Technical Appendix 12.2: Road Safety Risk Assessment and Designers Response

Windburn Wind Farm

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Windburn Wind Farm
A9, Blackford
Perth and Kinross

Road Safety Risk Assessment

Report No. D00330 – RSRA

4 Kempston Place
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Edinburgh,
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1 Introduction

1.1 This Road Safety Risk Assessment has been produced by Drummond Black Consulting Ltd. under the instruction of SLR Consulting Limited. The Assessment has been commissioned to examine any potential impact to road safety in connection with a proposed wind farm to the south of the A9 trunk road at Blackford in Perth and Kinross.

1.2 A list of the documents and drawings submitted for this Road Safety Risk Assessment can be found in **Appendix A**.

1.3 The Assessment Team had an initial briefing meeting online on the afternoon of 9th November outlining the requirements of the assessment. The assessment has been requested by Transport Scotland (TS) and Perth and Kinross Council (PKC) to examine possible improvements to the access junction on the A9 between Dunblane and Perth, just to the south west of the Blackford junction. The junction will be used to access a wind farm, for both normal construction traffic and abnormal indivisible loads (AILs).

1.4 The proposed wind farm is to have up to 15 turbines and is to take direct access from the junction on the A9 with a number of proposed improvements. The proposed access improvement layouts are shown on Drawings 00009, Sheets 2-5, with the preferred option shown on Sheet 5. Estimated traffic (based on a previous 16 turbine wind farm) provided by SLR predict daily two way trip generation of 250 HGVs and 64 light vehicles. Of the HGVs, the abnormal loads would be delivered in convoys of three. All vehicles would access via the A9 junction, with the AILs under full escort.

1.5 This Assessment will identify and analyse any hazards identified potential effects to road safety associated with the proposed wind farm and access arrangements described above and on the drawings. The Assessment will focus on the following:

- Issues with existing layout;
- Impacts of providing deceleration and acceleration lanes;
- What priority should be given to minor roads for construction access; and
- Any other identified hazards.

1.6 A view of the Assessment Location in local context is provided in Figure 1 below.

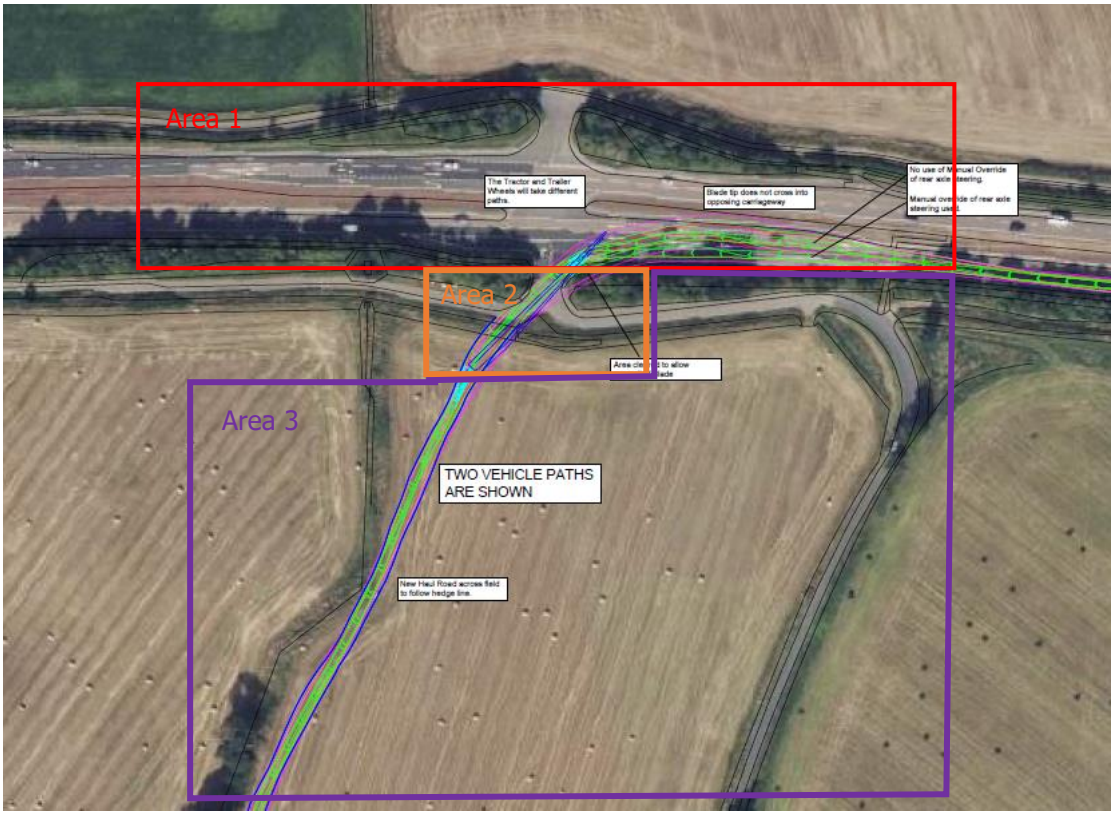

Figure 1 – Assessment Area Plan

2 Safety Risk Assessment Process

Hazard Identification and Analysis

2.1 All reasonably foreseeable hazards associated with a particular activity shall be identified and all identified hazards shall be documented. The identified hazards shall be analysed to understand the resulting safety risks and all reasonably foreseeable consequences should those risks be realised. All road users, including the police and emergency services, equestrians, cyclists and pedestrians, as well as those others, who are at work on the public highway such as privately contracted vehicle recovery and vehicle repair providers will be considered in the assessment.

