# Dendoldrum Farm Wind Turbine, Inverbervie: Archaeological Mitigation

Data Structure Report

by Peter Klemen issued 22<sup>nd</sup> June 2016 on behalf of Muirden Energy



## Quality Assurance

This report covers works which have been undertaken in keeping with the issued brief as modified by the agreed programme of works. The report has been prepared in keeping with the guidance of Rathmell Archaeology Limited on the preparation of reports. All works reported on within this document have been undertaken in keeping with the Institute for Archaeologists' Standards and Policy Statements and Code of Conduct.

Signed	Peter	Henren	Date	22/06/2016	
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#### Introduction

- 1. This Data Structure Report has been prepared for Muirden Energy in support of the erection of 1 No. 800kW Wind Turbine with associated ancillary infrastructure; including cable trenches, access track, turbine area, crane pad area and substations at Land to the South of Dendoldrum Farm, Inverbervie, DD10 0PL (Planning App: APP/2014/0522).
- 2. The archaeological works are designed to mitigate the impact on any archaeological remains within the development area to the agreement of Aberdeenshire Council Archaeology Service who advise Aberdeenshire Council on archaeological maters. Rathmell Archaeology Limited has been appointed by Muirden Energy LLP to undertake the development and implementation of archaeological mitigation works.
- 3. Aberdeenshire Council Archaeology Service has specified that the developer shall secure the implementation of an archaeological watching brief on any groundbreaking and development work following a 'Watching-brief' Condition (PAN 2/2011, SPP, SHEP). They have provided guidance on the structure of archaeological works required on this site during development. All works and reporting will comply with Aberdeenshire Council Archaeology Services *Standard for Archaeological* Fieldwork.

## Historical and Archaeological Background

- 4. Dendoldrum Farmstead (Canmore ID: 122222, ACAS HER: NO87SW0047) is located 1km to the west of Inverbervie and the development area is located in an arable field 600m south of the farmstead at 450m OD.
- 5. The first depiction and labelling of Dendoldrum is on Thomson's (1822) *Atlas of Scotland* (Figure 1a), there is little detail provided, but the farmstead is depicted as a black square and labelled as 'Dundoudrum'. The area to the south in which the development is located is blank.
- 6. With the 6-inch 1<sup>st</sup> edition Ordnance Survey (1868) (Figure 1b) a detailed depiction of the farmstead is provided with its current spelling of 'Dendoldrum'. This is as a 'C-shaped' range with an enclosure and associated building to the southwest and two buildings and garden to the northeast that may correspond with workers cottages or form a separate farm house form the main byres and barns.
- 7. The development area is depicted as improved land with the land to the west depicted as unimproved and the possible enclosure named 'Dendoldrum Hill' (Canmore ID: 36869, ACAS HER: NO87SW0004) depicted within the area of unimproved land.
- 8. By the time of the 6-inch 2<sup>nd</sup> edition Ordnance Survey (1904) (not shown) the farmsteading has been infilled to form a square with the two buildings to the northeast reduced to one. On the opposite side of the road there is a square building depicted that may be associated with the older buildings of Dendoldrum and linked with the farm. There has been no change to the land in which the development area is located.
- 9. There are no known archaeological sites within the development area however there are some in the vicinity. As previously mentioned, 'Dendoldrum Hill' (Canmore ID: 36869, ACAS HER: NO87SW0004) is a circular, turf-covered enclosure located approximately 75m to the west of the development area. Defined by a bank, 0.4m high, with a slight outer ditch and situated just off the summit of a hill on a gentle west facing slope and approximately 450m OD. It measures 26.5m in diameter crest to crest, with a possible ill-defined entrance on the N. It is considered not to be defensive due to its position and may be a tree-ring and is recorded on present mapping (Figure 2).
- 10. Another cropmark labelled 'Dendoldrum' (Canmore ID: 36863, ACAS HER: NO87SW0001) is located 280m to the west of Dendoldrum Farmstead and comprises a circular enclosure, measuring about 20m in diameter within its ditch, and on the north side there is a probable entrance. Presently nothing is visible on the ground.
- 11. To the east of the development area a find spot of two barbed and tanged arrowheads is recorded (ACAS HER: NO87SW0016) and reflects Bronze Age activity within the area.

