

Appendix A13.6 Road Safety Audit

Road Safety Audit
Stage 1
for
PROPOSED ACCESS
to
GDD WASTEWATER TREATMENT PLANT
AT
CLONSHAUGH, DUBLIN

Date: Feb 2014

Report produced for: TOBIN Consulting Engineers

Report produced by: Road Safety Matters

Reference: RSM/MOB/281114/CLONSHAUGH-RSA1

DOCUMENT CONTROL SHEET

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DRAFT 1	M O' B	AJS	04/12/14	Ger Regan, TOBIN Consulting Engineers
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DRAFT 3	M O' B	AJS	27/1/15	Ger Regan, TOBIN Consulting Engineers
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BACKGROUND INFORMATION

The report which follows is the Road Safety Audit - Stage 1 for access to and from a proposed Waste Water Treatment Plant in Clonshaugh, Dublin, based on the information supplied to the RSA Team as detailed below. The proposals involve provision of a one-way left-in access junction off the R139 Malahide Rd along the south of the site and a one-way left-out egress onto the Clonshaugh Rd to the west of the site and all associated ancillary works.

Table 1: Information Supplied

Item		Supplied	Comment
A	Plans / Drawings	Y	32102900-SK111_Access road option 2-20.02.14
			32102900-1060: Proposed Left-in Site Access Junction on R139
			32102900-1061: Proposed Left-out Site Exit on Clonshaugh Rd
			32102900-1062: Autotrack Analysis – Max Legal Articulated Vehicle
			32102901-1060-A: Proposed Left-in Site Access Junction on R139, Revision A
			32102900-1061-A: Proposed Left-out Site Exit on Clonshaugh Rd, Revision A
			32102900-1062-A: Autotrack Analysis – Max Legal Articulated Vehicle, Revision A
B	Traffic Volume Information	N	
C	Speed Count Data	N	
D	Collision Data	N	
E	Departures from Standards	N	
F	Audit Brief	Y	Road Safety Audit, Stage 1
G	Other Data / Documents	Y	32102900_ Appendix 9_Traffic & Access Assessment Phase 4_Final

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1. INTRODUCTION

- 1.1 This report results from a Stage 1 Road Safety Audit (RSA) on the access/egress to a site in Clonshaugh, Dublin 17, carried out at the request of TOBIN Consulting Engineers. This audit examines the road safety implications associated with provision of a left-in only entrance off the R139 Malahide Road to the south of the site, with a left-out only exit onto the Clonshaugh Rd to the west of the site. These junctions are connected to the site via a 5m wide one way road with a 0.5m hardstrip along each side. The R139 has a wide cross section (approx. 15m kerb to kerb with verge and footpath on each side) in the vicinity of the proposed access point with two lanes of traffic in each direction separated by wide central hatching, which accommodates a right turn reservoir in the immediate vicinity of the site access to allow eastbound traffic to turn into the residential area of Cara Park on the opposite side of the road. The Clonshaugh Road is a relatively narrow single carriageway with no footpaths and a width of approximately 6.9m in the vicinity of the proposed site egress.
- 1.2 The RSA was carried out during November/December 2014 and included a site visit by the Audit Team on Friday the 28th November 2014 during daylight hours. The weather at the time of the site visit was dull and dry, and the surface of the road was dry. Traffic conditions were moderate to heavy on the R139, and relatively light on the Clonshaugh Rd, although it was noted that significant roadworks were in place at the roundabout to the south of the proposed site egress, and further north of the site in the vicinity of the intersection with Baskin Lane, where a road closure and diversion was in place, which restricted access on Clonshaugh Rd to local access only to the south of this closure. The posted speed limit on both the R139 and the Clonshaugh Rd was 60kph.
- 1.3 The Audit Team Membership was as follows;
- | | |
|--------------|--------------------------------------------------|
| Team Leader: | Miriam O'Brien – BE (Civil) MIEI MCIHT |
| Team member: | Anthony Sumner – HNC Civil Eng, AEng, MIEI, MIHT |
- 1.4 The Audit took place at the offices of Road Safety Matters on the 3rd December 2014. 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 NRA HD 19/12. 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.
- 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**).

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 cross sections or long sections.

