Craig Watch Wind Farm

Technical Appendix 7.1: Route Survey Report

November 2024

Pell Frischmann

Craig Watch Wind Farm

Abnormal Indivisible Load Route Survey

July 2023

107824

Report Ref.	**230712 Craig Watch RSR V162.Docx**
File Path	**https://pellf.sharepoint.com/sites/EdinburghOfficeTeam/Shared Documents/General/Projects/107824 Ramboll Craig Watch SEI/01 - WIP/Reports/230712 Craig Watch RSR V162.docx**

Rev	Suit	Description	Date	Originator	Checker	Approver
A		Draft	11/07/2023	J Stirrat	T Lockett	G Buchan

Ref. reference. Rev revision. Suit suitability.

Prepared for

Statkraft

41 Moorgate
London
EC2R 6PP

Prepared by

Pell Frischmann

93 George Street
Edinburgh
EH2 3ES

Contents

Figures

Tables

Appendices

1 Introduction

1.1 Purpose of the Report

Pell Frischmann (PF) has been commissioned by Statkraft to undertake a survey of the approved delivery route for wind turbine Abnormal Indivisible Loads (AIL) associated with the construction and development of Craig Watch Wind Farm, located south of Dufftown, Morayshire.

The RSR has been prepared to help inform Statkraft on the likely issues associated with the development of the site with regards to off-site transport and access for AIL traffic. The report identifies the key issues associated with AIL deliveries for the proposed development and notes that remedial works, either in form of physical works or as traffic management interventions, would be required to accommodate the predicted loads.

The detailed designs of any remedial works are beyond the agreed scope of works between PF and Statkraft at this point in time.

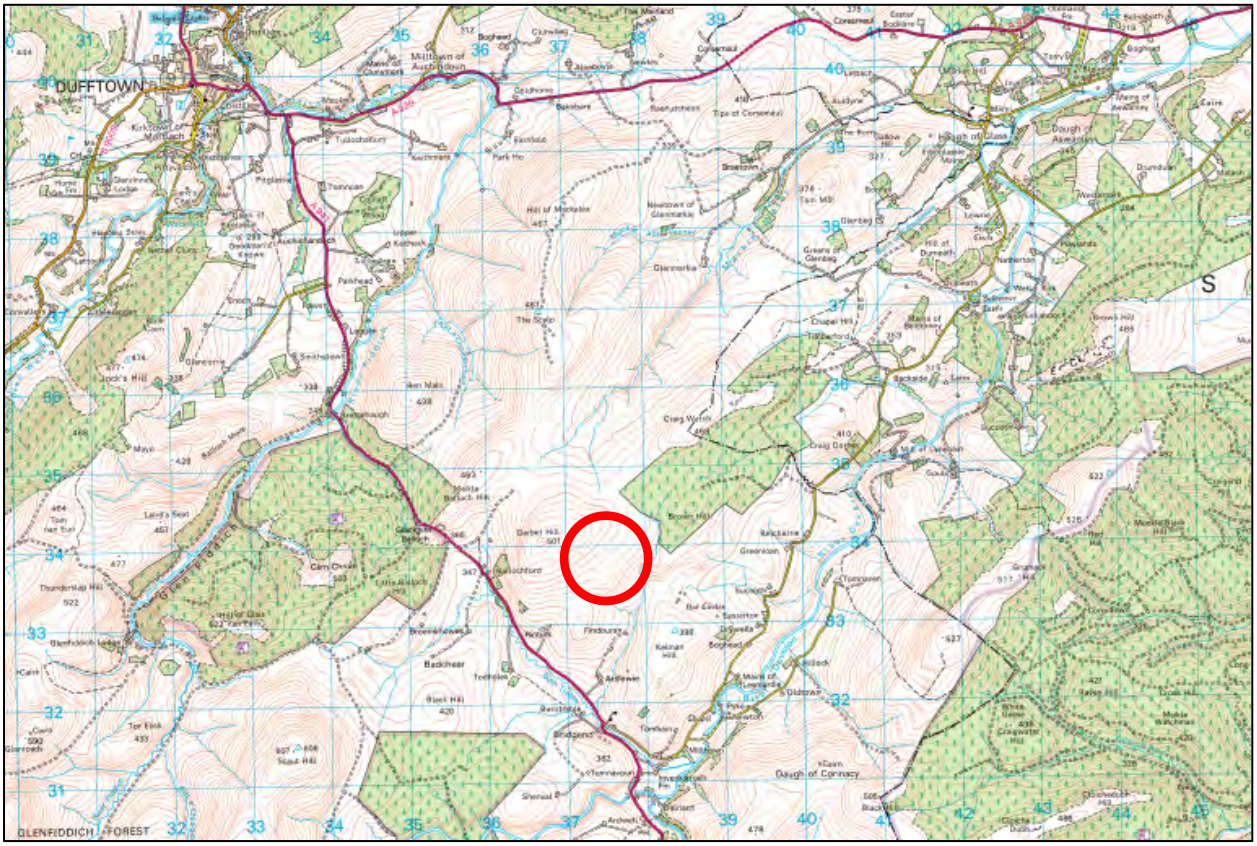
It is the responsibility of the wind turbine supplier to ensure that the entirety of the proposed access route is suitable and meets with their satisfaction. The turbine supplier would be responsible for ensuring that the finalised proposals meet with the appropriate levels of health and safety consideration for all road users has been made in accordance, in line with the relevant legislation at the time of delivery.

2 Site Background

2.1 Site Location

The development site is located to the south of Dufftown, Morayshire. Figure 2-1 illustrates the general site location.

Figure 2-1: Site Location Plan



2.2 Candidate Turbine

Statkraft have indicated that they wish to consider the worst-case components from a Vestas V162 turbine with a tip height of 200m. The details of the components are summarised in Tables 2-1.

Table 2-1: Turbine Size Summary

Component	Length (m)	Width (m)	Height / Min Diameter (m)	Weight (t)
V162 Blade	81.100	4.320	3.294	21.700
Base Tower	9.590	4.500	4.150	81.000
Mid Tower 1	12.040	4.150	4.150	82.000
Mid Tower 2	15.680	4.150	4.150	78.000
Mid Tower 3	20.720	4.150	4.150	77.000
Mid Tower 4	28.280	4.150	4.000	76.000
Top Tower	30.000	4.000	4.000	62.000

2.3 Proposed Delivery Equipment

To provide a robust assessment scenario based upon the known issues along the access route, it has been assumed that all blades would be carried on a Superwing trailer to reduce the need for mitigation in constrained sections of the route.

Towers would be carried in a 4+7 clamp adaptor style trailer, whereas loads such as the hub, nacelle housing and top towers would be carried on a six-axle step frame trailer.

Figure 2-2: Superwing Carrier Trailer

Figure 2-3: Tower Trailer Example

3 Access Route Review

3.1 Port of Entry

The nearest feasible Port of Entry (PoE) for the site is the Port of Dundee. The Port of Aberdeen, while closer, does not have sufficient capacity for use by wind turbine components due to a lack of storage capacity and a focus on off-shore oil and gas. Dundee has been used extensively as a renewable energy delivery hub including for deliveries of components to Mid Hill Wind Farm. The port has been upgraded to ensure that abnormal loads can easily exit the port and join onto the road network.

Access from Inverness, the next closest port is not considered feasible due to constraints located within the town of Keith. There are no feasible ports or strategic routes to site other than that described below.