Analysis of Safety Risks

2.2 The analysis of the safety risks for each population shall include an assessment of the likelihood of the risk being realised and the most common potential severity of the consequences of an event occurring. These values are then multiplied to determine a 'risk rating' value. These values will then fit into one of three risk categories. These categories can be found in Table 1 below.

Table 1 - Risk Matrix Ratings

Estimated Level of Risk (Based on Risk Rating) – (R)		
Low Risk (1-9)	Ensure assumed control measures are maintained and reviewed, as necessary.	Acceptable
Medium Risk (10-19)	Additional control measures needed to reduce risk rating to a level which is equivalent to a test of "reasonably required" for the population concerned.	Tolerable
High Risk (20-25)	Activity not permitted. Hazard to be avoided or risk to be reduced to a tolerable level.	Unacceptable

Risk Rating will apply to both likelihood and severity and then multiplied together to give actual Risk Rating of a particular hazard.

2.3 The analysis of the safety risk for each population may use a range of evidence sources including;

- Quantitative data
- Qualitative data including;
    1) Previous experience
    2) Expert opinion

3) Research

- Combination of quantitative and qualitative data.

Evaluation of Safety Risks

2.4 Outputs from safety risk analysis shall show the level of the safety risk associated with the activity. Outputs from safety risk analysis shall be compared to the safety baseline and safety objectives set for the activity.

2.5 Any mitigation measures relating the road safety implications of the scheme as presented and do not examine or verify the compliance of the designs to any other criteria.

2.6 To demonstrate that a proposed measure of control or mitigation is reasonably required, all suitable potential mitigations to reduce safety risks are assessed. Where the cost of a measure identified in the assessment is, in the reasonable opinion of those carrying out the assessment, proportionate to the benefit derived, that measure can be deemed as reasonably required.

Safety Risk Mitigations

2.7 Where the outcome of the safety risk assessment evaluation for an option being safety risk assessed is within the list below, safety risk mitigations / control measures shall be provided and explored.

- Shows a safety risk dis-benefit from the safety baseline.
- It does not meet the safety objective.
- Does not accord with ‘as low as reasonably possible’ (ALARP).
- Is less than what is deemed reasonably required.

3 Safety Risk Assessment Scope

Site Visit

3.1 A site visit was undertaken on Friday 10th November 2023 the hours of 10:00am and 11:00am. The weather was fine and clear and the carriageway surface was generally dry. Low levels of vehicular traffic were observed on the local road during this time, with traffic on the A9 busy, but free flowing. No Pedestrian or active travel movements were recorded during this time.

Existing Conditions

3.2 The A9 at this location is a 2-lane dual carriageway separated by post and wire fencing at the junction. The junction has an open median to facilitate turning to and from minor arms, north and south of the A9. There are short merge and diverge tapers on the minor arm to the south. The road is subject to a 70-mph speed limit. There is no street lighting, although illuminating studs are present. There is a pedestrian crossing facility to the east of the junction. A view of the A9 junction can be found in **Figure 2** below.

Figure 2 – A9 Junction (View west and East).

3.3 The local road to the south is a rural single carriageway road with no road markings, studs or lighting. The road narrows to single track south of the junction with passing places. The surfacing is currently in poor condition around the junction. A view of the local road can be found in **Figure 3**.

Figure 3 – View along minor road.

Safety Baseline and Safety Objective

Safety Baseline

3.4 The safety baseline will be determined by the existing collision data and observed evidence from site visits to the Assessment area. The safety baseline will consider all identified populations potentially affected by the development access proposals.

Collision Data Analysis.

3.5 Collision data has been obtained from the online Crashmap Database covering a 5-year study period from 2018 to 2022. For the purposes of this risk assessment only collisions occurring on in the immediate vicinity (350m) of The Assessment Area have been considered, which is best practice. This area has been selected as this is just in excess of the stopping site distance for the junction and would be considered reasonable for assessment of a single junction.

3.6 No collisions have occurred within this area in the 5 years to December 2022. The nearest collision over 650 metres to the east which was a 2-vehicle slight injury collision. A view of the PIC study area can be found in **Figure 4**.

3.7 It is noted that further to the east (1km) at the main Blackford junction, there have been a number of collisions, including 1 slight, 2 serious and 1 fatal collision. While it is noted that this junction is a main junction and features higher traffic turning flows and therefore higher risk, the collisions at this junction are the risks that are referred to in section 5 of this report.