2.1.3 A preliminary review of collision data in the vicinity of the site was carried out. A review of the Road Safety Authority (RSA) online collision database indicates that there was one minor collision involving a car and a pedestrian approximately 500 west of the proposed site access on the R139, and one minor collision involving a car and a rear end shunt on the Clonshaugh Rd, approximately 100m south of the proposed site egress as highlighted in figure 1 below.

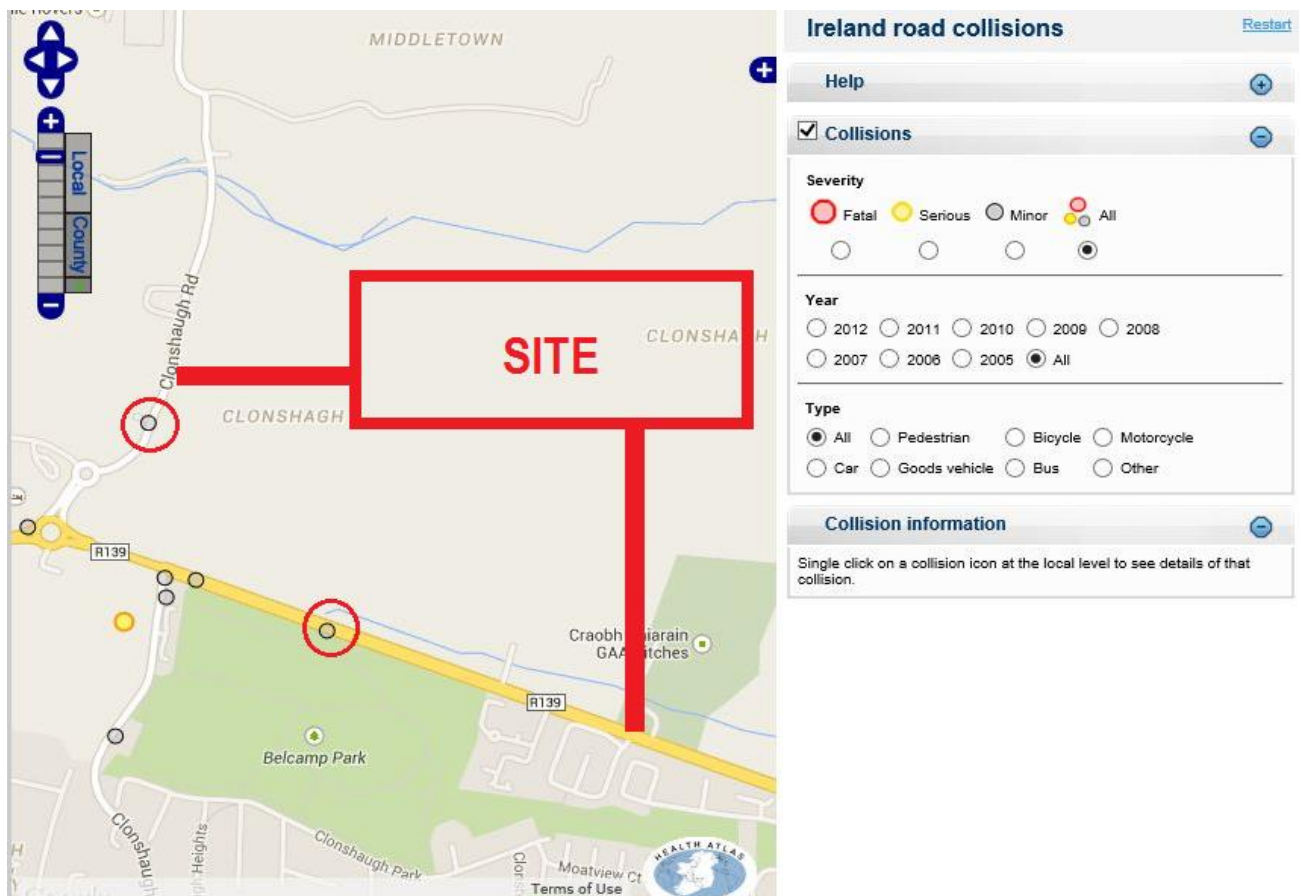


Figure 1: Collision Plot for Road Network surrounding site (2005-2012 incl)

There was an additional cluster of collisions (3 minor collisions, 1 serious collision) noted in the vicinity of the junction with the R139 / Clonshaugh Rd (South), which is located approximately 900m west of the proposed site access, and an additional cluster of collisions (one of which resulted in a motorcyclist fatality) in the vicinity of the Northern Cross signal controlled junction with the Malahide Rd, which is located approximately 1km to the east of the proposed site access.

