

Appendix VI. SOUND IMPACT ASSESSMENT



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1480 Bedford Highway
Bedford, Nova Scotia
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December 19, 2013

RE: Bateston Community Wind Project
Sound Modeling

The attached report provides the results of the sound model which we ran for the proposed wind turbine. The sound analysis was completed using WindPro 2.9.207 which provides a comprehensive suite of wind farm design and modeling software. The sound model is based on the ISO 9613-2 – Attenuation of sound during propagation outdoors, Part 2. This international standard provides a conservative estimate of sound propagation and subsequent environmental attenuation as a result of ground porosity, atmospheric attenuation and geometric spreading.

Ground attenuation is considered and uses the alternative case described in the ISO-9613-2 standard. This method uses the surface shape of the terrain to determine the sound dampening characteristic between the turbine hub and the receiver. The terrain is considered to be a bare earth model with no forest, vegetation or buildings. The terrain model was developed from 5 m contour data obtained from the Nova Scotia Geomatics Center.

The A-weighted sound pressure levels are modeled and represent the range of frequencies that are audible to the human ear. Noise emission data were obtained from the turbine manufacturer specifications and are based on calculated sound pressure levels for a variety of wind speeds (*SIAS-04SPL E-92 OM 1 2.3 MW Rev1_4-eng-eng.doc* dated December, 2012). A number of input parameters summarized in Table 1 were included in the model:

A conservative and standardized approach has been incorporated into the analysis which is based on modeling individual sound levels at a mean wind speed of 8 m/s (10 m height) which is representative for the site.

The resultant A-weighted sound pressure levels were mapped to determine whether the wind turbine will impact surrounding receptors. A threshold level of 40 dBA is currently recognized by Nova Scotia Environment and all of the receptors were below this threshold level. The details are provided in the attached report.



Table 1: Turbine Specifications Used for Sound Modeling.

Description	Specification
Manufacturer	Enercon
Model	E-92
Hub Height	98 m
Rotor Diameter	92 m
Operation Mode	Level 0
Rated Power Output	2300 kW
Noise Operation Model	Level 1
Maximum Sound Level (nacelle)	104.4 dBA @ 8 m/s

Kirk Schmidt
Vice President Operations
AL-PRO Wind Energy Consulting Canada Inc.

Project: **Bateston**
 Description: Celtic Current LP
 2.35 MW Proposed Wind Project
 Bateston, Cape Breton County
 Nova Scotia, Canada

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DECIBEL - Main Result

Noise calculation model:

ISO 9613-2 General

Wind speed:

8.0 m/s

Ground attenuation:

None

Meteorological coefficient, C0:

0.0 dB

Type of demand in calculation:

1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

Noise values in calculation:

All noise values are mean values (Lwa) (Normal)

Pure tones:

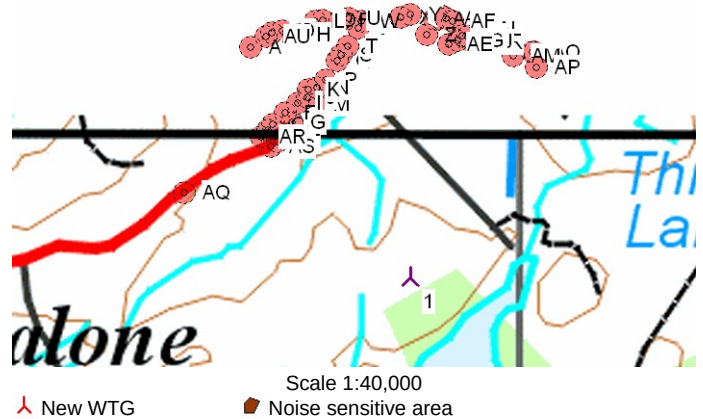
Pure and Impulse tone penalty are added to WTG source noise

Height above ground level, when no value in NSA object:

0.0 m Don't allow override of model height with height from NSA object

Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:

0.0 dB(A)



WTGs

UTM NAD83 Zone: 20				WTG type			Noise data				Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	
East	North	Z	Row data/Description	Valid	Manuf.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Creator Name				
		[m]												
1	739,474	5,097,949	70.0 ENERCON E-92 2,3 MW 23...	Yes	ENERCON	E-92 2,3 MW-2,300	2,300	92.0	98.0	EMD	Level 0 - calculated - Op.Mode I - 03/2012	8.0	104.4	0 dB

Calculation Results

Sound Level

UTM NAD83 Zone: 20				Demands		Sound Level		Demands fulfilled ?	
No.	Name	East	North	Z	Imission height [m]	Noise [dB(A)]	From WTGs [dB(A)]	Distance to noise demand [m]	Noise
	A A	738,580	5,099,134	28.5	0.0	40.0	30.1	917	Yes
	B B	738,688	5,099,213	22.6	0.0	40.0	30.1	922	Yes
	C C	738,714	5,098,727	35.2	0.0	40.0	33.5	520	Yes
	D D	738,744	5,099,227	20.4	0.0	40.0	30.2	905	Yes
	E E	738,689	5,098,700	37.2	0.0	40.0	33.5	518	Yes
	F F	738,778	5,098,796	32.8	0.0	40.0	33.4	529	Yes
	G G	738,816	5,098,742	30.2	0.0	40.0	34.1	464	Yes
	H H	738,830	5,099,209	20.7	0.0	40.0	30.6	847	Yes
	I I	738,839	5,098,849	30.0	0.0	40.0	33.4	534	Yes
	J J	738,888	5,098,882	30.0	0.0	40.0	33.4	534	Yes
	K K	738,893	5,098,920	30.0	0.0	40.0	33.1	564	Yes
	L L	738,915	5,099,282	20.0	0.0	40.0	30.4	879	Yes
	M M	738,934	5,098,847	27.7	0.0	40.0	33.9	481	Yes
	N N	738,940	5,098,931	30.0	0.0	40.0	33.2	550	Yes
	O O	738,953	5,099,289	20.0	0.0	40.0	30.5	871	Yes
	P P	738,984	5,098,975	29.8	0.0	40.0	33.0	570	Yes
	Q Q	739,038	5,099,080	22.6	0.0	40.0	32.4	645	Yes
	R R	739,044	5,099,297	20.0	0.0	40.0	30.6	848	Yes
	S S	739,058	5,099,110	21.8	0.0	40.0	32.2	667	Yes
	T T	739,092	5,099,160	20.4	0.0	40.0	31.8	703	Yes
	U U	739,094	5,099,304	19.9	0.0	40.0	30.7	841	Yes
	V V	739,145	5,099,259	17.7	0.0	40.0	31.2	784	Yes
	W W	739,161	5,099,296	17.3	0.0	40.0	30.9	815	Yes
	X X	739,368	5,099,323	11.4	0.0	40.0	30.9	810	Yes
	Y Y	739,420	5,099,338	11.0	0.0	40.0	30.8	822	Yes
	Z Z	739,508	5,099,234	15.0	0.0	40.0	31.7	717	Yes
	AA AA	739,545	5,099,319	10.5	0.0	40.0	31.0	804	Yes

To be continued on next page...

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DECIBEL - Main Result

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Noise sensitive area ATM NAD83 Zone: 20

Noise sensitive area					ATM NAD83 Zone: 20		Demands		Sound Level		Demands fulfilled ?	
No.	Name	East	North	Z	Imission height	Noise	From WTGs	Distance to noise demand	Noise			
				[m]	[m]	[dB(A)]	[dB(A)]	[m]				
	AB AB	739,566	5,099,322	10.3		0.0	40.0	30.9		807	Yes	
	AC AC	739,589	5,099,335	10.0		0.0	40.0	30.8		822	Yes	
	AD AD	739,607	5,099,326	10.0		0.0	40.0	30.9		815	Yes	
	AE AE	739,629	5,099,192	13.9		0.0	40.0	32.0		684	Yes	
	AF AF	739,645	5,099,316	10.0		0.0	40.0	30.9		809	Yes	
	AG AG	739,673	5,099,214	12.6		0.0	40.0	31.7		711	Yes	
	AH AH	739,697	5,099,238	12.0		0.0	40.0	31.5		739	Yes	
	AI AI	739,727	5,099,237	11.1		0.0	40.0	31.5		743	Yes	
	AJ AJ	739,750	5,099,209	10.0		0.0	40.0	31.7		721	Yes	
	AK AK	739,782	5,099,210	10.0		0.0	40.0	31.6		729	Yes	
	AL AL	739,789	5,099,281	8.5		0.0	40.0	31.0		799	Yes	
	AM AM	739,971	5,099,143	13.2		0.0	40.0	31.6		725	Yes	
	AN AN	740,070	5,099,166	11.2		0.0	40.0	31.1		786	Yes	
	AO AO	740,083	5,099,166	10.8		0.0	40.0	31.1		792	Yes	
	AP AP	740,095	5,099,087	16.1		0.0	40.0	31.6		728	Yes	
	AQ AQ	738,261	5,098,348	52.4		0.0	40.0	31.8		707	Yes	
	AR AR	738,656	5,098,661	40.0		0.0	40.0	33.6		516	Yes	
	AS AS	738,709	5,098,613	34.9		0.0	40.0	34.3		444	Yes	
	AT AT	738,740	5,098,641	33.1		0.0	40.0	34.3		440	Yes	
	AU AU	738,658	5,099,189	24.9		0.0	40.0	30.1		918	Yes	

Distances (m)**WTG**

NSA	1
A	1484
B	1489
C	1088
D	1472
E	1086
F	1096
G	1031
H	1415
I	1101
J	1101
K	1131
L	1446
M	1048
N	1117
O	1438
P	1137
Q	1211
R	1414
S	1233
T	1269
U	1407
V	1351
W	1382
X	1378
Y	1390
Z	1286
AA	1372
AB	1375
AC	1391
AD	1384

To be continued on next page...

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WTG

NSA 1
AE 1252
AF 1378
AG 1280
AH 1308
AI 1312
AJ 1290
AK 1298
AL 1368
AM 1293
AN 1355
AO 1361
AP 1296
AQ 1277
AR 1084
AS 1013
AT 1009
AU 1484

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DECIBEL - Detailed results

Noise calculation model: ISO 9613-2 General 8.0 m/s

Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
 (when calculated with ground attenuation, then Dc = Domega)

LWA,ref: Sound pressure level at WTG
 K: Pure tone
 Dc: Directivity correction
 Adiv: the attenuation due to geometrical divergence
 Aatm: the attenuation due to atmospheric absorption
 Agr: the attenuation due to ground effect
 Abar: the attenuation due to a barrier
 Amisc: the attenuation due to miscellaneous other effects
 Cmet: Meteorological correction

Calculation Results

Noise sensitive area: A A

WTG		Wind speed: 8.0 m/s											
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet	
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	
1	1,484	1,491	30.10	104.4	3.00	74.47	2.83	0.00	0.00	0.00	77.30	0.00	
Sum	30.10												

Noise sensitive area: B B

WTG		Wind speed: 8.0 m/s											
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet	
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	
1	1,489	1,496	30.06	104.4	3.00	74.50	2.84	0.00	0.00	0.00	77.34	0.00	
Sum	30.06												

Noise sensitive area: C C

WTG		Wind speed: 8.0 m/s											
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet	
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	
1	1,088	1,096	33.52	104.4	3.00	71.80	2.08	0.00	0.00	0.00	73.88	0.00	
Sum	33.52												

Noise sensitive area: D D

WTG		Wind speed: 8.0 m/s											
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet	
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	
1	1,472	1,479	30.19	104.4	3.00	74.40	2.81	0.00	0.00	0.00	77.21	0.00	
Sum	30.19												

Noise sensitive area: E E

WTG		Wind speed: 8.0 m/s											
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet	
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	
1	1,086	1,094	33.54	104.4	3.00	71.78	2.08	0.00	0.00	0.00	73.86	0.00	
Sum	33.54												

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DECIBEL - Detailed results**Noise calculation model: ISO 9613-2 General 8.0 m/s****Noise sensitive area: F F**

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,096	1,104	33.44	104.4	3.00	71.86	2.10	0.00	0.00	0.00	73.96	0.00
Sum	33.44											

Noise sensitive area: G G

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,031	1,040	34.08	104.4	3.00	71.34	1.98	0.00	0.00	0.00	73.32	0.00
Sum	34.08											

Noise sensitive area: H H

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,415	1,422	30.64	104.4	3.00	74.06	2.70	0.00	0.00	0.00	76.76	0.00
Sum	30.64											

Noise sensitive area: I I

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,101	1,110	33.38	104.4	3.00	71.91	2.11	0.00	0.00	0.00	74.02	0.00
Sum	33.38											

Noise sensitive area: J J

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,101	1,110	33.38	104.4	3.00	71.91	2.11	0.00	0.00	0.00	74.02	0.00
Sum	33.38											

Noise sensitive area: K K

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,131	1,139	33.10	104.4	3.00	72.13	2.16	0.00	0.00	0.00	74.30	0.00
Sum	33.10											

Noise sensitive area: L L

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,446	1,453	30.39	104.4	3.00	74.25	2.76	0.00	0.00	0.00	77.01	0.00
Sum	30.39											

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DECIBEL - Detailed results**Noise calculation model: ISO 9613-2 General 8.0 m/s****Noise sensitive area: M M**

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,048	1,058	33.90	104.4	3.00	71.49	2.01	0.00	0.00	0.00	73.50	0.00
Sum		33.90										

Noise sensitive area: N N

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,117	1,126	33.23	104.4	3.00	72.03	2.14	0.00	0.00	0.00	74.17	0.00
Sum		33.23										

Noise sensitive area: O O

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,438	1,445	30.46	104.4	3.00	74.20	2.75	0.00	0.00	0.00	76.94	0.00
Sum		30.46										

Noise sensitive area: P P

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,137	1,146	33.04	104.4	3.00	72.18	2.18	0.00	0.00	0.00	74.36	0.00
Sum		33.04										

Noise sensitive area: Q Q

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,211	1,220	32.35	104.4	3.00	72.73	2.32	0.00	0.00	0.00	75.05	0.00
Sum		32.35										

Noise sensitive area: R R

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,415	1,422	30.64	104.4	3.00	74.06	2.70	0.00	0.00	0.00	76.76	0.00
Sum		30.64										

Noise sensitive area: S S

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,233	1,242	32.16	104.4	3.00	72.88	2.36	0.00	0.00	0.00	75.24	0.00
Sum		32.16										

Project:

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WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,269	1,278	31.84	104.4	3.00	73.13	2.43	0.00	0.00	0.00	75.56	0.00
Sum	31.84											

Noise sensitive area: U U

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,407	1,415	30.70	104.4	3.00	74.02	2.69	0.00	0.00	0.00	76.70	0.00
Sum	30.70											

Noise sensitive area: V V

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,351	1,359	31.15	104.4	3.00	73.66	2.58	0.00	0.00	0.00	76.25	0.00
Sum	31.15											

Noise sensitive area: W W

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,382	1,390	30.89	104.4	3.00	73.86	2.64	0.00	0.00	0.00	76.51	0.00
Sum	30.89											

Noise sensitive area: X X

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,378	1,387	30.93	104.4	3.00	73.84	2.63	0.00	0.00	0.00	76.47	0.00
Sum	30.93											

Noise sensitive area: Y Y

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,390	1,399	30.83	104.4	3.00	73.91	2.66	0.00	0.00	0.00	76.57	0.00
Sum	30.83											

Noise sensitive area: Z Z

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,286	1,295	31.70	104.4	3.00	73.24	2.46	0.00	0.00	0.00	75.70	0.00
Sum	31.70											

Project:

Bateston

Description:

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Bateston, Cape Breton County
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DECIBEL - Detailed results**Noise calculation model: ISO 9613-2 General 8.0 m/s****Noise sensitive area: AA AA**

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,372	1,381	30.97	104.4	3.00	73.80	2.62	0.00	0.00	0.00	76.43	0.00
Sum	30.97											

Noise sensitive area: AB AB

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,376	1,385	30.94	104.4	3.00	73.83	2.63	0.00	0.00	0.00	76.46	0.00
Sum	30.94											

Noise sensitive area: AC AC

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,391	1,400	30.82	104.4	3.00	73.92	2.66	0.00	0.00	0.00	76.58	0.00
Sum	30.82											

Noise sensitive area: AD AD

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,384	1,393	30.88	104.4	3.00	73.88	2.65	0.00	0.00	0.00	76.52	0.00
Sum	30.88											

Noise sensitive area: AE AE

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,252	1,262	31.98	104.4	3.00	73.02	2.40	0.00	0.00	0.00	75.42	0.00
Sum	31.98											

Noise sensitive area: AF AF

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,378	1,387	30.93	104.4	3.00	73.84	2.63	0.00	0.00	0.00	76.47	0.00
Sum	30.93											

Noise sensitive area: AG AG

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,280	1,289	31.74	104.4	3.00	73.21	2.45	0.00	0.00	0.00	75.66	0.00
Sum	31.74											

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DECIBEL - Detailed results**Noise calculation model: ISO 9613-2 General 8.0 m/s****Noise sensitive area: AH AH**

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,308	1,317	31.50	104.4	3.00	73.39	2.50	0.00	0.00	0.00	75.90	0.00
Sum	31.50											

Noise sensitive area: AI AI

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,312	1,321	31.47	104.4	3.00	73.42	2.51	0.00	0.00	0.00	75.93	0.00
Sum	31.47											

Noise sensitive area: AJ AJ

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,290	1,299	31.66	104.4	3.00	73.28	2.47	0.00	0.00	0.00	75.74	0.00
Sum	31.66											

Noise sensitive area: AK AK

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,298	1,307	31.59	104.4	3.00	73.33	2.48	0.00	0.00	0.00	75.81	0.00
Sum	31.59											

Noise sensitive area: AL AL

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,368	1,378	31.00	104.4	3.00	73.78	2.62	0.00	0.00	0.00	76.40	0.00
Sum	31.00											

Noise sensitive area: AM AM

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,293	1,302	31.63	104.4	3.00	73.29	2.47	0.00	0.00	0.00	75.77	0.00
Sum	31.63											

Noise sensitive area: AN AN

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,355	1,364	31.11	104.4	3.00	73.70	2.59	0.00	0.00	0.00	76.29	0.00
Sum	31.11											

Project:

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DECIBEL - Detailed results**Noise calculation model: ISO 9613-2 General 8.0 m/s****Noise sensitive area: AO AO**

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,361	1,370	31.06	104.4	3.00	73.73	2.60	0.00	0.00	0.00	76.34	0.00
Sum	31.06											

Noise sensitive area: AP AP

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,296	1,305	31.61	104.4	3.00	73.31	2.48	0.00	0.00	0.00	75.79	0.00
Sum	31.61											

Noise sensitive area: AQ AQ

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,277	1,282	31.81	104.4	3.00	73.16	2.44	0.00	0.00	0.00	75.59	0.00
Sum	31.81											

Noise sensitive area: AR AR

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,084	1,092	33.56	104.4	3.00	71.76	2.07	0.00	0.00	0.00	73.84	0.00
Sum	33.56											

Noise sensitive area: AS AS

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,013	1,022	34.27	104.4	3.00	71.19	1.94	0.00	0.00	0.00	73.13	0.00
Sum	34.27											

Noise sensitive area: AT AT

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,009	1,018	34.31	104.4	3.00	71.15	1.93	0.00	0.00	0.00	73.09	0.00
Sum	34.31											

Noise sensitive area: AU AU

WTG		Wind speed: 8.0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1,484	1,491	30.09	104.4	3.00	74.47	2.83	0.00	0.00	0.00	77.31	0.00
Sum	30.09											

Project:

Bateston

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DECIBEL - Assumptions for noise calculation**Noise calculation model:** ISO 9613-2 General 8.0 m/s**Noise calculation model:**

ISO 9613-2 General

Wind speed:

8.0 m/s

Ground attenuation:

None

Meteorological coefficient, C0:

0.0 dB

Type of demand in calculation:

1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

Noise values in calculation:

All noise values are mean values (Lwa) (Normal)

Pure tones:

Pure and Impulse tone penalty are added to WTG source noise

Height above ground level, when no value in NSA object:

0.0 m Don't allow override of model height with height from NSA object

Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:

0.0 dB(A)

Octave data not required

Air absorption: 1.9 dB/km

WTG: ENERCON E-92 2,3 MW 2300 92.0 !-!**Noise:** Level 0 - calculated - Op.Mode I - 03/2012

Source Source/Date Creator Edited

Manufacturer 3/16/2012 EMD 3/16/2012 5:58 PM

According to manufacturer specification document "SIAS-04-SPL-E-92 OM I 2 3 MW Est Rev1 1-en-eng.pdf" dated 03/2012

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones
From Windcat	98.0	8.0	104.4	No

NSA: A-A**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** B-B**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** C-C**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** D-D**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:**

Project:

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DECIBEL - Assumptions for noise calculation**Noise calculation model:** ISO 9613-2 General 8.0 m/s**NSA: E-E****Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA: F-F****Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA: G-G****Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA: H-H****Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA: I-I****Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA: J-J****Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA: K-K****Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA: L-L****Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:**

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DECIBEL - Assumptions for noise calculation**Noise calculation model:** ISO 9613-2 General 8.0 m/s**NSA:** M-M**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** N-N**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** O-O**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** P-P**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** Q-Q**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** R-R**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** S-S**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** T-T**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:**

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DECIBEL - Assumptions for noise calculation**Noise calculation model:** ISO 9613-2 General 8.0 m/s**NSA:** U-U**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** V-V**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** W-W**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** X-X**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** Y-Y**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** Z-Z**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AA-AA**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AB-AB**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:**

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DECIBEL - Assumptions for noise calculation**Noise calculation model:** ISO 9613-2 General 8.0 m/s**NSA:** AC-AC**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AD-AD**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AE-AE**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AF-AF**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AG-AG**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AH-AH**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AI-AI**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AJ-AJ**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:**

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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DECIBEL - Assumptions for noise calculation**Noise calculation model:** ISO 9613-2 General 8.0 m/s**NSA:** AK-AK**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AL-AL**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AM-AM**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AN-AN**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AO-AO**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AP-AP**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AQ-AQ**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:****NSA:** AR-AR**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40.0 dB(A)**Distance demand:**

Project:

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DECIBEL - Assumptions for noise calculation

Noise calculation model: ISO 9613-2 General 8.0 m/s

NSA: AS-AS

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40.0 dB(A)

Distance demand:

NSA: AT-AT

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40.0 dB(A)

Distance demand:

NSA: AU-AU

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40.0 dB(A)

Distance demand:

Project:

Bateston

Description:

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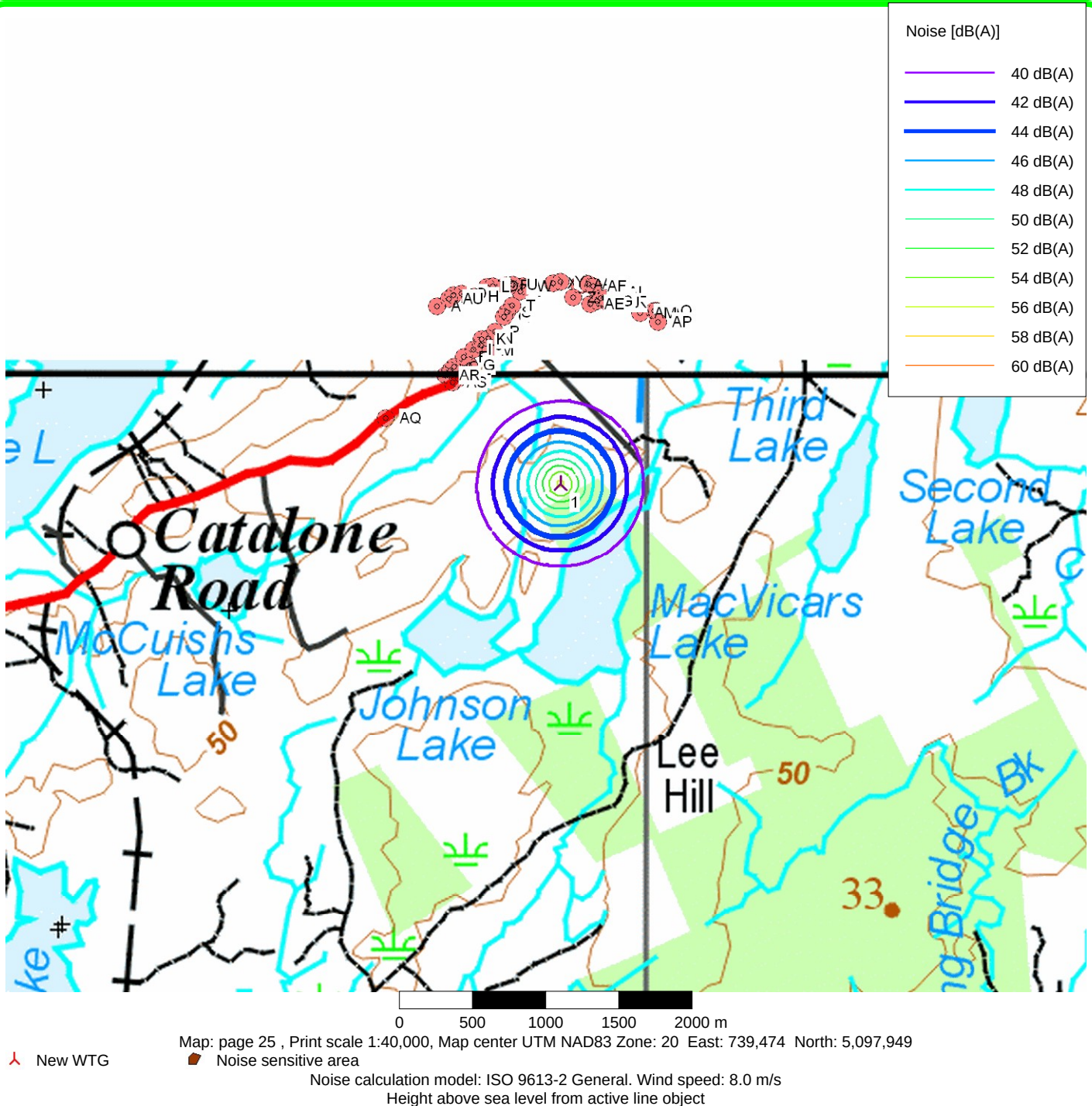
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Calculated:

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DECIBEL - Map 8.0 m/s

Noise calculation model: ISO 9613-2 General 8.0 m/s



Appendix VII. PHOTOMONTAGES AND ZONE OF VISUAL INFLUENCE

Bateston Community Wind Project

Photo Montage Locations

Legend:

 Image Location

Project Features

 Project Area

 Proposed E92 Turbine

Existing Features

 Road

 Trail

 Stream

 Contour

 Water

 Swamp

 Forest

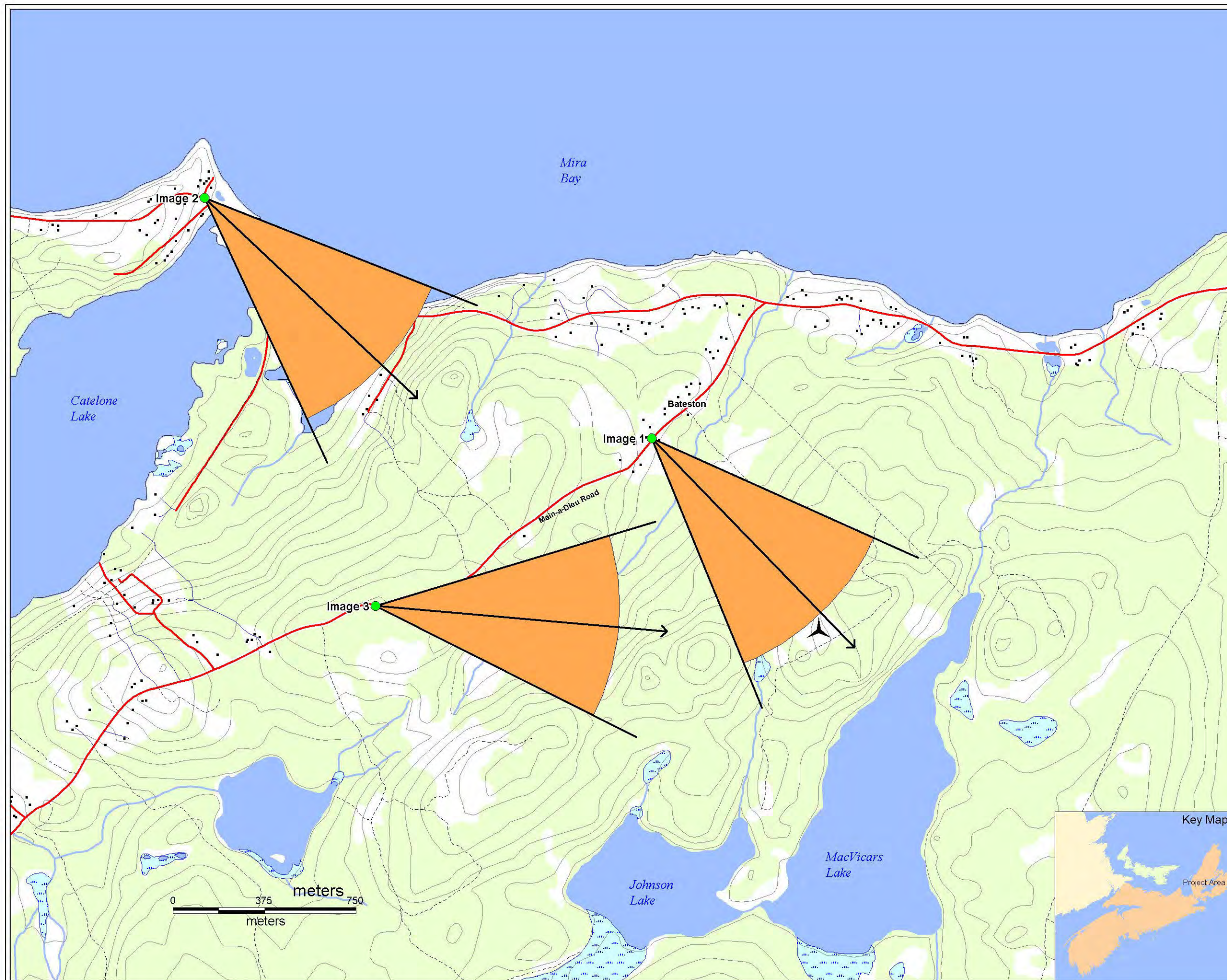


Turbine Model: Enercon E-92
Hub Height: 98 m
Rotor Diameter: 92 m
Rated Power: 2,350 kW

Scale: 1: 15,000

Source:	Base Data: Nova Scotia Geomatics Centre, Nova Scotia Topographical Database (NSTDB) Surficial Geologic Map of the Province of Nova Scotia, Version 2	
Dec 17, 2013	Coordinate System: NAD 1983 UTM Zone 20N	Version: 1.0

GIS By: Nortek Resource Solutions Inc.





Bateston Community Wind Project

Visual Simulation 1

Image Easting: 738,758
 Northing: 5,098,711
 Photograph Date: April 12, 2013
 View Angle: 136 Degrees

Turbine Manufacturer: Enercon
 Model: E92
 Hub Height: 98 m
 Rotor Diameter: 92 m
 Rated Power: 2300 kW
 Power Curve: Level 0

Coordinate System

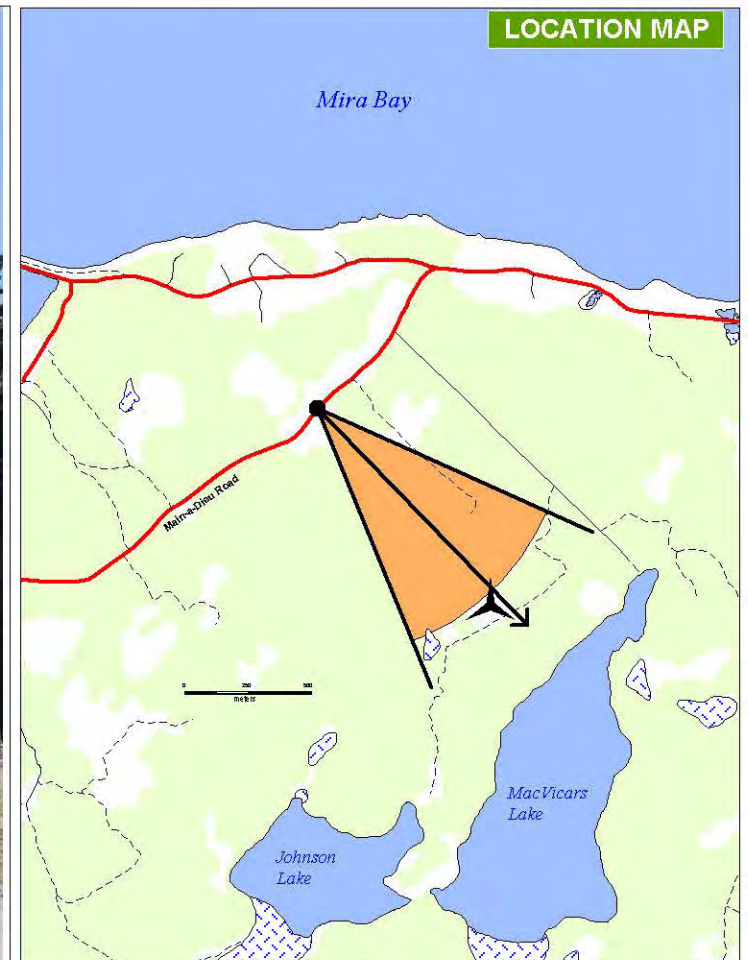
UTM, NAD83, Zone 20

December 17, 2013

Analysis By: AL-PRO Wind Energy Consulting Canada Inc.



LOCATION MAP





Bateston Community Wind Project

Visual Simulation 2

Image Easting: 736,947
 Northing: 5,099,738
 Photograph Date: April 12, 2013
 View Angle: 133 Degrees

Turbine Manufacturer: Enercon
 Model: E92
 Hub Height: 98 m
 Rotor Diameter: 92 m
 Rated Power: 2300 kW
 Power Curve: Level 0

Coordinate System

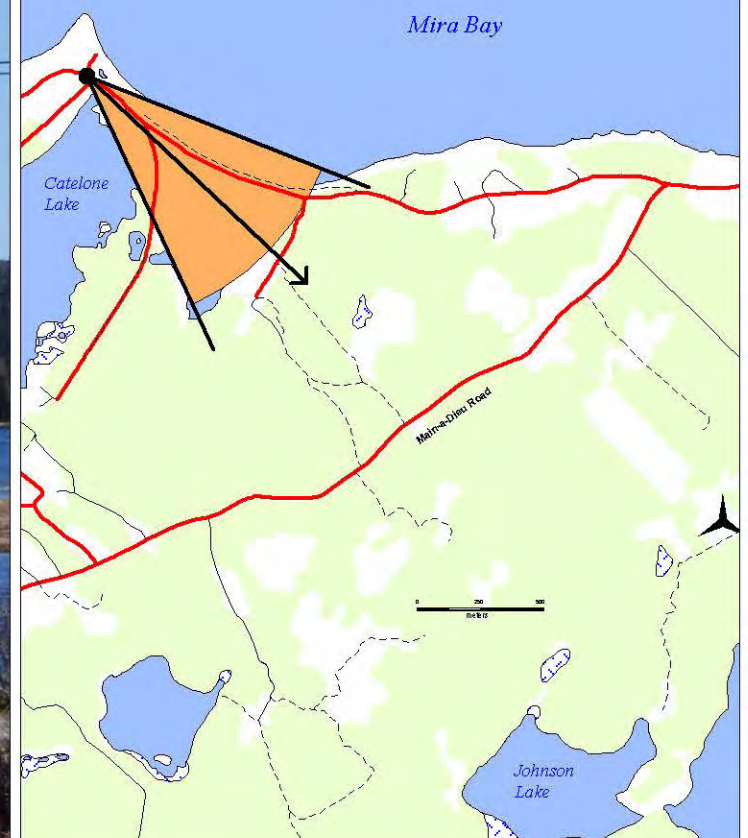
UTM, NAD83, Zone 20

December 17, 2013

Analysis By: AL-PRO Wind Energy Consulting Canada Inc.



LOCATION MAP





ORIGINAL PHOTOGRAPH



VISUAL SIMULATION



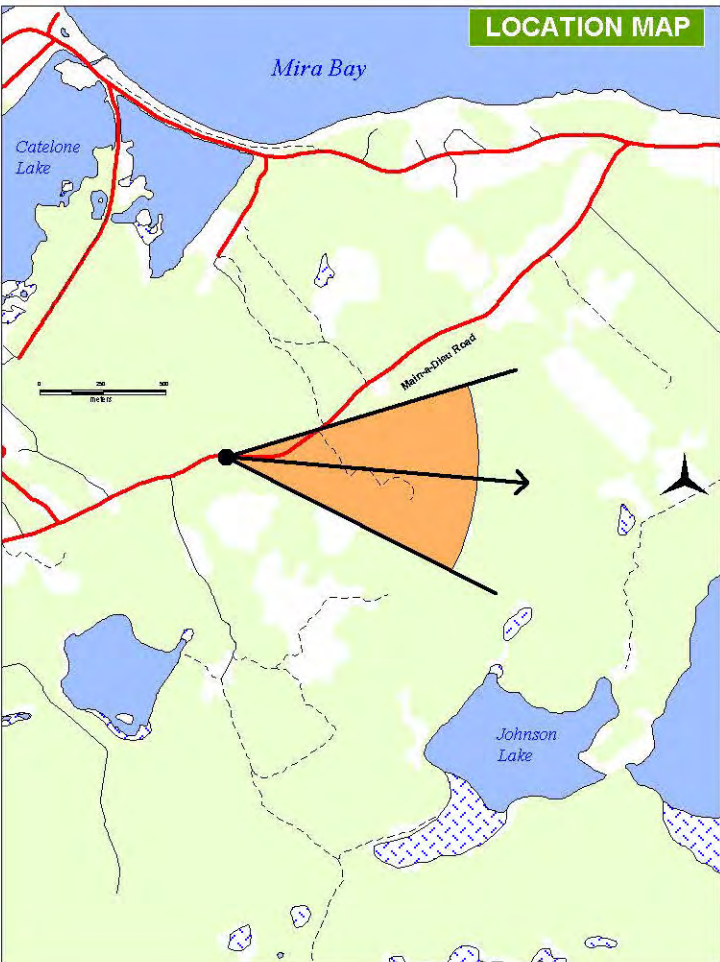
Bateston Community Wind Project

Visual Simulation 3

Image Easting: 737,651
 Northing: 5,098,032
 Photograph Date: April 12, 2013
 View Angle: 96 Degrees

Turbine Manufacturer: Enercon
 Model: E92
 Hub Height: 98 m
 Rotor Diameter: 92 m
 Rated Power: 2300 kW
 Power Curve: Level 0

Coordinate System	UTM, NAD83, Zone 20	December 17, 2013
Analysis By: AL-PRO Wind Energy Consulting Canada Inc.		AL-PRO



Bateston Community Wind Project

Zone of Visual Influence

Legend:

 Turbine Visible

Project Features

-  Project Area
-  Existing Access Road
-  Met Tower
-  Proposed E92 Turbine

Existing Features

-  Road
-  Trail
-  Stream
-  Contour
-  Water
-  Swamp
-  Forest

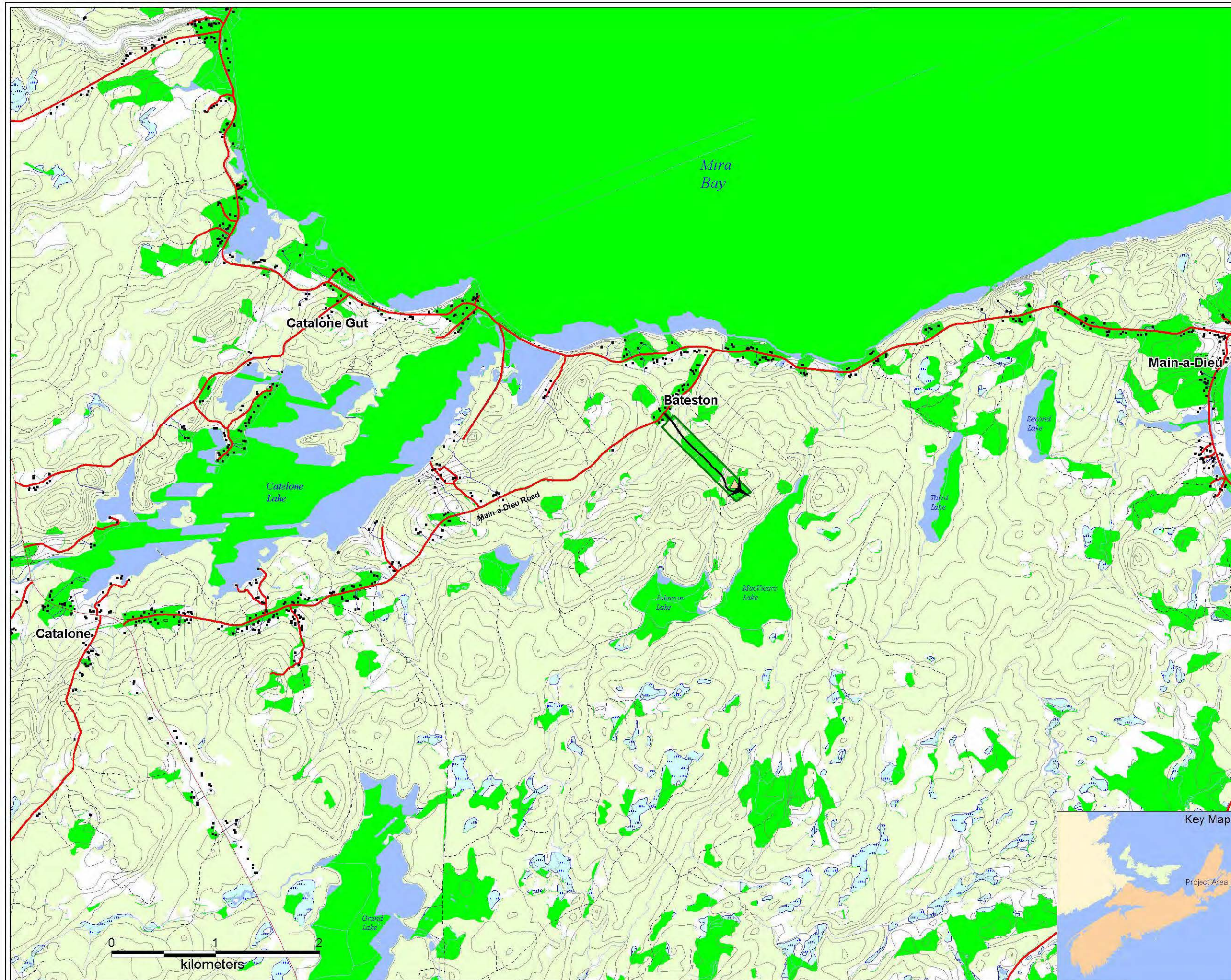


Turbine Model: Enercon E-92
Hub Height: 98 m
Rotor Diameter: 92 m
Rated Power: 2,350 kW

Scale: 1: 35,000

Source:	Base Data: Nova Scotia Geomatics Centre, Nova Scotia Topographical Database (NSTDB) Nova Scotia Well Logs Database	
Dec 17, 2013	Coordinate System: NAD 1983 UTM Zone 20N	Version: 1.0

GIS By: Nortek Resource Solutions Inc.



Appendix VIII. SHADOW FLICKER ASSESSMENT

Project: **Bateston**
 Description: Celtic Current LP
 2.35 MW Proposed Wind Project
 Bateston, Cape Breton County
 Nova Scotia, Canada

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SHADOW - Main Result

Calculation: E-92 @ 98m w Receptors (Hrs per Yr)

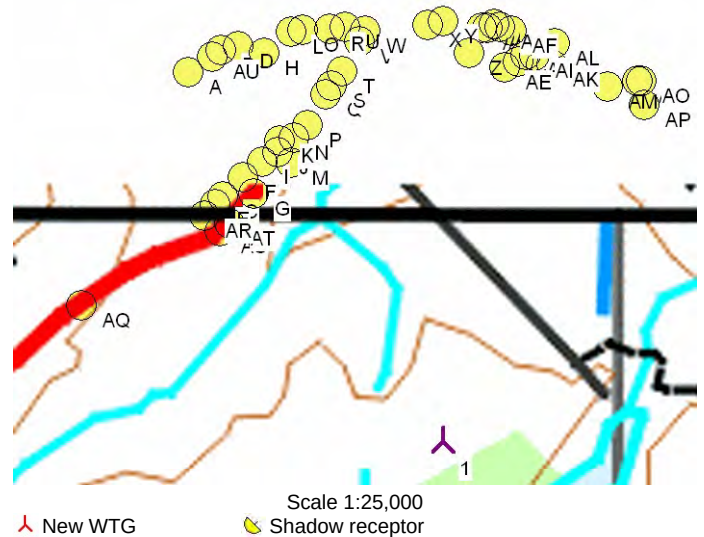
Assumptions for shadow calculations

Maximum distance for influence
 Calculate only when more than 20 % of sun is covered by the blade
 Please look in WTG table

Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 1 minutes
 The calculated times are "worst case" given by the following assumptions:
 The sun is shining all the day, from sunrise to sunset
 The rotor plane is always perpendicular to the line from the WTG to the sun
 The WTG is always operating

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values.
 A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

Height contours used: Contour_close proximity
 Obstacles used in calculation
 Eye height: 1.5 m
 Grid resolution: 10.0 m



WTGs

UTM NAD83 Zone: 20				WTG type				Shadow data			
East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM [RPM]
1	739,474	5,097,949	70.0 ENERCON E-92 2,3 MW 2300 92.0 ...	Yes	ENERCON	E-92 2,3 MW-2,300	2,300	92.0	98.0	1,516	16.0

Shadow receptor-Input

UTM NAD83 Zone: 20											
No.	Name	East	North	Z	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode	
A	A	738,580	5,099,134	28.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
B	B	738,688	5,099,213	22.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
C	C	738,714	5,098,727	35.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
D	D	738,744	5,099,227	20.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
E	E	738,689	5,098,700	37.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
F	F	738,778	5,098,796	32.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
G	G	738,816	5,098,742	30.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
H	H	738,830	5,099,209	20.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
I	I	738,839	5,098,849	30.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
J	J	738,888	5,098,882	30.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
K	K	738,893	5,098,920	30.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
L	L	738,915	5,099,282	20.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
M	M	738,934	5,098,847	27.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
N	N	738,940	5,098,931	30.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
O	O	738,953	5,099,289	20.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
P	P	738,984	5,098,975	29.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
Q	Q	739,038	5,099,080	22.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
R	R	739,044	5,099,297	20.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
S	S	739,058	5,099,110	21.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
T	T	739,092	5,099,160	20.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
U	U	739,094	5,099,304	19.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
V	V	739,145	5,099,259	17.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"	
W	W	739,161	5,099,296	17.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"	

To be continued on next page...