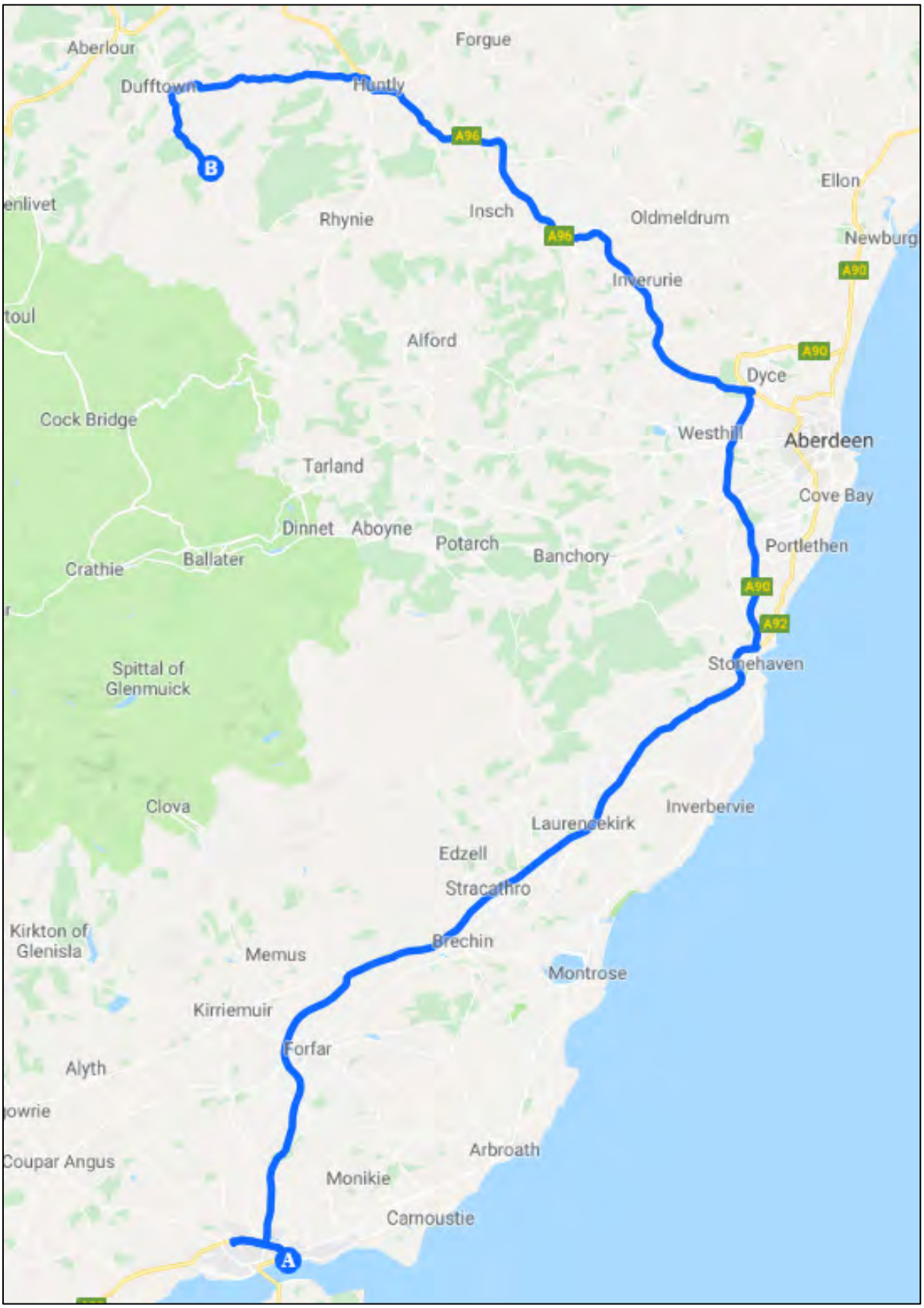
3.2 Proposed Access Route

The proposed access route to the site access junction from the Port of Dundee is as follows:

- Loads would depart the Port of Dundee via the east exit gate and continue over Stannergate Bridge to the roundabout, exiting onto Strips of Craigie Road;
- Loads would continue straight at the roundabout onto the Kingsway using the existing island overrun areas;
- Loads would continue west on the Kingsway until the junction with the B960 where loads will exit the Kingsway and proceed around the roundabout to re-join the Kingsway eastbound;
- Loads would continue on the Kingsway before turning left onto the A90 and proceeding north;
- Loads would continue on the A90 until the Craibstone junction, exiting to proceed along the Craibstone Junction Link before turning left at the Craibstone Roundabout to join the A96 bound north west;
- Loads would exit the A96 at Huntly, turning left onto the westbound A920; and
- Loads would exit the A920 east of Dufftown, turning left onto the A941 and proceeding south to the proposed site access.

The proposed access route is illustrated in Figure 3-2.

Figure 3-2: Proposed Access Route



3.3 Route Constraints

The constraints noted on the site visit are detailed in Table 3-1. These cover all constraints from the port access gate through to the site access junction. No consideration of the transport issues within the port or within the development site have been undertaken and this includes the design of the site access junction.

Plans illustrating the location of the constraints and a detailed list of POI are provided in Appendix A. Where swept path assessments have been prepared, these are provided in Appendix B.

Table 3-1: Constraint Summary

POI	Key Constraint	Details
1	**Dock East Gate** 	Loads will exit the port gate and continue straight ahead onto Broughty Ferry Road.
2	**Stannergate Roundabout** 	Loads will continue onto Strips of Craigie Road at the roundabout (2nd exit) utilising the existing overrun area. Loads will be able to utilise the existing overrun area with minimal additional works. Eight bollards within the roundabout centre island will need to be removed and vegetation trimmed. The safety barrier on the western verge on approach will be oversailed. Swept path assessment SK01 is included in Appendix B.
3	**Strips of Craigie Road** 	Loads will pass a number of traffic islands on Strips on Craigie Road where street furniture should be removed during deliveries. Parking will need to be temporarily suspended at locations where loads need to manoeuvre. A Temporary Traffic Regulation Order (TTRO) may be required.
4	**Strips of Craigie / A92 Roundabout** 	Loads will continue onto Kingsway East at the roundabout (2nd exit) utilising the existing overrun area. Socketed bollards within the roundabout splitter islands will need to be removed. One lit bollard, one lighting column, one lit road sign, and one road sign to be relocated. Permission should be sought to utilise the existing overrun areas. Loads will oversail the south western verge of the central island where the wall needs to be lowered. Swept path assessment SK02 is included in Appendix B.

POI	Key Constraint	Details
5	**Kingsway East / Mid Craigie Roundabout** 	Loads will continue ahead on Kingsway East at the roundabout (2nd exit). The escort vehicles should ensure that the loads have full access to the entry, circulating, and departure lanes of the junction. Loads will oversail the central reserve on approach to the roundabout but no works are required. They will then oversail the south western verge on approach and exit where the guardrails should be removed. Loads will oversail the south western verge of the roundabout island where loads should be raised to their highest suspension setting. Swept path assessment SK03 is included in Appendix B.
6	**Pitkerro / Roundabout** 	Loads will continue ahead on Kingsway East at the roundabout (2nd exit). The escort vehicles should ensure that the loads have full access to the entry, circulating, and departure lanes of the junction. Loads will overrun and oversail the central island where a load bearing surface should be laid. The raised island should be lowered. Two sets of lit chevron signs and two advertisement signs should be removed. Swept path assessment SK04 is included in Appendix B.
7	**Old Glamis Road Roundabout** 	Loads will continue ahead on the A90 Kingsway at the roundabout (2nd exit). Loads will oversail the northern and southern verges of the entry arm where the safety barrier and one lighting column should be removed on the southern verge. Loads will oversail the central island where two sets of lit chevron signs and one advertisement sign should be removed. Swept path assessment SK05 is included in Appendix B.
8	**Strathmartine Road Roundabout** 	Loads will continue ahead on the A90 Kingsway at the roundabout (2nd exit). Loads will oversail the southern verge of the entry arm but no works are required. Loads will oversail the southern verge of the central island where one set of lit chevron sign and one advertisement sign should be removed. They will then oversail the entry arm central reserve although no further mitigation is required. Swept path assessment SK06 is included in Appendix B.
9	**A90 / B960 Roundabout** 	Loads will undertake a u-turn and continue onto the A90 Kingsway eastbound at the roundabout (6th exit). Loads will oversail the northern verge on approach where vegetation should be cleared. A load bearing surface should be laid on the southern verge on entry where one road sign, one lighting column and a section of guardrail should be removed. Third party land is required. Loads will oversail the first and second exit splitter islands where one road sign, one lighting column and one bollard should be removed from each. A section of pedestrian guardrail should be removed on the southern verge.

POI	Key Constraint	Details
		Loads will oversail the southern and northern verges of the central island where two traffic signs, two advertisement signs, trees and two sets of chevron signs should be removed. Vegetation should be trimmed back. Loads will oversail the western verge where two lighting colu. Loads will oversail the barrier into third party land. A load bearing surface should be laid on the north western verge and the northern splitter island. A section of guardrail, one lighting column, one road sign and one bollard should be removed. Detailed discussions with Dundee City Council, Transport Scotland and Amey Scotland will be required regarding the mitigation in this location. Swept path assessment SK07 is included in Appendix B.
8	**Strathmartine Road Roundabout** 	Loads will return eastbound through the Strathmartine Roundabout. Loads will overrun the northern verge of the central island where a load bearing surface should be laid. One sets of lit chevron signs and two advertisement signs should be removed. Loads will oversail the guardrail on the northern verge of the entry arm. Swept path assessment SK08 is included in Appendix B.
7	**Old Glamis Road Roundabout** 	Loads will return eastbound through the Old Glamis Road Roundabout. Loads will oversail the northern and southern verge on entry where one lighting column should be removed from the south and the blade tip will oversail the safety barrier on the north. Loads will then overrun and oversail the central island where a load bearing surface should be laid. Two sets of lit chevron signs and one advertisement sign should be removed. One bollard to be oversailed on the exit arms central reserve. Swept path assessment SK09 is included in Appendix B.
10	**A90 Kingsway / A90 Forfar Road Junction** 	Loads will turn left from the A90 Kingsway onto the A90 Forfar Road. Loads will oversail the southern central reserve where two road signs, one traffic signal and guardrail should be removed. Loads will oversail the splitter island of the left turn where one bollard, two road signs, one pedestrian call post and three traffic signals should be removed. Blade tip to oversail the guardrail. Loads will oversail the inside verge of the junction where three lighting columns, one road sign, one traffic signal and pedestrian guardrail should be removed. One junction box should be oversailed. Trees and vegetation should be cleared. **Third party land** is required. Detailed discussions with Transport Scotland and BEAR Scotland will be required regarding the mitigation in this location. Swept path assessment SK10 is included in Appendix B.

