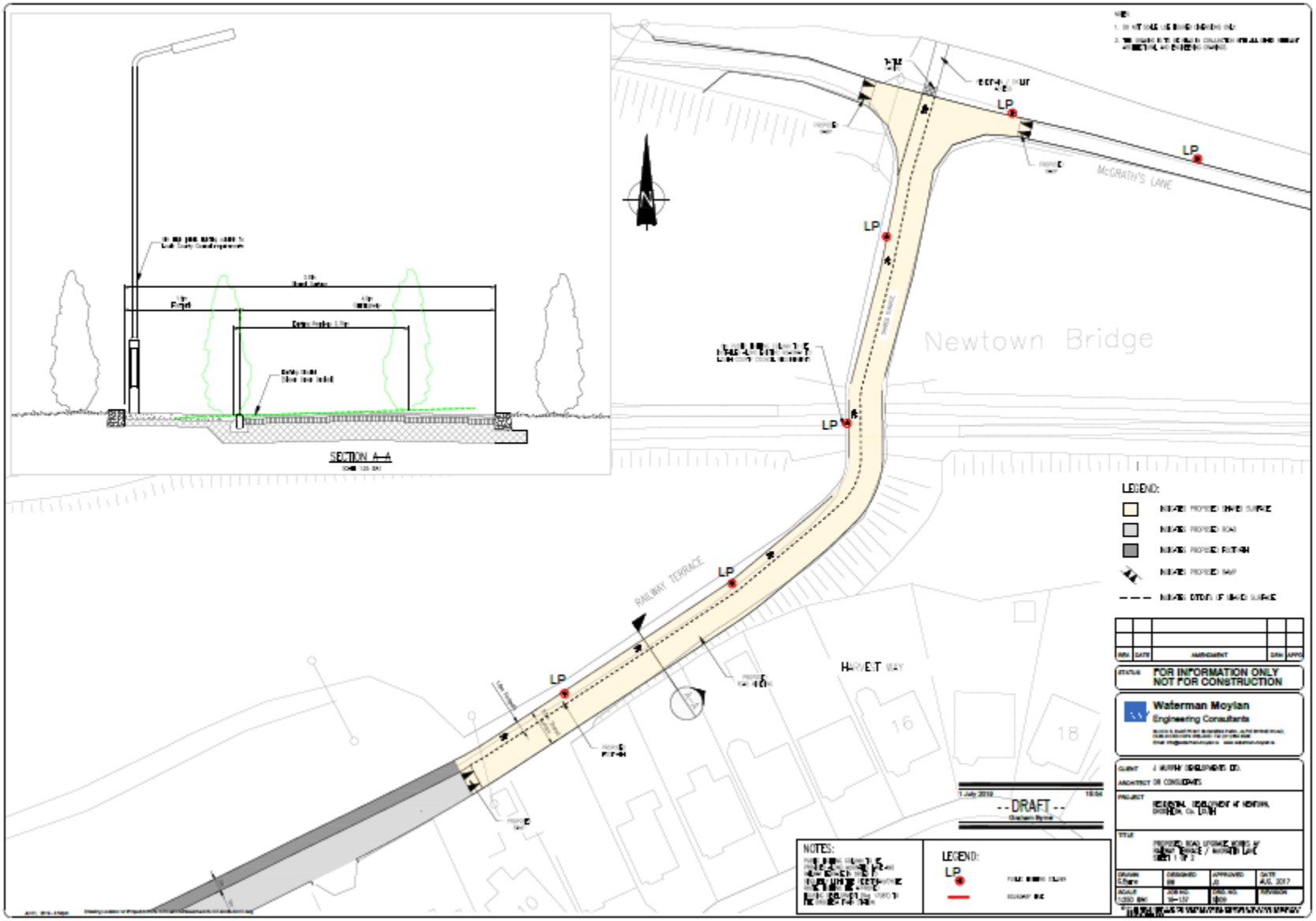
Engineering Consultants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NOT FOR CONSTRUCTION
Waterman Moylan
Engineering Consultants
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