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. Additional information was provided with reference to Fingal County Council (FCC) collision data, which indicated that there was a record of a serious collision on the R139 in 2002, and a record of two additional collisions occurring in 2002 close to the proposed access junction, both of which resulted in minor injury. The precise locations for these collisions are unknown, and have not been included in Figure 1.

2.1.4 Problem – Drainage Generally

There was no information provided relating to drainage on the site access roads or at the access/egress points. Insufficient drainage of surface water can lead to ponding which can contribute to skidding and loss of control type collisions for motorised vehicles, and slip hazards for Vulnerable Road Users (VRUs).

Recommendation

Provision for surface water drainage should be clarified at both the access and egress junctions and along the access roads to and from the site at detailed design, with all new gullies to be located such that the risk of ponding is minimised, and away from the desire line for two wheeled vehicles where possible.

2.2 JUNCTION LAYOUT AND ALIGNMENT

2.2.1 Problem – Traffic Speeds generally on the R139

The proposed left-in development access is located on a straight section of carriageway on the R139, with two lanes of traffic in each direction separated by hatching. The wide straight

carriageway (approx. 15m in the vicinity of the development site access) in the vicinity of the site may encourage high speeds inappropriate to local conditions, and safety barriers were also noted along both sides of the carriageway on the approaches to the site, which are typically installed for containment of loss of control type collisions in a high speed environment. The speed limit at the site is 60kph, however observations made during the site visit demonstrate that most vehicles appear to travel well in excess of this posted speed limit, although no 85th percentile speed surveys were provided to the Audit Team to determine actual speeds and any resultant increase in risk of collisions arising from the development proposals.

It was noted however that the geometry of the access is quite restricted, with the AutoTRACK analysis supplied demonstrating very little margin of error for Heavy Goods Vehicles (HGVs) turning left into the site on the relatively tight radii, which would necessitate significant deceleration to very slow speeds to enable negotiation of this turn, leading to an increase in the risk of rear shunt collisions with fast moving traffic approaching the site in an eastbound direction colliding with the rear of vehicles slowing suddenly to turn into the access, and an additional risk of sudden overtaking manoeuvres and side swipe type collisions. There was no information supplied to the Audit Team on existing traffic volumes on the R139, or on anticipated arrivals and departures to and from the proposed development site (inclusive of HGV proportions) to determine the level of risk arising.

It was also noted that traffic is using both the nearside and offside lanes in each direction on the R139, even though markings are shown for bus lanes on the nearside lane (solid white line and 'bus lane' markings on the carriageway). These markings are extremely well worn and there were no visible bus lane signs anywhere along the R139, hence these lanes appear to be used as normal traffic lanes.

Recommendations

An 85th percentile speed survey would be advisable to determine current freeflow speeds through the site along with an examination of existing and anticipated AADTs and trip rates to and from the development to determine if the proposed geometry is sufficient to provide safe access to the site with adequate margins of safety, or whether a deceleration lane or diverge taper would be more appropriate. Consideration should also be given to safe access and egress to/from the site

for construction traffic and for emergency vehicles, with clarification on the boundary treatment of the new access and egress links (e.g. solid obstruction/wall or soft verges etc).

Consideration should also be given to the provision of anti-skid surfacing on the approaches to the access junction to minimise skidding, loss of control and rear shunt risk, particularly during adverse weather conditions and to assist in highlighting the presence of the junction.

Clarification on the operation of the bus lane would be advisable, with road markings refreshed and clear signage on times of bus lane operation if necessary, which would encourage correct use of the lanes, and minimise the volume of traffic using the nearside eastbound lane thus reducing the rear shunt risk identified above.

2.2.2 Problem – Visibility at the Access / Egress to / from the development

A drawing supplied to the Audit Team shows provision for land acquisition required to maintain a 3.0m x 90m visibility splay towards the right from the proposed site egress, which is welcomed since visibility towards this point is currently restricted by a back to back curve on the horizontal alignment and the boundary treatment (dense hedging) along the nearside of this approach.