POI	Key Constraint	Details
11	**A90 / Fintry Drive Roundabout** 	Loads will continue ahead on the A90 at the roundabout (2nd exit). Loads will oversail the western verge on entry and the western verge of the central island where one set of lit chevron signs and one advertisement sign to be removed. Swept path assessment SK11 is included in Appendix B.
12	**A90 / Jack Martin Way Roundabout** 	Loads will continue ahead on the A90 at the roundabout (2nd exit). Loads will oversail both verges throughout this location where one lighting column should be removed from the western verge of the entry arm and the safety barrier oversailed on the entry arm central reserve. Swept path assessment SK12 is included in Appendix B.
13	**A90 / AWPR Stonehaven Junction** 	Loads would diverge from the A90 onto the A90 AWPR. Loads will oversail both sides of the carriageway through the bend where three road signs, four lighting columns, two lit road signs and three chevron signs should be removed. On the approach to the roundabout, loads would oversail the inside verge where one lighting column should be removed. Swept path assessment SK13 is included in Appendix B.
14	**A90 Stonehaven Roundabout** 	It is proposed that in order to reduce modification costs and increase the ease of movements for the loads that a new track will be created through the roundabout. Loads will overrun and oversail the approach splitter island where a load bearing surface should be laid and one road sign and one bollard should be removed. Existing utilities should be protected. Loads to oversail the safety barrier. Loads will overrun and oversail the north eastern half of the roundabout island where a load bearing surface should be laid and one lit chevron sign should be removed. Loads will overrun and oversail the exit splitter island where a load bearing surface should be laid and one bollard, one sign and one lighting column should be removed. Loads to oversail the safety barrier. Swept path assessment SK14 is included in Appendix B.
15	**A90 Cleanhill Roundabout** 	Loads would take the first exit and continue northbound. Loads would oversail the central reserve of the entry arm where the blade tip will oversail the barrier. Loads will oversail the western verge of the entry arm where two lighting columns should be removed. Loads will oversail the western verge of the central island and the western verge on exit, but no works are required. Swept path assessment SK15 is included in Appendix B.

POI	Key Constraint	Details
16	**A90 / C89c Craibstone Junction** 	Loads would exit the A90 and proceed to Craibstone Junction, where they will turn right at the traffic lights. Loads would oversail the western verge on approach to the junction where two lighting columns, traffic signal and one lit road sign should be removed. Loads will oversail the splitter island where two road signs, one call post, guardrail and three traffic signals should be removed. Loads would oversail the inside verge and will require the removal of three traffic signals, one lit road sign, guardrail and one lighting column should be removed. Loads would also oversail the central reserve where one traffic signal and one traffic bollard should be removed. Loads would oversail and overrun the northern verge where a load bearing surface should be laid. It is recommended that land searches are completed for all areas at this location to identify any areas of third party land. An alternative to this manoeuvre would be for loads to continue on the A90 and undertake a U turn at the next roundabout and then depart the road at the east side of the junction. A further assessment of this would be required if this option is adopted. Swept path assessment SK16 is included in Appendix B.
17	**C89c / A96 Craibstone Roundabout** 	Loads would proceed to take the first exit at the roundabout to join the A96 westbound. Loads would oversail the right-hand verge on approach to the roundabout where two traffic signal heads, one call post, one road sign and guardrail should be removed. Loads would also oversail the inside bend on traversing where one traffic signal head, guardrail and two lighting columns should be removed. Loads will oversail the exit arm central reverse where one road sign and one lighting column should be removed. Loads will oversail the southern verge of the exit arm where one traffic signal head and guardrail should be removed. Swept path assessment SK17 is included in Appendix B.
18	**A96 Clinterty Roundabout** 	Loads would take the second exit at the roundabout, continuing on the A96. On approach to the roundabout loads would oversail into southern verge where the blade tip will oversail the barrier. Loads would require an overrun area of load bearing surface to be laid on the southern edge of the roundabout. Oversail would also occur here, requiring the removal of one chevron sign and one road sign. Swept path assessment SK18 is included in Appendix B.
19	**A96 Kinellar Roundabout** 	Loads would take the second exit at the roundabout, continuing on the A96. Loads will oversail the entry arm central reserve where the blade tip will oversail the barrier. One lighting column should be removed. On approach to the roundabout loads would oversail the southern verge where the blade tip will oversail the safety barrier and one lighting column should be removed. Loads would oversail the southern edge of the central island, requiring the removal of one lit chevron sign. The height clearance

POI	Key Constraint	Details
		for loads over the raised roundabout should be confirmed during the test run. Swept path assessment SK19 is included in Appendix B.
20	**A96 Broomhill Roundabout** 	Loads would take the second exit at the roundabout, continuing on the A96. On approach to the roundabout loads would oversail the western verge where the blade tip will oversail the safety barrier and one lighting column should be removed. A land search should be completed to confirm the extent of adopted boundary available. Loads would then oversail the western edge of the roundabout central island, requiring the removal of two lit chevron signs. The height clearance for loads over the raised roundabout should be confirmed during the test run. Loads would oversail the western verge on exiting the roundabout, however this requires no physical mitigation. Swept path assessment SK20 is included in Appendix B.
21	**A96 Thainstone Roundabout** 	Loads would take the second exit at the roundabout, continuing on the A96. On approach and exit to the roundabout loads would oversail the western footways. Loads would oversail and overrun the western verge of the central island when traversing the roundabout, requiring the removal of two sets of lit chevron signs and the trimming of vegetation. A load bearing surface should be laid. Swept path assessment SK21 is included in Appendix B.
22	**A96 Inverurie Roundabout** 	Loads would take the second exit at the roundabout, continuing on the A96. On approach to the roundabout loads will oversail the western verge where one lighting column and vegetation should be removed. Loads will oversail the western edge of the roundabout where one chevron sign and vegetation should be removed. Loads will oversail the exit arms splitter island where one lighting column and one road sign should be removed. Two bollards should be oversailed. Swept path assessment SK22 is included in Appendix B.
23	**A96 Blackhall Roundabout** 	It is proposed that loads will contraflow the roundabout in order to minimise mitigation requirements. Loads will oversail the eastern verge on approach where one lighting column should be removed. Loads will then oversail the north eastern edge of the roundabout island where one set of lit chevron signs should be removed. Loads will also oversail the north eastern exit verge where one lighting column should be removed. Swept path assessment SK23 is included in Appendix B.

POI	Key Constraint	Details
24	**A96 Pitcaple** 	Loads would continue along the A96, straddling both lanes at this point and requiring police to halt oncoming traffic beyond the bend.
25	**A96 / B9002 Junction** 	Loads would continue along the A96, straddling both lanes at this point and requiring police to halt oncoming traffic beyond the bend.
26	**A96 North East of Westhall** 	Throughout the route, the tree canopy needs to be trimmed to provide a clear 5m head height. Trimming of the tree canopy can be subject to ecological constraints and it is suggested that early consultation with Transport Scotland is undertaken to agree cutting times and permits.
27	**A96 Huntly Roundabout** 	Loads would take the second exit at the roundabout, continuing on the A96. On approach to the roundabout loads would oversail the southern verge where vegetation should be trimmed. Loads would then oversail and overrun the southern edge of the roundabout island where a load bearing surface should be laid and one traffic bollard should be removed along with vegetation. Loads would oversail the western splitter island and western verge of the exit arm where one road sign should be removed. Swept path assessment SK24 is included in Appendix B.
28	**A96 West of Huntly** 	The clearances to overhead power lines at this location should be reviewed with the utility provider prior to loads moving to ensure that there is sufficient head height and flashover protection for all temperature ranges.

