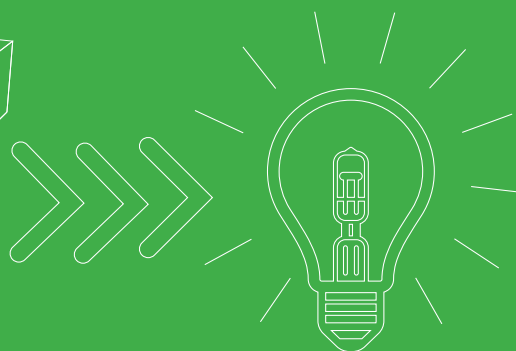
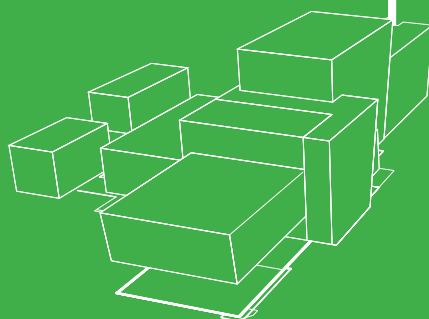




RINGASKIDDY RESOURCE RECOVERY CENTRE

2016



Stage 1

Road Safety Audit

ARUP

**Proposed Ringaskiddy
Resource Recovery Centre
at
Ringaskiddy, Co. Cork**

Stage 1 Road Safety Audit

Project No.: 16920
Document No.: 6001/Rev.C
Date: August 2015

ARUP

**Proposed Ringaskiddy Resource Recovery Centre
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Ringaskiddy, Co. Cork**

Stage 1 Road Safety Audit

Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
16920	6001	A	10.08.2015	C O'Callaghan	S. Quigley	P O'Donnell	Draft
16920	6001	B	20.10.2015	C O'Callaghan	S. Quigley	P O'Donnell	Final
16920	6001	C	02.11.2015	C O'Callaghan	S. Quigley	P O'Donnell	Final

Malachy Walsh and Partners, Engineering and Environmental Consultants

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Malachy Walsh and Partners
Engineering and Environmental Consultants

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1.0 INTRODUCTION

- 1.1 This report details the findings of a Stage 1 Road Safety Audit carried out on a Proposed Resource Recovery Centre at Ringaskiddy, Co. Cork.
- 1.2 Malachy Walsh and Partners was appointed by ARUP. It is understood that the audit is required for submission to An Bord Pleanála, in respect of a planning application for a Strategic Infrastructure Development. The proposed development is for the construction of a Waste to Energy facility, and includes for the upgrade of approximately 200 metres of the adjacent L2545 Local Road with two operational accesses to the L2545.
- 1.3 Malachy Walsh and Partners' Road Safety Auditors carried out the Audit.
- 1.4 The Audit Team members were as follows:-
- | | |
|---|--------------------------|
| Seamus Quigley, BE CEng MIEI MCIHT | Malachy Walsh & Partners |
| Ciaran O'Callaghan, BE MEngSc CEng MIEI | Malachy Walsh & Partners |
- 1.5 Seamus Quigley and Ciaran O'Callaghan inspected the site on the 10th of August 2015, between 15.15 p.m. and 16.00 p.m., in daylight, on foot and in a car, during dry weather. Record photographs were taken.
- 1.6 The proposed development site is located east of Ringaskiddy Village, south of the L2545 Local Road, and is currently accessed via an agricultural access gate. The L2545 Local Road connects the N28 National primary road to the access to Haulbowline Island. It provides access to a naval base, a crematorium, the Irish Maritime and Energy Resource Cluster (IMerc), and an amenity car park to the east. The National Maritime College of Ireland (NMCI) and the IMerc campus are located to the north of the L2545 north-west and north of the site. Hammond Lane Metal Company Ltd is surrounded by the Indaver site. The L2545 is within 50 kph urban speed limit zone.