It was noted that there was no clarification provided on whether or not the proposed left-in access will be gated / opened during certain times, which may lead to a requirement for waiting / stopping just off the main carriageway on the left-in arrangement. The conspicuity of this junction will also be reduced by the presence of dense vegetation / hedging along the nearside, within the visibility splay. Restrictions within visibility splays can reduce sightlines and contribute towards an increase in the risk of conflict.

Recommendations

Visibility splays should be clear and unobstructed at all times, with boundary treatments and landscaping carefully considered, and vegetation cut back or removed where necessary to prevent obstruction and to increase the junction conspicuity. Clarification is required on whether the access junction will be open at all times, or whether gated access will be provided, and if so, the mode of operation should also be clarified.

2.2.3 Observation – Access to the Craobh Chiaran GAA Club

A drawing supplied to the Audit Team shows that the alignment of the proposed access road from the R139 will intersect with the existing access road into the Craobh Chiaran GAA Club facilities within the site. It is unclear how the existing access to the GAA club will be maintained and accommodated within the works.

Recommendations

Access to the Craobh Chiaran GAA club site should not be effected by the proposed development, hence clarification is required on the layout and boundary treatments at this location.

2.3 NON-MOTORISED USER PROVISION

2.3.1 Observation – VRU Provision

No details were provided to the Audit Team on the likely pedestrian or cyclist demands and desire lines to and from the development, and no provision has been made for VRUs within the preliminary design layout. At present there is a footpath and verge located along the northern boundary of the R139, which will become discontinuous with the addition of the proposed left-in access junction. No provision has been made however for dropped kerbs and tactile paving at the vehicular access point to accommodate visually and mobility impaired pedestrians. A footpath is also provided along the southern boundary of the R139 at this location, however it is unclear if the development will lead to an increase in the demand for pedestrians to cross the carriageway at this location. There are currently no footpaths along either side of the Clonsaugh Rd in the vicinity of the proposed site egress, hence it is assumed there is no pedestrian demand at this location, although it was noted that there are residential dwellings along the road and new retail facilities under construction adjacent to the roundabout to the south of the proposed development egress, hence new pedestrian demands and desire lines may arise in the future.

Recommendation

Pedestrian and cyclist activity and demands should be assessed and existing footway provision reviewed, including along the new site access roads. Tactile paving and dropped kerbs should

be provided at all desire lines where pedestrians may cross traffic, both internally within the site, and at the access/egress points. Any demands for pedestrians to cross the R139 to access the development should also be assessed, as it was noted that the closest pedestrian crossing facilities on this link were located approx. 900m to the west and east of the proposed site access.

2.4 ROAD SIGNS, MARKINGS AND LIGHTING

2.4.1 Problem – Lighting Generally

No details on lighting have been supplied to the Audit Team. It was noted that the junction access proposals are likely to displace a lighting column on the northern side of the R139 and an electricity pole / overhead power line at the egress junction.

Recommendation

A review of all existing lighting provision is recommended at detailed design in addition to new lighting proposals, with new lighting advisable in the vicinity of the proposed access and egress junctions to increase their conspicuity. All new lighting columns should be sufficiently setback from the carriageway to minimise the risk of being struck by passing vehicles, and in a location which does not cause footway obstruction where applicable. Any street furniture displaced by the proposals should be reinstated at a safe location, and in the case of OH power lines, sufficient clearance for high load vehicles (including during construction) should be considered.

2.4.2 Problem – Signing and Lining Generally

Preliminary signing and lining details were supplied to the Audit Team, which included a left turn arrow and stop sign / stop line and 'stop' road marking at the egress in addition to a 'no right turn' sign which is welcomed in discouraging a right turn manoeuvre at a location where visibility and carriageway widths are constrained. It was noted that the geometry of the left-in access on the R139 should discourage right turn manoeuvres, however the movement could still be accommodated within the current layout, and would lead to an increase in the risk of right angled and head on collisions, with additional potential conflict arising from vehicles using the existing right turn reservoir to access the residential development at Cara Park.

It was noted that there were no details provided on guidance in respect of direction of traffic / permitted movements for traffic within the site. It was also noted that some existing road markings on both the R139 and the Clonshaugh Rd are very well worn, and virtually illegible at some locations.