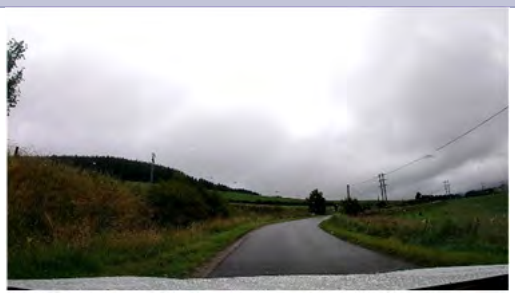
POI	Key Constraint	Details
29	**A96 / A920 West Junction** 	Loads would exit the A96 and turn left onto the A920. Loads will oversail the eastern verge and splitter island on approach to the junction where the blade tip will oversail two traffic bollards and one road sign should be removed. Loads will oversail the verge on the inside of the left turn where the fence, vegetation and two road signs should be removed. Third party land is required. Loads will oversail the northern verge on exit from the junction where vegetation should be trimmed. Swept path assessment SK25 is included in Appendix B.
30	**A920 West of Huntly** 	Loads would continue west on the A920. Loads will oversail both verges through the section. Loads will overrun and oversail the northern verge through the first and second bends where a load bearing surface should be laid and the fence removed. Third party land is required. A load bearing surface should be laid on the southern verge on exit from the right bend. Vegetation should be removed. Swept path assessment SK26 is included in Appendix B.
31	**A920 Arnhall Cottages** 	Loads will occupy the entire carriageway through the bend however no mitigation measures are required.
32	**A920 Craighead** 	Loads would continue west on the A920. Prior to the first bend loads will oversail the southern verge where vegetation should be trimmed. One road sign and one utility pole should be removed. Loads will oversail the northern verge through the first bend where the fence and vegetation should be removed. Third party land is required. One road sign should be removed from the northern verge of the second bend. The clearances to overhead power lines at this location should be reviewed with the utility provider prior to loads moving to ensure that there is sufficient head height and flashover protection for all temperature ranges. Swept path assessment SK27 is included in Appendix B.
33	**A920 Cairnford** 	Loads would continue west on the A920. Loads will oversail the northern verge and southern verge. Loads should be placed on their higher suspension settings to avoid the need for verge re-profiling. These should be reset following the bend. Vegetation should be trimmed on both verges. Loads will oversail the southern verge through the bend where a land search is recommended to confirm the extent of the adopted boundary. A land search is recommended to confirm the extent of the adopted boundary on the southern verge.

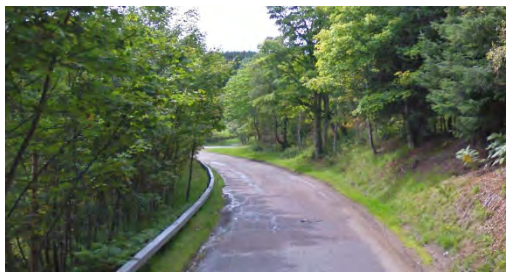
POI	Key Constraint	Details
		The clearances to overhead power lines at this location should be reviewed with the utility provider prior to loads moving to ensure that there is sufficient head height and flashover protection for all temperature ranges. Swept path assessment SK28 is included in Appendix B.
34	**A920 Waterside of Blairmore** 	The clearances to overhead power lines at this location should be reviewed with the utility provider prior to loads moving to ensure that there is sufficient head height and flashover protection for all temperature ranges.
35, 36	**A920 Greystonefolds**  	Loads would continue along the A920. Loads will continue to oversail both verges through this section. Loads will overrun and oversail into third party land to the south of the road where a load bearing surface should be laid. Fence, bollards, vegetation and one utility pole should be removed. Vegetation should be trimmed on the northern verge through the first bend. A land search is recommended to confirm the extent of the adopted boundary. The clearances to overhead power lines at this location should be reviewed with the utility provider prior to loads moving to ensure that there is sufficient head height and flashover protection for all temperature ranges. It is recommended that a topographical survey is completed, and the swept path assessment repeated to confirm the required mitigation. Swept path assessment SK29 is included in Appendix B.
37	**A920 Easter Bodylair** 	Loads would continue west on the A920. Loads will overrun and oversail the northern verge where a load bearing surface should be laid. The fence and gate should be removed. Third party land is required. Loads will oversail the southern verge, but no works are required. Swept path assessment SK30 is included in Appendix B.

POI	Key Constraint	Details
38	**A920 Wester Bodylair** 	Loads will continue west on the A920 through a series of bends. Loads will oversail both verges through the bends where vegetation should be trimmed.
39, 40	**A920 Corsemaul Croft**  	Loads will continue west on the A920 through a series of bends. Loads will straddle the centreline through the section. Escorts should hold oncoming vehicles in advance of the section.
41	**A920 Raehutcheon** 	The road surface was noted to be in a poor state of repair at this location. It is recommended that discussions are held with the roads authority to ensure repairs are completed prior to deliveries commencing.
42, 43	**A920 Bakebare** 	Loads will continue west and north through the bends on the A920. Loads will oversail and overrun into third party land on the inside of the right bend where a load bearing surface should be laid. Detailed design on a topographical base will be required on a topographical base to confirm the required mitigation and bank reprofiling extents. Loads will continue to oversail both verges through the following bend where vegetation should be trimmed on the east and the blade tip will oversail the safety barrier on the west. Swept path assessment SK31 is included in Appendix B.

POI	Key Constraint	Details
		
44	**A920 Coldhome** 	Loads will continue west on the A920 at Coldhome. Loads will oversail both the inside and outside of the first left bend. It is recommended that the swept path assessment is repeated on a topographical base map. Vegetation and trees should be removed on the east. Loads will oversail the safety barrier on the western verge and the fence should be removed. Third party land is required. Swept path assessment SK32 is included in Appendix B.
45, 46	**A920 Milltown of Auchindoun**  	Loads will continue through Milltown of Auchindoun on the A920. It is recommended that the swept path assessment is repeated on a topographical base map to confirm the required mitigation. Loads will overrun and oversail into third party land to the south of the road where a load bearing surface should be laid. It will be necessary to build the land up at this location to form the required overrun area and detailed design will be required. One chevron sign and fence should be removed. Loads will continue to overrun and oversail the southern verge through the following left bend where a load bearing surface should be laid and third party land is required. The fence should be removed. It is recommended that a vertical assessment is completed on a topographical base plan to ensure adequate ground clearance is available for loads when transiting the section, or that clearances are reviewed in the test run when the haulier is selected. Swept path assessment SK33 is included in Appendix B.
47	**A920 Tullochallum** 	Loads will continue west on the A920. Loads will occupy the entire carriageway through the section and oversail both verges. Vegetation should be trimmed. Escorts to hold oncoming vehicles in advance of the left turn at POI49.

POI	Key Constraint	Details
48	**A920 Tullochallum** 	Loads will continue west on the A920. Loads will oversail both verges of the carriageway where one utility pole should be removed on the south. Vegetation and the fence should be removed on the northern verge where third party land is required. Escorts to hold oncoming vehicles in advance of the left turn at POI49. Swept path assessment SK34 is included in Appendix B.
49	**A920 / A941 Junction Bridge of Burnend** 	Loads would exit the A920 and turn right to join the southbound A941. Loads will oversail the northern verge of the A920 on approach to the junction. Loads will overrun and oversail the verge on the inside of the left bend. A load bearing surface should be laid. Detailed design on a topographical base will be required to confirm the extent of mitigation. Third party land will be required. The drainage ditch should be culverted, and trees and vegetation cleared. Two traffic bollards should be removed. Loads will overrun and oversail the western verge of the A941 where a load bearing surface should be laid. Swept path assessment SK35 is included in Appendix B.
50	**A941 South of Bridge of Burnend** 	Loads would continue south on the A941. Loads will overrun and oversail the verge on the inside of the left bend where a load bearing surface should be laid, and vegetation cleared. Loads will overrun and oversail the inside of the right bend where a load bearing surface should be laid, and the fence removed. Trees and vegetation should be cleared. Third party land is required. Bollards should be oversailed on the eastern verge through the right bend. Swept path assessment SK36 is included in Appendix B.
51	**A941 Tomnoan** 	Loads will continue south on the A941. Loads will overrun and oversail the western verge where a load bearing surface should be laid. One road sign and a section of fence should be removed. Third party land is required. Loads will oversail the eastern verge where the embankment will be oversailed. Swept path assessment SK37 is included in Appendix B.
52, 53	**A941 South of Tomnoan** 	Loads will continue south on the A941. Loads will oversail both verges through the left bend where vegetation should be trimmed on the east and one road sign removed on the west. Loads will oversail and overrun the eastern verge of the right bend where a load bearing surface should be laid. The drainage ditch should be culverted. One road sign and trees / vegetation should be removed. Swept path assessment SK38 is included in Appendix B.