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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SHADOW - Main Result**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)**

...continued from previous page

UTM NAD83 Zone: 20

No.	Name	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
				[m]	[m]	[m]	[m]	[°]	[°]	
X X		739,368	5,099,323	11.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
Y Y		739,420	5,099,338	11.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
Z Z		739,508	5,099,234	15.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AA AA		739,545	5,099,319	10.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AB AB		739,566	5,099,322	10.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AC AC		739,589	5,099,335	10.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AD AD		739,607	5,099,326	10.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AE AE		739,629	5,099,192	13.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AF AF		739,645	5,099,316	10.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AG AG		739,673	5,099,214	12.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AH AH		739,697	5,099,238	12.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AI AI		739,727	5,099,237	11.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AJ AJ		739,750	5,099,209	10.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AK AK		739,782	5,099,210	10.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AL AL		739,789	5,099,281	8.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AM AM		739,970	5,099,143	13.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AN AN		740,070	5,099,166	11.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AO AO		740,083	5,099,166	10.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AP AP		740,095	5,099,087	16.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AQ AQ		738,261	5,098,348	52.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AR AR		738,656	5,098,661	40.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AS AS		738,709	5,098,613	34.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AT AT		738,740	5,098,641	33.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
AU AU		738,658	5,099,189	24.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"

Calculation Results

Shadow receptor

Shadow, worst case

No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
A A		0:00	0	0:00
B B		0:00	0	0:00
C C		5:17	26	0:15
D D		0:00	0	0:00
E E		11:13	40	0:20
F F		0:00	0	0:00
G G		0:00	0	0:00
H H		0:00	0	0:00
I I		0:00	0	0:00
J J		0:00	0	0:00
K K		0:00	0	0:00
L L		0:00	0	0:00
M M		0:00	0	0:00
N N		0:00	0	0:00
O O		0:00	0	0:00
P P		0:00	0	0:00
Q Q		0:00	0	0:00
R R		0:00	0	0:00
S S		0:00	0	0:00
T T		0:00	0	0:00
U U		0:00	0	0:00
V V		0:00	0	0:00

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Project:

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Description:

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SHADOW - Main Result**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)**

...continued from previous page

Shadow, worst case

No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
W W		0:00	0	0:00
X X		0:00	0	0:00
Y Y		0:00	0	0:00
Z Z		0:00	0	0:00
AA AA		0:00	0	0:00
AB AB		0:00	0	0:00
AC AC		0:00	0	0:00
AD AD		0:00	0	0:00
AE AE		0:00	0	0:00
AF AF		0:00	0	0:00
AG AG		0:00	0	0:00
AH AH		0:00	0	0:00
AI AI		0:00	0	0:00
AJ AJ		0:00	0	0:00
AK AK		0:00	0	0:00
AL AL		0:00	0	0:00
AM AM		0:00	0	0:00
AN AN		0:00	0	0:00
AO AO		0:00	0	0:00
AP AP		0:00	0	0:00
AQ AQ		5:05	22	0:17
AR AR		17:26	56	0:22
AS AS		21:04	64	0:23
AT AT		17:28	52	0:23
AU AU		0:00	0	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	ENERCON E-92 2,3 MW 2300 92.0 !-! hub: 98.0 m (TOT: 144.0 m) (3)	34:53	

Project:

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Description:

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Calculated:

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SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: A - A****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42 16:25	07:24 17:05	06:41 17:46	06:42 19:28	05:48 20:07	05:13 20:43	05:13 20:55	05:42 20:31	06:20 20:19	06:58 18:42	06:40 16:47	07:21 16:17
2	07:42 16:26	07:22 17:06	06:39 17:47	06:40 19:29	05:47 20:09	05:13 20:44	05:13 20:55	05:43 20:29	06:21 19:38	06:59 18:40	06:41 16:46	07:22 16:17
3	07:42 16:27	07:21 17:08	06:37 17:48	06:38 19:30	05:45 20:10	05:12 20:45	05:14 20:54	05:44 20:28	06:22 19:36	07:00 18:38	06:43 16:44	07:23 16:16
4	07:42 16:28	07:20 17:09	06:35 17:50	06:36 19:32	05:44 20:11	05:12 20:45	05:15 20:54	05:45 20:27	06:24 19:34	07:01 18:36	06:44 16:43	07:24 16:16
5	07:42 16:29	07:19 17:11	06:33 17:51	06:34 19:33	05:42 20:12	05:11 20:46	05:15 20:54	05:46 20:25	06:25 19:32	07:03 18:34	06:45 16:42	07:25 16:16
6	07:42 16:30	07:17 17:12	06:31 17:53	06:32 19:34	05:41 20:14	05:11 20:47	05:16 20:53	05:48 20:24	06:26 19:31	07:04 18:32	06:47 16:40	07:26 16:15
7	07:42 16:31	07:16 17:14	06:30 17:54	06:30 19:36	05:39 20:15	05:10 20:48	05:17 20:53	05:49 20:22	06:27 19:29	07:05 18:30	06:48 16:39	07:27 16:15
8	07:42 16:32	07:14 17:15	06:28 18:55	06:28 19:37	05:38 20:16	05:10 20:48	05:17 20:53	05:50 20:21	06:29 19:27	07:07 18:28	06:50 16:38	07:29 16:15
9	07:41 16:33	07:13 17:16	06:26 18:57	06:27 19:38	05:37 20:17	05:10 20:49	05:18 20:52	05:51 20:19	06:30 19:25	07:08 18:27	06:51 16:36	07:30 16:15
10	07:41 16:34	07:12 17:18	06:24 18:58	06:25 19:40	05:35 20:19	05:10 20:50	05:19 20:51	05:52 20:18	06:31 19:23	07:09 18:25	06:53 16:35	07:30 16:15
11	07:41 16:36	07:10 17:19	06:22 19:00	06:23 19:41	05:34 20:20	05:09 20:50	05:20 20:51	05:54 20:16	06:32 19:21	07:11 18:23	06:54 16:34	07:31 16:15
12	07:40 16:37	07:09 17:21	06:20 19:01	06:21 19:42	05:33 20:21	05:09 20:51	05:21 20:50	05:55 20:15	06:34 19:19	07:12 18:21	06:55 16:33	07:32 16:15
13	07:40 16:38	07:07 17:22	06:18 19:02	06:19 19:44	05:31 20:22	05:09 20:52	05:22 20:50	05:56 20:13	06:35 19:17	07:13 18:19	06:57 16:32	07:33 16:15
14	07:39 16:39	07:06 17:24	06:16 19:04	06:17 19:45	05:30 20:24	05:09 20:52	05:22 20:49	05:57 20:12	06:36 19:15	07:15 18:17	06:58 16:30	07:34 16:15
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16	07:38 16:42	07:03 17:27	06:13 19:06	06:14 19:48	05:28 20:26	05:09 20:53	05:24 20:48	06:00 20:08	06:39 19:11	07:17 18:14	07:01 16:28	07:36 16:15
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22	07:34 16:50	06:53 17:36	06:01 19:14	06:03 19:55	05:21 20:33	05:09 20:55	05:30 20:42	06:07 19:58	06:46 18:59	07:26 18:03	07:09 16:23	07:39 16:18
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31	07:25 17:03		06:44 19:26		05:14 20:42		05:40 20:32	06:19 19:42		07:38 17:49		07:42 16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr) Shadow receptor: B - B****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42 16:25	07:24 17:05	06:41 17:46	06:42 19:28	05:48 20:07	05:13 20:43	05:13 20:55	05:42 20:31	06:20 20:19	06:58 18:42	06:40 16:47	07:21 16:17
2	07:42 16:26	07:22 17:06	06:39 17:47	06:40 19:29	05:47 20:09	05:13 20:44	05:13 20:55	05:43 20:29	06:21 19:38	06:59 18:40	06:41 16:46	07:22 16:17
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4	07:42 16:28	07:20 17:09	06:35 17:50	06:36 19:32	05:44 20:11	05:12 20:45	05:15 20:54	05:45 20:27	06:24 19:34	07:01 18:36	06:44 16:43	07:24 16:16
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22	07:34 16:50	06:53 17:36	06:01 19:14	06:03 19:55	05:21 20:33	05:09 20:55	05:30 20:42	06:07 19:58	06:46 18:59	07:26 18:03	07:09 16:23	07:39 16:18
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26	07:30 16:56	06:46 17:41	06:53 19:20	05:56 20:01	05:18 20:37	05:11 20:55	05:35 20:38	06:12 19:51	06:51 18:52	07:31 17:57	07:15 16:20	07:41 16:20
27	07:29 16:57	06:44 17:43	06:51 19:21	05:55 20:02	05:17 20:38	05:11 20:55	05:36 20:37	06:14 19:49	06:52 18:50	07:33 17:55	07:16 16:19	07:41 16:21
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29	07:27 17:00		06:47 19:24	05:51 20:05	05:15 20:40	05:12 20:55	05:38 20:34	06:16 19:46	06:55 18:46	07:35 17:52	07:18 16:18	07:42 16:22
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31	07:25 17:03		06:44 19:26		05:14 20:42		05:40 20:32	06:19 19:42		07:38 17:49		07:42 16:24
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Total, worst case												

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: C - C****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

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The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January		February		March	April	May	June	July	August	September	October	November	December	
1	07:42		08:48 (1)	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21	
	16:25	9	08:57 (1)	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17	
2	07:42		08:49 (1)	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22	
	16:26	8	08:57 (1)	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17	
3	07:42		08:51 (1)	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23	
	16:27	5	08:56 (1)	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16	
4	07:42			07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24	
	16:28			17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16	
5	07:42			07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25	
	16:29			17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16	
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	16:30			17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15	
7	07:42			07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27	
	16:31			17:14	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15	
8	07:42			07:14	07:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28	
	16:32			17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15	
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	16:33			17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15	4 08:44 (1)
10	07:41			07:12	07:24	06:25	05:35	05:10	05:19	05:52	06:31	07:09	06:53	07:30	08:39 (1)
	16:34			17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15	7 08:46 (1)
11	07:41			07:10	07:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31	08:38 (1)
	16:36			17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15	9 08:47 (1)
12	07:40			07:09	07:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32	08:38 (1)
	16:37			17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15	11 08:49 (1)
13	07:40			07:07	07:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33	08:38 (1)
	16:38			17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15	12 08:50 (1)
14	07:39			07:06	07:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34	08:38 (1)
	16:39			17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15	13 08:51 (1)
15	07:39			07:04	07:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35	08:38 (1)
	16:41			17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15	13 08:51 (1)
16	07:38			07:03	07:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36	08:38 (1)
	16:42			17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15	14 08:52 (1)
17	07:37			07:01	07:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36	08:39 (1)
	16:43			17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16	14 08:53 (1)
18	07:37			06:59	07:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37	08:39 (1)
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19	07:36			06:58	07:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38	08:39 (1)
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20	07:35			06:56	07:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38	08:40 (1)
	16:47			17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17	15 08:55 (1)
21	07:35			06:54	07:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39	08:40 (1)
	16:49			17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17	15 08:55 (1)
22	07:34			06:53	07:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39	08:41 (1)
	16:50			17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18	15 08:56 (1)
23	07:33			06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40	08:41 (1)
	16:52			17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18	15 08:56 (1)
24	07:32			06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40	08:41 (1)
	16:53			17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19	15 08:56 (1)
25	07:31			06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41	08:42 (1)
	16:54			17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19	15 08:57 (1)
26	07:30			06:46	06:53	05:56	05:18	05:11	05:35	06:12	06:51	07:31	07:15	07:41	08:43 (1)
	16:56			17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:52	17:57	16:20	16:20	14 08:57 (1)
27	07:29			06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41	08:43 (1)
	16:57			17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21	14 08:57 (1)
28	07:28			06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42	08:44 (1)
	16:59			17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21	14 08:58 (1)
29	07:27				06:47	05:52	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42	08:45 (1)
	17:00				19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22	13 08:58 (1)
30	07:26				06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42	08:46 (1)
	17:02				19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23	12 08:58 (1)
31	07:25				06:44		05:14		05:40	06:19		07:38		07:42	08:47 (1)
	17:03				19:26		20:42		20:32	19:42		17:49		16:24	11 08:58 (1)
Potential sun hours	282		290	369	406	463	471	476	438	377	339	285	270		
Total, worst case	22														295

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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12/19/2013 11:29 AM / 7

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: D - D****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:29
	16:32	17:15	18:55	19:37	20:16	20:48	20:53	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:27	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:30	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:55	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:52	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:11	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:52	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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12/19/2013 11:29 AM / 8

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: E - E****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

		January	February	March	April	May	June	July	August	September	October	November	December		
1	07:42	08:36 (1)	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21		
	16:25	19	08:55 (1)	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17	
2	07:42	08:37 (1)	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22	08:28 (1)	
	16:26	18	08:55 (1)	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17	7 08:35 (1)
3	07:42	08:38 (1)	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23	08:28 (1)	
	16:27	17	08:55 (1)	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16	9 08:37 (1)
4	07:42	08:38 (1)	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24	08:27 (1)	
	16:28	16	08:54 (1)	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16	12 08:39 (1)
5	07:42	08:39 (1)	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25	08:27 (1)	
	16:29	15	08:54 (1)	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16	13 08:40 (1)
6	07:42	08:40 (1)	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26	08:26 (1)	
	16:30	15	08:55 (1)	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15	15 08:41 (1)
7	07:42	08:41 (1)	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27	08:26 (1)	
	16:31	14	08:55 (1)	17:14	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15	15 08:41 (1)
8	07:42	08:42 (1)	07:14	07:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28	08:26 (1)	
	16:32	12	08:54 (1)	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15	16 08:42 (1)
9	07:41	08:44 (1)	07:13	07:26	06:27	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29	08:26 (1)	
	16:33	9	08:53 (1)	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15	17 08:43 (1)
10	07:41	08:46 (1)	07:12	07:24	06:25	05:35	05:10	05:19	05:52	06:31	07:09	06:53	07:30	08:26 (1)	
	16:35	7	08:53 (1)	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15	18 08:44 (1)
11	07:41		07:10	07:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31	08:26 (1)	
	16:36		17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15	19 08:45 (1)	
12	07:40		07:09	07:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32	08:27 (1)	
	16:37		17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15	18 08:45 (1)	
13	07:40		07:07	07:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33	08:27 (1)	
	16:38		17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15	19 08:46 (1)	
14	07:39		07:06	07:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34	08:28 (1)	
	16:39		17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15	19 08:47 (1)	
15	07:39		07:04	07:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35	08:27 (1)	
	16:41		17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15	20 08:47 (1)	
16	07:38		07:03	07:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36	08:28 (1)	
	16:42		17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15	19 08:47 (1)	
17	07:37		07:01	07:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36	08:29 (1)	
	16:43		17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16	19 08:48 (1)	
18	07:37		06:59	07:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37	08:29 (1)	
	16:45		17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16	20 08:49 (1)	
19	07:36		06:58	07:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38	08:29 (1)	
	16:46		17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16	20 08:49 (1)	
20	07:35		06:56	07:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38	08:30 (1)	
	16:47		17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17	20 08:50 (1)	
21	07:35		06:54	07:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39	08:30 (1)	
	16:49		17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17	20 08:50 (1)	
22	07:34		06:53	07:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39	08:31 (1)	
	16:50		17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18	20 08:51 (1)	
23	07:33		06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40	08:31 (1)	
	16:52		17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18	20 08:51 (1)	
24	07:32		06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40	08:31 (1)	
	16:53		17:39	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19	20 08:51 (1)	
25	07:31		06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41	08:32 (1)	
	16:54		17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19	20 08:52 (1)	
26	07:30		06:46	06:53	05:56	05:18	05:11	05:35	06:12	06:51	07:31	07:15	07:41	08:32 (1)	
	16:56		17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:52	17:57	16:20	16:20	20 08:52 (1)	
27	07:29		06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41	08:33 (1)	
	16:57		17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21	19 08:52 (1)	
28	07:28		06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42	08:34 (1)	
	16:59		17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21	20 08:54 (1)	
29	07:27			06:47	05:52	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42	08:34 (1)	
	17:00			19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22	20 08:54 (1)	
30	07:26			06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42	08:35 (1)	
	17:02			19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23	19 08:54 (1)	
31	07:25			06:44		05:14		05:40	06:19		07:38		07:42	08:36 (1)	
	17:03			19:26		20:42		20:32	19:42		17:49		16:24	18 08:54 (1)	
Potential sun hours	282		290	369	406	463	471	476	438	377	339	285	270		
Total, worst case	142													531	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
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Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: F - F****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:27	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:10	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:52	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:11	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:52	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21
29	07:27		06:47	05:52	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	290	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: G - G****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42 16:25	07:24 17:05	06:41 17:46	06:42 19:28	05:48 20:07	05:13 20:43	05:13 20:55	05:42 20:31	06:20 20:19	06:58 18:42	06:40 16:47	07:21 16:17
2	07:42 16:26	07:22 17:06	06:39 17:47	06:40 19:29	05:47 20:09	05:13 20:44	05:13 20:55	05:43 20:29	06:21 19:38	06:59 18:40	06:41 16:46	07:22 16:17
3	07:42 16:27	07:21 17:08	06:37 17:48	06:38 19:30	05:45 20:10	05:12 20:45	05:14 20:54	05:44 20:28	06:22 19:36	07:00 18:38	06:43 16:44	07:23 16:16
4	07:42 16:28	07:20 17:09	06:35 17:50	06:36 19:32	05:44 20:11	05:12 20:45	05:15 20:54	05:45 20:27	06:24 19:34	07:01 18:36	06:44 16:43	07:24 16:16
5	07:42 16:29	07:19 17:11	06:33 17:51	06:34 19:33	05:42 20:12	05:11 20:46	05:15 20:54	05:46 20:25	06:25 19:32	07:03 18:34	06:45 16:42	07:25 16:16
6	07:42 16:30	07:17 17:12	06:31 17:53	06:32 19:34	05:41 20:14	05:11 20:47	05:16 20:53	05:48 20:24	06:26 19:31	07:04 18:32	06:47 16:40	07:26 16:15
7	07:42 16:31	07:16 17:13	06:30 17:54	06:30 19:36	05:39 20:15	05:10 20:48	05:17 20:53	05:49 20:22	06:27 19:29	07:05 18:30	06:48 16:39	07:27 16:15
8	07:42 16:32	07:14 17:15	06:28 18:55	06:28 19:37	05:38 20:16	05:10 20:48	05:17 20:52	05:50 20:21	06:29 19:27	07:07 18:28	06:50 16:38	07:28 16:15
9	07:41 16:33	07:13 17:16	06:26 18:57	06:27 19:38	05:37 20:17	05:10 20:49	05:18 20:52	05:51 20:19	06:30 19:25	07:08 18:27	06:51 16:36	07:29 16:15
10	07:41 16:34	07:12 17:18	06:24 18:58	06:25 19:40	05:35 20:19	05:10 20:50	05:19 20:51	05:52 20:18	06:31 19:23	07:09 18:25	06:53 16:35	07:30 16:15
11	07:41 16:36	07:10 17:19	06:22 19:00	06:23 19:41	05:34 20:20	05:09 20:50	05:20 20:51	05:54 20:16	06:32 19:21	07:11 18:23	06:54 16:34	07:31 16:15
12	07:40 16:37	07:09 17:21	06:20 19:01	06:21 19:42	05:33 20:21	05:09 20:51	05:21 20:50	05:55 20:15	06:34 19:19	07:12 18:21	06:55 16:33	07:32 16:15
13	07:40 16:38	07:07 17:22	06:18 19:02	06:19 19:44	05:31 20:22	05:09 20:51	05:22 20:50	05:56 20:13	06:35 19:17	07:13 18:19	06:57 16:32	07:33 16:15
14	07:39 16:39	07:06 17:24	06:16 19:04	06:17 19:45	05:30 20:24	05:09 20:52	05:22 20:49	05:57 20:12	06:36 19:15	07:15 18:17	06:58 16:30	07:34 16:15
15	07:39 16:41	07:04 17:25	06:14 19:05	06:15 19:46	05:29 20:25	05:09 20:52	05:23 20:48	05:59 20:10	06:37 19:13	07:16 18:16	07:00 16:29	07:35 16:15
16	07:38 16:42	07:03 17:27	06:13 19:06	06:14 19:48	05:28 20:26	05:09 20:53	05:24 20:48	06:00 20:08	06:39 19:11	07:17 18:14	07:01 16:28	07:36 16:15
17	07:37 16:43	07:01 17:28	06:11 19:08	06:12 19:49	05:27 20:27	05:09 20:53	05:25 20:47	06:01 20:07	06:40 19:09	07:19 18:12	07:02 16:27	07:36 16:16
18	07:37 16:45	06:59 17:30	06:09 19:09	06:10 19:50	05:26 20:28	05:09 20:54	05:26 20:46	06:02 20:05	06:41 19:07	07:20 18:10	07:04 16:26	07:37 16:16
19	07:36 16:46	06:58 17:31	06:07 19:10	06:08 19:52	05:24 20:29	05:09 20:54	05:27 20:45	06:04 20:03	06:42 19:05	07:21 18:08	07:05 16:25	07:38 16:16
20	07:35 16:47	06:56 17:33	06:05 19:12	06:07 19:53	05:23 20:31	05:09 20:54	05:28 20:44	06:05 20:02	06:44 19:03	07:23 18:07	07:07 16:24	07:38 16:17
21	07:35 16:49	06:54 17:34	06:03 19:13	06:05 19:54	05:22 20:32	05:09 20:54	05:29 20:43	06:06 20:00	06:45 19:01	07:24 18:05	07:08 16:24	07:39 16:17
22	07:34 16:50	06:53 17:36	06:01 19:14	06:03 19:55	05:21 20:33	05:09 20:55	06:07 20:42	06:46 19:58	07:26 18:59	07:09 18:03	07:19 16:23	07:39 16:18
23	07:33 16:52	06:51 17:37	06:59 19:16	06:01 19:57	05:20 20:34	05:10 20:55	06:09 20:41	06:47 19:56	07:27 18:57	07:11 18:02	07:20 16:22	07:40 16:18
24	07:32 16:53	06:49 17:38	06:57 19:17	06:00 19:58	05:19 20:35	05:10 20:55	06:10 20:40	06:49 19:55	07:28 18:55	07:12 18:00	07:19 16:21	07:40 16:19
25	07:31 16:54	06:48 17:40	06:55 19:18	05:58 19:59	05:19 20:36	05:10 20:55	06:11 20:39	06:50 19:53	07:30 18:53	07:13 17:58	07:20 16:20	07:41 16:19
26	07:30 16:56	06:46 17:41	06:53 19:20	05:56 20:01	05:18 20:37	05:11 20:55	06:12 20:38	06:51 19:51	07:31 18:52	07:15 17:57	07:19 16:20	07:41 16:20
27	07:29 16:57	06:44 17:43	06:51 19:21	05:55 20:02	05:17 20:38	05:11 20:55	06:14 20:37	06:52 19:49	07:33 18:50	07:16 17:55	07:20 16:19	07:41 16:21
28	07:28 16:59	06:42 17:44	06:49 19:22	05:53 20:03	05:16 20:39	05:11 20:55	06:15 20:36	06:54 19:47	07:34 18:48	07:17 17:53	07:21 16:19	07:42 16:21
29	07:27 17:00		06:47 19:24	05:52 20:05	05:15 20:40	05:12 20:55	06:16 20:34	06:55 19:46	07:35 17:52	07:18 16:18	07:22 16:22	07:42 16:22
30	07:26 17:02		06:46 19:25	05:50 20:06	05:15 20:41	05:12 20:55	06:17 20:33	06:56 19:44	07:37 18:44	07:20 17:50	07:23 16:17	07:42 16:23
31	07:25 17:03		06:44 19:26		05:14 20:42		06:19 20:32		07:38 19:42		07:24 17:49	07:42 16:24
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Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: H - H****Assumptions for shadow calculations**

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	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
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	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
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18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:30	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
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	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:52	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
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	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:15	07:41
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28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21
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	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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12/19/2013 11:29 AM / 12

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Dorfstraße 100

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+49 (0) 4936 6986-0

Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: I - I****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:27	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:10	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
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14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
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	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:52	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
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30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	290	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: J - J****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
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	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:27	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
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15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
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	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:52	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:11	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:52	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
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29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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12/19/2013 11:29 AM / 14