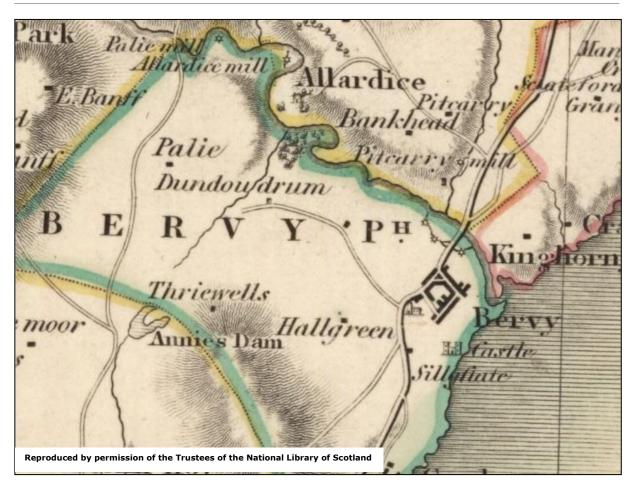


Figure 1a: Extract from Thomson Kincardine Shire (1822)

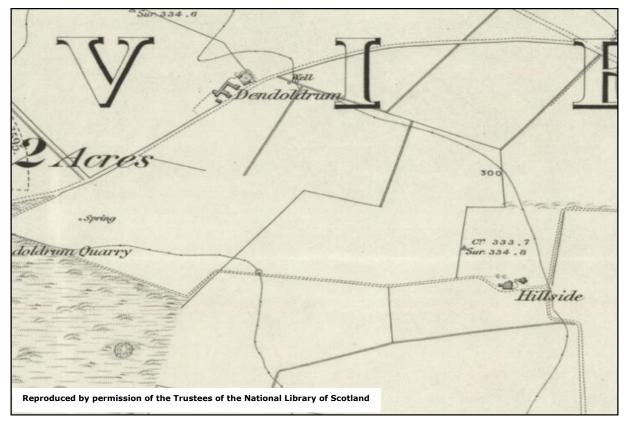


Figure 1b: Extract from the 6-inch  $1^{st}$  edition Ordnance Survey sheet XXV (1868)

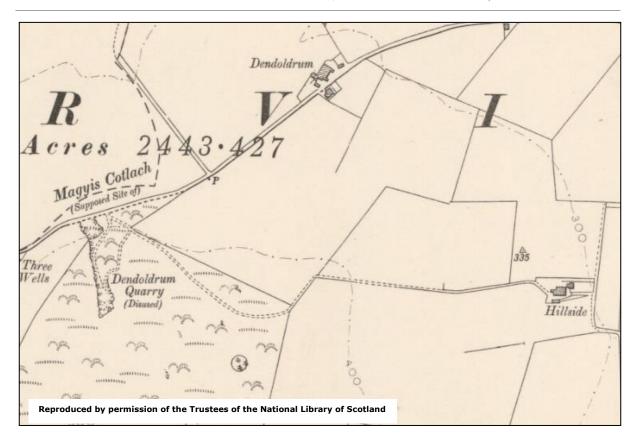


Figure 2a: Extract from the 6-inch 2<sup>nd</sup> edition Ordnance Survey sheet XXV (1904)



Figure 2b: Northern edge of turbine storage and crane pad area.



Figure 3a: Excavating turbine storage and crane pad area.



Figure 3b: Turbine storage, crane pad area and turbine area fully excavated. Turbine area located in the foreground of the image. Demonstrating context (002).

12. While no known archaeological sites have been recorded within the proposed development area. The close proximity of the prehistoric remains described above, and the lack of any previous development within the area, demonstrates the potential for archaeological features to have survived.

## **Project Works**

- 13. The programme of mitigation consisted of the archaeological monitoring of the topsoil excavation for the turbine and crane pad areas along with cable trenches associated with a single wind turbine. Works were undertaken by Rathmell Archaeology Ltd and consistent with the terms described in the Written Scheme of investigation (Klemen 2015). Monitoring, recording and excavation were carried out in conjunction with the terms of this document.
- 14. Archaeological monitoring works were undertaken over two phases. Site investigation works consisting of the excavation of the haul road, turbine base and crane pad area were undertaken on the  $4^{th}$ ,  $5^{th}$  and  $9^{th}$  May 2016. Excavations were carried out by a Hitachi Zaxis 210LC tracked excavator.
- 15. Monitoring of the cable trenches was undertaken on the 31<sup>st</sup> May and 1<sup>st</sup>, 10<sup>th</sup>, 13<sup>th</sup> and 14<sup>th</sup> June 2016. Excavations were carried out by a Kobi SK75 SR tracked excavator and a JCB JS130 LC.
- 16. Any potentially significant archaeological features, structures or deposits encountered were recorded by the archaeologist on site, using Rathmell Archaeology Ltd standard methods. All contexts, small finds and environmental samples were given unique numbers with bulk finds collected by context.
- 17. All works complied with Aberdeenshire Council Archaeological Services *Standard for Archaeological* Fieldwork, the Chartered Institute for Archaeologists' Standards and Policy Statements and Code of Conduct and Historic Environment Scotland Policy Statement.