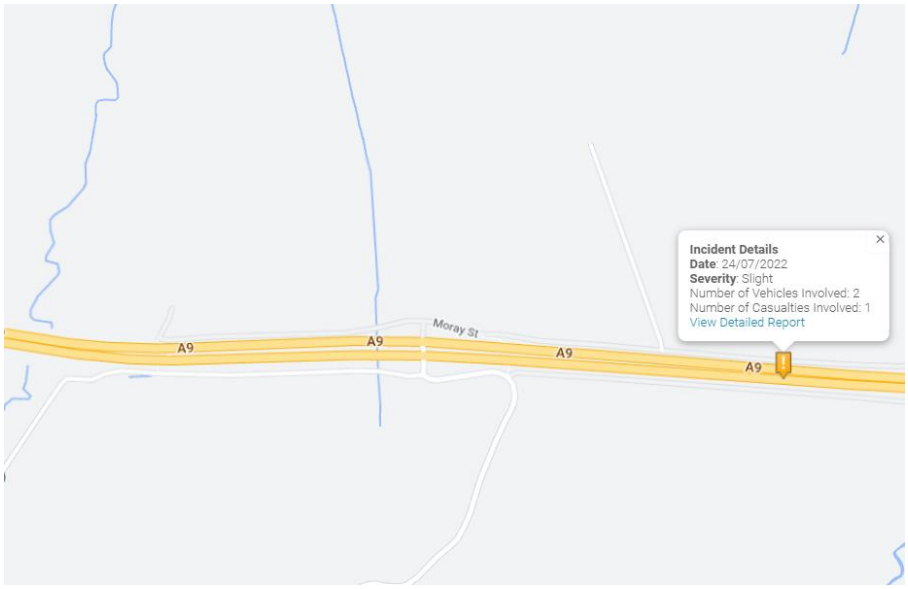

Figure 4 – Personal Injury Collision Study Area (*Source: Crashmap)*

3.8 As no collisions have occurred in the past 5 years, there is no evidence to suggest an existing safety problem caused by the current layout of highway network within the Assessment Area.

3.9 With a safety baseline of zero, there will be an increase in risk with increased use of the junction, particularly by HGVs. The safety baseline for this assessment is set as a zero-net increase of collisions as a result of the proposed wind farm and its construction.

3.10 It should be noted that looking further than the 5-years, there have been historical collisions with 3 slight and one serious at the junction and 2 slight injury collisions at the bend to the south on the local road. There are no clear differences with the road layout or use of the junction in these years. A comparison of traffic data (https://roadtraffic.dft.gov.uk/manualcountpoints/20730) on the A9 over these years shows that traffic levels remain consistent between 20 and 25 thousand AADF (with a dip during COVID years). It could be accepted that there is an existing risk of collision at the junction and on the local road.

3.11 Safety Objective

The safety objective in this instance is to ensure that the proposed wind farm and its construction does not contribute to the elevation of an existing hazard, to an 'unacceptable' level above the safety baseline. As no existing hazard has been identified (based on collision data), this assessment will therefore focus on identifying relevant existing and potential hazards from the

drawings and site visit findings and determining the potential effect that an increase in vehicular trips may have on the existing operation within the Assessment Area. The assessment will focus on three Areas:

- **Area 1** – Access/ Egress from A9 Junction.
- **Area 2** – Local Road Junction Immediately south of A9.
- **Area 3 –** Local Access Road.

3.12 Any mitigation or control measures listed within this assessment may be applied where reasonably required to further reduce or mitigate a potential road safety risk.

3.13 The resultant safety objective of the site is to maintain the existing identified level of risk in line with the principle to be managed to a level 'as low as reasonably practicable'. This 'ALARP' principle intends identify manage and mitigate all risks to users / workers relating to the proposed scheme.

4 Development Proposals

4.1 The proposals comprise of a wind farm of up to 15 turbines to the south of the A9(T) at Blackford between Perth and Kinross and Clackmannanshire. The main impacts will be during the construction and installation phase rather than following completion.

4.2 Estimated traffic information has been provided to show a daily two way trip generation of approximately 250 HGVs and 64 light vehicles. The HGV flows will also include Abnormal Indivisible Loads (AILs). It is anticipated these would be delivered in convoys of three with a full escort. All vehicles would access via the A9 junction.

4.3 The proposal will include mitigation improvements to the A9 junction as well as changes to the local road arrangement to facilitate access by HGVs and AILs.