POI	Key Constraint	Details
		
54	**A941 Gallow Hill** 	Loads will continue south on the A941 past Gallow Hill. Loads will oversail both verges through the section. Loads will overrun the verge on the outside of the right bend. A load bearing surface should be laid and the ditch culverted. One traffic bollard and trees should be removed. One road sign should be removed from the western verge. Swept path assessment SK39 is included in Appendix B.
55	**A941 Rows Cottage** 	The clearances to overhead power lines at this location should be reviewed with the utility provider prior to loads moving to ensure that there is sufficient head height and flashover protection for all temperature ranges.
56	**A941 North of Laggan** 	Loads will continue south on the A941. ***The OS mapping does not accurately represent the road network as noted on site. An indicative road edge has been provided for illustration only and should be confirmed during the test run or through a topographical survey.*** Loads will oversail both verges through the section without the requirement for physical mitigation. Swept path assessment SK40 is included in Appendix B.
57	**A941 Blackfolds** 	Loads will continue south on the A941. Loads will oversail both verges through the section. Vegetation should be trimmed. Swept path assessment SK41 is included in Appendix B.

POI	Key Constraint	Details
58	**A941 Bridgehaugh** 	Loads will continue south on the A941 at Bridgehaugh. Loads will oversail both verges through the first bend where a section of barrier and one road sign should be removed on the eastern verge. Loads will overrun and oversail the verge on the outside of the second bend where a load bearing surface should be laid. One bollard, vegetation, trees, one sign and the safety barrier should be removed. Loads will oversail the eastern verge through the second bend where a bollard and the safety barrier will be oversailed. Vegetation should be trimmed on the inside of the final bend. Swept path assessment SK42 is included in Appendix B.
59	**A941 South of Bridgehaugh** 	Loads will continue south on the A941. Loads will oversail both verges through the section where the embankment on the inside of the first bend should be reprofiled. A land search is recommended to confirm the extent of the adopted boundary Vegetation should be trimmed on both verges of the carriageway through the following bends. Swept path assessment SK43 is included in Appendix B.
60, 61	**A941 Glacks of Balloch**  	Loads will continue east on the A941. Loads will oversail both verges throughout this location. A load bearing surface should be laid on the inside of the left bend and the ditch should be culverted. The fence should be removed and vegetation cleared. Third party land is required. Loads will oversail and overrun the inside of the right bend where a load bearing surface should be laid. Vegetation should be removed. Swept path assessment SK44 is included in Appendix B.
62	**A941 Glacks of Balloch** 	It is recommended that the road is widened to meet manufacturer standards. The road surface was noted to be in a poor state of repair at this location. It is recommended that discussions are held with the roads authority to ensure repairs are completed prior to deliveries.

POI	Key Constraint	Details
63	**A941 Ballochford** 	Loads will continue south on the A941. Loads will oversail both verges through the bend. Loads will overrun and oversail the western verge where a load bearing surface should be laid and third party land is required. The fence should be removed. Swept path assessment SK45 is included in Appendix B.
64	**A941 Ballochford** 	Loads will continue through the constrained section at Ballochford. It is recommended that a topographical survey is completed, and the swept path assessment repeated to confirm the required mitigation. Loads will overrun and oversail the western verge through the left bend where a load bearing surface should be laid. Loads will overrun and oversail the inside of the left bend where a load bearing surface should be laid. Trees and the fence should be removed and third party land is required. Loads will overrun and oversail the inside of the right bend where a load bearing surface should be laid. Loads will oversail the bridge parapet. The fence, two road signs and trees should be removed. Third party land is required. Loads will overrun and oversail the eastern verge on the outside of the right bend when exiting the section. A load bearing surface should be laid, and detailed design will be required to confirm the required mitigation. Bank reprofiling will be required and further third party land may be required to provide the mitigation. Swept path assessment SK46 is included in Appendix B.
65	**A941 Bridge of Rhinturk** 	Loads will continue south east on the A941 The road should be widened to meet manufacturer minimum standards of 4.5m. It is recommended that a topographical survey is completed and the swept path assessment repeated. Loads will oversail both verges on approach before overrunning the eastern verge on the outside of the bend where a load bearing surface will be required. Detailed design will be required to confirm the extent of works. Bank reprofiling will be required and tree removal. Third party land is required. Bollards should be removed on the western verge. Swept path assessment SK47 is included in Appendix B.
66, 67	**A941 Rhinturk** 	Loads will continue south east on the A941 The road should be widened to meet manufacturer minimum standards of 4.5m. Loads will oversail both verges through the section. The fence should be removed on the eastern verge and third party land is required. The embankment should be reprofiled. Swept path assessment SK48 is included in Appendix B.

POI	Key Constraint	Details
		
69	**A941 Rhinturk** 	Loads will continue south east on the A941 The road should be widened to meet manufacturer minimum standards of 4.5m. Loads will oversail both verges through the section. A load bearing surface is required in the north eastern verge on the outside of the right bend. Detailed design on a topographical survey base is required to confirm the mitigation. Verge reprofiling will be required along the removal of a stone wall and fencing. Third party land is required. Swept path assessment SK49 is included in Appendix B.
70	**A941 Site Access** 	A new access junction could be created at this location to meet manufacturer standards. The new junction would be required to provide an indicative visibility splay of 4.5m x 160m in either direction. This would be clarified through discussions with Moray Councils roads team.

3.4 Swept Path Assessment Results and Summary

The detailed swept path drawings for the locations assessed are provided in Appendix B for review. The drawings in Appendix B illustrate tracking undertaken for the worst caseloads at each location.

The colours illustrated on the swept paths are:

- Grey / Black – OS / Topographical Base Mapping;
- Green – Vehicle body outline (body swept path);
- Red – Tracked pathway of the wheels (wheel swept path); and
- Purple – The over-sail tracked path of the load where it encroaches out with the trailer (load swept path).

Where mitigation works are required, the extents of overrun and over-sail areas are illustrated on the swept path drawings.

Please note that where assessments have been undertaken using Ordnance Survey (OS) base mapping, there can be errors in this data source.

Where provided by the client, topographical data has been utilised. Please note that PF cannot accept liability for errors on the data source, be that OS base mapping or client supplied data.

3.5 Weight Review

A revised weight review will need to be undertaken via the ESDAL (Electronic Service Delivery for Abnormal Loads) contacts database using the National Highways website www.esdal.com

The relevant ESDAL contacts are noted in Table 3-2, with responses, where received, in Appendix C.

Table 3-2: ESDAL Contacts

Organisation	Email Address
Police Scotland	osdwindfarmabnormalloads@scotland.pnn.police.uk
Network Rail	Abloadsesdal@networkrail.co.uk
Historic Rail Estate	rsgbrb@jacobs.com
Scottish Canals	SCAbnormal.Loads@scottishcanals.co.uk
Dundee City Council	mark.cobb@dundeecity.gov.uk
Aberdeenshire Council	abnormal.loads@aberdeenshire.gov.uk
Moray Council	abloads@moray.gov.uk
Transport Scotland	AbnormalLoads@transport.gov.scot
Bear North East	abnormal-load@bearscotland.co.uk

3.6 Summary Issues

The following matters would be addressed post consent and would be undertaken as part of the abnormal load permitting process by the developer or turbine supplier / haulier prior to the first load being transported.

- Topographical data is collected and the required assessments repeated;
- A revised review of axle loading on structures along the entire access route with the various road agencies is undertaken immediately prior to the loads being transported once the final turbine has been chosen and in case of last-minute changes to structures;
- A review of clear heights with utility providers and the transport agencies along the route to ensure that there is sufficient SKce to allow for loads plus sufficient flashover protection (to electrical installations);
- That any vegetation and tree canopies which may foul loads is trimmed prior to loads moving; and
- That a review of potential roadworks and or closures is undertaken once the delivery schedule is established in draft form.

In addition, it is recommended that the developer also undertakes the following post consent:

- A test run will be completed to confirm the route and review any vertical clearance issues, as is normal for any wind farm project of this scale; and
- That a road condition survey is undertaken to ascertain the extents of road defects prior to loads commencing to protect the developer and road agencies from damage claims. This would cover a before and after construction survey and would be undertaken with a member of Moray Council in attendance.

4 Summary

4.1 Summary of Access Review

PF has been commissioned by Statkraft to prepare a Route Survey Report to examine the issues associated with the transport of AIL turbine components from the port of entry through to the development site.

This report identifies the key points and issues associated with the proposed route and outlines the issues that would need to be considered for successful delivery of components.