## **Findings**

- 18. The first stage of archaeological monitoring works covered the machine digging of the turbine and turbine storage area and the crane pad area. The turbine was to be stored on site before being erected, thus the need for a larger area to store the turbine. The excavation started at the northern edge of this area and moved south with the total area excavated including the turbine area, turbine storage area and crane pad area being 1685m² (Figures 2b, 3a & 3b). The length of the haul road was 165m in length and 4m in width (Figures 4a & 4b).
- 19. Across the areas excavated 250mm-300mm of (001) topsoil was removed and exposing (002) the natural subsoil. Context (001) was characterised by a moderately compacted, mid-brown clay and sand mix with very frequent small to medium sized rounded stones (50mm-100mm in size) and very frequents rootlets. Context (002) was formed of a compacted orange brown clay with very frequent small to medium sized rounded stones (50mm-400mm in size). In areas the clay had a higher sand inclusion, approximately 50/50, although the overall majority exposed was clay (Figures 3b, 4a & 4b).
- 20. Only two features were recorded. Feature (003) was located in the north-western area of the turbine area and consisted of a north-south aligned 25m linear, measuring 400mm wide and filled with medium sized rounded stones (100mm-250mm in size). The last 2-2.5m at the south was is in better condition (Figure 5a).
- 21. The second feature, (004) consisted of a grouping of eight east-west aligned linears approximately 17m in length and running to the east edge of the turbine area (figures 6a & 6b). The linears were 700mm wide by 30-40mm in depth and spaced evenly at 250mm. They all had gently sloping sides and a rounded base forming a 'U-shaped' profile. The fill was formed by (001).



Figure 4a: Lower northern section of haul road and demonstrating context (002) recorded across the excavated areas.



Figure 4b: Upper southern section of haul road and demonstrating context (002) recorded across the excavated areas.



Figure 5a: Feature (003, rubble field drain in located in the north-western area of the turbine area.



Figure 5b: Feature (003, rubble field drain in located in the north-western area of the turbine area. Showing the last 2-2.5m.



Figure 6a: Feature (004), plough scars located in the eastern side of the turbine storage and crane pad area



Figure 6b: Feature (004), plough scars located in the eastern side of the turbine storage and crane pad area. With ranging rods.