4.4 A view of the proposed site extents can be found in Figure 5 below in line with the EIA scoping turbine layout.

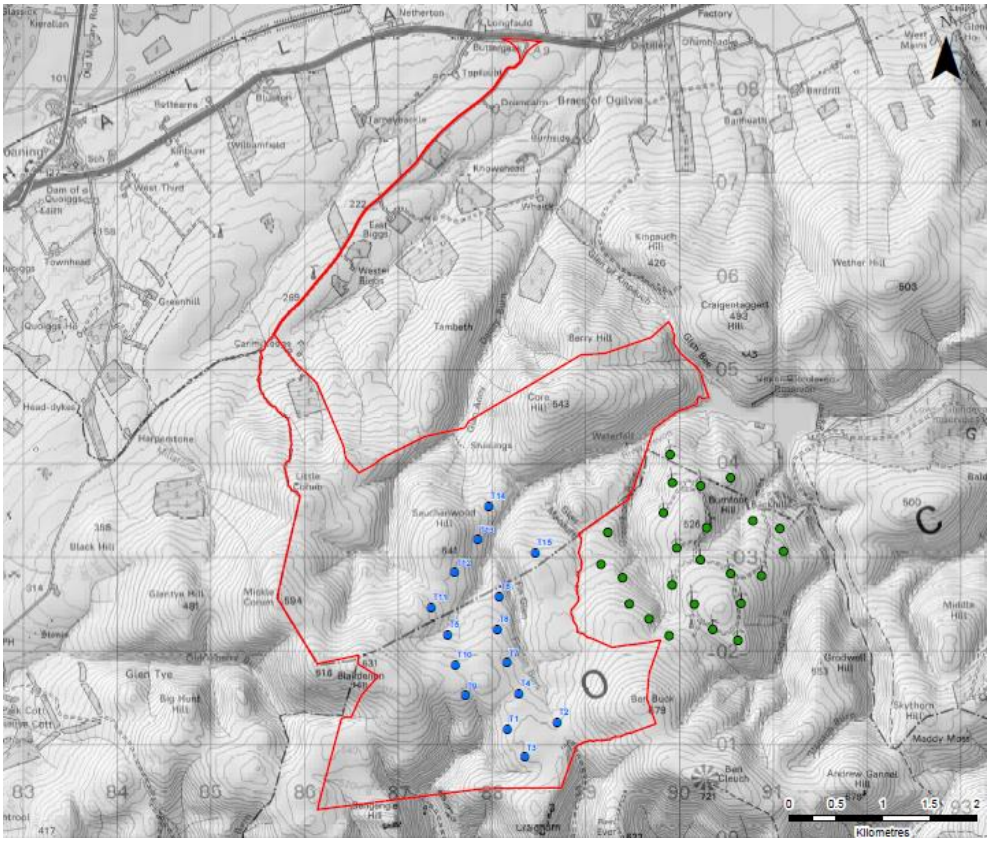

Figure 5 – Proposed Development Site Extents

5 Risk Assessment – Area 1 (A9 Junction)

5.1 The assessment will focus on the interaction between existing and proposed vehicular traffic and active travel user movements in this location. The assessment provides mitigation and control measures with the aim of potentially reducing these identified risks wherever reasonably practicable.

5.2 A risk matrix in accordance with Table D1 and Table D2 of GG104 has been completed to demonstrate the identified hazards and their resultant risk factors. These risks have been quantified and where necessary following the principles of ALARP, additional control measures have been provided to reduce the resultant risks.

Existing Use

5.3 Area 1 examines the junction with the A9 at Blackford, initially with its current layout and existing use levels.

5.4 The proposed scenario risk matrix can be found in Table 1 below.

Table 1 - Risk Assessment Matrix

Location	A9 Blackford Junction (Existng without Windfarm Traffic)
Date:	20th November 2023

DRUMMOND BLACK CONSULTING LTD

Severity of Outcome – (S)	Rating Given	Likelihood – (L)	Rating Given	
Minor Harm: Minor damage or loss no injury.	1	Very Unlikely	1	Rating will apply to both likelihood and severity multiplied to give hazard risk rating
Moderate Harm: Slight injury or illness, moderate damage or loss.	2	Unlikely	2	
Serious Harm: Serious injury or illness, substantial damage or loss.	3	May Happen	3	
Major Harm: Fatal injury, major damage or loss.	4	Likely	4	
Extreme Harm: Multiple fatalities extreme loss or damage.	5	Almost Certain	5	

Hazard	Risk	S	L	R	Control Measures	S	L	R	Further Action Required	By Whom
Slow moving traffic crossing high speed traffic lanes	Risk of side impact collsiions. Low current risk as no collisions recorded in the past 5 years with existing traffic levels.	4	2	8	None	4	2	8	None	
Slowing traffic to turn left into junction.	Risk of rear shunt collisions. Low current risk as no collisions recorded in the past 5 years with existing traffic levels.	2	1	2	None	2	1	2	None	
Slow traffic merging on westbound carriageway.	Risk of rear shunt and side swipe collisions. Low current risk as no collisions recorded in the past 5 years with existing traffic levels.	2	2	4	None	2	1	2	None	

Proposed Use

5.5 The following assessment examines the introduction of the proposed wind farm traffic using the existing junction with no proposed changes other than the clearances noted on the option drawings.