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: K - K****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:27	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:52	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:11	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:52	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: L - L****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
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9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
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	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:30	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
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	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:52	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: M - M****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:52	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:11	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:52	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: N - N****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:52	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:11	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: O - O****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42 16:25	07:24 17:05	06:41 17:46	06:42 19:28	05:48 20:07	05:13 20:43	05:13 20:55	05:42 20:31	06:20 20:19	06:58 18:42	06:40 16:47	07:21 16:17
2	07:42 16:26	07:22 17:06	06:39 17:47	06:40 19:29	05:47 20:09	05:13 20:44	05:13 20:55	05:43 20:29	06:21 19:38	06:59 18:40	06:41 16:46	07:22 16:17
3	07:42 16:27	07:21 17:08	06:37 17:48	06:38 19:30	05:45 20:10	05:12 20:45	05:14 20:54	05:44 20:28	06:22 19:36	07:00 18:38	06:43 16:44	07:23 16:16
4	07:42 16:28	07:20 17:09	06:35 17:50	06:36 19:32	05:44 20:11	05:12 20:45	05:15 20:54	05:45 20:27	06:24 19:34	07:01 18:36	06:44 16:43	07:24 16:16
5	07:42 16:29	07:19 17:10	06:33 17:51	06:34 19:33	05:42 20:12	05:11 20:46	05:15 20:54	05:46 20:25	06:25 19:32	07:03 18:34	06:45 16:42	07:25 16:16
6	07:42 16:30	07:17 17:12	06:31 17:53	06:32 19:34	05:41 20:14	05:11 20:47	05:16 20:53	05:48 20:24	06:26 19:31	07:04 18:32	06:47 16:40	07:26 16:15
7	07:42 16:31	07:16 17:13	06:30 17:54	06:30 19:36	05:39 20:15	05:10 20:48	05:17 20:53	05:49 20:22	06:27 19:29	07:05 18:30	06:48 16:39	07:27 16:15
8	07:42 16:32	07:14 17:15	06:28 18:55	06:28 19:37	05:38 20:16	05:10 20:48	05:17 20:52	05:50 20:21	06:29 19:27	07:07 18:28	06:50 16:38	07:28 16:15
9	07:41 16:33	07:13 17:16	06:26 18:57	06:26 19:38	05:37 20:17	05:10 20:49	05:18 20:52	05:51 20:19	06:30 19:25	07:08 18:27	06:51 16:36	07:29 16:15
10	07:41 16:34	07:12 17:18	06:24 18:58	06:25 19:40	05:35 20:19	05:09 20:50	05:19 20:51	05:52 20:18	06:31 19:23	07:09 18:25	06:53 16:35	07:30 16:15
11	07:41 16:36	07:10 17:19	06:22 19:00	06:23 19:41	05:34 20:20	05:09 20:50	05:20 20:51	05:54 20:16	06:32 19:21	07:11 18:23	06:54 16:34	07:31 16:15
12	07:40 16:37	07:09 17:21	06:20 19:01	06:21 19:42	05:33 20:21	05:09 20:51	05:21 20:50	05:55 20:15	06:34 19:19	07:12 18:21	06:55 16:33	07:32 16:15
13	07:40 16:38	07:07 17:22	06:18 19:02	06:19 19:44	05:31 20:22	05:09 20:51	05:22 20:50	05:56 20:13	06:35 19:17	07:13 18:19	06:57 16:32	07:33 16:15
14	07:39 16:39	07:06 17:24	06:16 19:04	06:17 19:45	05:30 20:24	05:09 20:52	05:22 20:49	05:57 20:12	06:36 19:15	07:15 18:17	06:58 16:30	07:34 16:15
15	07:39 16:41	07:04 17:25	06:14 19:05	06:15 19:46	05:29 20:25	05:09 20:52	05:23 20:48	05:59 20:10	06:37 19:13	07:16 18:16	07:00 16:29	07:35 16:15
16	07:38 16:42	07:03 17:27	06:13 19:06	06:14 19:48	05:28 20:26	05:09 20:53	05:24 20:48	06:00 20:08	06:39 19:11	07:17 18:14	07:01 16:28	07:36 16:15
17	07:37 16:43	07:01 17:28	06:11 19:08	06:12 19:49	05:27 20:27	05:09 20:53	05:25 20:47	06:01 20:07	06:40 19:09	07:19 18:12	07:02 16:27	07:36 16:16
18	07:37 16:45	06:59 17:30	06:09 19:09	06:10 19:50	05:26 20:28	05:09 20:54	05:26 20:46	06:02 20:05	06:41 19:07	07:20 18:10	07:04 16:26	07:37 16:16
19	07:36 16:46	06:58 17:31	06:07 19:10	06:08 19:52	05:24 20:30	05:09 20:54	05:27 20:45	06:04 20:03	06:42 19:05	07:21 18:08	07:05 16:25	07:38 16:16
20	07:35 16:47	06:56 17:33	06:05 19:12	06:07 19:53	05:23 20:31	05:09 20:54	05:28 20:44	06:05 20:02	06:44 19:03	07:23 18:07	07:07 16:24	07:38 16:17
21	07:35 16:49	06:54 17:34	06:03 19:13	06:05 19:54	05:22 20:32	05:09 20:54	05:29 20:43	06:06 20:00	06:45 19:01	07:24 18:05	07:08 16:24	07:39 16:17
22	07:34 16:50	06:53 17:36	06:01 19:14	06:03 19:55	05:21 20:33	05:09 20:55	05:30 20:42	06:07 19:58	06:46 18:59	07:26 18:03	07:09 16:23	07:39 16:18
23	07:33 16:51	06:51 17:37	06:09 19:16	06:01 19:57	05:20 20:34	05:10 20:55	05:31 20:41	06:09 19:56	06:47 18:57	07:27 18:02	07:11 16:22	07:40 16:18
24	07:32 16:53	06:49 17:38	06:57 19:17	06:00 19:58	05:19 20:35	05:10 20:55	05:32 20:40	06:10 19:55	06:49 18:55	07:28 18:00	07:12 16:21	07:40 16:19
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26	07:30 16:56	06:46 17:41	06:53 19:20	05:56 20:01	05:18 20:37	05:10 20:55	05:35 20:38	06:12 19:51	06:51 18:51	07:31 17:57	07:15 16:20	07:41 16:20
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28	07:28 16:59	06:42 17:44	06:49 19:22	05:53 20:03	05:16 20:39	05:11 20:55	05:37 20:36	06:15 19:47	06:54 18:48	07:34 17:53	07:17 16:18	07:42 16:21
29	07:27 17:00		06:47 19:24	05:51 20:05	05:15 20:40	05:12 20:55	05:38 20:34	06:16 19:46	06:55 18:46	07:35 17:52	07:18 16:18	07:42 16:22
30	07:26 17:02		06:46 19:25	05:50 20:06	05:15 20:41	05:12 20:55	05:39 20:33	06:17 19:44	06:56 18:44	07:37 17:50	07:20 16:17	07:42 16:23
31	07:25 17:03		06:44 19:26		05:14 20:42		05:40 20:32	06:19 19:42		07:38 17:49		07:42 16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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12/19/2013 11:29 AM / 19

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AL-PRO GmbH & Co.KG

Dorfstraße 100

DE-26532 Großheide

+49 (0) 4936 6986-0

Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: P - P****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
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	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:52	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21
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30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Licensed user:

AL-PRO GmbH & Co.KG

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+49 (0) 4936 6986-0

Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: Q - Q****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
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7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
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	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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12/19/2013 11:29 AM / 21

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: R - R****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: S - S****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
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13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
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	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: T - T****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: U - U****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
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Total, worst case												

Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: V - V****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
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	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
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	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
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	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:15	07:41
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28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
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	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: W - W****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
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14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
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27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
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30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: X - X****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
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	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
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	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
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	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
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15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:15	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
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30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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12/19/2013 11:29 AM / 28

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AL-PRO GmbH & Co.KG

Dorfstraße 100

DE-26532 Großheide

+49 (0) 4936 6986-0

Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: Y - Y****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:52	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:31	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:14	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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12/19/2013 11:29 AM / 29

Licensed user:

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Dorfstraße 100

DE-26532 Großheide

+49 (0) 4936 6986-0

Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: Z - Z****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42 16:25	07:23 17:05	06:40 17:46	06:42 19:28	05:48 20:07	05:13 20:43	05:13 20:55	05:42 20:31	06:20 20:19	06:57 18:42	06:40 16:47	07:21 16:17
2	07:42 16:26	07:22 17:06	06:39 17:47	06:40 19:29	05:47 20:08	05:13 20:44	05:13 20:55	05:43 20:29	06:21 19:38	06:59 18:40	06:41 16:46	07:22 16:17
3	07:42 16:27	07:21 17:07	06:37 17:48	06:38 19:30	05:45 20:10	05:12 20:45	05:14 20:54	05:44 20:28	06:22 19:36	07:00 18:38	06:42 16:44	07:23 16:16
4	07:42 16:28	07:20 17:09	06:35 17:50	06:36 19:32	05:44 20:11	05:12 20:45	05:15 20:54	05:45 20:27	06:24 19:34	07:01 18:36	06:44 16:43	07:24 16:16
5	07:42 16:29	07:18 17:10	06:33 17:51	06:34 19:33	05:42 20:12	05:11 20:46	05:15 20:54	05:46 20:25	06:25 19:32	07:03 18:34	06:45 16:42	07:25 16:16
6	07:42 16:30	07:17 17:12	06:31 17:53	06:32 19:34	05:41 20:14	05:11 20:47	05:16 20:53	05:48 20:24	06:26 19:31	07:04 18:32	06:47 16:40	07:26 16:15
7	07:42 16:31	07:16 17:13	06:30 17:54	06:30 19:36	05:39 20:15	05:10 20:48	05:17 20:53	05:49 20:22	06:27 19:29	07:05 18:30	06:48 16:39	07:27 16:15
8	07:42 16:32	07:14 17:15	06:28 18:55	06:28 19:37	05:38 20:16	05:10 20:48	05:17 20:52	05:50 20:21	06:29 19:27	07:07 18:28	06:50 16:38	07:28 16:15
9	07:41 16:33	07:13 17:16	06:26 18:57	06:26 19:38	05:37 20:17	05:10 20:49	05:18 20:52	05:51 20:19	06:30 19:25	07:08 18:27	06:51 16:36	07:29 16:15
10	07:41 16:34	07:12 17:18	06:24 18:58	06:25 19:40	05:35 20:19	05:09 20:50	05:19 20:51	05:52 20:18	06:31 19:23	07:09 18:25	06:52 16:35	07:30 16:15
11	07:41 16:36	07:10 17:19	06:22 19:00	06:23 19:41	05:34 20:20	05:09 20:50	05:20 20:51	05:54 20:16	06:32 19:21	07:11 18:23	06:54 16:34	07:31 16:15
12	07:40 16:37	07:09 17:21	06:20 19:01	06:21 19:42	05:33 20:21	05:09 20:51	05:21 20:50	05:55 20:15	06:34 19:19	07:12 18:21	06:55 16:33	07:32 16:15
13	07:40 16:38	07:07 17:22	06:18 19:02	06:19 19:44	05:31 20:22	05:09 20:51	05:21 20:50	05:56 20:13	06:35 19:17	07:13 18:19	06:57 16:31	07:33 16:15
14	07:39 16:39	07:06 17:24	06:16 19:04	06:17 19:45	05:30 20:24	05:09 20:52	05:22 20:49	05:57 20:12	06:36 19:15	07:15 18:17	06:58 16:30	07:34 16:15
15	07:39 16:41	07:04 17:25	06:14 19:05	06:15 19:46	05:29 20:25	05:09 20:52	05:23 20:48	05:59 20:10	06:37 19:13	07:16 18:15	07:00 16:29	07:35 16:15
16	07:38 16:42	07:03 17:27	06:13 19:06	06:14 19:48	05:28 20:26	05:09 20:53	05:24 20:47	06:00 20:08	06:39 19:11	07:17 18:14	07:01 16:28	07:36 16:15
17	07:37 16:43	07:01 17:28	06:11 19:08	06:12 19:49	05:27 20:27	05:09 20:53	05:25 20:47	06:01 20:07	06:40 19:09	07:19 18:12	07:02 16:27	07:36 16:16
18	07:37 16:45	06:59 17:30	06:09 19:09	06:10 19:50	05:25 20:28	05:09 20:54	05:26 20:46	06:02 20:05	06:41 19:07	07:20 18:10	07:04 16:26	07:37 16:16
19	07:36 16:46	06:58 17:31	06:07 19:10	06:08 19:51	05:24 20:29	05:09 20:54	05:27 20:45	06:04 20:03	06:42 19:05	07:21 18:08	07:05 16:25	07:38 16:16
20	07:35 16:47	06:56 17:33	06:05 19:12	06:07 19:53	05:23 20:31	05:09 20:54	05:28 20:44	06:05 20:02	06:44 19:03	07:23 18:07	07:07 16:24	07:38 16:17
21	07:35 16:49	06:54 17:34	06:03 19:13	06:05 19:54	05:22 20:32	05:09 20:54	05:29 20:43	06:06 20:00	06:45 19:01	07:24 18:05	07:08 16:23	07:39 16:17
22	07:34 16:50	06:53 17:36	06:01 19:14	06:03 19:55	05:21 20:33	05:09 20:55	05:30 20:42	06:07 19:58	06:46 18:59	07:26 18:03	07:09 16:23	07:39 16:18
23	07:33 16:51	06:51 17:37	06:59 19:16	06:01 19:57	05:20 20:34	05:10 20:55	05:31 20:41	06:09 19:56	06:47 18:57	07:27 18:02	07:11 16:22	07:40 16:18
24	07:32 16:53	06:49 17:38	06:57 19:17	06:00 19:58	05:19 20:35	05:10 20:55	05:32 20:40	06:10 19:55	06:49 18:55	07:28 18:00	07:12 16:21	07:40 16:19
25	07:31 16:54	06:48 17:40	06:55 19:18	05:58 19:59	05:19 20:36	05:10 20:55	05:34 20:39	06:11 19:53	06:50 18:53	07:30 17:58	07:13 16:20	07:41 16:19
26	07:30 16:56	06:46 17:41	06:53 19:20	05:56 20:01	05:18 20:37	05:10 20:55	05:35 20:38	06:12 19:51	06:51 18:51	07:31 17:57	07:14 16:20	07:41 16:20
27	07:29 16:57	06:44 17:43	06:51 19:21	05:55 20:02	05:17 20:38	05:11 20:55	05:36 20:37	06:14 19:49	06:52 18:50	07:33 17:55	07:16 16:19	07:41 16:21
28	07:28 16:59	06:42 17:44	06:49 19:22	05:53 20:03	05:16 20:39	05:11 20:55	05:37 20:36	06:15 19:47	06:54 18:48	07:34 17:53	07:17 16:18	07:42 16:21
29	07:27 17:00		06:47 19:24	05:51 20:05	05:15 20:40	05:12 20:55	05:38 20:34	06:16 19:46	06:55 18:46	07:35 17:52	07:18 16:18	07:42 16:22
30	07:26 17:02		06:45 19:25	05:50 20:06	05:15 20:41	05:12 20:55	05:39 20:33	06:17 19:44	06:56 18:44	07:37 17:50	07:20 16:17	07:42 16:23
31	07:25 17:03		06:44 19:26		05:14 20:42		05:40 20:32	06:19 19:42		07:38 17:49		07:42 16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AA - AA****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:52	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
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16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
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18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
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19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:14	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
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Total, worst case												

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Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AB - AB****Assumptions for shadow calculations**

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The WTG is always operating

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1	07:42 16:25	07:23 17:05	06:40 17:46	06:42 19:28	05:48 20:07	05:13 20:43	05:13 20:55	05:42 20:31	06:20 20:19	06:57 18:42	06:40 16:47	07:21 16:17
2	07:42 16:26	07:22 17:06	06:39 17:47	06:40 19:29	05:47 20:08	05:13 20:44	05:13 20:55	05:43 20:29	06:21 19:38	06:59 18:40	06:41 16:46	07:22 16:17
3	07:42 16:27	07:21 17:07	06:37 17:48	06:38 19:30	05:45 20:10	05:12 20:45	05:14 20:54	05:44 20:28	06:22 19:36	07:00 18:38	06:42 16:44	07:23 16:16
4	07:42 16:28	07:20 17:09	06:35 17:50	06:36 19:32	05:44 20:11	05:12 20:45	05:15 20:54	05:45 20:27	06:24 19:34	07:01 18:36	06:44 16:43	07:24 16:16
5	07:42 16:29	07:18 17:10	06:33 17:51	06:34 19:33	05:42 20:12	05:11 20:46	05:15 20:54	05:46 20:25	06:25 19:32	07:03 18:34	06:45 16:42	07:25 16:16
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16	07:38 16:42	07:03 17:27	06:13 19:06	06:14 19:48	05:28 20:26	05:09 20:53	05:24 20:47	06:00 20:08	06:39 19:11	07:17 18:14	07:01 16:28	07:36 16:15
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21	07:35 16:49	06:54 17:34	07:03 19:13	07:03 19:54	05:22 20:32	05:09 20:54	05:29 20:43	06:06 20:00	06:45 19:01	07:24 18:05	07:08 16:23	07:39 16:17
22	07:34 16:50	06:53 17:36	07:01 19:14	07:01 19:55	06:03 20:33	05:09 20:55	05:30 20:42	06:07 19:58	06:46 18:59	07:26 18:03	07:09 16:23	07:39 16:18
23	07:33 16:51	06:51 17:37	06:59 19:16	06:59 19:57	06:01 20:34	05:10 20:55	05:31 20:41	06:09 19:56	06:47 18:57	07:27 18:02	07:11 16:22	07:40 16:18
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25	07:31 16:54	06:48 17:40	06:55 19:18	06:55 19:59	05:19 20:36	05:10 20:55	05:34 20:39	06:11 19:53	06:50 18:53	07:30 17:58	07:13 16:20	07:41 16:19
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31	07:25 17:03		06:44 19:26	06:44 20:06	05:14 20:42		05:40 20:32	06:19 19:42		07:38 17:49		07:42 16:24
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Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AC - AC****Assumptions for shadow calculations**

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2	07:42 16:26	07:22 17:06	06:39 17:47	06:40 19:29	05:47 20:08	05:13 20:44	05:13 20:55	05:43 20:29	06:21 19:38	06:59 18:40	06:41 16:46	07:22 16:17
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Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
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	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AD - AD****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

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The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

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	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AE - AE****Assumptions for shadow calculations**

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The WTG is always operating

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	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
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	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AF - AF****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:52	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:31	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
16	07:38	07:03	06:12	06:14	05:28	05:09	05:24	06:00	06:38	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:06	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:14	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AG - AG****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:52	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:31	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
16	07:38	07:03	06:12	06:14	05:28	05:09	05:24	06:00	06:38	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:06	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:14	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:19	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AH - AH****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
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11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
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	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
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	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
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	16:42	17:27	19:06	19:48	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
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18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:06	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
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	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:14	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:19	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Dorfstraße 100

DE-26532 Großheide

+49 (0) 4936 6986-0

Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AI - AI****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:52	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
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	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
16	07:38	07:03	06:12	06:14	05:28	05:09	05:24	06:00	06:38	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:06	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:14	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:19	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AJ - AJ****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:30	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
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	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
16	07:38	07:03	06:12	06:14	05:28	05:09	05:24	06:00	06:38	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:43	07:23	07:06	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:14	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:19	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AK - AK****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:54	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:30	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:52	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:31	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
16	07:38	07:03	06:12	06:14	05:28	05:09	05:24	06:00	06:38	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:43	07:23	07:06	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:14	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:19	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AL - AL****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:30	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:52	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:31	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
16	07:38	07:03	06:12	06:14	05:28	05:09	05:24	06:00	06:38	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:43	07:23	07:06	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:09	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
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	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:19	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AM - AM****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:54	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:30	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:26	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:52	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:33	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:31	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
16	07:38	07:03	06:12	06:14	05:28	05:09	05:24	06:00	06:38	07:17	07:01	07:35
	16:42	17:27	19:06	19:48	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:06	05:23	05:09	05:28	06:05	06:43	07:23	07:06	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:25	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:09	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:33	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:14	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:32	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:49	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:19	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AN - AN****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:04	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:54	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:47	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:30	18:32	16:40	16:15
7	07:42	07:16	06:29	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:26	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:52	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:33	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:31	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
16	07:38	07:02	06:12	06:14	05:28	05:09	05:24	06:00	06:38	07:17	07:01	07:35
	16:42	17:27	19:06	19:47	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:06	05:23	05:09	05:28	06:05	06:43	07:23	07:06	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:25	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:09	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:33	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:14	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:32	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:49	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:19	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AO - AO****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:04	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:54	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
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	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
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	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:06	05:23	05:09	05:28	06:05	06:43	07:23	07:06	07:38
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	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:25	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:09	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:33	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30	06:46	06:53	05:56	05:18	05:10	05:35	06:12	06:51	07:31	07:14	07:41
	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:32	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:49	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
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	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:19	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Dorfstraße 100

DE-26532 Großheide

+49 (0) 4936 6986-0

Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AP - AP****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:23	06:40	06:42	05:48	05:13	05:13	05:42	06:20	06:57	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:08	20:44	20:54	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:42	07:23
	16:27	17:07	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:18	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:10	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:47	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:30	18:32	16:40	16:15
7	07:42	07:16	06:29	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
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	16:32	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:26	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:26	16:36	16:15
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	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
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12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:33	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:21	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:31	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
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	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:15	16:29	16:15
16	07:38	07:02	06:12	06:14	05:28	05:09	05:24	06:00	06:38	07:17	07:01	07:35
	16:42	17:27	19:06	19:47	20:26	20:53	20:47	20:08	19:11	18:14	16:28	16:15
17	07:37	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
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18	07:37	06:59	06:09	06:10	05:25	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:51	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:06	05:23	05:09	05:28	06:05	06:43	07:23	07:06	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35	06:54	06:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:23	16:17
22	07:34	06:53	06:01	06:03	05:21	05:09	05:30	06:07	06:46	07:25	07:09	07:39
	16:50	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33	06:51	06:59	06:01	05:20	05:09	05:31	06:09	06:47	07:27	07:11	07:40
	16:51	17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32	06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53	17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31	06:48	06:55	05:58	05:19	05:10	05:33	06:11	06:50	07:30	07:13	07:41
	16:54	17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
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	16:56	17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:51	17:57	16:20	16:20
27	07:29	06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:32	07:16	07:41
	16:57	17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:49	17:55	16:19	16:21
28	07:28	06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59	17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:18	16:21
29	07:27		06:47	05:51	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26		06:45	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:19	07:42
	17:02		19:25	20:06	20:41	20:55	20:33	19:44	18:44		17:50	16:17
31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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+49 (0) 4936 6986-0

Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AQ - AQ****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42 16:25	07:24 17:05	06:41 17:46	06:42 19:28	05:48 20:07	05:13 20:43	05:13 20:55	05:42 20:31	06:20 19:40	06:58 18:42	06:40 16:47	07:21 16:17
2	07:42 16:26	07:22 17:06	06:39 17:47	06:40 19:29	05:47 20:09	05:13 20:44	05:13 20:55	05:43 20:29	06:21 19:38	06:59 18:40	06:41 16:46	07:22 16:17
3	07:42 16:27	07:21 17:08	06:37 17:48	06:38 19:30	05:45 20:10	05:12 20:45	05:14 20:54	05:44 20:28	06:22 19:36	07:00 18:38	06:43 16:45	07:23 16:16
4	07:42 16:28	07:20 17:09	06:35 17:50	06:36 19:32	05:44 20:11	05:12 20:45	05:15 20:54	05:45 20:27	06:24 19:34	07:01 18:36	06:44 16:43	07:24 16:16
5	07:42 16:29	07:19 17:11	06:33 17:51	06:34 19:33	05:42 20:12	05:11 20:46	05:15 20:54	05:46 20:25	06:25 19:32	07:03 18:34	06:45 16:42	07:25 16:16
6	07:42 16:30	07:17 17:12	06:31 17:53	06:32 19:34	05:41 20:14	05:11 20:47	05:16 20:53	05:48 20:24	06:26 19:31	07:04 18:32	06:47 16:40	07:26 16:15
7	07:42 16:31	07:16 17:14	06:30 17:54	06:30 19:36	05:39 20:15	05:10 20:48	05:17 20:53	05:49 20:22	06:27 19:29	07:05 18:30	06:48 16:39	07:27 16:15
8	07:42 16:32	07:14 17:15	06:28 17:54	06:28 19:37	05:38 20:16	05:10 20:48	05:17 20:52	05:50 20:21	06:29 19:27	07:07 18:28	06:50 16:38	07:29 16:15
9	07:41 16:33	07:13 17:17	06:27 18:57	06:27 19:38	05:37 20:17	05:18 20:49	05:18 20:52	05:51 20:19	06:30 19:25	07:08 18:27	06:51 16:36	07:29 16:15
10	07:41 16:35	07:12 17:18	06:24 18:58	06:25 19:40	05:35 20:19	05:10 20:50	05:19 20:51	05:52 20:18	06:31 19:23	07:09 18:25	06:53 16:35	07:30 16:15
11	07:41 16:36	07:10 17:19	06:22 19:00	06:23 19:41	05:34 20:20	05:09 20:50	05:20 20:51	05:54 20:16	06:32 19:21	07:11 18:23	06:54 16:34	07:31 16:15
12	07:40 16:37	07:09 17:21	06:20 19:01	06:21 19:42	05:33 20:21	05:09 20:51	05:21 20:50	05:55 20:15	06:34 19:19	07:12 18:21	06:55 16:33	07:32 16:15
13	07:40 16:38	07:07 17:22	06:19 19:02	06:19 19:44	05:31 20:22	05:09 20:51	05:22 20:50	05:56 20:13	06:35 19:17	07:13 18:19	06:57 16:32	07:33 16:15
14	07:39 16:39	07:06 17:24	06:16 19:04	06:17 19:45	05:30 20:24	05:09 20:52	05:22 20:49	05:57 20:12	06:36 19:15	07:15 18:17	06:58 16:30	07:34 16:15
15	07:39 16:41	07:04 17:25	06:14 19:05	06:15 19:46	05:29 20:25	05:09 20:52	05:23 20:48	05:59 20:10	06:37 19:13	07:16 18:16	07:54 (1) 08:03 (1)	07:00 16:29
16	07:38 16:42	07:03 17:27	06:13 19:06	06:14 19:48	05:28 20:26	05:09 20:53	05:24 20:48	06:00 20:08	06:39 19:11	07:17 18:14	07:52 (1) 08:05 (1)	07:01 16:28
17	07:37 16:43	07:01 17:28	06:11 19:07	06:12 19:49	05:27 20:27	05:09 20:53	05:25 20:47	06:01 20:07	06:40 19:09	07:19 18:12	07:51 (1) 08:06 (1)	07:02 16:27
18	07:37 16:45	06:59 17:30	06:10 19:09	06:10 19:50	05:26 20:28	05:09 20:54	05:26 20:46	06:02 20:05	06:41 19:07	07:20 18:10	07:49 (1) 08:06 (1)	07:04 16:26
19	07:36 16:46	06:58 17:31	06:08 19:10	06:08 19:52	05:24 20:30	05:09 20:54	05:27 20:45	06:04 20:03	06:42 19:05	07:21 18:08	07:50 (1) 08:06 (1)	07:05 16:25
20	07:35 16:47	06:56 17:33	06:07 19:12	06:07 19:53	05:23 20:31	05:09 20:54	05:28 20:44	06:05 20:02	06:44 19:03	07:23 18:07	07:49 (1) 08:06 (1)	07:07 16:24
21	07:35 16:49	06:54 17:34	06:05 19:13	06:05 19:54	05:22 20:32	05:09 20:54	05:29 20:43	06:06 20:00	06:45 19:01	07:24 18:05	07:49 (1) 08:06 (1)	07:08 16:24
22	07:34 16:50	06:53 17:36	06:03 19:14	06:03 19:55	05:21 20:33	05:09 20:55	05:30 20:42	06:07 19:58	06:46 18:59	07:26 18:03	07:49 (1) 08:05 (1)	07:09 16:23
23	07:33 16:52	06:51 17:37	06:01 19:16	06:01 19:57	05:20 20:34	05:10 20:55	05:31 20:41	06:09 19:56	06:47 18:57	07:27 18:02	07:51 (1) 08:05 (1)	07:11 16:22
24	07:32 16:53	06:49 17:39	06:00 19:17	06:00 19:58	05:20 20:35	05:10 20:55	05:33 20:40	06:10 19:55	06:49 18:55	07:28 18:00	07:51 (1) 08:03 (1)	07:12 16:21
25	07:31 16:54	06:48 17:40	05:58 19:18	05:58 19:59	05:19 20:36	05:10 20:55	05:34 20:39	06:11 19:53	06:50 18:53	07:30 17:58	07:54 (1) 08:01 (1)	07:13 16:20
26	07:30 16:56	06:46 17:41	05:56 19:20	05:56 20:01	05:18 20:37	05:11 20:55	05:35 20:38	06:12 19:51	06:51 18:52	07:31 17:57	07:51 (1) 08:01 (1)	07:15 16:20
27	07:29 16:57	06:44 17:43	05:55 19:21	05:55 20:02	05:17 20:38	05:11 20:55	05:36 20:37	06:14 19:49	06:52 18:50	07:33 17:55	07:51 (1) 08:01 (1)	07:16 16:21
28	07:28 16:59	06:42 17:44	05:53 19:22	05:53 20:03	05:16 20:39	05:11 20:55	05:37 20:36	06:15 19:47	06:54 18:48	07:34 17:54	07:51 (1) 08:01 (1)	07:17 16:21
29	07:27 17:00		05:52 19:24	05:52 20:05	05:15 20:40	05:12 20:55	05:38 20:34	06:16 19:46	06:55 18:46	07:35 17:52	07:51 (1) 08:01 (1)	07:18 16:22
30	07:26 17:02		05:50 19:25	05:50 20:06	05:15 20:41	05:12 20:55	05:39 20:33	06:17 19:44	06:56 18:44	07:37 17:50	07:51 (1) 08:01 (1)	07:19 16:23
31	07:25 17:03		05:44 19:26	05:44 20:04	05:14 20:42	05:40 20:55	05:40 20:32	06:19 19:42	06:58 17:49	07:38 17:49	07:51 (1) 08:01 (1)	07:20 16:24
Potential sun hours	282	290	369	406	463	471	476	438	377	339	285	270
Total, worst case		152								153		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AR - AR****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:42	08:25 (1)	07:24	06:41	06:42	05:48	05:13	05:42	06:20	06:58	06:40	07:21	08:12 (1)
	16:25	21	08:46 (1)	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47
2	07:42	08:25 (1)	07:22	06:39	06:40	05:47	05:13	05:43	06:21	06:59	06:41	07:22	08:12 (1)
	16:26	21	08:46 (1)	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46
3	07:42	08:26 (1)	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23
	16:27	21	08:47 (1)	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44
4	07:42	08:25 (1)	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	21	08:46 (1)	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43
5	07:42	08:26 (1)	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	21	08:47 (1)	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42
6	07:42	08:27 (1)	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	21	08:48 (1)	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40
7	07:42	08:28 (1)	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	20	08:48 (1)	17:14	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39
8	07:42	08:28 (1)	07:14	07:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28
	16:32	20	08:48 (1)	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38
9	07:41	08:29 (1)	07:13	07:26	06:27	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29
	16:33	19	08:48 (1)	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36
10	07:41	08:30 (1)	07:12	07:24	06:25	05:35	05:10	05:19	05:52	06:31	07:09	06:53	07:30
	16:35	19	08:49 (1)	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35
11	07:41	08:30 (1)	07:10	07:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	19	08:49 (1)	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34
12	07:40	08:31 (1)	07:09	07:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	18	08:49 (1)	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33
13	07:40	08:32 (1)	07:07	07:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	16	08:48 (1)	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32
14	07:39	08:32 (1)	07:06	07:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	16	08:48 (1)	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30
15	07:39	08:34 (1)	07:04	07:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	14	08:48 (1)	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29
16	07:38	08:35 (1)	07:03	07:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	12	08:47 (1)	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28
17	07:37	08:36 (1)	07:01	07:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	10	08:46 (1)	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27
18	07:37	08:40 (1)	06:59	07:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	4	08:44 (1)	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26
19	07:36		06:58	07:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46		17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35		06:56	07:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47		17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
21	07:35		06:54	07:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39
	16:49		17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17
22	07:34		06:53	07:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39
	16:50		17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18
23	07:33		06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40
	16:52		17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18
24	07:32		06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40
	16:53		17:39	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19
25	07:31		06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41
	16:54		17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19
26	07:30		06:46	06:53	05:56	05:18	05:11	05:35	06:12	06:51	07:31	07:15	07:41
	16:56		17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:52	17:57	16:20	16:20
27	07:29		06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41
	16:57		17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	16:21
28	07:28		06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:42
	16:59		17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:54	16:19	16:21
29	07:27			06:47	05:52	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42
	17:00			19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
30	07:26			06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42
	17:02			19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	16:23
31	07:25			06:44		05:14		05:40	06:19		07:38		07:42
	17:03			19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282		290	369	406	463	471	476	438	377	339	285	270
Total, worst case	313										89		644

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AS - AS****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

		January	February	March	April	May	June	July	August	September	October	November	December					
1	07:42	08:26 (1)	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21	08:12 (1)				
	16:25	22	08:48 (1)	17:05	17:46	19:28	20:07	20:43	20:31	19:40	18:42	16:47	16:17	22	08:34 (1)			
2	07:42	08:26 (1)	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22		08:12 (1)			
	16:26	22	08:48 (1)	17:06	17:47	19:29	20:44	20:55	20:29	19:38	18:40	16:46	16:17	22	08:34 (1)			
3	07:42	08:27 (1)	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23		08:13 (1)			
	16:27	22	08:49 (1)	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16	22	08:35 (1)		
4	07:42	08:26 (1)	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24		08:13 (1)			
	16:28	23	08:49 (1)	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16	23	08:36 (1)		
5	07:42	08:27 (1)	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25		08:13 (1)			
	16:29	22	08:49 (1)	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16	23	08:36 (1)		
6	07:42	08:27 (1)	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26		08:14 (1)			
	16:30	23	08:50 (1)	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15	22	08:36 (1)		
7	07:42	08:28 (1)	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27		08:14 (1)			
	16:31	23	08:51 (1)	17:14	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15	22	08:36 (1)		
8	07:42	08:28 (1)	07:14	07:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28		08:14 (1)			
	16:32	22	08:50 (1)	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15	23	08:37 (1)		
9	07:41	08:29 (1)	07:13	07:26	06:27	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29		08:15 (1)			
	16:33	22	08:51 (1)	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15	22	08:37 (1)		
10	07:41	08:30 (1)	07:12	07:24	06:25	05:35	05:10	05:19	05:52	06:31	07:09	06:53	07:30		08:15 (1)			
	16:35	22	08:52 (1)	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15	22	08:37 (1)		
11	07:41	08:30 (1)	07:10	07:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31		08:16 (1)			
	16:36	22	08:52 (1)	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15	22	08:38 (1)		
12	07:40	08:31 (1)	07:09	07:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32		08:17 (1)			
	16:37	22	08:53 (1)	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15	21	08:38 (1)		
13	07:40	08:31 (1)	07:07	07:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33		08:17 (1)			
	16:38	21	08:52 (1)	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15	22	08:39 (1)		
14	07:39	08:31 (1)	07:06	07:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34		08:18 (1)			
	16:39	21	08:52 (1)	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15	21	08:39 (1)		
15	07:39	08:32 (1)	07:04	07:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35		08:18 (1)			
	16:41	21	08:53 (1)	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15	21	08:39 (1)		
16	07:38	08:33 (1)	07:03	07:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36		08:19 (1)			
	16:42	19	08:52 (1)	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15	20	08:39 (1)		
17	07:37	08:33 (1)	07:01	07:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36		08:19 (1)			
	16:43	19	08:52 (1)	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16	21	08:40 (1)		
18	07:37	08:35 (1)	06:59	07:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37		08:19 (1)			
	16:45	17	08:52 (1)	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16	21	08:40 (1)		
19	07:36	08:36 (1)	06:58	07:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38		08:20 (1)			
	16:46	15	08:51 (1)	17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16	21	08:41 (1)		
20	07:35	08:38 (1)	06:56	07:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38		08:21 (1)			
	16:47	12	08:50 (1)	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	3	08:21 (1)	16:17	20	08:41 (1)
21	07:35	08:39 (1)	06:54	07:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39		08:21 (1)			
	16:49	10	08:49 (1)	17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	10	08:25 (1)	16:17	20	08:41 (1)
22	07:34	08:43 (1)	06:53	07:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39		08:22 (1)			
	16:50	3	08:46 (1)	17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	12	08:26 (1)	16:18	20	08:42 (1)
23	07:33		06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:39		08:22 (1)			
	16:52		17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	15	08:27 (1)	16:18	20	08:42 (1)	
24	07:32		06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:39		08:22 (1)			
	16:53		17:39	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	17	08:29 (1)	16:19	20	08:42 (1)	
25	07:31		06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41		08:23 (1)			
	16:54		17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	18	08:30 (1)	16:19	21	08:44 (1)	
26	07:30		06:46	06:53	05:56	05:18	05:11	05:35	06:12	06:51	07:31	07:15	07:41		08:23 (1)			
	16:56		17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:52	17:57	16:20	19	08:31 (1)	16:20	21	08:44 (1)	
27	07:29		06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16	07:41		08:24 (1)			
	16:57		17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19	21	08:32 (1)	16:21	20	08:44 (1)	
28	07:28		06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17	07:41		08:25 (1)			
	16:59		17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19	21	08:32 (1)	16:21	21	08:46 (1)	
29	07:27			06:47	05:52	05:15	05:12	05:38	06:16	06:55	07:35	07:18	07:42		08:25 (1)			
	17:00			19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	21	08:33 (1)	16:22	21	08:46 (1)	
30	07:26			06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20	07:42		08:25 (1)			
	17:02			19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17	22	08:34 (1)	16:23	21	08:46 (1)	
31	07:25			06:44		05:14		05:40	06:19		07:38		07:42		08:25 (1)			
	17:03			19:26		20:42		20:32	19:42		17:49		16:24	22	08:47 (1)			
Potential sun hours	282		290	369	406	463	471	476	438	377	339	285	270					
Total, worst case	425										179		660					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AT - AT****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

		January	February	March	April	May	June	July	August	September	October	November		December		
1	07:42	08:34 (1)	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21	08:22 (1)		
	16:25	23	08:57 (1)	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17	18	08:40 (1)
2	07:42	08:35 (1)	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22	08:22 (1)		
	16:26	22	08:57 (1)	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17	19	08:41 (1)
3	07:42	08:35 (1)	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23	08:23 (1)		
	16:27	23	08:58 (1)	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16	20	08:43 (1)
4	07:42	08:35 (1)	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24	08:23 (1)		
	16:28	22	08:57 (1)	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16	20	08:43 (1)
5	07:42	08:36 (1)	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25	08:23 (1)		
	16:29	22	08:58 (1)	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16	21	08:44 (1)
6	07:42	08:37 (1)	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26	08:23 (1)		
	16:30	21	08:58 (1)	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15	21	08:44 (1)
7	07:42	08:38 (1)	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27	08:23 (1)		
	16:31	21	08:59 (1)	17:14	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15	22	08:45 (1)
8	07:42	08:38 (1)	07:14	07:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:28	08:23 (1)		
	16:32	20	08:58 (1)	17:15	18:55	19:37	20:16	20:48	20:52	20:21	19:27	18:28	16:38	16:15	22	08:45 (1)
9	07:41	08:39 (1)	07:13	07:26	06:27	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:29	08:23 (1)		
	16:33	20	08:59 (1)	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15	23	08:46 (1)
10	07:41	08:40 (1)	07:12	07:24	06:25	05:35	05:10	05:19	05:52	06:31	07:09	06:53	07:30	08:24 (1)		
	16:35	19	08:59 (1)	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15	22	08:46 (1)
11	07:41	08:40 (1)	07:10	07:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31	08:24 (1)		
	16:36	18	08:58 (1)	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15	23	08:47 (1)
12	07:40	08:42 (1)	07:09	07:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32	08:25 (1)		
	16:37	17	08:59 (1)	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15	22	08:47 (1)
13	07:40	08:42 (1)	07:07	07:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33	08:25 (1)		
	16:38	16	08:58 (1)	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15	23	08:48 (1)
14	07:39	08:43 (1)	07:06	07:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34	08:26 (1)		
	16:39	14	08:57 (1)	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15	23	08:49 (1)
15	07:39	08:45 (1)	07:04	07:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35	08:26 (1)		
	16:41	12	08:57 (1)	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15	22	08:48 (1)
16	07:38	08:47 (1)	07:03	07:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36	08:26 (1)		
	16:42	8	08:55 (1)	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15	23	08:49 (1)
17	07:37		07:01	07:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36	08:27 (1)		
	16:43		17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16	23	08:50 (1)	
18	07:37		06:59	07:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37	08:27 (1)		
	16:45		17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16	23	08:50 (1)	
19	07:36		06:58	07:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38	08:28 (1)		
	16:46		17:31	19:10	19:52	20:29	20:54	20:45	20:03	19:05	18:08	16:25	16:16	22	08:50 (1)	
20	07:35		06:56	07:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38	08:29 (1)		
	16:47		17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17	22	08:51 (1)	
21	07:35		06:54	07:03	06:05	05:22	05:09	05:29	06:06	06:45	07:24	07:08	07:39	08:28 (1)		
	16:49		17:34	19:13	19:54	20:32	20:54	20:43	20:00	19:01	18:05	16:24	16:17	23	08:51 (1)	
22	07:34		06:53	07:01	06:03	05:21	05:09	05:30	06:07	06:46	07:26	07:09	07:39	08:29 (1)		
	16:50		17:36	19:14	19:55	20:33	20:55	20:42	19:58	18:59	18:03	16:23	16:18	23	08:52 (1)	
23	07:33		06:51	06:59	06:01	05:20	05:10	05:31	06:09	06:47	07:27	07:11	07:40	08:29 (1)		
	16:52		17:37	19:16	19:57	20:34	20:55	20:41	19:56	18:57	18:02	16:22	16:18	23	08:52 (1)	
24	07:32		06:49	06:57	06:00	05:19	05:10	05:32	06:10	06:49	07:28	07:12	07:40	08:30 (1)		
	16:53		17:38	19:17	19:58	20:35	20:55	20:40	19:55	18:55	18:00	16:21	16:19	22	08:52 (1)	
25	07:31		06:48	06:55	05:58	05:19	05:10	05:34	06:11	06:50	07:30	07:13	07:41	08:31 (1)		
	16:54		17:40	19:18	19:59	20:36	20:55	20:39	19:53	18:53	17:58	16:20	16:19	23	08:54 (1)	
26	07:30		06:46	06:53	05:56	05:18	05:11	05:35	06:12	06:51	07:31	07:15		8	08:26 (1)	
	16:56		17:41	19:20	20:01	20:37	20:55	20:38	19:51	18:52	17:57	16:20		8	08:34 (1)	
27	07:29		06:44	06:51	05:55	05:17	05:11	05:36	06:14	06:52	07:33	07:16		8	08:25 (1)	
	16:57		17:43	19:21	20:02	20:38	20:55	20:37	19:49	18:50	17:55	16:19		11	08:36 (1)	
28	07:28		06:42	06:49	05:53	05:16	05:11	05:37	06:15	06:54	07:34	07:17		11	08:23 (1)	
	16:59		17:44	19:22	20:03	20:39	20:55	20:36	19:47	18:48	17:53	16:19		14	08:37 (1)	
29	07:27			06:47	05:52	05:15	05:12	05:38	06:16	06:55	07:35	07:18			08:24 (1)	
	17:00			19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18		15	08:39 (1)	
30	07:26			06:46	05:50	05:15	05:12	05:39	06:17	06:56	07:37	07:20			08:23 (1)	
	17:02			19:25	20:06	20:41	20:55	20:33	19:44	18:44	17:50	16:17		17	08:40 (1)	
31	07:25			06:44		05:14		05:40	06:19		07:38				07:42	
	17:03			19:26		20:42		20:32	19:42		17:49				16:24	
Potential sun hours	282		290	369	406	463	471	476	438	377	339	285	270		685	
Total, worst case	298											65				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)Shadow receptor: AU - AU****Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42	07:24	06:41	06:42	05:48	05:13	05:13	05:42	06:20	06:58	06:40	07:21
	16:25	17:05	17:46	19:28	20:07	20:43	20:55	20:31	19:40	18:42	16:47	16:17
2	07:42	07:22	06:39	06:40	05:47	05:13	05:13	05:43	06:21	06:59	06:41	07:22
	16:26	17:06	17:47	19:29	20:09	20:44	20:55	20:29	19:38	18:40	16:46	16:17
3	07:42	07:21	06:37	06:38	05:45	05:12	05:14	05:44	06:22	07:00	06:43	07:23
	16:27	17:08	17:48	19:30	20:10	20:45	20:54	20:28	19:36	18:38	16:44	16:16
4	07:42	07:20	06:35	06:36	05:44	05:12	05:15	05:45	06:24	07:01	06:44	07:24
	16:28	17:09	17:50	19:32	20:11	20:45	20:54	20:27	19:34	18:36	16:43	16:16
5	07:42	07:19	06:33	06:34	05:42	05:11	05:15	05:46	06:25	07:03	06:45	07:25
	16:29	17:11	17:51	19:33	20:12	20:46	20:54	20:25	19:32	18:34	16:42	16:16
6	07:42	07:17	06:31	06:32	05:41	05:11	05:16	05:48	06:26	07:04	06:47	07:26
	16:30	17:12	17:53	19:34	20:14	20:47	20:53	20:24	19:31	18:32	16:40	16:15
7	07:42	07:16	06:30	06:30	05:39	05:10	05:17	05:49	06:27	07:05	06:48	07:27
	16:31	17:13	17:54	19:36	20:15	20:48	20:53	20:22	19:29	18:30	16:39	16:15
8	07:42	07:14	06:28	06:28	05:38	05:10	05:17	05:50	06:29	07:07	06:50	07:29
	16:32	17:15	18:55	19:37	20:16	20:48	20:53	20:21	19:27	18:28	16:38	16:15
9	07:41	07:13	06:26	06:27	05:37	05:10	05:18	05:51	06:30	07:08	06:51	07:30
	16:33	17:16	18:57	19:38	20:17	20:49	20:52	20:19	19:25	18:27	16:36	16:15
10	07:41	07:12	06:24	06:25	05:35	05:09	05:19	05:52	06:31	07:09	06:53	07:30
	16:34	17:18	18:58	19:40	20:19	20:50	20:51	20:18	19:23	18:25	16:35	16:15
11	07:41	07:10	06:22	06:23	05:34	05:09	05:20	05:54	06:32	07:11	06:54	07:31
	16:36	17:19	19:00	19:41	20:20	20:50	20:51	20:16	19:21	18:23	16:34	16:15
12	07:40	07:09	06:20	06:21	05:33	05:09	05:21	05:55	06:34	07:12	06:55	07:32
	16:37	17:21	19:01	19:42	20:21	20:51	20:50	20:15	19:19	18:21	16:33	16:15
13	07:40	07:07	06:18	06:19	05:31	05:09	05:22	05:56	06:35	07:13	06:57	07:33
	16:38	17:22	19:02	19:44	20:22	20:51	20:50	20:13	19:17	18:19	16:32	16:15
14	07:39	07:06	06:16	06:17	05:30	05:09	05:22	05:57	06:36	07:15	06:58	07:34
	16:39	17:24	19:04	19:45	20:24	20:52	20:49	20:12	19:15	18:17	16:30	16:15
15	07:39	07:04	06:14	06:15	05:29	05:09	05:23	05:59	06:37	07:16	07:00	07:35
	16:41	17:25	19:05	19:46	20:25	20:52	20:48	20:10	19:13	18:16	16:29	16:15
16	07:38	07:03	06:13	06:14	05:28	05:09	05:24	06:00	06:39	07:17	07:01	07:36
	16:42	17:27	19:06	19:48	20:26	20:53	20:48	20:08	19:11	18:14	16:28	16:15
17	07:38	07:01	06:11	06:12	05:27	05:09	05:25	06:01	06:40	07:19	07:02	07:36
	16:43	17:28	19:08	19:49	20:27	20:53	20:47	20:07	19:09	18:12	16:27	16:16
18	07:37	06:59	06:09	06:10	05:26	05:09	05:26	06:02	06:41	07:20	07:04	07:37
	16:45	17:30	19:09	19:50	20:28	20:54	20:46	20:05	19:07	18:10	16:26	16:16
19	07:36	06:58	06:07	06:08	05:24	05:09	05:27	06:04	06:42	07:21	07:05	07:38
	16:46	17:31	19:10	19:52	20:30	20:54	20:45	20:03	19:05	18:08	16:25	16:16
20	07:35	06:56	06:05	06:07	05:23	05:09	05:28	06:05	06:44	07:23	07:07	07:38
	16:47	17:33	19:12	19:53	20:31	20:54	20:44	20:02	19:03	18:07	16:24	16:17
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	17:00		19:24	20:05	20:40	20:55	20:34	19:46	18:46	17:52	16:18	16:22
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31	07:25		06:44		05:14		05:40	06:19		07:38		07:42
	17:03		19:26		20:42		20:32	19:42		17:49		16:24
Potential sun hours	282	289	369	406	463	471	476	438	377	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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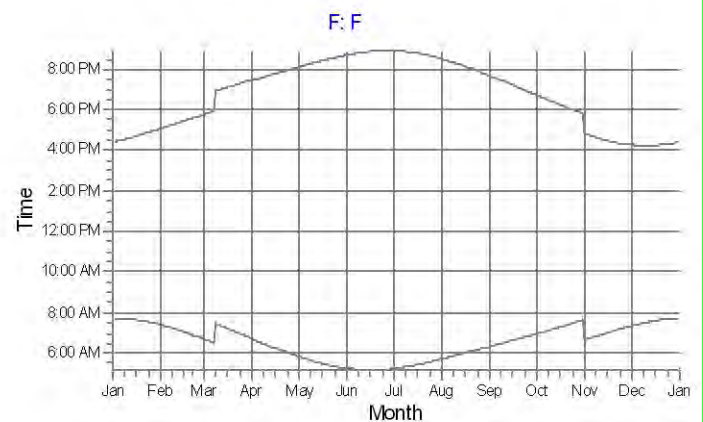
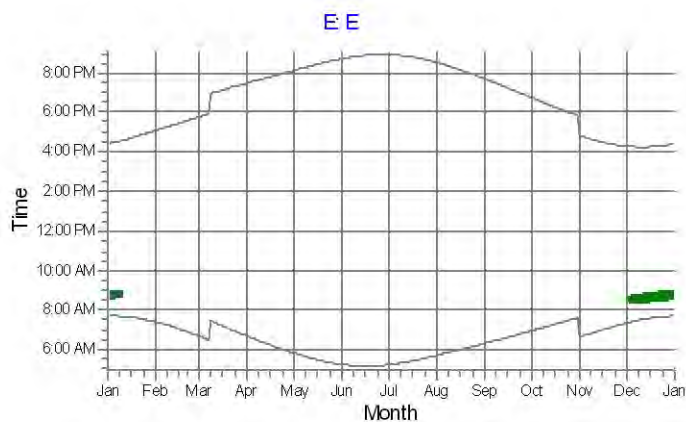
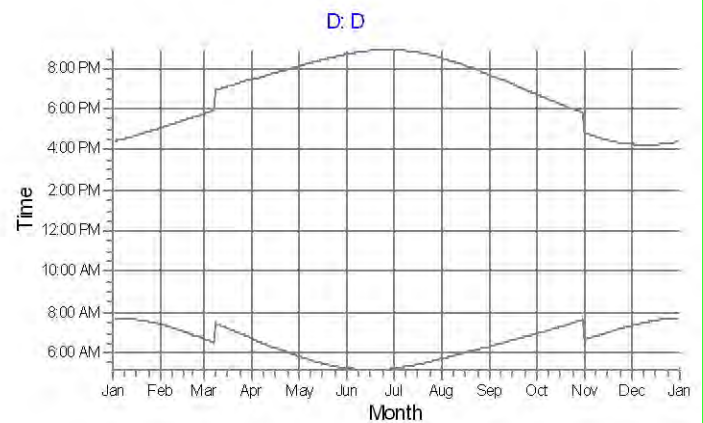
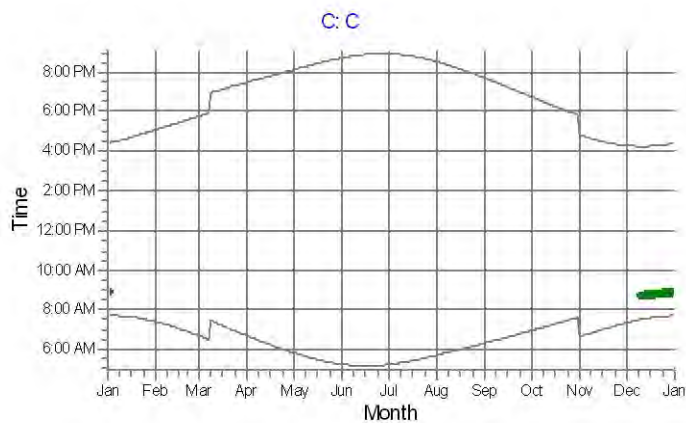
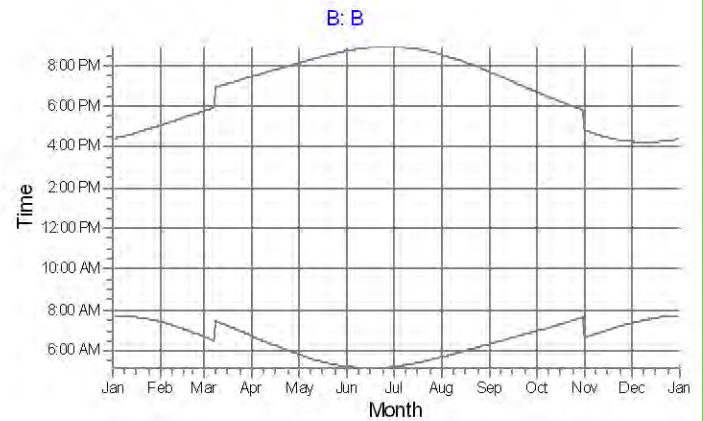
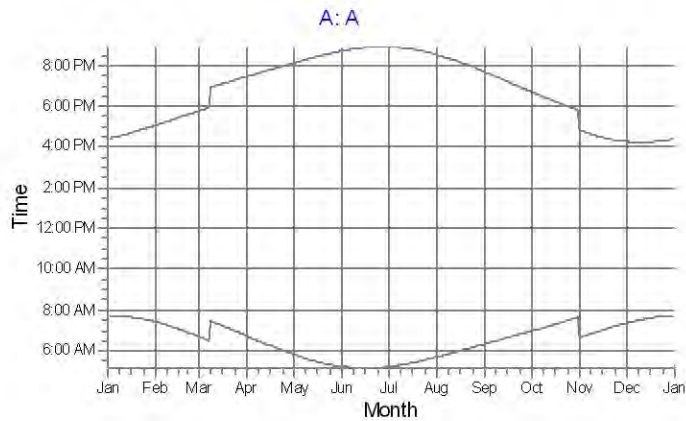
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SHADOW - Calendar, graphical**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)**