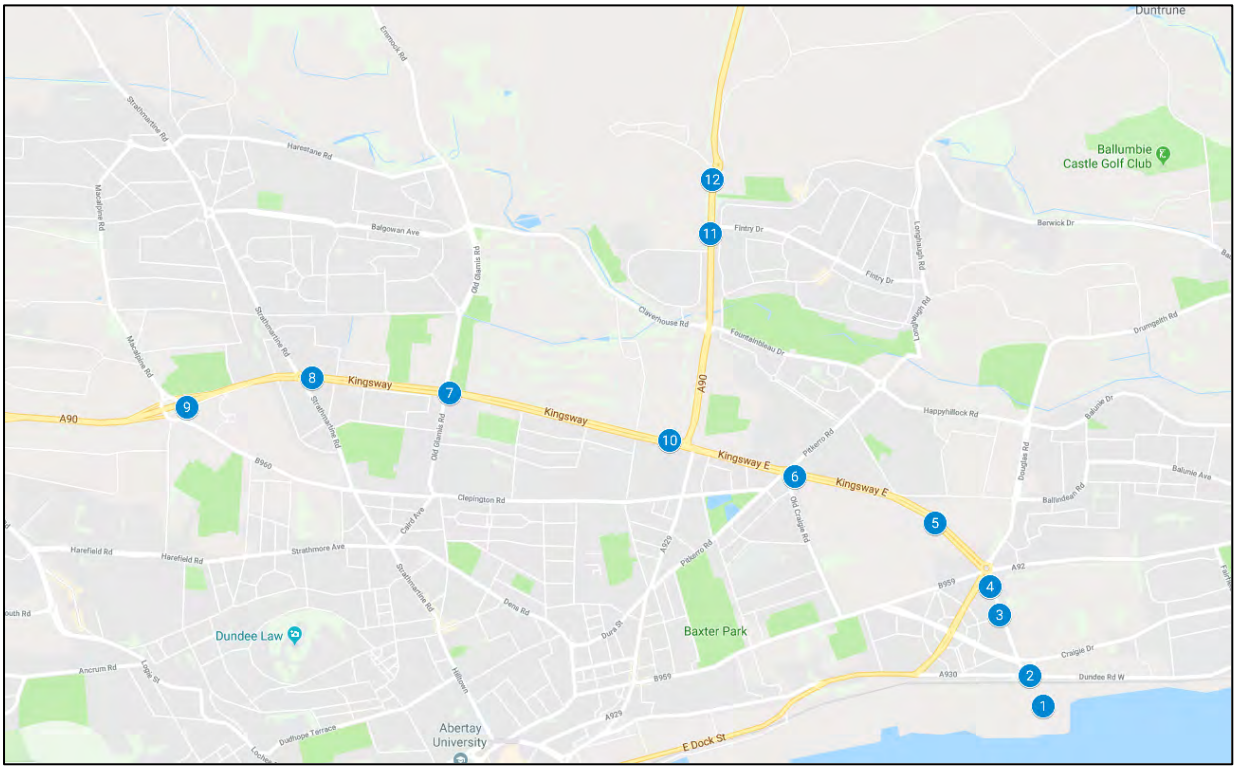
The report is presented to Statkraft for consideration. Various road modifications and interventions are required to successfully access the site. If these are assessed, approved and undertaken, access to the consented wind farm site is considered feasible.