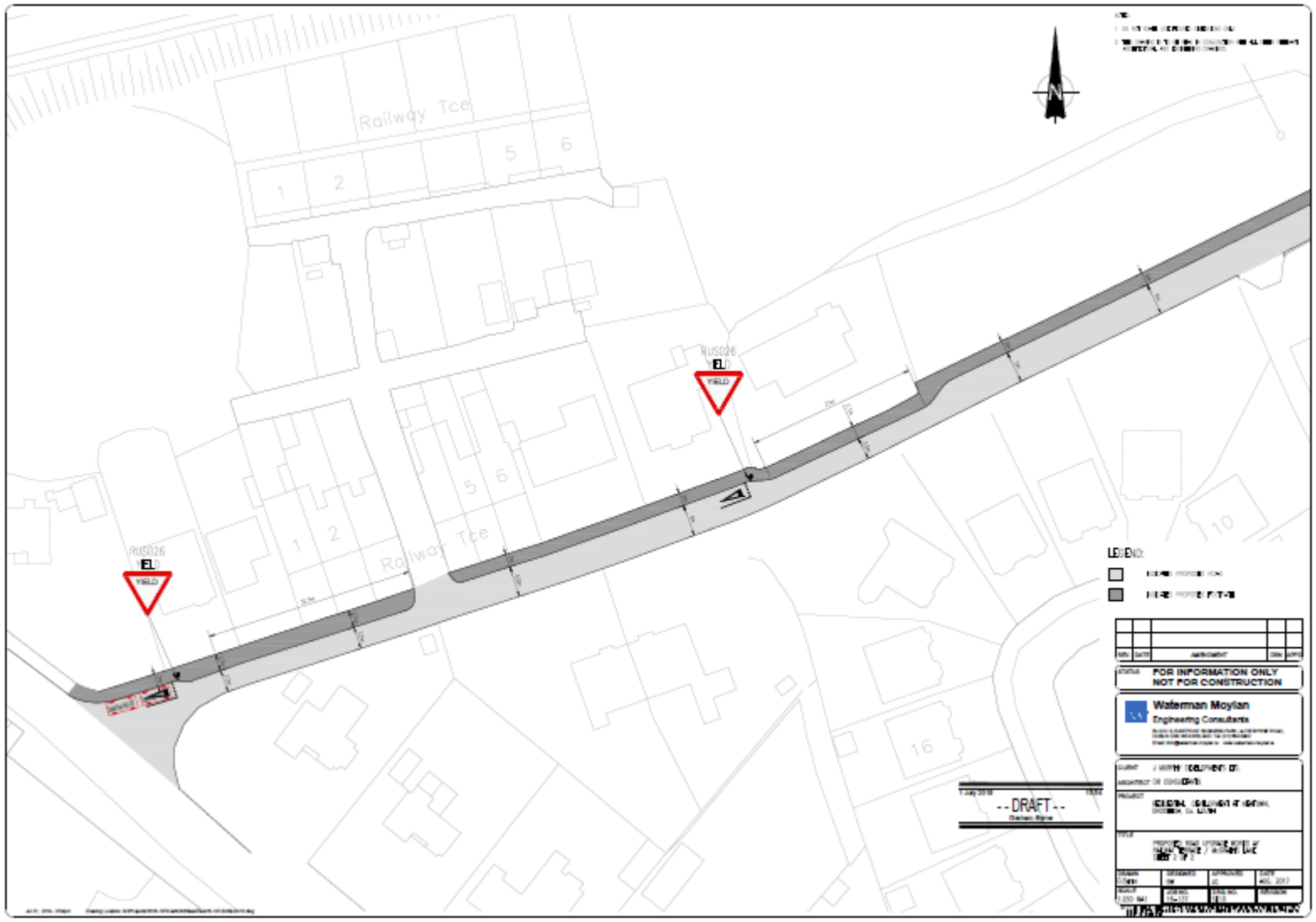
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Waterman Moylan
Engineering Consultants
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Road Safety Audit Feedback Form