WTGs

1: ENERCON E-92 2,3 MW 2300 92.0 !-! hub: 98.0 m (TOT: 144.0 m) (3)

Project:

Bateston

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Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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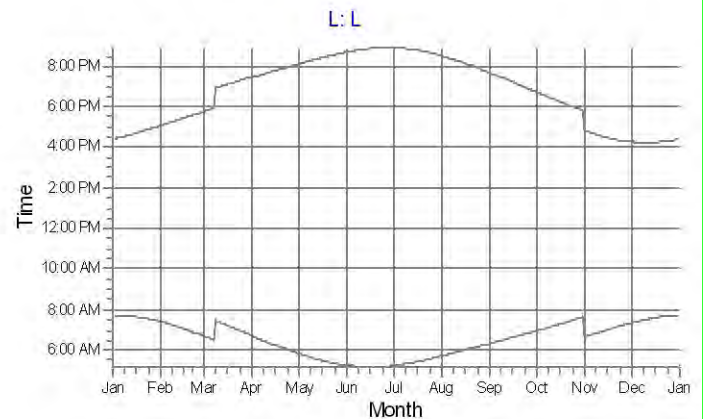
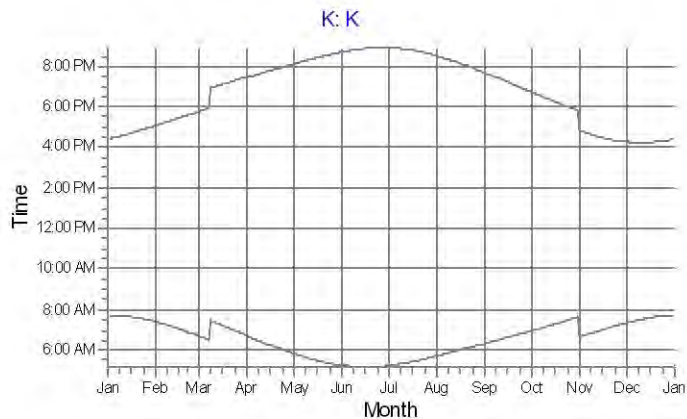
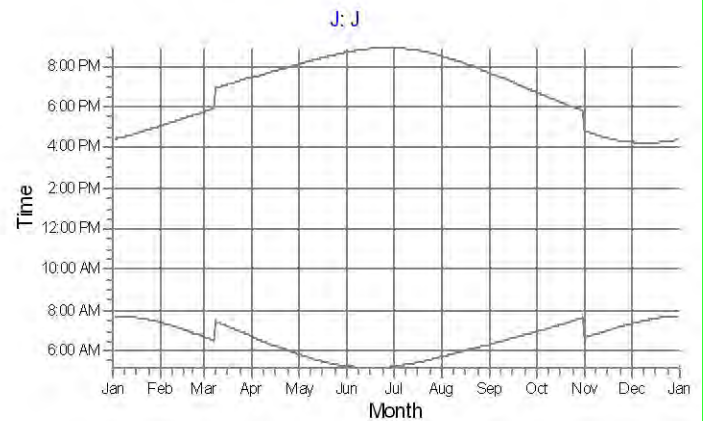
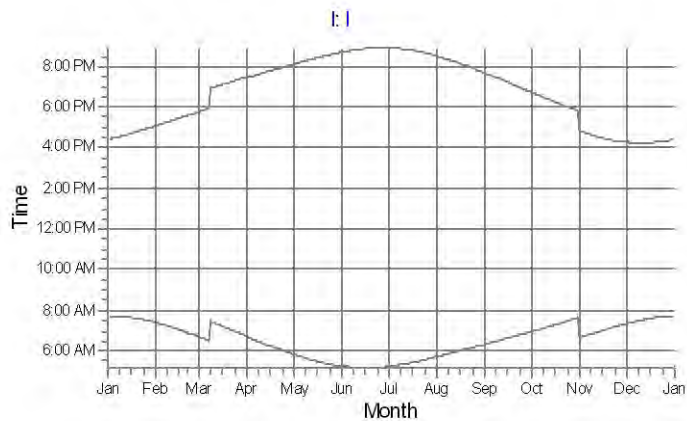
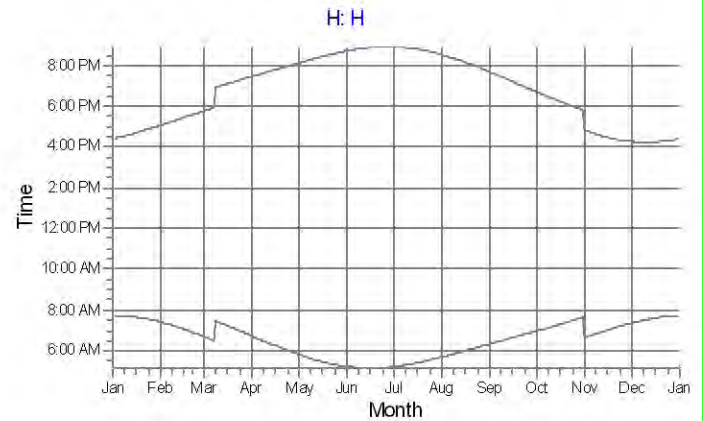
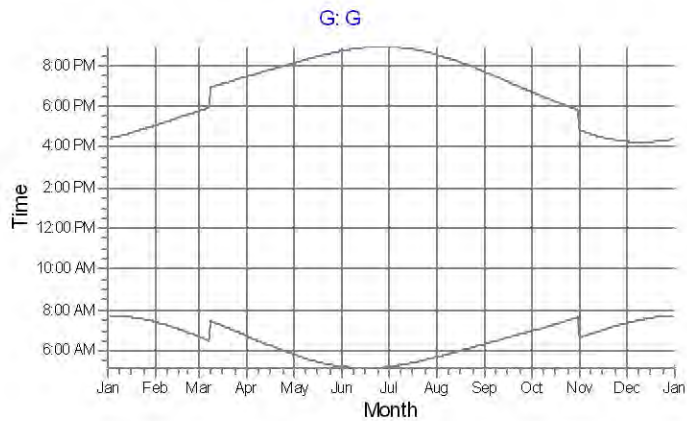
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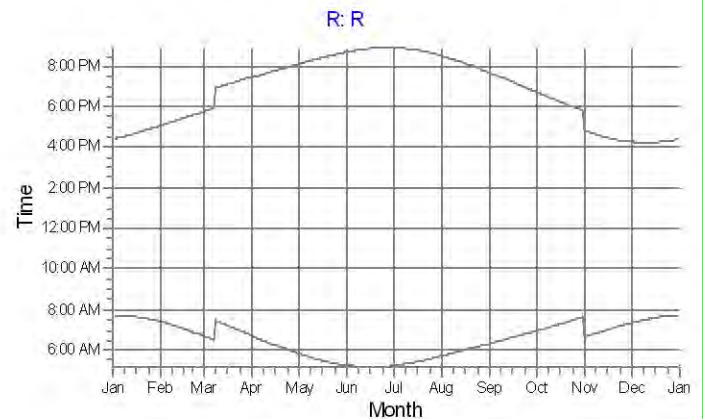
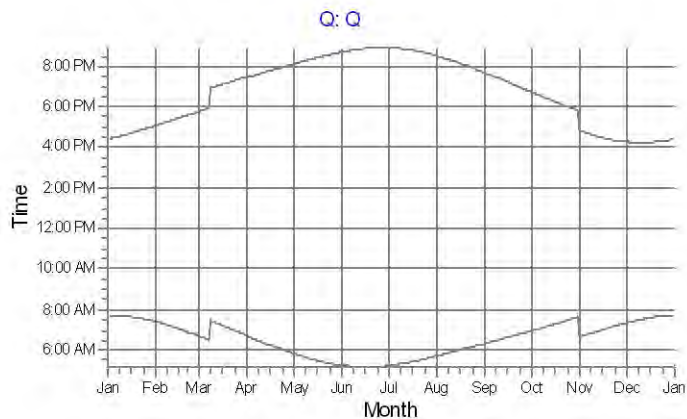
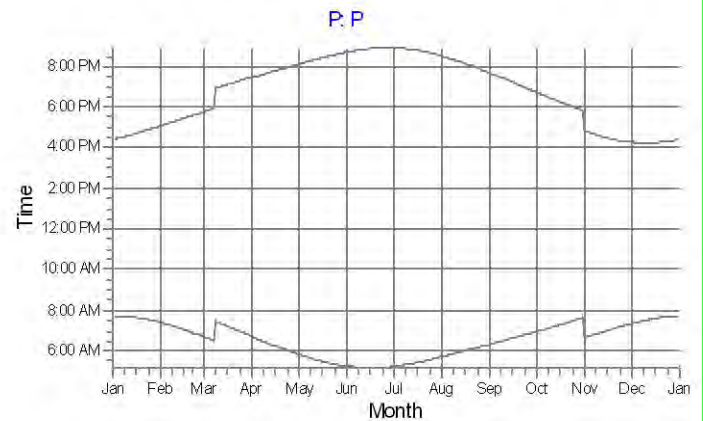
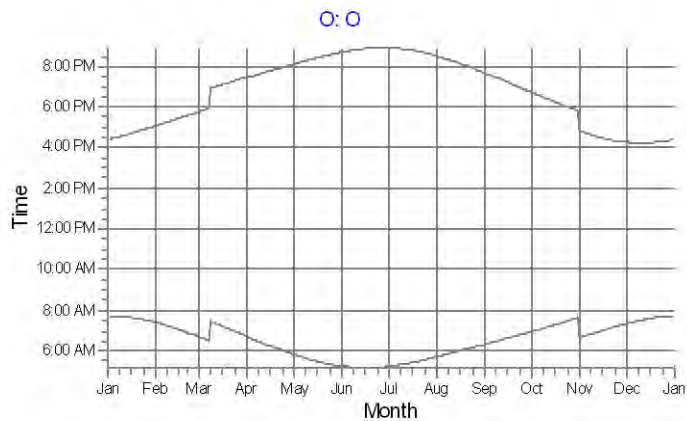
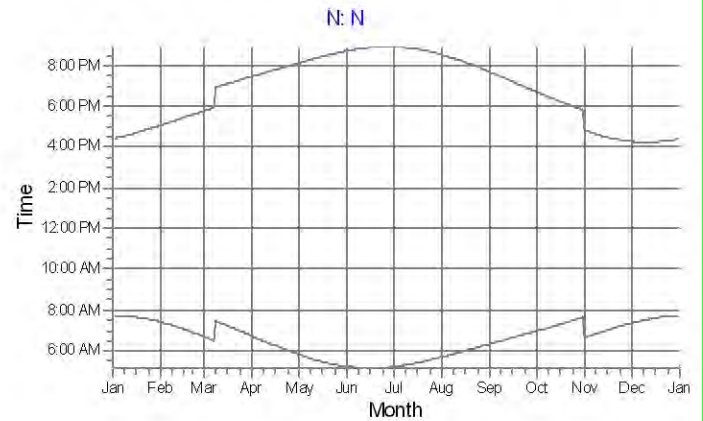
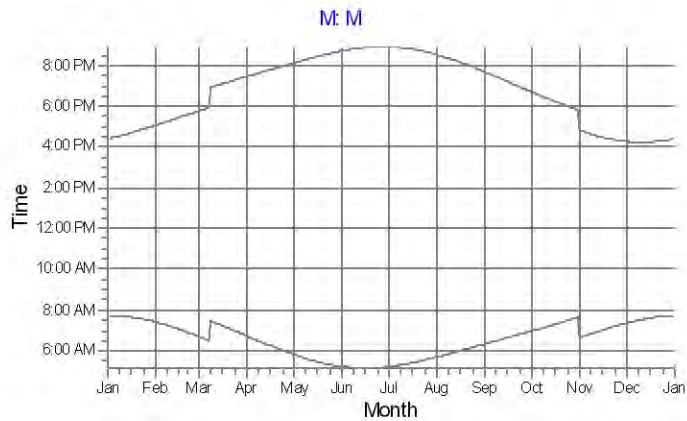
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SHADOW - Calendar, graphical**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)**

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Project:

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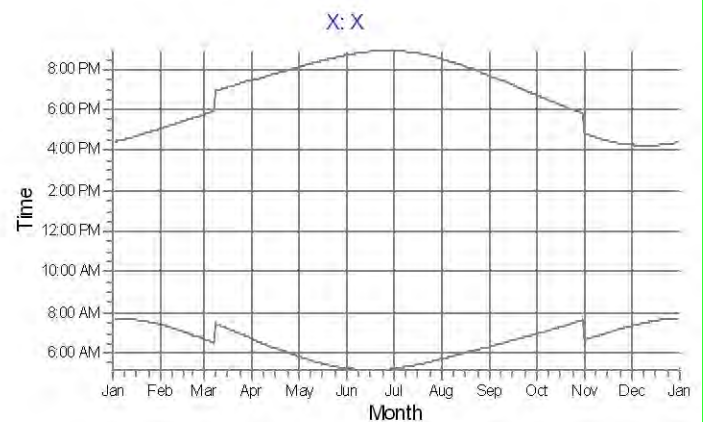
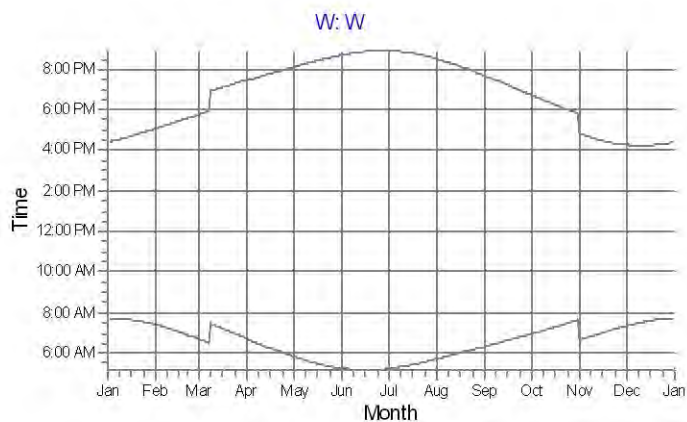
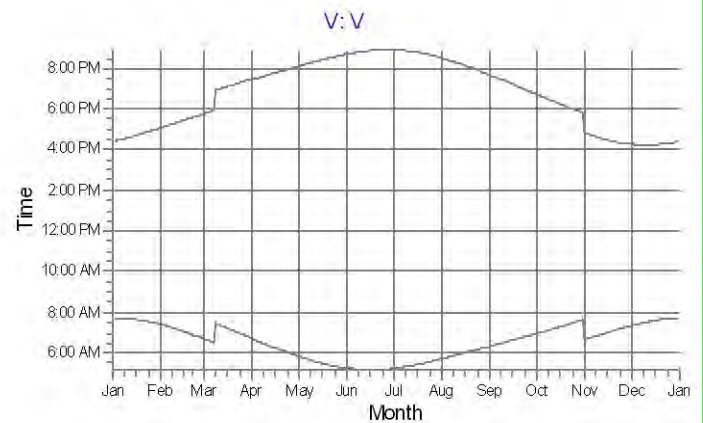
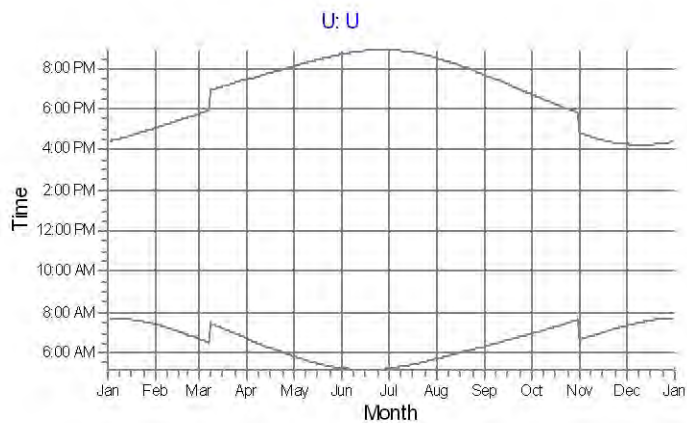
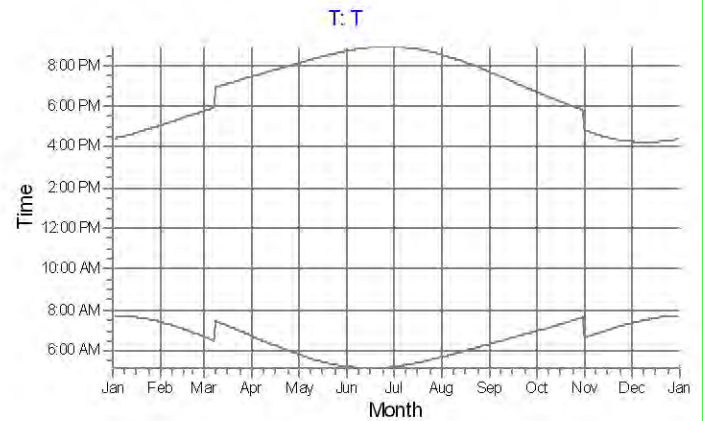
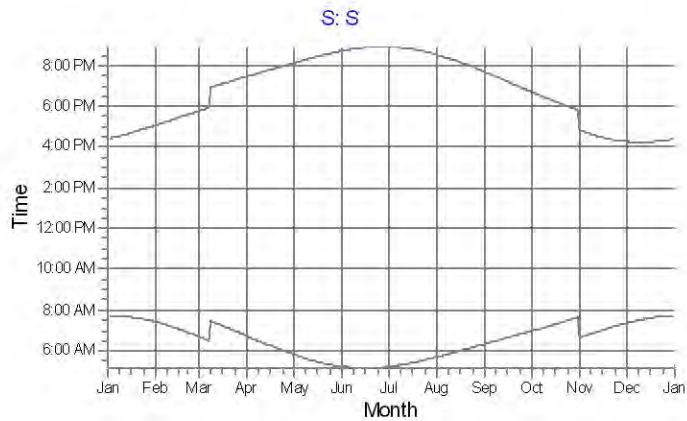
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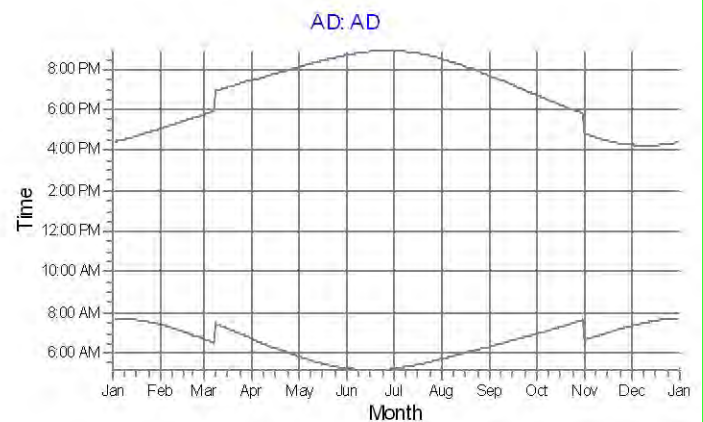
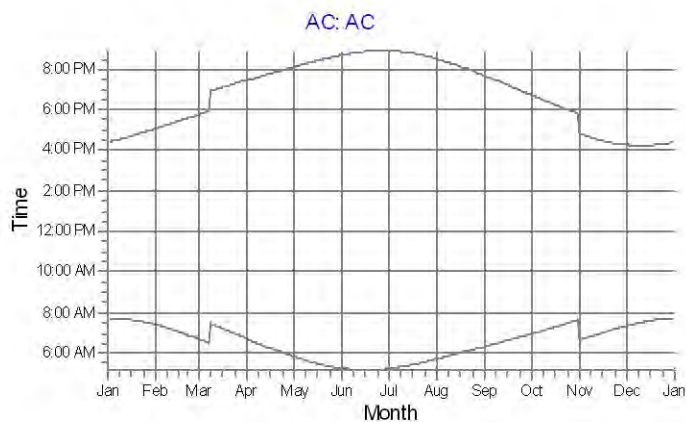
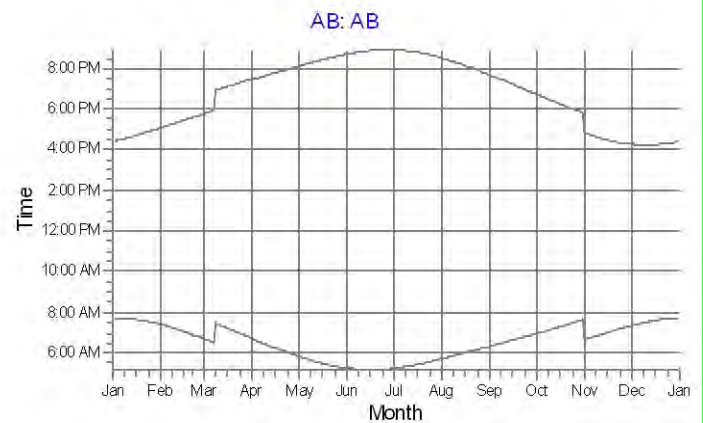
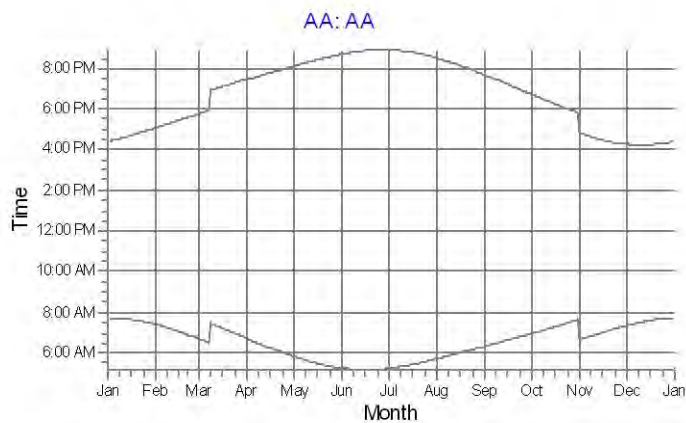
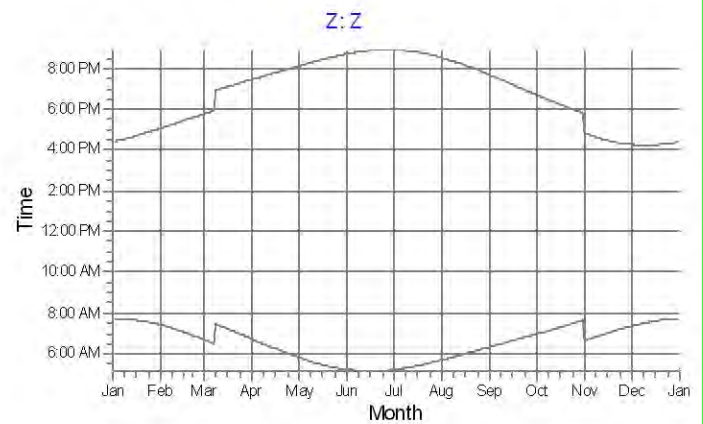
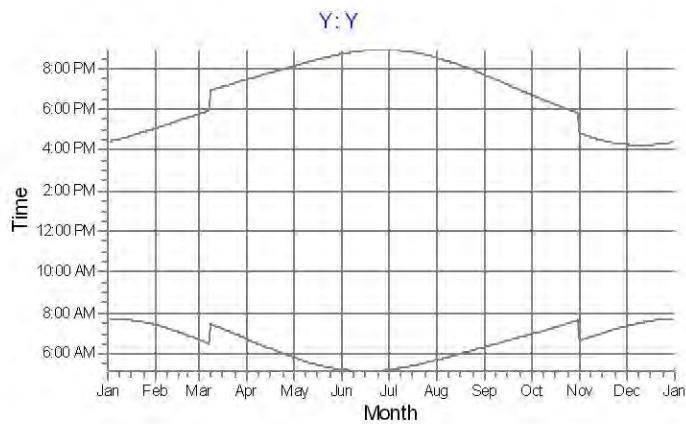
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SHADOW - Calendar, graphical**Calculation: E-92 @ 98m w Receptors (Hrs per Yr)**