5.6 The proposed scenario risk matrix can be found in Table 2 below.

Table 2 - Risk Assessment Matrix

Location	A9 Blackford Junction (Existing Layout with Additional Traffic)
Date:	20th November 2023

DRUMMOND BLACK CONSULTING LTD

Severity of Outcome – (S)	Rating Given	Likelihood – (L)	Rating Given
Minor Harm: Minor damage or loss no injury.	1	Very Unlikely	1
Moderate Harm: Slight injury or illness, moderate damage or loss.	2	Unlikely	2
Serious Harm: Serious injury or illness, substantial damage or loss.	3	May Happen	3
Major Harm: Fatal injury, major damage or loss.	4	Likely	4
Extreme Harm: Multiple fatalities extreme loss or damage.	5	Almost Certain	5

Rating will apply to both likelihood and severity multiplied to give hazard risk rating

Hazard	Risk	S	L	R	Control Measures	S	L	R	Further Action Required	By Whom
Increase in slow moving traffic crossing A9.	Increased risk of side impact collsiions	4	3	12	Provide additional temporary warning signage on approach during construction phase. Additional interactive signing can be used (See A90 Dundee to Aberdeen) to alert when traffic at minor arm.	4	2	8	Review of Risk Assessment throughout the design process. Likelihood and risk could be further reduced if a turning restriction was provided at the junction for left-in, left-out only. Road Safety Audit of any design proposals.	Designer Independent RSA Team.
Increase in slowing traffic to turn left into junction.	Increased risk of rear shunt collisions	2	2	4	Provide temporary junction warning signage during construction phase. An extended diverge lane could also be considered, however would not be proportionate based on the lower likelihood and temporary increase in use of the junction.	1	2	2	Review of Risk Assessment throughout the design process. Road Safety Audit of any design proposals.	Designer Independent RSA Team.
Increase in traffic merging on westbound carriageway.	Increased risk of rear shunt and side swipe collisions.	2	2	4	Provide temporary junction warning signage during construction phase. An extended merge lane could also be considered, however would not be proportionate based on the lower likelihood and temporary increase in use of the junction.	1	2	2	Review of Risk Assessment throughout the design process. Road Safety Audit of any design proposals.	Designer Independent RSA Team.
Proposed straight downhill approach to A9 junction.	There is potentially a steep gradient on the minor arm approach to the A9. This gradient will affect stopping sight distances and could potentially result in overshoot / loss of control type collisions.	4	2	8	Provide a high friction surface on the minor arm approach to the junction to increase braking efficiency to reduce the risk of overshoot / loss of control type collisions.	4	1	4	Review of Risk Assessment throughout the design process. Road Safety Audit of any design proposals.	Designer Independent RSA Team.

6 Risk Assessment – Area 2 (Local Road Junction Immediately south of A9)

6.1 The assessment will focus on the interaction between existing and proposed vehicular traffic and active travel user movements in this location. The assessment provides mitigation and control measures with the aim of potentially reducing these identified risks wherever reasonably practicable.

6.2 A risk matrix in accordance with Table D1 and Table D2 of GG104 has been completed to demonstrate the identified hazards and their resultant risk factors. These risks have been quantified and where necessary following the principles of ALARP, additional control measures have been provided to reduce the resultant risks.

Existing Use

6.1 Area 2 examines the local road junction immediately to the south of the A9 that will tie-in with the new access road. The initial assessment will examine its current layout and existing use levels.

6.2 The proposed scenario risk matrix can be found in Table 3 below.

Table 3 - Risk Assessment Matrix

Location	Local Road Junction (Existng without Windfarm Traffic)
Date:	20th November 2023

DRUMMOND BLACK CONSULTING LTD

Severity of Outcome – (S)	Rating Given	Likelihood – (L)	Rating Given	
Minor Harm: Minor damage or loss no injury.	1	Very Unlikely	1	Rating will apply to both likelihood and severity multiplied to give hazard risk rating
Moderate Harm: Slight injury or illness, moderate damage or loss.	2	Unlikely	2	
Serious Harm: Serious injury or illness, substantial damage or loss.	3	May Happen	3	
Major Harm: Fatal injury, major damage or loss.	4	Likely	4	
Extreme Harm: Multiple fatalities extreme loss or damage.	5	Almost Certain	5	

Hazard	Risk	S	L	R	Control Measures	S	L	R	Further Action Required	By Whom
Poor existing surfacing on local roads on minor arm of A9 junction.	Risk of skidding and loss of control as well as overshoot collsiions at priority junction.	2	1	2	None.					
Absent/ Faded priority markings at minor arm priority junction.	Risk of collisions at junction.	2	1	2	None.					

Proposed Use

6.1 The following assessment examines the introduction of the proposed wind farm traffic using the existing junction with no proposed changes other than the clearances noted on the option drawings.

6.2 The proposed scenario risk matrix can be found in Table 4 below.

Table 4 - Risk Assessment Matrix

Location	Local Road Junction (Existing Layout with Additional Traffic)
Date:	20th November 2023

DRUMMOND BLACK CONSULTING LTD

Severity of Outcome – (S)	Rating Given	Likelihood – (L)	Rating Given
Minor Harm: Minor damage or loss no injury.	1	Very Unlikely	1
Moderate Harm: Slight injury or illness, moderate damage or loss.	2	Unlikely	2
Serious Harm: Serious injury or illness, substantial damage or loss.	3	May Happen	3
Major Harm: Fatal injury, major damage or loss.	4	Likely	4
Extreme Harm: Multiple fatalities extreme loss or damage.	5	Almost Certain	5

Rating will apply to both likelihood and severity multiplied to give hazard risk rating