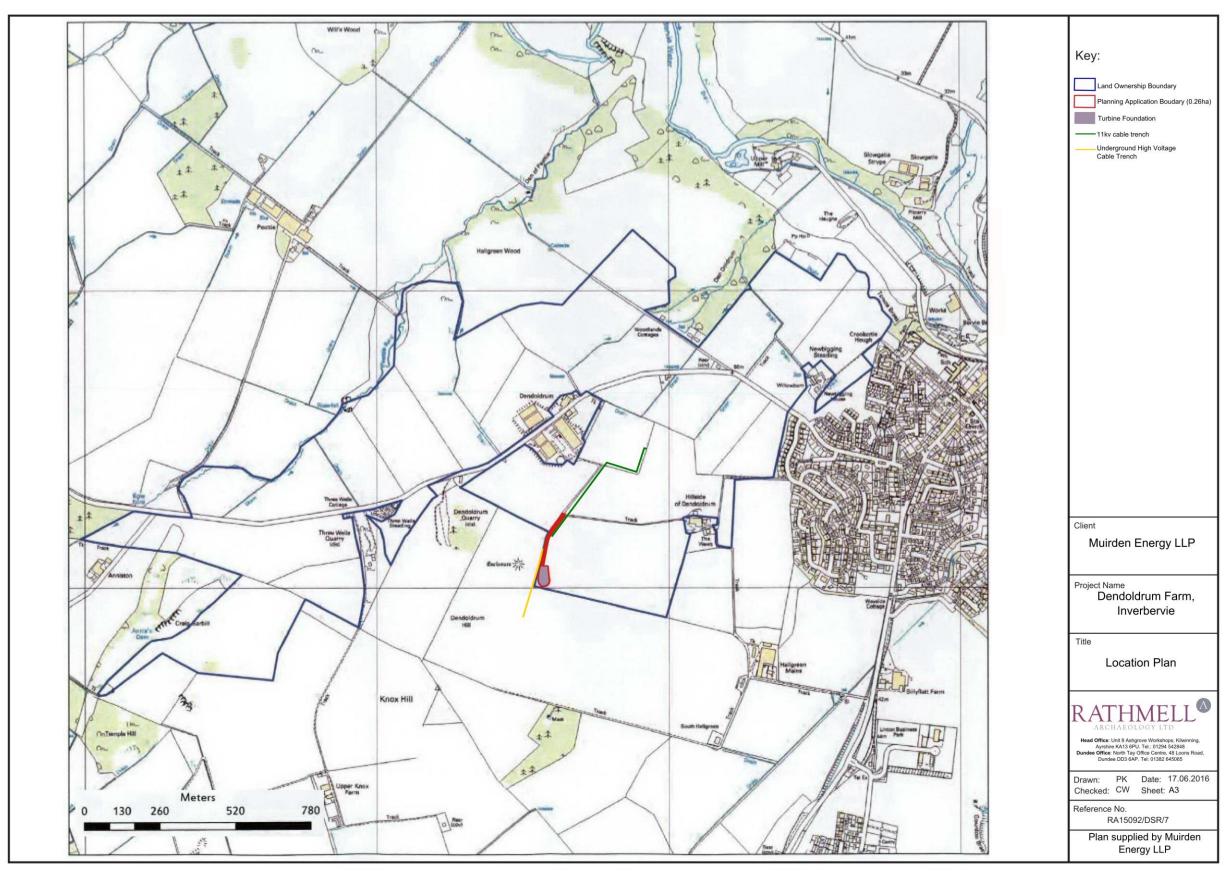


Figure 7: Location Plan of the monitored areas: turbine base, turbine storage and crane pad area, haul road and cable trench.