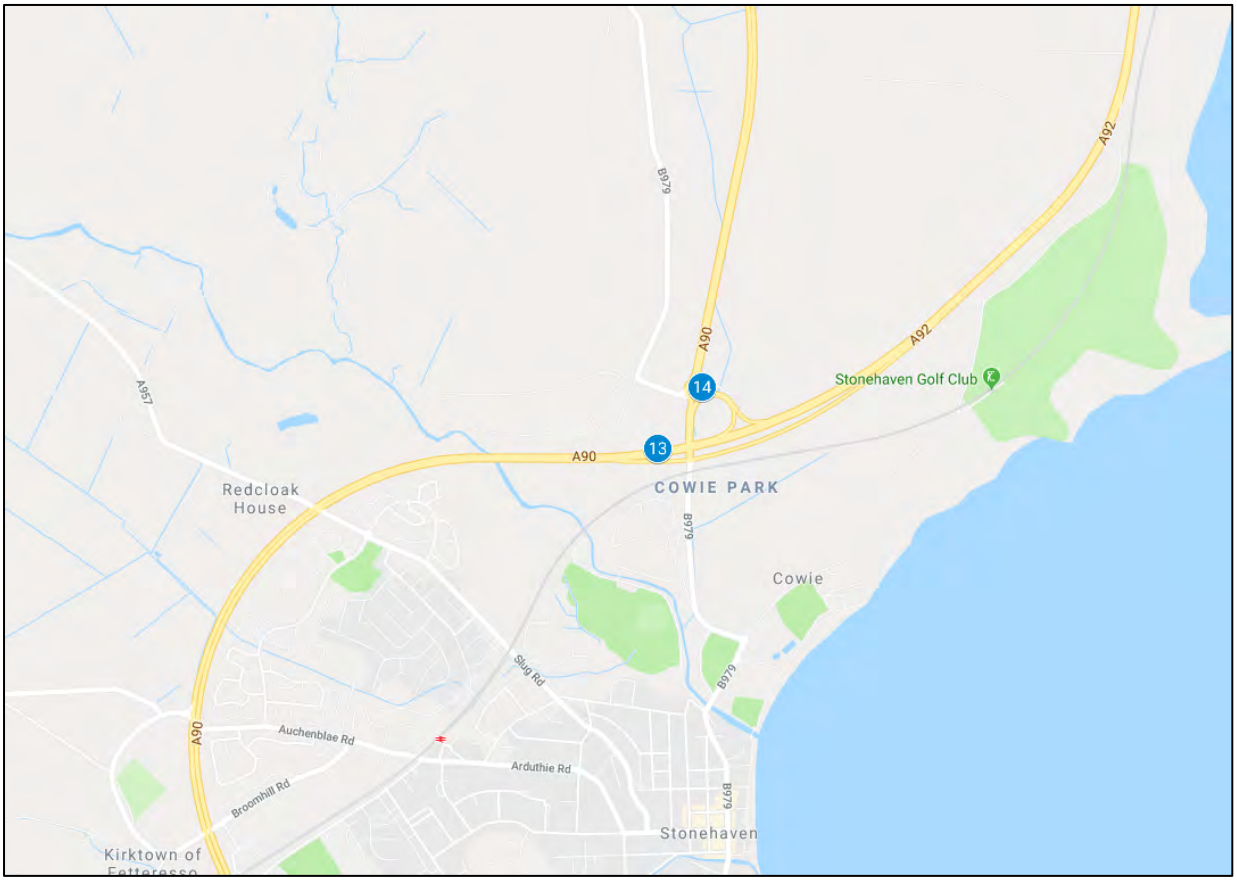
4.2 Further Actions

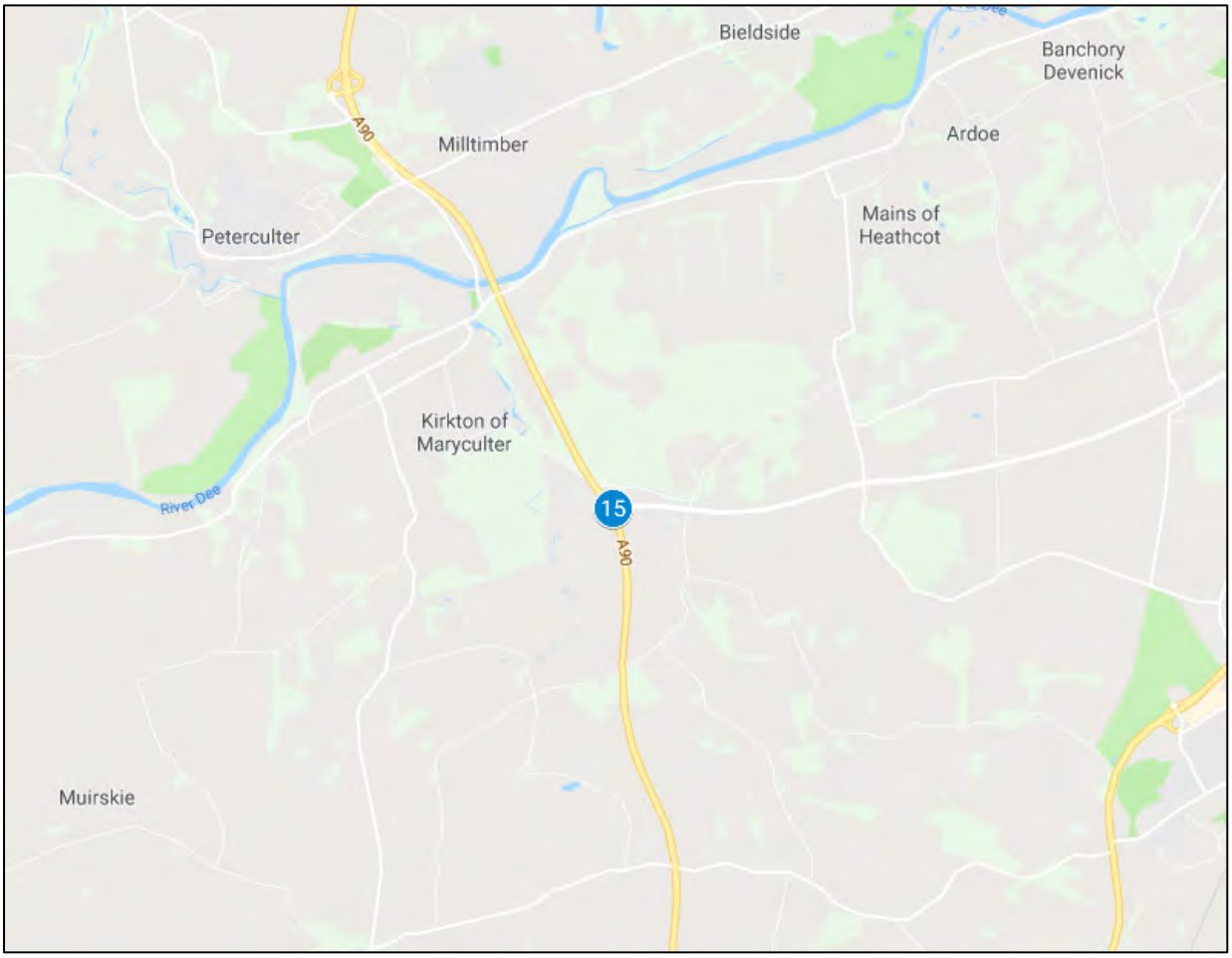
The following actions are recommended to pursue the transport and access issues further:

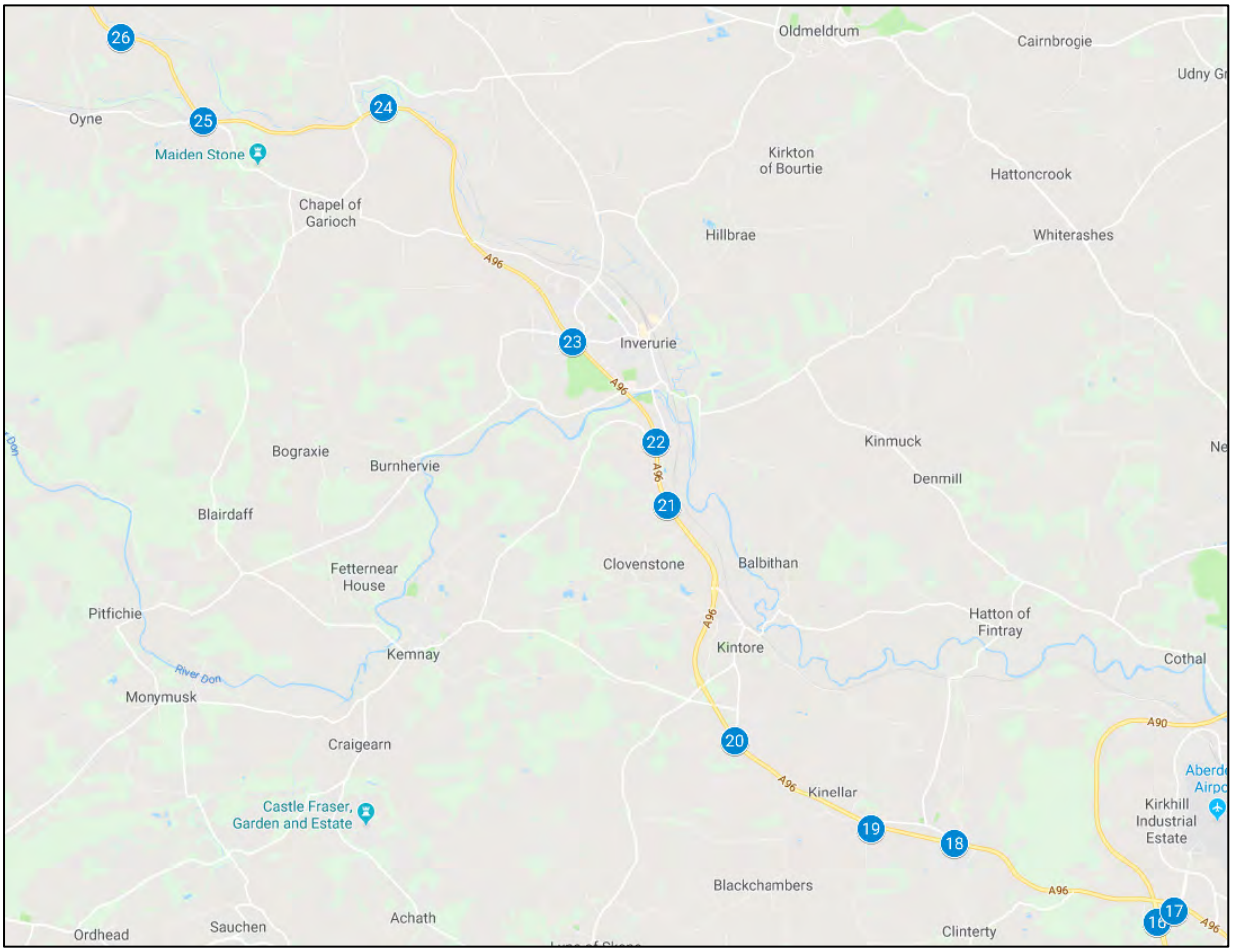
- Obtain the necessary land rights;
- Prepare detailed mitigation design proposals to help inform consultee / licence discussions;
- Undertake discussions with the affected utility providers and roads agencies;
- Obtain the necessary statutory licences to enable the mitigation measures; and
- Develop a detailed operational Transport Management Plan to assist in transporting the proposed loads.