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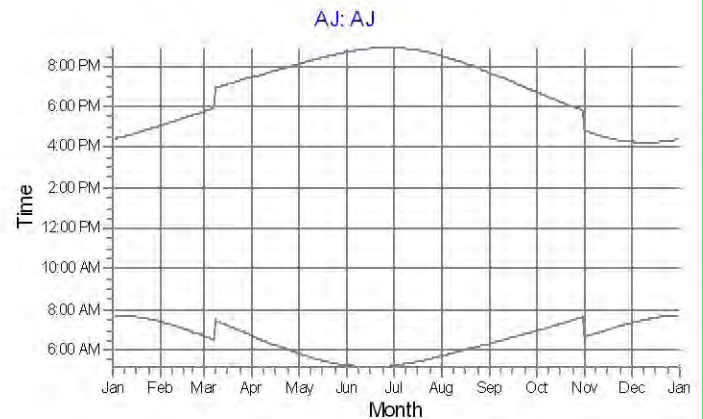
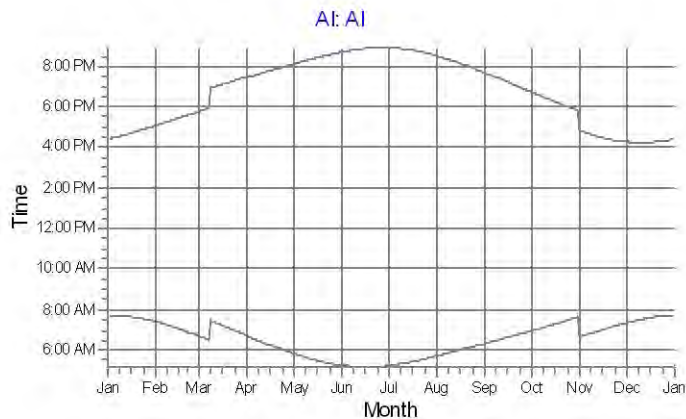
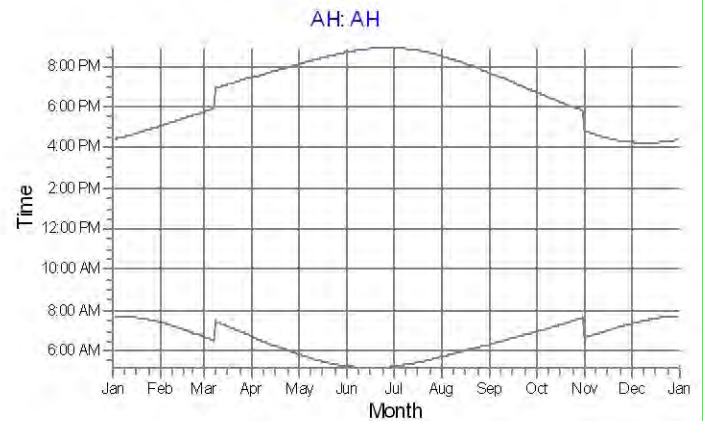
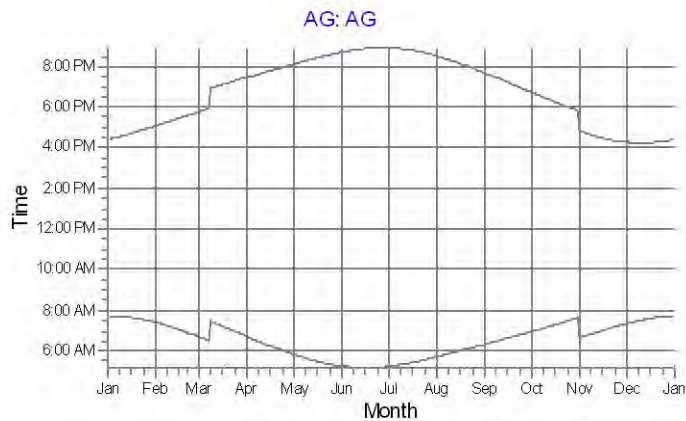
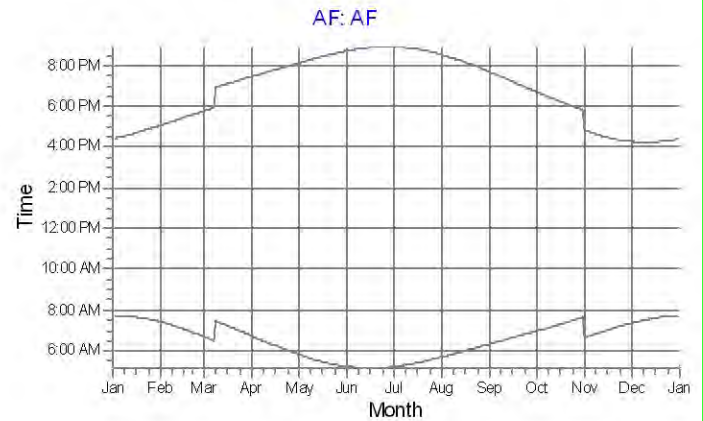
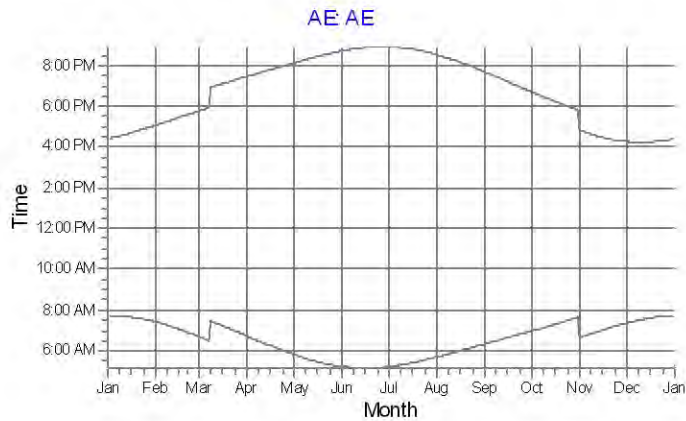
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Project:

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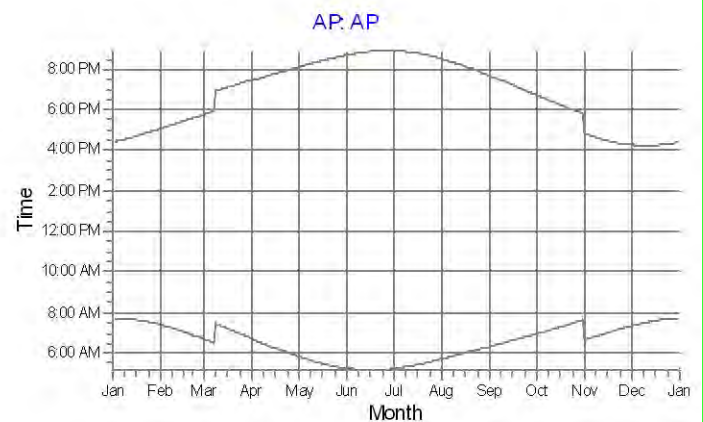
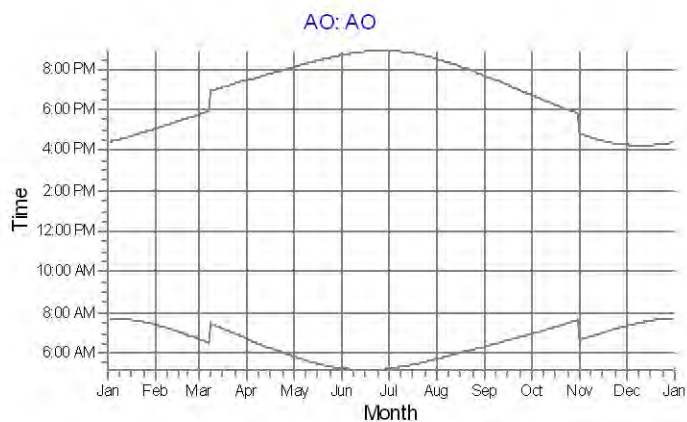
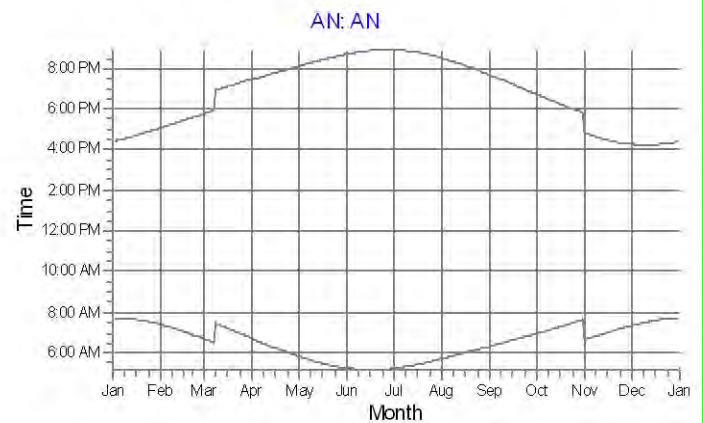
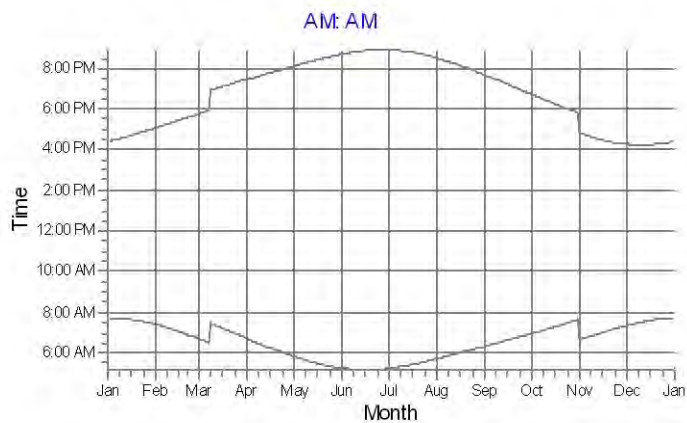
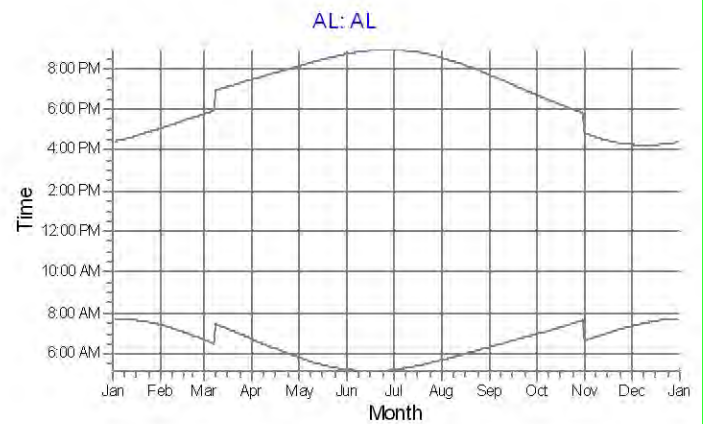
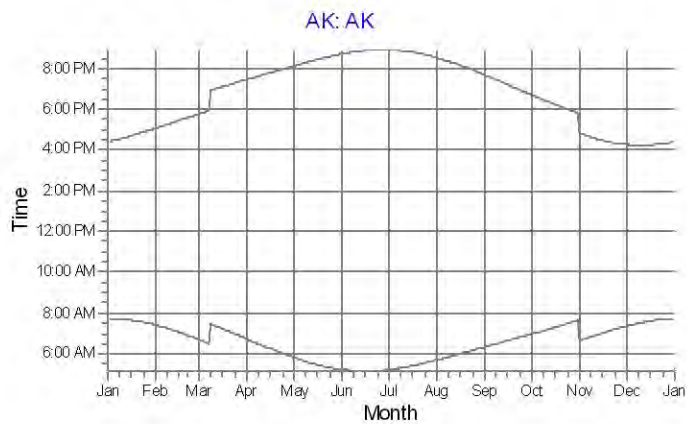
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Project:

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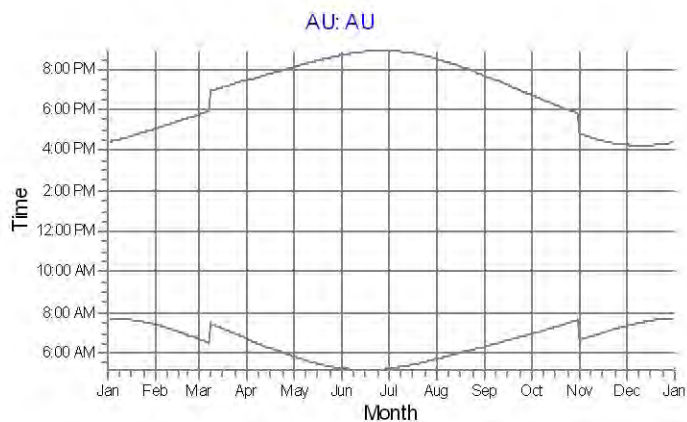
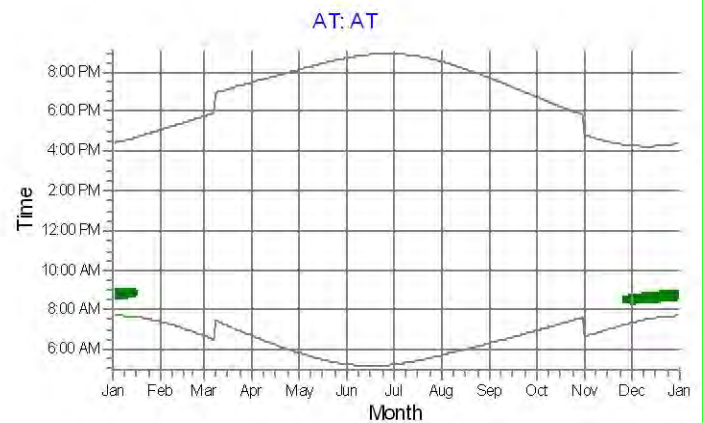
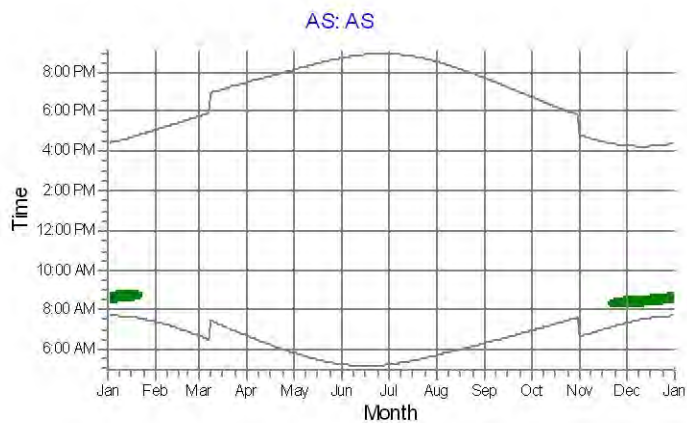
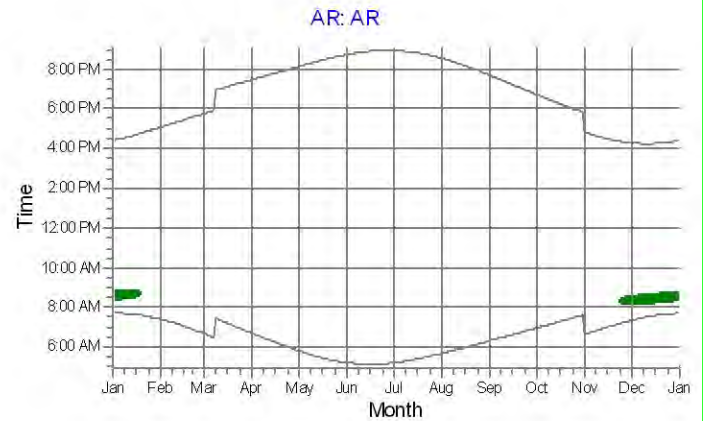
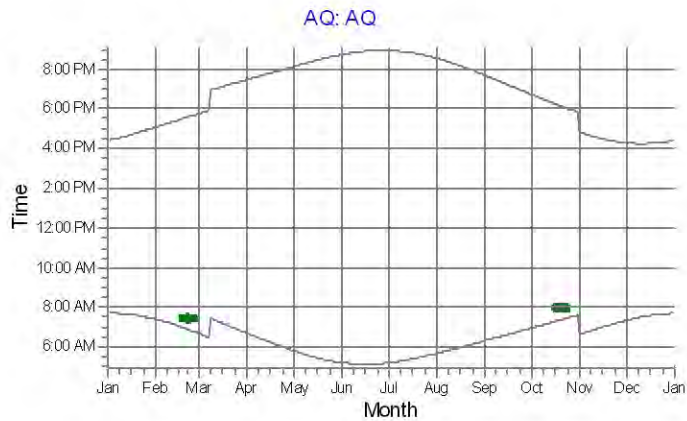
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WTGs

1: ENERCON E-92 2,3 MW 2300 92.0 !-! hub: 98.0 m (TOT: 144.0 m) (3)