Scheme: Mixed use Development, Newtown, Drogheda, Co Louth

Route No. N/A

Audit Stage: 1

Date Audit Completed: July 2019

	To Be Completed By Designer			To Be Completed by Audit Team Leader
Paragraph No. in Safety Audit Report	**Problem accepted (yes/no)**	**Recommended measure accepted (yes/no)**	**Describe alternative measure(s). Give reasons for not accepting recommended measure**	**Alternative measures or reasons accepted by auditors (yes/no)**
2.1.4 Problem - Speeds and Speed Limits Surrounding Site	Yes	Yes - agree, it is proposed to extend the 50 km/hr speed limit zone to the road network surrounding the proposed residential development, particularly along the R150 to the junction with the LIHAF Road. 60km/hr transitional zones will be provided as appropriate.		Yes
2.1.5 Problem - Internal Site Speeds and Speed Limit	Yes	Yes - agree that internal housing estate speed limits are to be 30kph. Advisory signs will be provided as necessary. The traffic calming measures as shown on the drawings are thought to be necessary. The stretch of road shown in Figure 7 includes on-street parking, a cul-de-sac and stop signs at the junction to encourage low speeds. The stretch of road in Figure 8 has a bend to reduce speeds. An additional raised		Yes[2]

[2] Subject to detailed design review, as more frequent vertical deflection may be necessary due to site terrain/gradients

		table has also been added at the first junction from the LIHAF road entrance.		
2.1.6 Problem - Earthworks, Landscaping and Fencing / Boundary Treatments	Yes	Landscaping proposals have been provided by Ronan MacDiarmada & Associates Ltd as part of the SHD submission. Appropriate VRU desire lines and visibility splays will be facilitated. Earthworks proposals will form part of the detailed design. Demands for vehicular access to the south of the site will be very low, with access to the 2 No. existing properties only. No vehicular access to the proposed development area will be provided from the South.		Yes
2.1.7 Problem - Drainage	Yes	Yes - Drainage gullies will be provided as required to prevent ponding on surfaces and ensure adequate drainage of the carriageway surface.		Yes
2.1.8 Problem - Carriageway Proposals	Yes	Yes - long and cross sections and construction details for roads will be provided at detailed design stage. Improvements to the roads surfacing will be made in accordance with LCC requirements. Suitable high friction surfacing will be provided where necessary.		Yes
2.1.9 Problem - Insufficient Clearance to Hazards	Partially	Yes, a full structural analysis of the railway over-bridge will be examined as part of the detailed design. All hazards within the development area will be set-back as appropriate.	In relation to potential hazards on approach to the site from Railway Terrace / McGraths Lane, these are existing local streets / lanes and the proposed development will not result in any increased vehicular traffic as there is no vehciular access to the development from this direction. Furthermore, Railway Terrace is a minor dead-end street providing access to circa. 30 houses. In this regard, traffic speeds & volumes will be low. The works proposed on Railway Terrace aim to increase pedestrian safety by widening the footpath and limiting traffic flows via a yield system. McGraths Lane improvement works involve prioritising pedestrians and cyclists through the provision of a widened shared surface with upgraded lighting. It is noted that traffic flows over the bridge will be very low as the only access is to the 2 No. existing properties.	Yes[3]

[3] Subject to monitoring of pedestrian/vehicular flows, as McGrath's Lane also provides gated access to the railway lane, and demand for maintenance and emergency vehicle access will need to be maintained

			Appropriate warning / shared surface signage will be provided.	
2.1.10 Problem - Parking Generally	Partially	Yes - Car-parking has been provided to comply with the relevant standards.	Figure 23 - 25 - It is our opinion that the car-parking is set a sufficient distance from the junction given the low speed environment and the various traffic calming measures in close proximity to the car-parking spaces highlighted. These include raised tables, riased pedestrian crossings, shared surfaces, etc. We would also note that the positioning of stop signage to control the direction of through taffic, helps ensure that sightlines are maximised for stopped / waiting cars. It is not proposed to relocate these parking spaces.	Yes[4]
2.1.11 Observation - Cumulative Traffic Volumes and access junction proposals	Yes	A traffic and transport assessment (TTA) has been prepared as part of the subject application and is available under separate cover. The junctions have been designed to accomodate anticipated flows. There is no vehicular access to the south of the site from McGraths Lane / Railway Terrace.		Yes
2.2.1 Problem - Steep gradients and alignments	Partially	Horizontal and vertical alignments to be provided as required at detail design stage. In relation to Fig. 31, drainage gullies will be provided as necessary.	Road gradients - The gradient of the LIHAF road has been approved by Louth County Council and is necessary given the natural topography. In relation to steep internal gradients, the topography of the site in particular areas results in a requirement for short sections of steep road gradients to avoid excessive earthworks. The roads have been designed to comply with DMURS which permits short sections of roads at gradient steeper than 1/20 (5%). The 1/10 and 1/12 sections are basement access ramps and comply with the relevant guidelines.	Yes[5]
2.2.2 Existing Alignment and visibility along Railway Terrace	No		There is no vehicular access to the site from Railway Terrace / McGraths Lane. There will be very low traffic in the area indicated in Figures 32 - 34 given that McGraths	Yes[6]

[4] Subject to ongoing monitoring and risk assessment, and on the understanding that the Designer accepts liability for any location where parked vehicles, creating an obstruction in visibility splays, could be a contributory factor in a collision

[5] Subject to detailed design and vertical deflection where necessary, as sections of steep basement ramps shown on plans are exposed and not covered

[6] Subject to detailed design to include additional traffic calming/speed control at all locations where forward visibility and SSD cannot be achieved. See also footnote 3