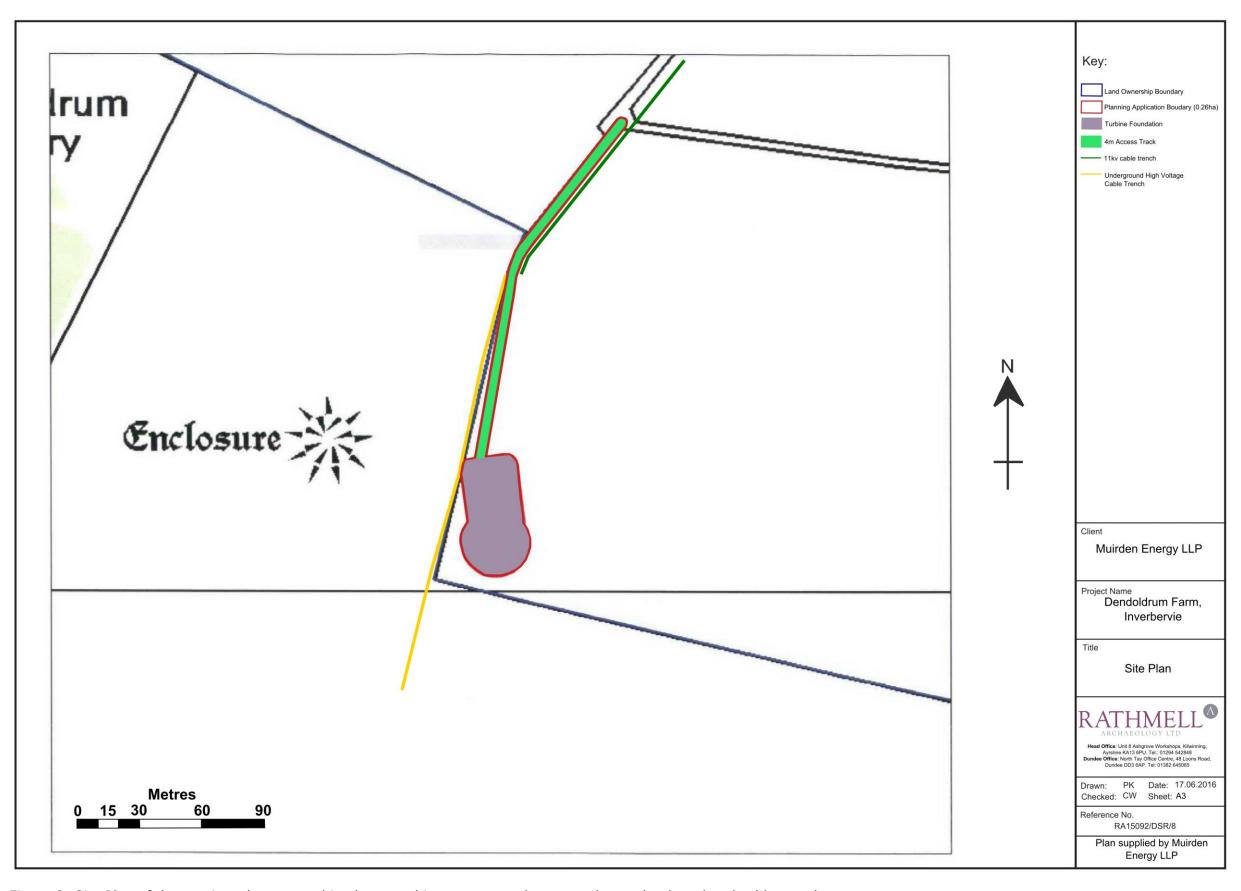


Figure 8: Site Plan of the monitored areas: turbine base, turbine storage and crane pad area, haul road and cable trench



Figure 9a: Cable trench to take the high voltage electricity cable underground looking north.



Figure 9b: Cable trench to take the high voltage electricity cable underground looking south.



Figure 10a: Post excavation of the upper southern section of the 11kv cable trench.



Figure 10b: Topsoil excavated from the lower north-eastern section of the 11kv cable trench.

- 22. The second stage of works comprised the excavation of two cable trenches (Figures 7 & 8). The first cable trench ran parallel to the haul road, turbine area and turbine storage area on its west side (Figures 9a & 9b). This trench was to take the high voltage line underground from present day overground route between electricity poles 24-28.
- 23. Context (001) comprised the same topsoil/ploughsoil as that recorded for the adjacent areas and at the same thickness. The dimensions for the cable trench were 248m in length and changed in width from 600mm to 2m wide. Context (002) formed the natural subsoil and the same as that recorded along the length of the haul road and across the turbine area, turbine storage area and crane pad area.
- 24. The second cable trench was to take the 11kv cable from the turbine to the existing substation. The route of the 11kv cable trench followed the east side of the haul road and along the fence line the adjoining field. In total 645m was monitored with the trench being a width of 600mm.
- 25. As with rest of the monitored areas, context (001) and (002) formed the topsoil and subsoil respectively. No features were recorded within either of the trenches. The only finds recorded were modern ceramic and some glass which were not kept.
- 26. No significant archaeological features were recorded during the course of the excavation works for either the haul road, turbine bases, crane pad area or the cable trench.

#### Discussion

- 27. In the immediate and wider landscape there are a number of sites that have been recorded representing archaeological activity in the form of Prehistoric features. However during each stage of monitoring works no significant archaeological features were uncovered.
- 28. The only anthropic features recorded were in the form of a rubble-filled drain exposed in the north-western area of the turbine area. This form of field drain is considered to represent 18<sup>th</sup> to early 19<sup>th</sup> century agricultural activity and would have been inserted during a period when the landscape across much of Scotland was under a regime of 'improvement'.
- 29. The second feature, characterised by a grouping of eight evenly separated linears located in the eastern area of the crane pad and turbine storage area represents agricultural activity in the form of plough scars. It is not known when the field was last ploughed, but the evenly spaced nature of the plough scars would suggest that they are modern and possibly 20<sup>th</sup> century in date.

#### Recommendations

- 30. The archaeological mitigation works did not reveal any significant archaeological material from within the development area. Those features that were revealed are considered to be of recent origin.
- 31. As such it is the recommendation of Rathmell Archaeology Ltd that no further works are appropriate. The appropriateness and acceptability of our recommendations rest with Aberdeenshire Council Archaeology Service on behalf of Aberdeenshire Council.