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- 1.7 The L2545 has a straight east-west horizontal alignment adjacent to the proposed development. The alignment curves through approximately 90 degrees at the east side of the proposed development. The existing vertical alignment of the L2545 is relatively level, adjacent to the development site, and is understood to be prone to flooding.
- 1.8 The L2545 Local Road carriageway is 7.5 metres wide with a dashed centre-line and approximately 0.5 metres wide hard-shoulders. A footway and street lighting is provided along its north side. A short section of footway was recently constructed on the south side of the L2545 Local Road, opposite the NMCI access, between Hammond Lane's access and the western side of the proposed development site. An uncontrolled crossing is provided across the L2545, from the west side of the NMCI access.
- 1.9 A recessed bus stop is provided on the L2545, west of the NMCI access junction, to serve the number 223 Bus Éireann eastbound service (Cork to Haulbowline). An existing bus stop is provided on the south side of L2545, west of Hammond Lane's access junction, to serve the number 223 Bus Éireann westbound service.
- 1.10 The planned realigned N28 route is proposed to intersect the L2545, approximately 300 metres west of the proposed development access.
- 1.11 The proposed development includes the construction of a waste management facility, which would facilitate the processing of waste material including energy recovery in the form of electricity. It is understood that materials would typically be brought to site via 16.5 and 18 metres long articulated vehicles and smaller vehicles. The residues would be transported off-site via 16.5 and 18 metres long articulated vehicles. Expected traffic generation rates have been provided for this Audit.
- 1.12 An administration building would be constructed on the west side of the development site, west of the access road. A 57 space car park, with three disabled user spaces, is proposed adjacent to the administration building. This car park would be accessed from the west side of the internal access road, via a priority controlled junction approximately 25 metres south of the south side of the L2545.

- 1.13 The proposed development includes the construction of a new main vehicular access to the site from the L2545, approximately 100 metres east of Hammond Lane's access. This would include four entrance lanes and a single, wide, outbound lane and a central splitter island. The total access width would be approximately 24 metres wide. A new 2.0 metres wide footway would be provided along the south side of the L2545, west of the proposed access, to tie-in with the existing footway, west of the site. The footway would continue from the L2545 along the west side of the main access toward the staff car park and administration building.
- 1.14 A five metres wide emergency access would be provided approximately 50 metres east of the proposed main access.
- 1.15 The proposed development includes a vertical realignment scheme for the L2545 to alleviate local flooding issues.
- 1.16 The drawings and other documents, including expected trip generation rates, provided to carry out the Audit are listed in Appendix A.
- 1.17 The Road Safety Authority collision website was checked. This shows collisions from 2005 to 2012. No collisions reported on their website in the vicinity of the L2545 Local Road are considered to be significant to the proposed development.
- 1.18 This Audit has been carried out in the context of the relevant sections of the NRA HD 19/15. The Auditors have examined and reported only on those features of the design considered to have road safety implications and have not examined or verified the compliance of the scheme to any other criteria.
- 1.19 Section 2 of this report presents the findings of the Stage 1 Road Safety Audit of the proposed development site's operational layout. The Designer's Feedback is provided in Appendix B.

2.0 FINDINGS OF THE STAGE 1 ROAD SAFETY AUDIT

JUNCTION LAYOUT AND VISIBILITY

2.1 Problem – Potential Queuing to L2545

Drivers accessing the proposed development are provided with four entry lanes from the L2545. There is a limited length of access road to change lanes within the proposed development, having left the L2545. The selection of the incorrect lane, for unfamiliar drivers could result in stopping with potential blocking of following vehicles, and vehicle delays/ dwelling on the L2545. Drivers may reverse on-site, back to the L2545, or crossing the driver walk zones. This could result in impact with vehicles travelling along the L2545, rear end impact or pedestrian impact, with possible injury.

Recommendation

This is a Stage 1 Audit, and does not include signage. It is recommended that a method is put in place to ensure that there would be no driver ambiguity on approach to the access.

2.2 Problem – Potential Queuing to and on the L2545

It is understood that a Traffic Impact Assessment (TIA) is being progressed at present. Trip generation rates have been provided for this Audit. There may be a risk of vehicle arrivals exceeding the capacity of the proposed weighbridges. This could result in queuing back to the L2545. This could result in impact with vehicles travelling along the L2545 or blocking access or visibility for inbound staff to the staff car park.

Recommendation

It is recommended that the TIA includes a capacity check of the weighbridge operation in relation to the likely peak arrival rates to ensure that queuing does not extend back to the L2545, or to the inbound staff access.