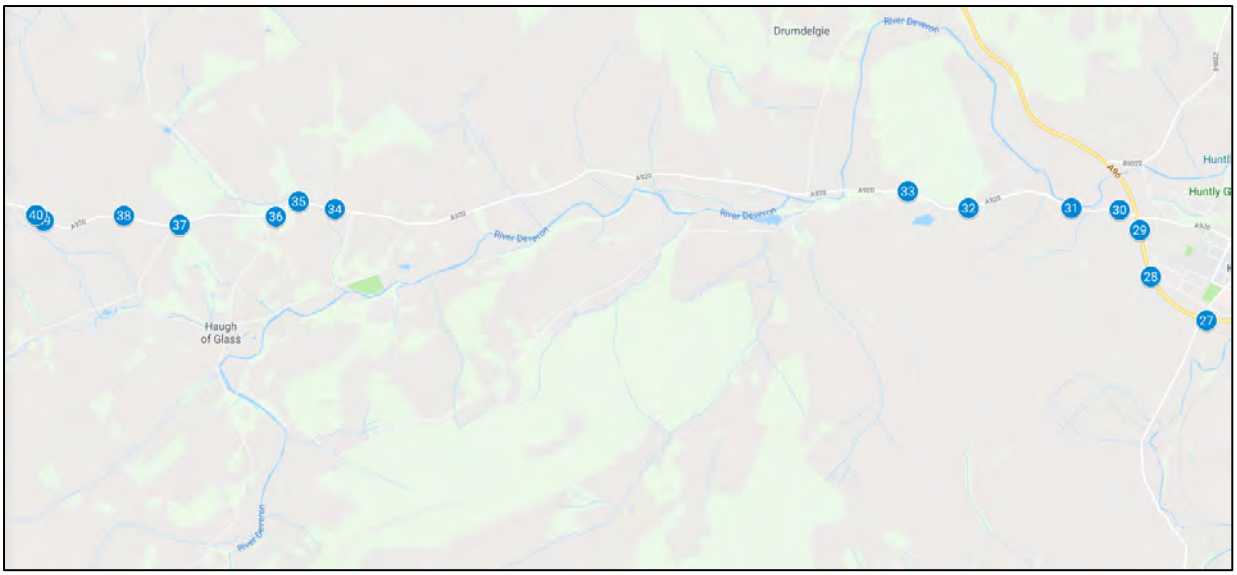
Appendix A Points of Interest

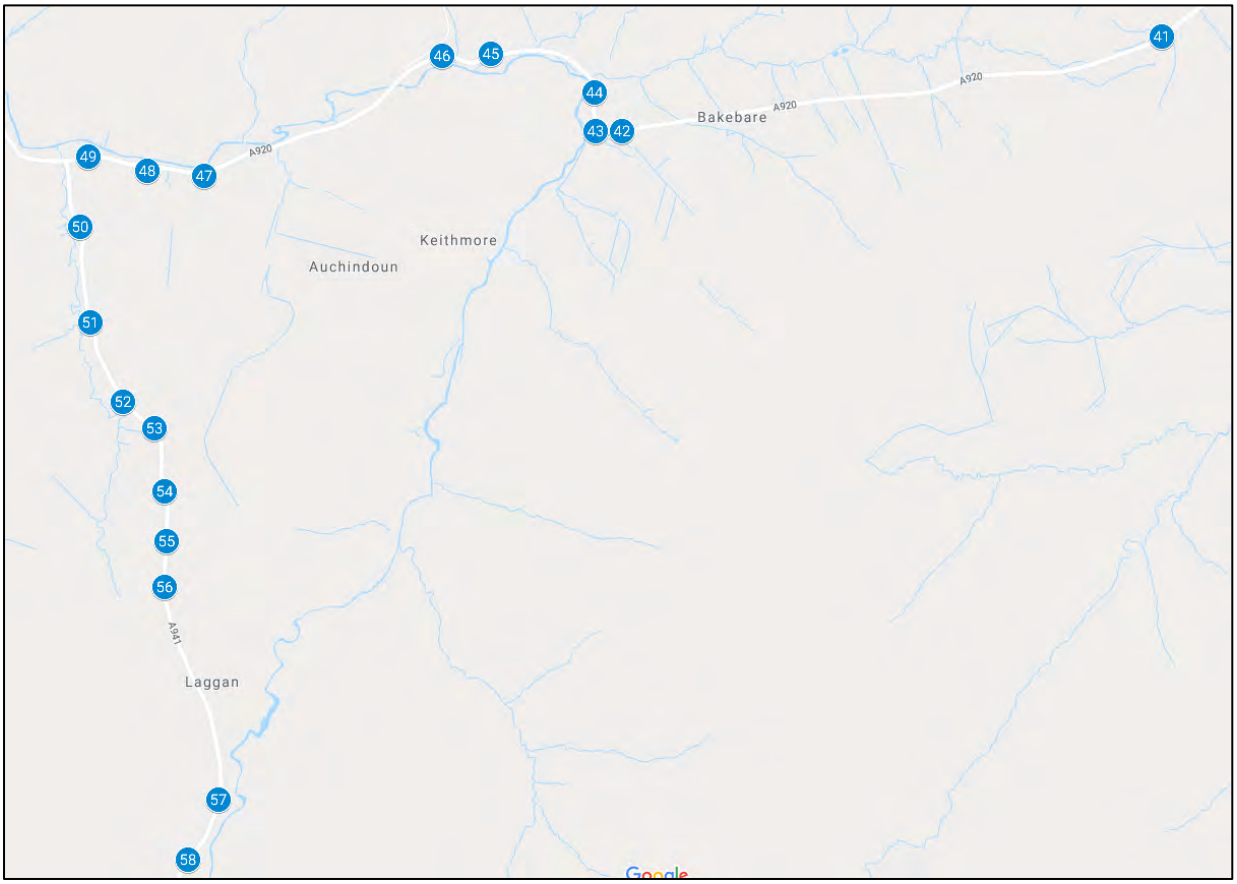

Dundee Law
Baxter Park
Abertay University
Ballumbie Castle Golf Club
Kingsway
Kingsway E
A90
A92
A929
B959
E Dock St
Dundee Rd W
1
2
3
4
5
6
7
8
9
10
11
12

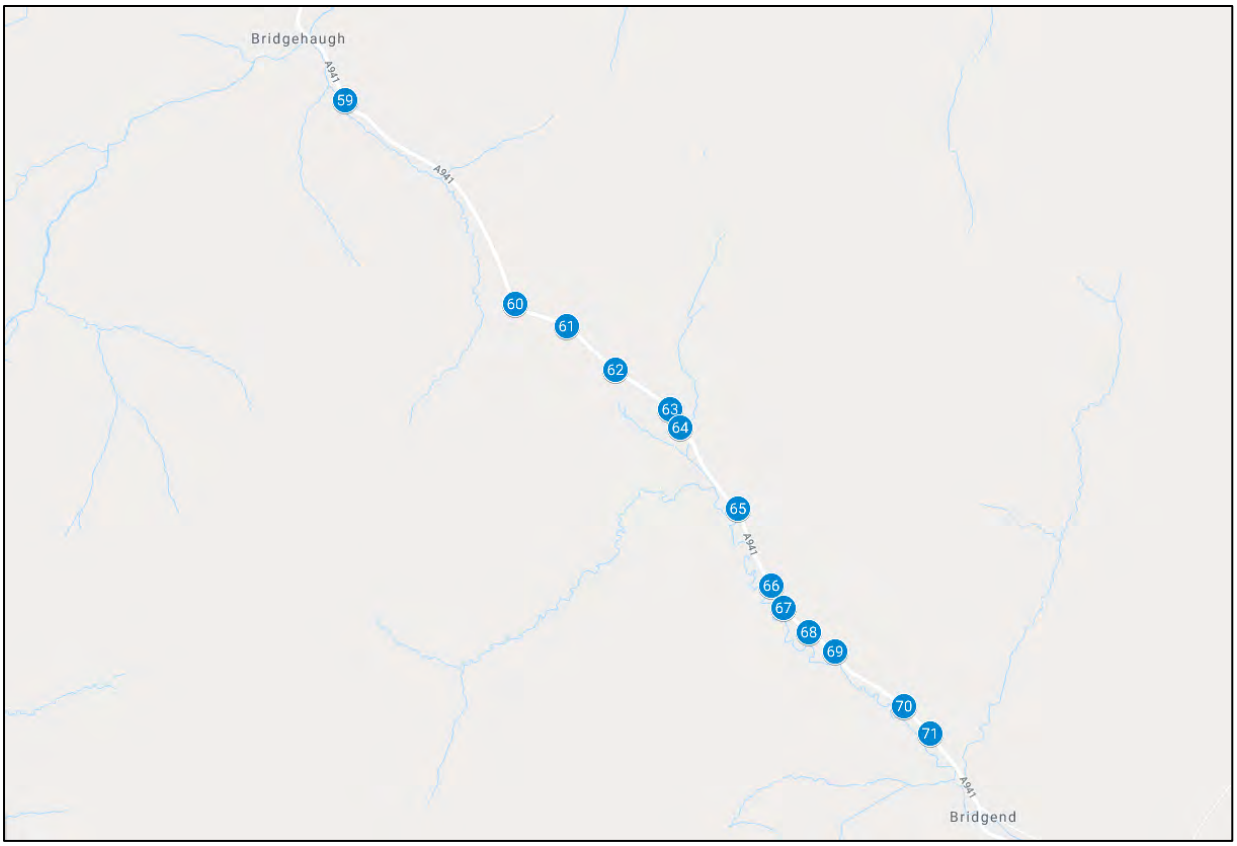

A90
A92
A957
B979
Stonehaven Golf Club
COWIE PARK
Redcloak House
Cowie
Stonehaven
Kirktown of Fetteresso
Auchenblae Rd
Arduthie Rd
Broomhill Rd
Slug Rd
13
14


Bieldside
Banchory
Devenick
A90
Milltimber
Ardoe
Peterculter
Mains of
Heathcot
Kirkton of
Maryculter
River Dee
15
A90
Muirskie


Oldmeldrum
Cairnbrogie
Udny G
Oyne
Maiden Stone
Kirkton of Bourtie
Hattoncrook
Chapel of Garioch
Hillbrae
Whiterashes
A96
Inverurie
Bograxie
Burnhervie
Kinmuck
Denmill
Blairdaff
Fetternear House
Clovenstone
Balbithan
Pitfichie
Kemnay
Kintore
Hatton of Fintray
Cothal
River Don
Monymusk
A90
Craigearn
Kinellar
Aberd
Airpo
Castle Fraser, Garden and Estate
Kirkhill Industrial Estate
Blackchambers
Ordhead
Sauchen
Achath
Clinterty
26
25
24
23
22
21
20
19
18
17
16


Drumdelgie
River Deveron
Huntly
Haugh of Glass
40
38
37
36
35
34
33
32
31
30
29
28
27


41
46
45
44
43
42
Bakebare
A920
A920
A920
49
48
47
50
Keithmore
Auchindoun
51
52
53
54
55
56
A941
Laggan
57
58
Google


Bridgehaugh
A941
59
A941
60
61
62
63
64
65
A941
66
67
68
69
70
71
A941
Bridgend