#### Conclusion

32. A programme of archaeological monitoring was carried over two phases on the 4<sup>th</sup>, 5<sup>th</sup> and 9<sup>th</sup> May 2016 and 1<sup>st</sup>, 10<sup>th</sup>, 13<sup>th</sup> and 14<sup>th</sup> June 2016 on behalf of Muirden Energy in support of the construction of a single wind turbine at Dendoldrum Farm, Inverbervie, Aberdeenshire (Planning Ref: APP/2014/0522). This Data Structure Report covers the monitoring works requested by Aberdeenshire Council Archaeology Service who advise Aberdeenshire Council on archaeological matters.

33. In the course of the archaeological monitoring no significant archaeology was uncovered, only two features relating to agricultural activities were recorded in the form of a rubble filed drain representing potentially 18<sup>th</sup> to 19<sup>th</sup> century activity and plough scars.

#### References

#### Documentary

Klemen, P. 2015 Dendoldrum Farm Wind Turbine: Archaeological Mitigation, Written Scheme of Investigation. Unpublished commercial report by Rathmell Archaeology Ltd.

#### Cartographic

Thomson, J.	1822	Kincardine Shire
Ordnance Survey	1868	6-inch First Edition Sheet 25
Ordnance Survey	1904	6-inch Second Edition Sheet 25

# Appendix 1: Registers

# Context Register

Context No.	Area/ Trench	Туре	Description	Interpretation
001	Whole area (haul road, crane pad, turbine base, cable trench)	Deposit	Moderately compacted, mid-brown colour composed of a clay and sand mix with very frequent small to medium sized rounded stones (50mm-100mm in size) and very frequents rootlets. 300-310mm in depth	Topsoil/ploughsoil
002	Whole area (haul road, crane pad, turbine base, cable trench)	Deposit	Compacted orange brown clay with very frequent small to medium sized rounded stones (50mm-400mm in size). In areas the clay has a higher sand inclusion, approximately 50/50, although the overall majority is clay.	Natural subsoil
003	Turbine storage area	Feature	Aligned N-S and located in the upper NW area of the turbine pad is a 25m linear, measuring 400mm wide and filled with medium sized rounded stones (50mm-250mm in size). The last 2-2.5m at the south end is in better condition.	Rubble field drain
004	Turbine storage area	Feature	E-W aligned linear, grouping of 8 and approximately 17m in length and running to the east edge of the turbine area. Linears are 700mm wide by 30-40mm in depth and are evenly 250mm. Gently sloping sides and a rounded base forming a 'U-shaped' profile. Fill formed by (001).	Plough scars

### Photographic Register

Image No.	Digital	Description	From	Date
01	4083	Pre- excavation of crane pad area and turbine storage area	NE	04/05/16
02	4084	Pre- excavation of crane pad area and turbine storage area	SE	04/05/16
03	4085	Pre- excavation of route for the track, looking north	S	04/05/16
04	4086	Route of track leading to crane pad and turbine storage area	N	04/05/16
05	4087	Working shot: area where track widens to form crane pad	N	04/05/16
06	4088	Rubble field drain (003)	S	05/05/16
07	4089	Rubble field drain (003), south end	W	05/05/16
08	4090	Showing context (0010 & (002)	N	05/05/16
09	4091	South & Southwest area of the turbine storage area and (002)	N	05/05/16
10	4092	Context (002)	S	05/05/16
11	4093	Working shot	SE	05/05/16
12	4094	(004) - plough scars, aligned E-W	W	05/05/16
13	4095	(004) - plough scars, aligned E-W	SW	05/05/16
14	4096	(004) - plough scars, aligned E-W	W	05/05/16
15	4097	Working shot	W	05/05/16
16	4098	Site photo: turbine storage and crane pad area	SW	05/05/16
17	4099	Site photo: turbine storage and crane pad area	SW	05/05/16
18	4100	Turbine storage area fully excavated	W	05/05/16
19	4101	Turbine storage area fully excavated	SW	05/05/16
20	4102	Turbine storage area and crane pad area fully excavated	SE	05/05/16
21	4103	Possible rubble field drain	SSE	05/05/16