2.3 Comment – Proposed L2545 Approach Level

The levels shown for the proposed access from the development to the L2545 road appear to be 3.3% for 10 metres. The potential hazards are that vehicles may have to approach at a steeper than optimal gradient for braking or start-up to enter the L2545 Local road. It is recommended that a longitudinal gradient of between 1% and 2% and suitable carriageway cross-falls for a minimum of 15 m would be provided on the approach to the Local Road along the access road.

2.4 Comment – Possible Abrupt Tie-in

The proposed realigned section of L2545 is provided. However, the vertical alignment of the existing road section, adjacent to the works, at chainage 00.00 and chainage 184.247 is not shown. This could result in an abrupt change of gradient at the tie-in point. It is recommended that this should be checked as the design progresses and appropriate tie-in vertical alignments should be provided.

2.5 Comment – Internal Junction

It is proposed to provide a priority junction, approximately 20 metres from the L2545. Waiting turning traffic could generate traffic queues and impact other vehicles. Refer also to Item 2.2 above.

NON-MOTORISED USERS

2.6 Problem – Insufficient Footpath Width on Approach to Queuing Locations

It is proposed to provide walk zones for drivers in between inbound heavy vehicle access lanes, at queuing locations. These measure 1.0 metres in width and include areas where the carriageway is on a curved alignment. There appears to be spot widening of the inbound lanes of the curved alignment, to approximately 4.0 metres in width. This may not be sufficient to ensure that inbound articulated vehicles would not over-run the driver walk zones. This could result in people in the walk zone at risk of vehicular impact.

Recommendation:

It is recommended that the inbound and outbound lanes should be checked, including swept paths of largest likely articulate vehicles, to ensure that adequate walk zone widths are provided.

2.7 Comment – Pedestrian Continuity

There are no dropped kerbs across the Hammond Lane existing access. This would form part of the route for pedestrian travelling to the existing west bound bus stop from the proposed development. There is a note on the drawings provided for audit (H-000-002) that there is a recently constructed bus stop on the east side of the access to Hammond Lane. The infrastructure for the bus stop including Kassel Kerbs was evident during the site inspection however the bus stop was still located to the west of the Hammond Lane access. The lack of continuity and dished kerbs for pedestrians could result in pedestrians within the L2545 carriageway, at risk of vehicular impact. It is recommended that continuous pedestrian route with appropriate facilities for disabled users from the proposed development to the bus stop should be provided.

2.8 Observation – Pedestrian Continuity

The existing footway on the south side of the L2545 does not appear to connect to the bus stop area to the west of the access to Hammond Lane. This results in pedestrians walking in the existing hard-shoulder area of the L2545 in order to access the west bound bus stop from Hammond Lane or the proposed development.

2.9 Comment – Unclear Footway Detail

It is unclear whether some of the pedestrian facilities would be at road level or raised kerbed areas. It is envisaged that the footways shown at the access would be raised, however no dishing is shown. It is recommended that raised footways should be provided, with dishing, as appropriate, at the proposed crossing locations.

2.10 Comment – Stop Location Proximity to Walkway

The proposed stop line for the most eastern 16.5 m hgv inbound lane is close to the pedestrian walkway. There may not be sufficient visibility to pedestrians for hgv drivers putting pedestrians at risk of impact as driver continue their inbound journey from the stop line. It is recommended that this is checked to ensure that sufficient forward visibility would be provided from an hgv to any pedestrian on the walkway.

INTERNAL LAYOUT

GENERAL LAYOUT

2.11 Comment – Undefined Route

There appears to be a vehicular route to the east side of the 'tipping floor' building. The purpose of this route is not clear. It appears to be very steep with a tight radius bend to the north corner of the 'tipping floor' building. If it is intended as a vehicle circulation route, its gradient and alignment should be checked to ensure that appropriate geometry is provided. If it is intended as an emergency access route only, the swept path of the likely most onerous vehicle should be checked.

2.12 Problem – Unclear Walkway Details

The internal walkways appear to be of minimal width, and include raised, kerbed walkways and those at road grade level. Kerb heights and dropped kerbs have not been indicated on the layouts provided. This could result in inadequate widths for pedestrian refuge, trip hazards, or inaccessible routes for disabled users.