Recommendation

A review of all existing signs and road marking provision is recommended at detailed design stage in conjunction with proposed signs and road markings, with markings refreshed where necessary. Clarification is required on the operation / layout for the bus lanes on the R139 with markings to be refreshed and accompanied by appropriate signage where necessary, and dashed markings to be provided in accordance with standards on the approach to the proposed site egress to accommodate traffic wishing to turn left into the site. In the event that the bus lane is now redundant, consideration should be given to removal of all redundant markings to prevent driver confusion.

Appropriate advanced warning lining and signage should also be considered on the approaches to the access and egress to provide adequate notice to motorists to slow down, and to highlight the presence of the access and egress points (e.g. slow markings, warning signs indicating minor road junction ahead for the access). Clear lining and signing should also be provided internally to ensure site traffic does not attempt to exit via the entrance road (e.g. no entry signs and road markings, 'entrance only' signs etc).

In the absence of any physical constraint for the right turn manoeuvre into the site access off the R139, a 'no right turn' sign should be provided on the westbound approach to the junction along with a review of junction geometry and swept path analysis to provide a layout which prevents this manoeuvre from taking place if possible, and forces westbound traffic to perform a U-turn manoeuvre at the roundabout further west. Clarification is also required on potential demands for traffic to access the site from the residential area (Cara Park) on the opposite side of the carriageway, which should also be highly discouraged.

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 NRA HD 19/12.

Signed:

A handwritten signature in black ink, appearing to read 'Marian J. Reilly', is written over a horizontal line.

Date: 27/1/15

Signed:

A handwritten signature in blue ink is written over a horizontal line.

Date: 27/1/15

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	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Departures from Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Scheme Drawings	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Scheme Details (e.g. signs schedules, traffic signal staging)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Collision data for existing roads affected by scheme	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Traffic surveys	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. Previous Road Safety Audit Reports and Designer Responses/Feedback Form	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Previous Exception Reports	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9. Start date for construction and expected opening date	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. Any elements to be excluded from audit	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Any other information?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