Image No.	Digital	Description	From	Date
22	4104	Turbine area	E	05/05/16
23	4105	Turbine area	W	05/05/16
24	4106	Turbine area, storage area and crane pad fully excavated	S	05/05/16
25	4107	Working shot: track	S	05/05/16
26	4108	Working shot: top area of track	N	09/05/16
27	4109	Working shot: lower area of track	S	09/05/16
28	4110	Working shot: lower area of track	SE	09/05/16
29	4111	Lower 'N' part of track where meets existing track	N	09/05/16
30	4112	Upper 'S' part of track	S	09/05/16
31	4113	Between poles 27 & 28, per-excavation of cable trench route	N	31/05/16
32	4114	Working shot: cable trench between poles 27 & 28	N	31/05/16
33	4115	Post-excavation of cable trench between poles 28 & 27	N	01/06/16
34	4116	Pre-excavation route of cable trench between poles 27-24	S	01/06/16
35	4117	Pre-excavation route of cable trench between poles 25-24	S	01/06/16
36	4118	Working shot: cable trench	N	01/06/16
37	4119	Cable trench; 'N' end at pole 24	N	01/06/16
38	4120	Cable trench; looking North to poles 25 & 24	S	01/06/16
39	4121	Cable trench; looking South to poles 25 & 24	N	01/06/16
40	4122	From pole 28 looking North	S	01/06/16
41	4123	11kv cable trench, pre-excavation, following track for 50m	NE	10/06/16
42	4124	11kv cable trench, pre-excavation, follows side of the field	SW	10/06/16
43	4125	11kv cable trench, pre-excavation, follows side of the field	W	10/06/16
44	4126	11kv cable trench, pre-excavation, follows side of the field and where joins to electricity pole	S	10/06/16

Image No.	Digital	Description	From	Date
45	4127	Post-excavation, upper southern area of cable trench	S	10/06/16
46	4128	Upper southern section of 11kv cable trench	SE	13/06/16
47	4129	Working shot on 11kv cable trench	SW	13/06/16
48	4130	View to south along upper & mid-section of cable trench	NE	13/06/16
49	4131	Lower northern section of 11kv trench	W	13/06/16
50	4132	Lower northern section of 11kv trench	W	13/06/16
51	4134	Fully excavated, lower northern section of 11kv trench	E	14/06/16
52	4135	Lower northern section of 11kv trench	NE	14/06/16

# Appendix 2: Discovery & Excavation in Scotland

LOCAL AUTHORITY:	Aberdeenshire
PROJECT TITLE/SITE NAME:	Dendoldrum Farm Wind Turbine, Inverbervie
PROJECT CODE:	RA15092
PARISH:	Inverbervie
NAME OF CONTRIBUTOR:	Peter Klemen
NAME OF ORGANISATION:	Rathmell Archaeology Limited
TYPE(S) OF PROJECT:	Monitoring
NMRS NO(S):	None
SITE/MONUMENT TYPE(S):	None
SIGNIFICANT FINDS:	None
NGR (2 letters, 8 or 10 figures)	NO 81564 72025 (Centred)
START DATE (this season)	04 <sup>th</sup> May 2016
END DATE (this season)	14 <sup>th</sup> June 2016
PREVIOUS WORK (incl. DES ref.)	None
MAIN (NARRATIVE) DESCRIPTION: (may include information from other fields)	A programme of archaeological monitoring was carried over two phases on the 4th, 5th and 9th May 2016 and 1st, 10th, 13th and 14th June 2016 on behalf of Muirden Energy in support of the construction of a single wind turbine at Dendoldrum Farm, Inverbervie, Aberdeenshire (Planning Ref: APP/2014/0522). This Data Structure Report covers the monitoring works requested by Aberdeenshire Council Archaeology Service who advise Aberdeenshire Council on archaeological matters.
	In the course of the archaeological monitoring no significant archaeology was uncovered, only two features relating to agricultural activities were recorded in the form of a rubble filed drain representing potentially 18th to 19th century activity and plough scars.
PROPOSED FUTURE WORK:	None
CAPTION(S) FOR ILLUSTRS:	None
SPONSOR OR FUNDING BODY:	Muirden Energy
ADDRESS OF MAIN CONTRIBUTOR:	Unit 8 Ashgrove Workshops, Kilwinning, Ayrshire KA13 6PU
EMAIL ADDRESS:	contact@rathmell-arch.co.uk
ARCHIVE LOCATION (intended/deposited)	Report to Aberdeenshire Council Archaeology Service and archive to RCAHMS Collections.

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