Recommendation:

It is recommended that the design should be checked and accessible walkway routes of appropriate width should be provided throughout the proposed development.

2.13 Comment – Internal Vehicle Movements Unclear

The movement and swept paths of internal vehicle movements is not clear from the drawings provided. These movements, including access to loading locations and dock levellers should be checked and provided for the next Audit stage, prior to finalising the design.

NON-MOTORISED USERS**2.14 Problem – Inadequate Drivers Visibility to Walk Zones on Approach to Weighbridges**

It is proposed to provide walk zones for drivers in between inbound heavy vehicle access lanes, at queuing locations and across the access road, north of the weighbridge. These measure 1.0 metres in width along the access road with approximately 2.0 metres wide crossings. The swept path of inbound vehicles approaching the weighbridge appear to potentially conflict with walk zones, crossing through a turning manoeuvre, to the left side of vehicles inbound to the weighbridge, and to the right for outbound vehicles from the weighbridge. Visibility for drivers to the walk zones and crossings could be restricted, particularly for inbound heavy vehicles. This could result in risk of vehicular impact for people in the walk zones and crossings.

Recommendation:

It is recommended that the inbound and outbound lanes should be checked, including swept paths of largest likely articulate vehicles, to ensure that adequate walk zone widths are provided, outside of swept paths of vehicles, as appropriate.

2.15 Problem – Drivers Visibility to Crossing

It is proposed to provide a pedestrian crossing immediately north of the weighbridges. Visibility for drivers to the crossing could be restricted, for outbound heavy vehicles, due to the proximity of the crossing from vehicles stopped on the weighbridge. This could result in risk of vehicular impact, and consequent injury, for people using the crossing.

Recommendation:

It is recommended that there should be adequate distance between a stopped vehicle and the crossing to provide sufficient visibility.

2.16 Problem – Pedestrian Route Continuity from the L2545

It is proposed to provide a pedestrian footway from the L2545 toward the car park and administration building. However, the footway appears include kerbed areas and areas at road grade level, without level details. Lack of facilities for all users, or inappropriate kerb heights, could result in trip hazards or restrictions for disabled users putting them at risk of trip hazard, or walking within the road carriageway putting them at risk of impact with vehicles, and potential consequent injury.

Recommendation:

Provide a continuous pedestrian route from the L2545 to the proposed administration building, with dished kerbs and tactile paving, as appropriate.

2.17 Problem – Pedestrian Continuity from Car Park

The extent of the pedestrian areas/ routes from the staff car park to the administration building is unclear from the layout drawing which appears to show steps from the car park to the main access. This includes appropriate pedestrian routes, with wheelchair access, from the proposed disabled user parking spaces. This could result in access issues and consequent safety issues due to trip hazards or routing via carriageways. This could put users at risk of impact with vehicles, and potential consequent injury.

Recommendation:

Provide a continuous pedestrian route from the proposed staff car park to the administration building, for all likely users.

2.18 Comment – Drivers Visibility to Crossing

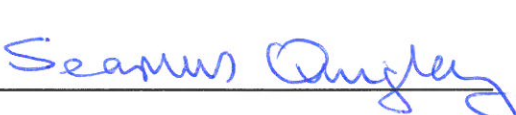
It is proposed to provide a pedestrian crossing immediately north of the weighbridges. Visibility for drivers to the crossing could be restricted by the vertical details in the weighbridge area, such as walls. This could result in risk of vehicular impact, and consequent injury, for people using the crossing. This should be checked to ensure that visibility from drivers to pedestrians is not restricted.

3.0 AUDIT TEAM STATEMENT

We certify that we have examined the drawings and other information listed in Appendix A of this report. The examination has been carried out for the sole purpose of identifying any features of the design that could be removed or modified in order to improve the safety of the scheme. The problems we have identified are noted in the report, together with suggestions for improvement, which we recommend should be studied for implementation.