APPENDIX B – SITE PHOTOGRAPHS



VIEW ON SOUTHBOUND APPROACH TO PROPOSED SITE EGRESS ON CLONSHAUGH RD



VIEW TOWARDS LEFT (SOUTH) FROM PROPOSED SITE EGRESS ON CLONSHAUGH RD



VIEW TOWARDS RIGHT (NORTH) FROM PROPOSED SITE EGRESS ON CLONSHAUGH RD



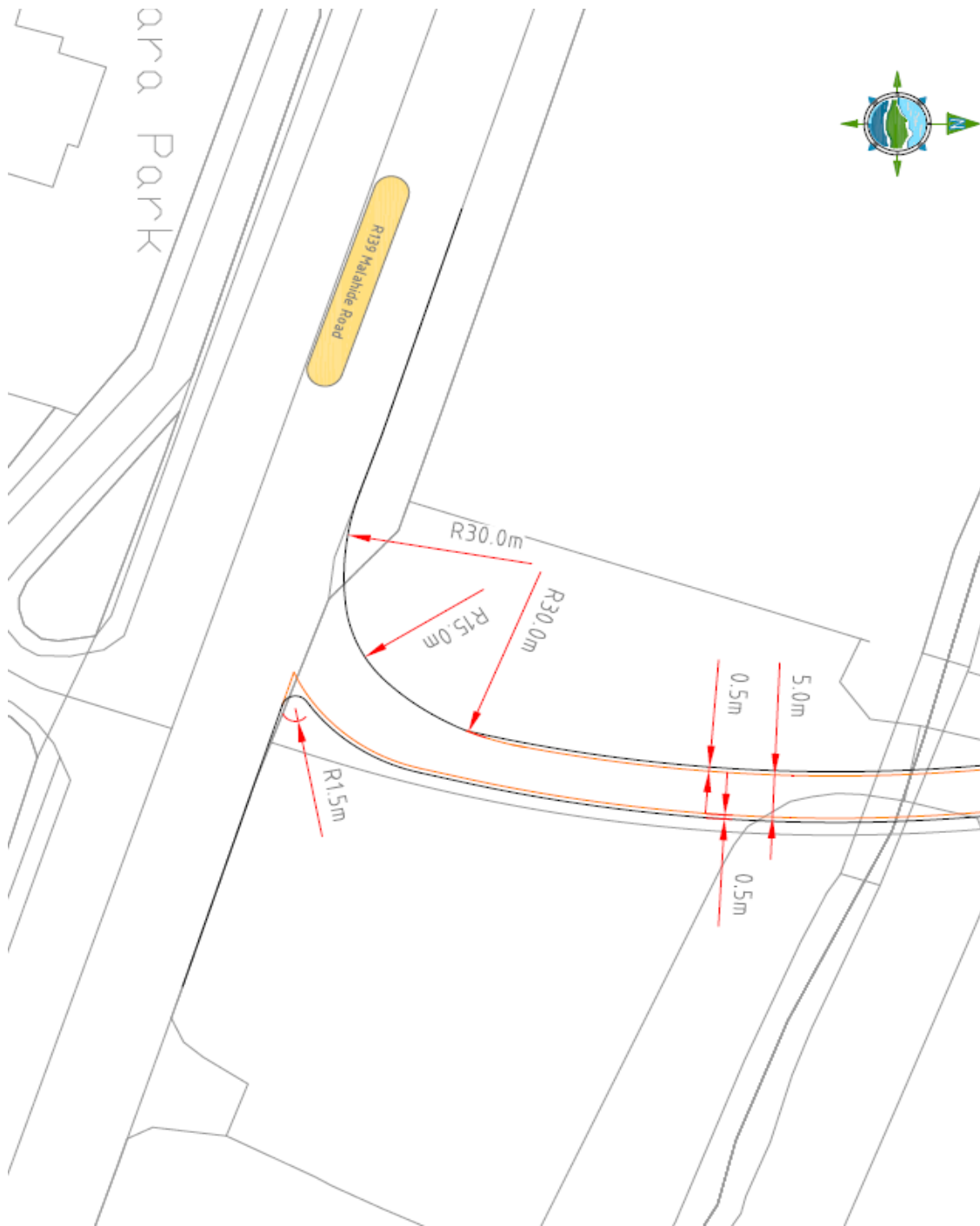
VIEW TOWARDS RIGHT (WEST) FROM PROPOSED SITE ACCESS ON R139

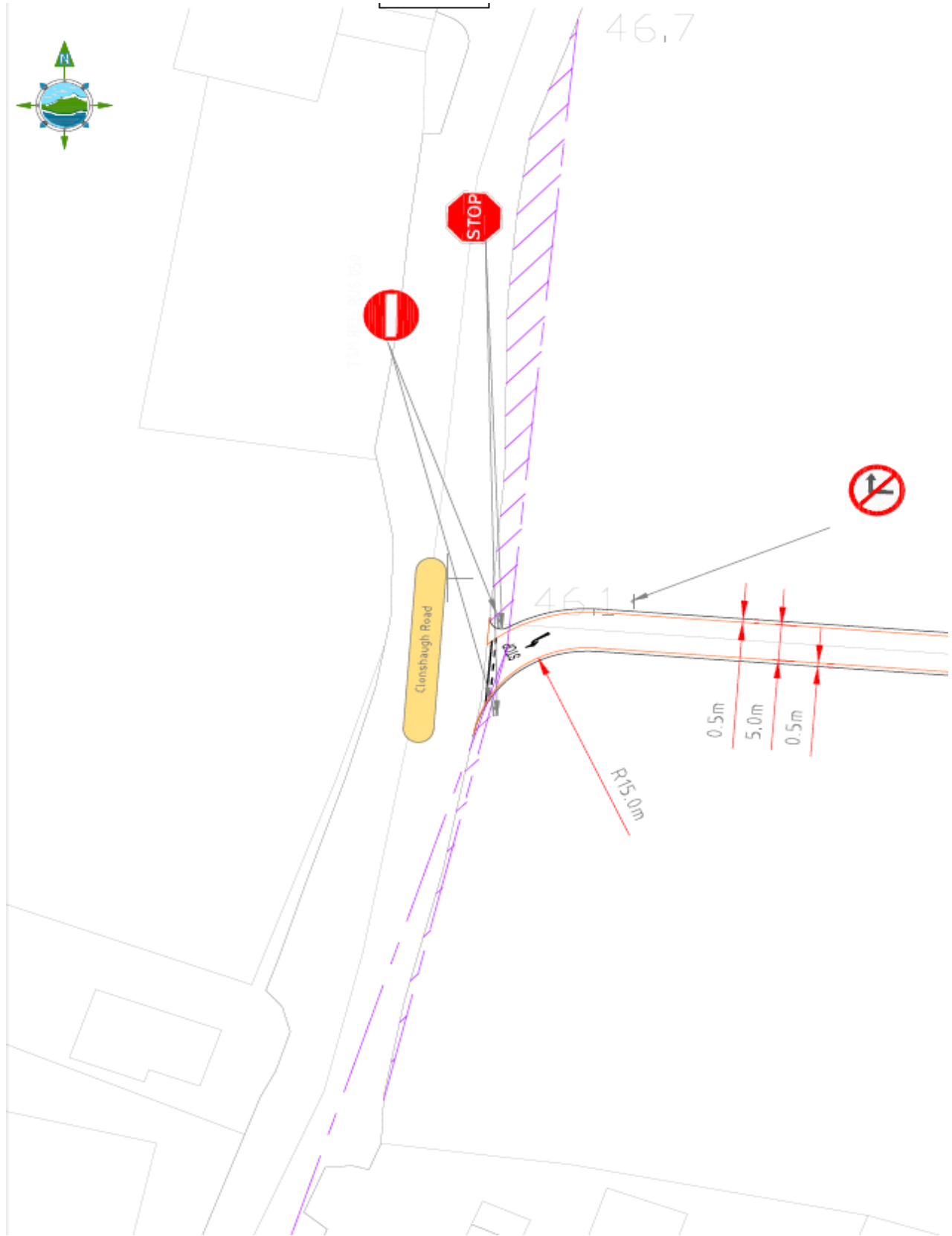


VIEW TOWARDS LEFT (EAST) FROM PROPOSED SITE ACCESS ON R139



VIEW EASTWARDS ON APPROACH TO PROPOSED SITE ACCESS ON R139





APPENDIX D – FEEDBACK FORM

Road Safety Audit Feedback Form

Scheme: Proposed Access to WW Treatment Plant, Clonshaugh, Dublin


Route No. R136 (old N32)

Audit Stage: 1

Date Audit Completed: 1/15

		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	Yes	Yes	SW Drainage to be fully designed at Detailed Design stage	Y	
2.2.1	Yes	Yes	The proposed access junction has been redesigned with a compound curve on the western edge of the access road to provide additional margins of safety for large articulated vehicles to safely turn. Refer to Drawing 32102900-1062-A for details. Anti-skid surfacing to be provided at both junctions and to be developed at Detailed Design Stage. Detailed Design development to include liaison with Fingal County Council with regards to the future operation of the bus lane along R139, following these discussions the detailed design of this junction will take account of the council's plans for public transport in the area. It is further proposed that a Stage 2 Road Safety Audit will be undertaken of the junctions following Detailed Design.	Y	