Hazard	Risk	S	L	R	Control Measures	S	L	R	Further Action Required	By Whom
Poor existing surfacing on local roads on minor arm of A9 junction.	Increased traffic levels will increase the risk of skidding and loss of control as well as overshoot collsiions at priority junction.	2	3	6	Resurface the local roads in the vicinity of the junction.	1	2	2	This should be monitored and any damage or wear repaired following the constrion period.	Contractor
Absent/ Faded priority markings at minor arm priority junction.	Increased traffic levels will increase the risk of collisions at junction.	2	3	6	Provide priority markings to assign priority to the more dominant flow.	1	2	2	The flow charachteristics will change and this will need to be reviewed following the completion of the construction phase. Road Safety Audit of any design proposals.	Designer Independent RSA Team.
Provisions of southern arm of minor junction will create a cross-roads junction.	Creation of a cross-roads junction will increase risk of overshoot and side impact collisions.	2	3	6	Provide a stagger on the minor arms to reduce a see through of the road ahead.	1	2	2	Some further option testing and design will be required. As the flow profiles are likely to change after construction, the layout should ensure this is also compatible with future use. Eastern arm could potentially be closed off during construction phase. Road Safety Audit of any design proposals.	Designer Independent RSA Team.

7 Risk Assessment – Area 3 (Local Access Road)

7.1 As the use of the existing access road is not possible without changes in alignment, this assessment will consider the three proposed options for the access road alignment.

7.2 The assessment will focus on the interaction between existing and proposed vehicular traffic and active travel user movements in this location. The assessment provides mitigation and control measures with the aim of potentially reducing these identified risks wherever reasonably practicable.

7.3 A risk matrix in accordance with Table D1 and Table D2 of GG104 has been completed to demonstrate the identified hazards and their resultant risk factors. These risks have been quantified and where necessary following the principles of ALARP, additional control measures have been provided to reduce the resultant risks. As the risks raised were similar for all options, these have been combined for all options.

7.4 The proposed scenario risk matrix can be found in Table 5 below.

Table 5 - Risk Assessment Matrix

Location	Access Road (All Options)
Date:	20th November 2023

DRUMMOND BLACK CONSULTING LTD

Severity of Outcome – (S)	Rating Given	Likelihood – (L)	Rating Given
Minor Harm: Minor damage or loss no injury.	1	Very Unlikely	1
Moderate Harm: Slight injury or illness, moderate damage or loss.	2	Unlikely	2
Serious Harm: Serious injury or illness, substantial damage or loss.	3	May Happen	3
Major Harm: Fatal injury, major damage or loss.	4	Likely	4
Extreme Harm: Multiple fatalities extreme loss or damage.	5	Almost Certain	5

Rating will apply to both likelihood and severity multiplied to give hazard risk rating

Hazard	Risk	S	L	R	Control Measures	S	L	R	Further Action Required	By Whom
Narrow access road with limited passing places. Some widening is noted, however swept path does not show for potential of 2 HGVs passing in opposite directions.	Risk of head-on coillisions and collsions related to potential reversing	3	3	9	Provide sufficient passing places with clear visibility. Carriageway widening should also be considered, depending on frequency and flow profiles of construction traffic.	3	1	3	Review of Risk Assessment throughout the design process. Road Safety Audit of any design proposals.	Designer / Independent RSA Team.
Restricted forward visibility on bends.	Risk of head-on coillisions. Two historic collions have been recorded on the bends to the south. Increase in traffic levels would bring back this risk.	3	3	9	Clear vegetation and boundary hedges to ensure clear visibility.	3	1	3	Review of Risk Assessment throughout the design process. Road Safety Audit of any design proposals.	Designer / Independent RSA Team.

8 Summary and Conclusion

8.1 This Risk Assessment has analysed, and where appropriate recommended mitigation measures in order to reduce to 'as low as is reasonably practicable' (ALARP) any resultant road safety risks that may arise in connection with the proposed residential developments on land to the north of the identified Assessment Area.

8.2 Site visit observations conclude that currently, existing interactions between vehicles and pedestrians were managed by road users who accommodate their movements accordingly to the conditions. This situation is also reflected in the most recent collision data with no evidence to suggest collision trends or cluster sites within the Assessment Area.

AREA 1 – A9 Junction

8.3 Hazards identified within this assessment have been considered and weighted accordingly within the risk matrices scale. Where appropriate mitigation has been provided. A summary of mitigation measures for Area 1 can be found below:

i) Provide additional temporary warning signage on approach during construction phase. Additional interactive signing can be used (See A90 Dundee to Aberdeen) to alert when traffic at minor arm.

ii) Provide a high friction surface on the minor arm approach to the junction to increase braking efficiency to reduce the risk of overshoot / loss of control type collisions.

8.4 An extended merge and diverge lane could also be considered to further reduce the risks on the A9, however due to the temporary nature of the change in traffic use during the construction period, this would not be proportionate.

AREA 2 – Local minor junction

8.5 Hazards identified within this assessment have been considered and weighted accordingly within the risk matrices scale. Where appropriate mitigation has been provided. A summary of mitigation measures for Area 2 can be found below:

i) Resurface the local roads in the vicinity of the junction.

ii) Provide priority markings to assign priority to the more dominant flow.

iii) Provide a stagger on the minor arms to reduce a see through of the road ahead.