			Lane only provides access to the existing 2 No. properties. Appropriate signage will be provided to warn vehicles of the shared surfaces. However, it is not proposed to alter these walls to improve sightlines.	
2.2.3 Proposed geometry at Junctions and internal links generally	Yes	Auto-track drawings will be provided as part of the planning submission to show the proposed layout can adequately facilitate turning manoeuvres. The road widths are generally 6m and have been designed in accordance with DMURS for local estate roads. Where cross-road junctions are proposed, suitable traffic calming and stop signage has been provided.		Yes
2.2.4 Proposed give way arrangements on Railway Terrace	No		Louth County Council have agreed that there should be no on-street parking on Railway Terrace. There is sufficient parking for residents on the surrounding side lane ways. It appears that people using the Train Station may park along this road to avoid parking fees at the station. As outlined above, there will be no vehicular access to the proposed development along Railway Terrace / McGraths Lane. The upgrade works have been designed to improve pedestrian access along this route. Given that Railway Terrace only grants access to a small number of dwellings, and hence traffic flows are expected to be low, the 2 No. waiting spaces shown in Figure 35 are considered adequate.	Yes[7]
2.2.5 Problem - Ambiguous rights of way	Yes	The stop-signage shown in Figure 46 has been amended to ensure certainty in relation to rights of way.	McGraths Lane and the entrance to the south of the development will become a shared surface area. Warning signage will be implemented on McGraths Lane to the north of the over-bridge to ensure that vehicles are aware that pedestrians will be on the shared surface. There will be minimal vehicular traffic in this area as the only access is to the 2 No. existing properties.	Yes
2.3.1 Problem - Pedestrian Provision Generally	Partially	Yes - pedestrian and cyclist demands are been assessed as part of the Traffic and Transport and Mobility Management Plan Reports that are	In relation to the new footpath / cycle-tracks on Marsh Road (R150) the drawings have been reviewed for clarity. In this regard, the new	Yes

[7] Provided clear forward visibility can be provided to and from oncoming traffic at all times and towards the rear of any queues forming

		included in this SHD submission. In areas where footpaths exceed 5%, alternative Part M access pathways will be provided. Futhermore, lift access will be provided to the office block and associated podium areas at the north of the site. Details of all kerbs to be provided as part of the detailed design. The one-entrance to the site from McGraths Lane is considered appropriate. This provides access to the civic space from which VRU's can access all areas of the development. The McGraths Lane surface will be upgraded as part of the works. The shared route through the site consists of a 2m wide cyclepath and a wider paved area to cater for pedestrians. Full surfacing details of this shared corridor are shown within the Landscaping Rationale. All signs will be positioned with the required set-back as required to ensure pedestrian desire lines are maintained. A min footpath width of 2m is facilitated along Railway Terrace whilst McGraths Lane is a shared surface with a 1.8m pedestrian zone, which complies with DMURS. Internal footpaths have been designed in accordance with DMURS and are suitable for estate roads which are a low speed environment. Drop kerbs and tactiles will be provided as necessary. LCC will be consulted in relation to the trimming of existing hedges on the R150 as shown in Figure 53. All manhole chambers and gullies will be flush with the surrounding pavement and will be located outside of pedestrian and cyclist desire lines where possible.	footpath / cycle-tracks will merge with the existing footpath on the southern side of Marsh Road will leads into Drogheda. The new footpath / cycle-track will be provided from the large tree which is in-line with the property boundary hedge (at the LIHAF Road entrance). It will connect to the existing footpath at the next large tree to the west. Cyclists will be on-road after this point. No crossing on Marsh Road is intended at this location.	
2.3.2 Problem - Cyclist Provision	Yes	Potential cyclist activity has been reviewed as part of the Mobility Management Plan Report included as part of this SHD Application. Cyclists will transition to be on-road where there are no off-road cycle-tracks, particularly at the interface to existing roads. The gradients on the LIHAF Road have been agreed with Louth County Council as part of the detailed design of same. Given the topography of the site it is not feasible to limit cycle path gradients to 3%. The southern		Yes[8]

[8] On understanding that Louth County Council have granted a departure from standard in respect of the gradients on the new cycling facility on the LIHAF

		link to McGraths Lane is a continuation of the shared pedestrian / cyclist corridor which consists of a 2m cyclepath and a wider paved surface for pedestrians. Surfacing details are indicated in the Landscaping Rationale. The internal site layout allows for cyclists to share the road space within the traffic calmed 30kph in accordance with DMURS. 2m wide off-raod cycle-tracks have been provided at key links throughout the site to enhance connectivity. Drob kerbs and tactiles will be provided to facilitate access to bike shelters within the development. These will be shown on drawings at detailed design stage.		
2.4.1 Problem - Lighting	Yes	Lighting design will be carried out at detailed design stage and will comply with Local Authority Standards whilst noting the recommendations outlined in the RSA. The position of the lighting column on the railway over-bridge has been amended to mitigate associated risks.		Yes
2.4.2 Problem - Signing and Lining	Yes	A signage and lining schedule will be completed at detailed design stage taking into account all items raised in the Road Safety Audit.		Yes

Signed: _____ **Designer** **Date** 31-7-19

Signed: _____ **Audit Team Leader** **Date** 31/7/19