3.2.2	Yes	Yes	Boundary treatments and landscaping will be developed at detailed design to ensure that the required visibility splays are maintained. It is proposed to provide gates at both the access and egress junctions in order to restrict unauthorised access to the facility. It is likely that these gates will be opened as required. The location of the gates at the access will be located to ensure that vehicles waiting to access the facility will not impact on the through movements along the R139. Details of these gates will be developed at Detailed Design stage, with proposals to be included within the scope of the Stage 2 Road Safety Audit.	Y
2.2.3	Yes	Yes	Access to Craobh Chiaran GAA club shall be maintained. Details shall be developed at Detailed Design stage, with proposals to be including within the scope of the Stage 2 Road Safety Audit.	Y
2.3.1	Yes	Yes	Provisions for Vulnerable Road Users shall be developed at Detailed Design stage	Y
2.4.1	Yes	Yes	Lighting provision will be developed at detailed design stage and will be subject to the Stage 2 Road Safety Audit.	Y
2.4.2	Yes	Yes	A full review of existing signs and markings to be undertaken at Detailed Design stage. Additional signage and road markings shall be provided at detailed design stage and shall be included in the scope of the Stage 2 Road Safety Audit.	Y

Signed:  Designer Date 5/2/15

Signed:  Audit Team Leader Date 15/1/15