AREA 3 – Local Access Road

8.6 Hazards identified within this assessment have been considered and weighted accordingly within the risk matrices scale. Where appropriate mitigation has been provided. A summary of mitigation measures for Area 1 can be found below:

vi) Provide sufficient passing places with clear visibility. Carriageway widening should also be considered, depending on frequency and flow profiles of construction traffic.

vii) Clear vegetation and boundary hedges to ensure clear visibility.

Conclusion

8.7 To conclude, there are a range of mitigation measures identified within this report that will serve to assist in bringing any identified risks, including those risks which already exist within the Assessment Area in line with the principles of ALARP (as low as reasonably practicable).

8.8 The collision data supplied does not indicate there is an existing highway safety problem in this location Notwithstanding this, with the nature of the junction layout and the mix of slow and fast moving traffic, there is likely to be an increase in risk with the introduction of construction traffic.

8.9 We find that with the introduction of mitigation measures, the risks associated with the introduction of proposed development and construction traffic can be reduced to a level that can be considered acceptable.

Appendix A – List of drawings/documents provided

List of Drawings and Documents Provided

Doc. No.	Doc Title
12959.00001.0025.1	Wind Farm Scoping Layout
STI-07767-00009-H001-R0a-A1L H001 SHEET 2	Swept Path Analysis Option 2
STI-07767-00009-H001-R0a-A1L H001 SHEET 3	Swept Path Analysis Option 2
STI-07767-00009-H001-R0a-A1L H001 SHEET 4	Swept Path Analysis Sheet 4
STI-07767-00009-H001-R0a-A1L H001 SHEET 5	Swept Path Analysis Sheet 5
N/A	Email containing details of proposed wind farm.

DESIGNERS RESPONSE

28 February 2024

Attention: [redacted] (Transport Scotland), [redacted] (PKC)

SLR Project No.: 428.V12959.00001

Client Reference No.: STI-07767.00009

RE: Windburn Wind Farm, A9/Sheriffmuir Road Junction, Blackford, Perth and Kinross

1.0 Introduction

This letter provides the Designers Response to the road safety risk assessment prepared by Drummond Black Consulting Limited dated 7th December 2023, Ref: D00330-RSRA.

2.0 Background Information

The report identifies that the existing road infrastructure is in good condition along the A9 where it would be the responsibility of Transport Scotland; the road is in poor condition on the minor road where it would be the responsibility of the local council as Highway Authority.

The risk tables contained in Sections 5, 6 and 7 of the report place all of the identified risks as 'Low Risk', meaning that they can be controlled through measures.

The report states that no collisions have been recorded in the vicinity of the junction within the review period. The designer comments that this does not mean that the junction is safe, it simply means that no accidents have occurred, probably due to the low numbers of traffic using the junction.

2.1 Risks Identified by the Auditor

The report splits the works into three areas, as follows:

- Area 1 - A9
- Area 2 - Junction
- Area 3 – Local roads

2.1.1 Risks for Area 1 (Section 5)

Four risks were identified for this location, three are existing with one coming from the proposed works. The risks are:

- Slow moving traffic crossing high speed roads - existing.
- Traffic slowing on the A9 Southbound to turn left - existing.
- Traffic accelerating as it joins the A9 Southbound - existing.
- Downhill approach towards the A9 along the proposed new haul road – related to proposed works.

2.1.1.1 Designers' response

To mitigate against the three existing risks, all construction traffic will be required to turn left at the junction and, if required, turn around at the first grade separated junction along the A9

(approx.5km to the north and 12km to the south). This will allow lorries to cross the A9 using overbridges, reducing the risk of collision with traffic on the A9 while turning. The contractor will be required to enforce this and have appropriate sanctions for any drivers that ignore the instruction.

In addition to mitigate for slow moving HGV traffic a temporary speed limit will be proposed for the A9 for the duration of the wind farm construction period when stone and other materials will be delivered to site. This will reduce the differential speed between vehicles.

Detailed design has not been undertaken for the proposed haul road, however a simple long section created on google maps would suggest that the gradient along the road would be around 4%. The haul road will be designed to be closer to field levels, however the immediate approaches to the public roads will be flattened to be no more than 2.5% to reduce the risk of vehicles overshooting the junction.

2.1.2 Risks for Area 2 (Section 6)

Three risks were identified for this location.

- Poor road surfacing - existing.
- Absent or faded road markings - existing.
- Proposed haul road will create a crossroads – related to proposed works

2.1.2.1 Designers' response

The poor road surfacing and faded road markings identified in the risk table will be resolved during the construction of the haul road.

The proposed haul road will create a temporary crossroads and temporary traffic signs will be used in accordance with Chapter 8. The priority will always stay with the public road requiring traffic using the haul road to give way to traffic on the public roads.

2.1.3 Risks for Area 3 (Section 7)

Two risks were identified for this location, both for the existing road.