Signed:  Date: 02/11/2015

Ciaran O'Callaghan, BE CEng MEngSc MIEI
Audit Team Leader
Malachy Walsh and Partners
Consulting Engineers
Park House
Mahon Technology Park
Blackrock
Cork

Signed:  Date: 02/11/2015

Seamus Quigley, BE CEng MIEI MCIHT
Audit Team Member
Malachy Walsh and Partners
Consulting Engineers
Park House
Mahon Technology Park
Blackrock
Cork

APPENDIX A – LIST OF DOCUMENTS PROVIDED FOR THIS AUDIT

Drawings:-

Civil infrastructure, Proposed Site Layout

Drawing Title: Area of Proposed Works on L2545 Local Road

ARUP Drawing No. H-000-001 Rev P5

Date: 04.08.2015

Civil infrastructure,

Drawing Title: Raised Section of L2545 Local Road Plan & Longitudinal Profile

ARUP Drawing No. H-000-002 Rev P5

Date: 04.08.2015

Civil infrastructure,

Drawing Title: Proposed Surface Water Drainage Layout

ARUP Drawing No. C-000-001 Rev P4

Date: 04.08.2015

Adobe Acrobat Document:

Title: Indaver Draft Site Layout

Date: 11.08.2015 (received via email)

Other Documents:-

Document: Traffic Impact Assessment

Progress Trip Generation Table.

Date: 11.08.2015 (received via email)

APPENDIX B – DESIGNER’S FEEDBACK

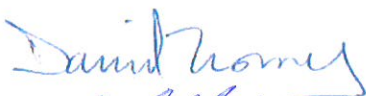
Road Safety Audit Feedback Form

Scheme: Ringaskiddy Resource Recovery Centre	
Audit Stage: Stage 1	Date Audit Completed: 10 August 2015

	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)	Response	Alternative Measures Accepted (yes/no)
2.1	Yes	Yes	Signage and lining will be incorporated into the design to provide clear routes for all vehicles.	
2.2	Yes	Yes	This has been assessed during the TIA process. A delivery booking system will be utilised – there is adequate queuing space in advance of the weighbridge during peak arrival times to ensure that queuing does not extend back to the L2545.	
2.3	Yes	Yes	The gradients have been amended so that a 2% gradient will be provided for 15m on approach to the local road.	
2.4	Yes	Yes	Appropriate vertical tie-ins to the existing road levels will be provided.	
2.5	Yes	Yes	This has been assessed as part of the TIA. The outward flow of vehicles from the site will not cause right turn traffic to the staff car park to queue back onto the public road.	
2.6	Yes	Yes	A swept path analysis has been carried out which indicates that walk zone widths are adequate	
2.7	Yes	Yes	Facilities for a new bus stop has been constructed to the east side of the Hammond Lane entrance. There will be direct access from the site to the new bus stop location. Bus Eireann have indicated that this will brought into service in the near future.	
2.8	Yes	Yes	The proposed relocation of the bus stop to the east of the Hammond Lane entrance will remove this issue.	
2.9	Yes	Yes	Dished footpaths will be provided at the proposed crossing locations.	
2.10	Yes	Yes	Visibility has been checked to ensure that there is adequate visibility to pedestrians.	

	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)	Response	Alternative Measures Accepted (yes/no)
2.11	Yes	Yes	This is an emergency access route. The swept path of the most onerous vehicle has been checked and the geometry is deemed appropriate.	
2.12	Yes	Yes	Accessible walkway routes of appropriate width will be provided. Dished footpaths will be provided at the proposed crossing locations.	
2.13	Yes	Yes	The swept path of internal vehicle movements have been carried out and have informed the design of the internal layout.	
2.14	Yes	Yes	A swept path analysis has been carried out which indicates that walk zone widths are adequate and lie outside of the swept path of the vehicles.	
2.15	Yes	Yes	The crossing has been relocated further away from the weighbridges. Sufficient visibility is provided to the crossing from a stopped vehicle.	
2.16	Yes	Yes	A continuous pedestrian route from the L2545 to the administration building with dished kerbs and tactile paving as appropriate will be provided.	
2.17	Yes	Yes	A continuous pedestrian route will be provided to the administration building from the car park for all users. Dropped kerbs will be provided adjacent to wheelchair parking.	
2.18	Yes	Yes	The crossing has been relocated further away from the weighbridges. Sufficient visibility is provided to the crossing from an approaching vehicle.	

Signed



Designer

Date 13/10/15


Signed



Audit Team Leader

Date 20/10/15

Signed



Employer

Date 14/10/15