- Narrow road width - existing
- Restricted visibility around bends – existing

2.1.3.1 Designers' response

The proposed haul road will be used by abnormal load vehicles to avoid bends near to the A9, over this section the existing road will be retained for use by General construction traffic. The road width over this section will remain as existing, with passing places provided at the bend and at intervals along the road to suit the flow of traffic.

Following the location where the proposed haul road rejoins the existing road, the existing road will need to be widened to be in accordance with the turbine manufacturers delivery requirements. For most manufacturers this will require a minimum road width of 5m with passing places as necessary for the traffic flow. At passing places the road will be widened to 6.5m minimum width over 20m length.

The existing road passes through gently undulating arable farmland and closely follows the topography. There are occasional trees along the road edge but no constant hedge. Forward visibility is good along the road including around the bends.

3.0 Summary and Conclusions (Section 8)

The risk assessments are summarised in Section 8 and the auditor makes recommendations for changes to the project as follows:

3.1 Auditors comment

Issues affecting Area 1 include the risk of collisions due to construction traffic turning across the Southbound carriageway, risk of collisions due to differential speeds of traffic caused by turning HGV's travelling slower than the through traffic. The auditor recommends the use of temporary traffic signs (8.3(i)) and use of a high friction surfacing (8.3(ii)).

Designers' response

The designer agrees with the recommendation under item 8.3 (i), and signs to Chapter 8 of the traffic signs manual will be provided on the A9 approaches to the junction, to warn drivers of the risk of slow-moving traffic. Although there will be no lane restrictions, a provision for the inclusion of a temporary 50mph speed restriction, will be included as it will assist to help raise awareness and to slow traffic. There is no guarantee that the temporary speed limit will be granted.

The temporary speed limit will be applied for the minimum 800m length and will apply to the southbound carriageway only, commencing 50m before the first warning sign and terminating 90m after the last sign.

The designer partially disagrees with the recommendation under item 8.3 (ii) to provide a high friction surface. It would appear from Google Streetview images that the A9 in the vicinity of the junction was resurfaced between April 2021 and September 2021. Given the relatively new surfacing, it is likely to have been installed with the correct PSV for the location and this can be checked through a review of existing records or with a simple skid test. If the PSV accords with standards, then no further action is required; if it fails then resurfacing may be required, this is to be discussed with Transport Scotland at the time of construction.

3.2 Auditors comment

The Auditor recommends in item 8.4 that consideration is given to the extension of the merge and diverge lanes at the junction, but also states that this may be disproportionate, as it is only required for a temporary increase in use of the junction.

Designers' response

The designer agrees that extending the merge and diverge lanes would be disproportionate given the temporary nature of the windfarm construction. Both the diverge and merge lanes would have accorded with the design standards at the time of construction, with a possible departure from standard as both are slightly shorter than the current standards require.

The designer comments that managing and trimming tree and hedge growth, which hides the junction from view for traffic approaching from Perth, may be a greater improvement to road safety than increasing the length of the diverge taper, as it will increase the prominence of the junction, along with the temporary traffic signs and temporary speed limit which would greatly assist with both the merge and diverge of construction traffic.

3.3 Auditors comment

The auditor recommends in item 8.5(i) for resurfacing of the local roads.

Designers' response

The designer agrees and this will be covered by the works at the junction, as the proposed changes to the road layout will require general resurfacing, which would be undertaken to the correct PSV value for location. It should be noted that the geometry of this location will not generate high traffic speeds on the approach to the junction.

3.4 Auditors comment

The auditor recommends in item 8.5(ii) for road markings to give priority to the local road.

Designers' response

The designer agrees and road markings will be provided that keep the priority with the public road. During construction the junction will have extensive temporary signs and markings in accordance with chapter 8 which will be fully removed upon completion.

3.5 Auditors comment

The auditor recommends in item 8.5(iii) to stagger the minor roads to avoid constructing a crossroads.

Designers' response

The designer comments that the staggering of the minor roads would result in an overdesign and complication for the junction given its location. The minor road to the west simply provides access to a small number of properties and farmland and the haul road will be designed so that it remains obvious that its intended use is temporary.

3.6 Auditors comment

The auditor recommends in item 8.6(vi) for general road widening and passing place provision along the minor road to the windfarm.

Designers' response

The designer comments that the roads used by the abnormal loads will need to be widened to accord with the turbine delivery requirements. Passing places can be provided to widen the road further as necessary. Subject to agreement the widening may have an unbound temporary surface to discourage higher speeds along the minor road.

3.7 Auditors comment

The auditor recommends in item 8.6(vii) for vegetation clearance along the minor road to improve visibility.

Designers' response

The designer comments that this will be assessed and undertaken at the time of construction, however most of the minor road has no hedges or trees alongside, therefore any clearance or trimming will need to be done sympathetically to avoid over clearance.

Closure

The designer accepts some of the recommendations made by the auditors, however most of the recommendations can be included in the detailed design of the proposed junction.

With regards to the skidding resistance, testing of the existing surface will be necessary prior to determining if any works are necessary.

Temporary traffic management measures will be necessary and will be designed in accordance with Chapter 8 of the Traffic Signs Manual.

Regards,

SLR Consulting Limited

[redacted]

[redacted]
Principal Highway Engineer

[redacted]