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SHADOW - Calendar per WTG**Calculation:** E-92 @ 98m w Receptors (Hrs per Yr) **WTG:** 1 - ENERCON E-92 2,3 MW 2300 92.0 !-! hub: 98.0 m (TOT: 144.0 m) (3)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:42 08:25-08:57/32 16:25	07:23 17:05	06:40 17:46	06:42 19:28	05:48 20:07	05:13 20:43	05:13 20:55	05:42 20:31	06:20 19:40	06:57 18:42	06:40 16:47	07:21 08:12-08:40/28 16:17
2	07:42 08:25-08:57/32 16:26	07:22 17:06	06:39 17:47	06:40 19:29	05:47 20:08	05:13 20:44	05:13 20:54	05:43 20:29	06:21 19:38	06:59 18:40	06:41 16:46	07:22 08:12-08:41/29 16:17
3	07:42 08:26-08:58/32 16:27	07:21 17:08	06:37 17:48	06:38 19:30	05:45 20:10	05:12 20:45	05:14 20:54	05:44 20:28	06:22 19:36	07:00 18:38	06:42 16:44	07:23 08:13-08:43/30 16:16
4	07:42 08:25-08:57/32 16:28	07:20 17:09	06:35 17:50	06:36 19:32	05:44 20:11	05:12 20:45	05:15 20:54	05:45 20:27	06:24 19:34	07:01 18:36	06:44 16:43	07:24 08:13-08:43/30 16:16
5	07:42 08:26-08:58/32 16:29	07:18 17:11	06:33 17:51	06:34 19:33	05:42 20:12	05:11 20:46	05:15 20:54	05:46 20:25	06:25 19:32	07:03 18:34	06:45 16:42	07:25 08:13-08:44/31 16:16
6	07:42 08:27-08:58/31 16:30	07:17 17:12	06:31 17:53	06:32 19:34	05:41 20:14	05:11 20:47	05:16 20:53	05:48 20:24	06:26 19:31	07:04 18:32	06:47 16:40	07:26 08:13-08:44/31 16:15
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8	07:42 08:28-08:58/30 16:32	07:14 17:15	07:28 18:55	06:28 19:37	05:38 20:16	05:10 20:48	05:17 20:52	05:50 20:21	06:29 19:27	07:07 18:28	06:50 16:38	07:28 08:13-08:45/32 16:15
9	07:41 08:29-08:59/30 16:33	07:13 17:16	07:26 18:57	06:26 19:38	05:37 20:17	05:10 20:49	05:18 20:52	05:51 20:19	06:30 19:25	07:08 18:27	06:51 16:36	07:29 08:14-08:46/32 16:15
10	07:41 08:30-08:59/29 16:34	07:12 17:18	07:24 18:58	06:25 19:40	05:35 20:19	05:10 20:50	05:19 20:51	05:52 20:18	06:31 19:23	07:09 18:25	06:52 16:35	07:30 08:14-08:46/32 16:15
11	07:41 08:30-08:58/28 16:36	07:10 17:19	07:22 19:00	06:23 19:41	05:34 20:20	05:09 20:50	05:20 20:51	05:54 20:16	06:32 19:21	07:11 18:23	06:54 16:34	07:31 08:15-08:47/32 16:15
12	07:42 08:31-08:59/28 16:37	07:09 17:21	07:20 19:01	06:21 19:42	05:33 20:21	05:09 20:51	05:21 20:50	05:55 20:15	06:34 19:19	07:12 18:21	06:55 16:33	07:32 08:15-08:48/33 16:15
13	07:40 08:31-08:58/27 16:38	07:07 17:22	07:18 19:02	06:19 19:44	05:31 20:22	05:09 20:51	05:22 20:50	05:56 20:13	06:35 19:17	07:13 18:19	06:57 16:32	07:33 08:16-08:49/33 16:15
14	07:39 08:31-08:57/26 16:39	07:06 17:24	07:16 19:04	06:17 19:45	05:30 20:24	05:09 20:52	05:22 20:49	05:57 20:12	06:36 19:15	07:15 18:17	06:58 16:30	07:34 08:16-08:50/34 16:15
15	07:39 08:32-08:57/25 16:41	07:04 17:25	07:14 19:05	06:15 19:46	05:29 20:25	05:09 20:52	05:23 20:48	05:59 20:10	06:37 19:13	07:16 07:54-08:03/9 18:16	07:00 16:29	07:35 08:16-08:49/33 16:15
16	07:38 08:33-08:55/22 16:42	07:03 17:27	07:13 19:06	06:14 19:48	05:28 20:26	05:09 20:53	05:24 20:47	06:00 20:08	06:39 19:11	07:17 07:52-08:05/13 18:14	07:01 16:28	07:35 08:17-08:50/33 16:15
17	07:37 08:33-08:52/19 16:43	07:01 07:23-07:32/9 17:28	07:11 19:08	06:12 19:49	05:27 20:27	05:09 20:53	05:25 20:47	06:01 20:07	06:40 19:09	07:19 07:51-08:06/15 18:12	07:02 16:27	07:36 08:18-08:51/33 16:16
18	07:37 08:35-08:52/17 16:45	06:59 07:21-07:34/13 17:30	07:09 19:09	06:10 19:50	05:26 20:28	05:09 20:54	05:26 20:46	06:02 20:05	06:41 19:07	07:20 07:49-08:06/17 18:10	07:04 16:26	07:37 08:19-08:51/32 16:16
19	07:36 08:36-08:51/15 16:46	06:58 07:20-07:34/14 17:31	07:07 19:10	06:08 19:51	05:24 20:29	05:09 20:54	05:27 20:45	06:04 20:03	06:42 19:05	07:21 07:50-08:06/16 18:08	07:05 16:25	07:38 08:18-08:51/33 16:16
20	07:35 08:38-08:50/12 16:47	06:56 07:19-07:35/16 17:33	07:05 19:12	06:07 19:53	05:23 20:31	05:09 20:54	05:28 20:44	06:05 20:02	06:44 19:03	07:23 07:49-08:06/17 18:07	07:06 08:18-08:21/3 16:24	07:38 08:19-08:52/33 16:17
21	07:35 08:39-08:49/10 16:49	06:54 07:19-07:36/17 17:34	07:03 19:13	06:05 19:54	05:22 20:32	05:09 20:54	05:29 20:43	06:06 20:00	06:45 19:01	07:24 07:49-08:06/17 18:05	07:08 08:15-08:25/10 16:24	07:39 08:19-08:52/33 16:17
22	07:34 08:43-08:46/3 16:50	06:53 07:18-07:35/17 17:36	07:01 19:14	06:03 19:55	05:21 20:33	05:09 20:55	05:30 20:42	06:07 19:58	06:46 18:59	07:26 07:49-08:05/16 18:03	07:09 08:14-08:26/12 16:23	07:39 08:20-08:53/33 16:18
23	07:33 16:52	06:51 07:18-07:35/17 17:37	06:59 19:16	06:01 19:57	05:20 20:34	05:10 20:55	05:31 20:41	06:09 19:56	06:47 18:57	07:27 07:51-08:05/14 18:02	07:11 08:12-08:27/15 16:22	07:40 08:20-08:53/33 16:18
24	07:32 16:53	06:49 07:19-07:35/16 17:38	06:57 19:17	06:00 19:58	05:19 20:35	05:10 20:55	05:32 20:40	06:10 19:55	06:49 18:55	07:28 07:51-08:03/12 18:00	07:12 08:12-08:29/17 16:21	07:40 08:20-08:53/33 16:19
25	07:31 16:54	06:48 07:20-07:34/14 17:40	06:55 19:18	05:58 19:59	05:19 20:36	05:10 20:55	05:34 20:39	06:11 19:53	06:50 18:53	07:30 07:54-08:01/7 17:58	07:13 08:12-08:30/18 16:20	07:41 08:21-08:55/34 16:19
26	07:30 16:56	06:46 07:21-07:32/11 17:41	06:53 19:20	05:56 20:01	05:18 20:37	05:11 20:55	05:35 20:38	06:12 19:51	06:51 18:51	07:31 07:54-08:01/7 17:57	07:14 08:12-08:34/22 16:20	07:41 08:22-08:55/33 16:20
27	07:29 16:57	06:44 07:22-07:30/8 17:43	06:51 19:21	05:55 20:02	05:17 20:38	05:11 20:55	05:36 20:37	06:14 19:49	06:52 18:50	07:33 07:54-08:01/7 17:55	07:16 08:11-08:36/25 16:19	07:41 08:22-08:55/33 16:21
28	07:28 16:59	06:42 17:44	06:49 19:22	05:53 20:03	05:16 20:39	05:11 20:55	05:37 20:36	06:15 19:47	06:54 18:48	07:34 07:54-08:01/7 17:53	07:17 08:11-08:37/26 16:19	07:42 08:23-08:56/33 16:21
29	07:27 17:00		06:47 19:24	05:51 20:05	05:15 20:40	05:12 20:55	05:38 20:34	06:16 19:46	06:55 18:46	07:35 07:54-08:01/7 17:52	07:18 08:12-08:39/27 16:18	07:42 08:23-08:57/34 16:22
30	07:26 17:02		06:45 19:25	05:50 20:06	05:15 20:41	05:12 20:55	05:39 20:33	06:17 19:44	06:56 18:44	07:37 07:54-08:01/7 17:50	07:19 08:12-08:40/28 16:17	07:42 08:24-08:57/33 16:23
31	07:25 17:03		06:44 19:26		05:14 20:42		05:40 20:32	06:19 19:42		07:38 07:54-08:01/7 17:49		07:42 08:24-08:57/33 16:24
Potential sun hours	282	290	369	406	463	471	476	438	377	339	285	270
Sum of minutes with flicker	543	152	0	0	0	0	0	0	0	153	203	1042

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project:

Bateston

Description:

Celtic Current LP
2.35 MW Proposed Wind Project
Bateston, Cape Breton County
Nova Scotia, Canada

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Dorfstraße 100

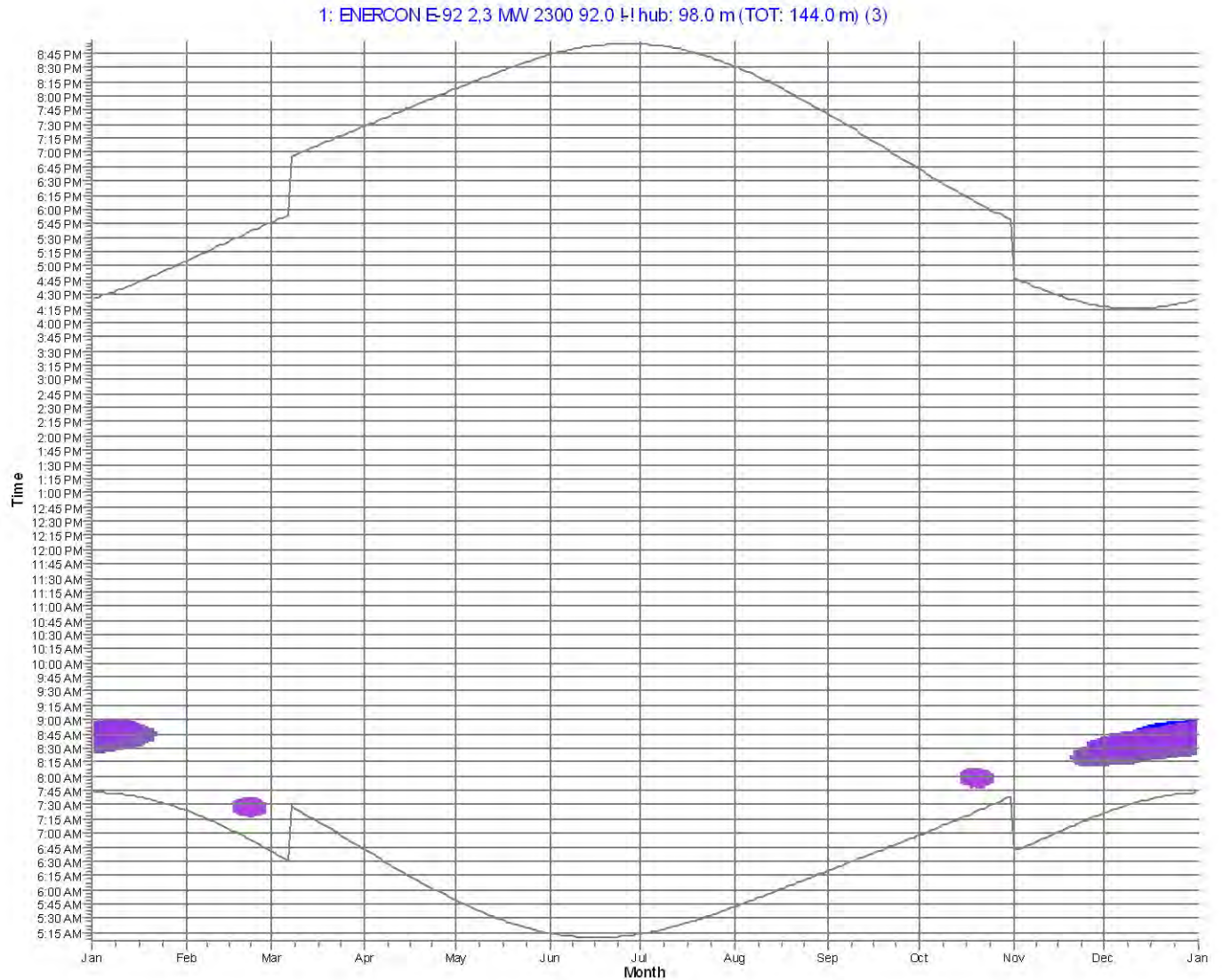
DE-26532 Großheide

+49 (0) 4936 6986-0

Kirk Schmidt / kirk.schmidt@al-pro.ca

Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Calendar per WTG, graphical**Calculation:** E-92 @ 98m w Receptors (Hrs per Yr) **WTG:** 1 - ENERCON E-92 2,3 MW 2300 92.0 !-! hub: 98.0 m (TOT: 144.0 m) (3)

Shadow receptors

C: C
 E: E
 AQ: AQ
 AR: AR
 AS: AS
 AT: AT

Project:

Bateston

Description:

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2.35 MW Proposed Wind Project
Bateston, Cape Breton County
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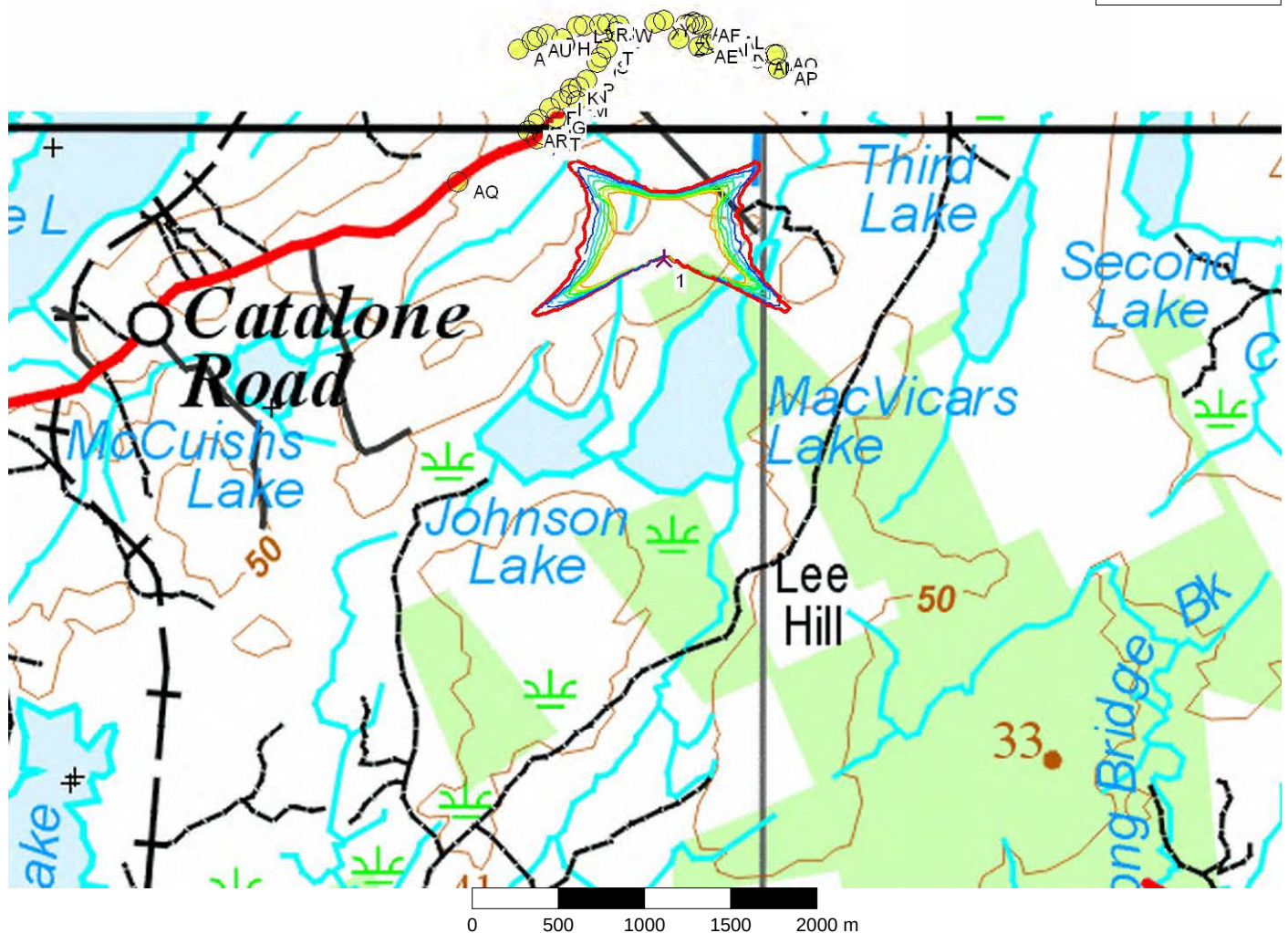
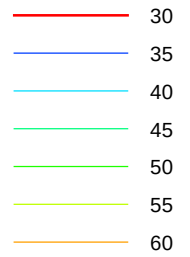
Calculated:

12/17/2013 2:54 PM/2.9.207

SHADOW - Map

Calculation: E-92 @ 98m w Receptors (Hrs per Yr) **WTG: 1 - ENERCON E-92 2,3 MW 2300 92.0 !-! hub: 98.0 m (TOT: 144.0 m) (3)**

Hours per year,
worst case



▲ New WTG

Map: page 25 , Print scale 1:40,000, Map center UTM NAD83 Zone: 20 East: 739,470 North: 5,097,960

● Shadow receptor

Flicker map level: Contour_close proximity

Appendix IX. EMI REPORT WITH REGULATORY CORRESPONDENCE

Preliminary EMI Report
for the
Bateston Community Wind Project

Prepared For

McCallum Environmental Ltd.

December 17, 2013

Prepared By



Nortek Resource Solutions Inc.
RR # 1
Thorburn, Nova Scotia
B0K 1W0
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1.0 Introduction

The proposed Bateston Community Wind Project is located approximately 1.1 km south of Bateston, Nova Scotia in Cape Breton County. The proposed wind project will consist of a single utility scale wind turbine that has a hub height of 98 m and a rotor diameter of 92 m.

This preliminary EMI Study is designed to apply the guidelines identified by the joint *Radio Advisory Board of Canada and Canadian Wind Energy Association Technical Information and Coordination Process Between Wind Turbines and Radiocommunication and Radar Systems*¹ (herein after referred to as the RABC). The technical guidelines have been developed to apply a consistent approach to determining if wind energy developments may impact existing radio, telecommunication and radar systems.

Additionally, CBC/Radio Canada has specific requirements to ensure that proposed wind farms will not have a negative influence on existing CBC/Radio signals. CBC/Radio Canada requires that specific spatial analysis and mapping be included in this preliminary report.

2.0 Point-to-Point Systems above 890 MHz

The existing RABC guidelines describe consultation zones for Point-to-Point Systems above 890 MHz include a 1.0 km consultation zone around existing transmitters and receivers as well as a variable “cylinder” between links that are based on the distance between links and the licensed frequencies.

A variable consultation zone along the line of sight between the transmitter and receiver recommended by RABC is calculated using::

$$L_C = R + 52\sqrt{D/F}$$

Where:

D = Path length in kilometers

F = Frequency in gigahertz

L_C = Diameter of the cylinder in meters

R = Wind turbine rotor diameter in meters

Data obtained from the Industry Canada Technical and Administrative Frequency Lists accessed through the Spectrum Direct web site² is summarized in Figure 1.

There are no links that are located within the RABC recommended consultation zones.



Figure 1: RBAC Guideline Consultation Zones for Point-to-Point Radio Links above 890 MHz. There are no Point-to-Point Radio Links Located within the Frequency Specific Consultation Zones.

3.0 Broadcast Transmitters

3.1 AM Transmitters

A 15 km consultation zone is recommended by RABC for AM radio transmitters utilizing multiple tower antenna systems. For single tower systems, a 5 km consultation zone is required. CHER 950 AM Broadcasts at 950 kHz from Dutch Brook, Nova Scotia and is the closet AM transmitter, located 24.4 km from the proposed wind turbine (Figure 2).

The proposed wind farm is not within the 5 or 15 km consultation zones recommended for AM Radio transmitters.

3.2 FM Transmitters

For proximity reasons, the RABC suggests a 2.0 km consultation zone around existing FM transmitters. The closest FM transmitter is located on the Mira Road, south of Sydney, Nova Scotia (Figure 3). CBC Radio transmits from the site on two channels which are detailed in Table 1.

Table 1: Summary of Closest FM Transmitters to the Bateston Wind Turbine

Call Sign	Frequency	Distance to Turbine
CBI-FM	105.1	21.7 km
CBAF-FM-14	95.9	

The proposed wind project is not within the 2.0 km consultation zone recommended by RABC for FM transmitters.

3.3 TV Transmitters

The closest TV Transmitter is located approximately 9.6 km south of the proposed wind turbine and is located in the Town of Louisbourg, Nova Scotia (Figure 4).

There are no Television Transmitters located within recommended 2 km consultation zone.

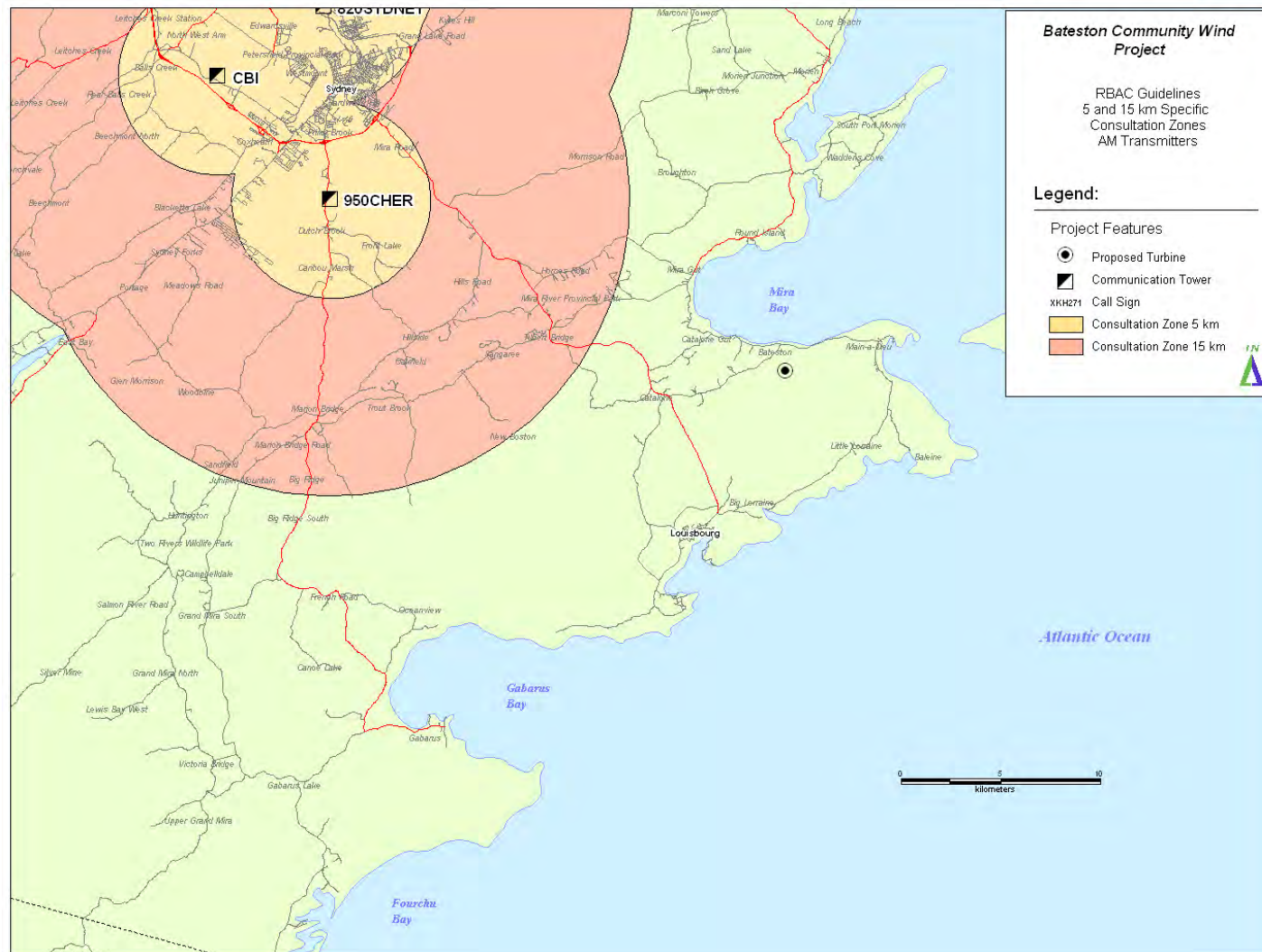


Figure 2: RBAC Guideline Consultation Zones for AM Radio Transmitters. There are no AM Transmitters Located within 15 Km of the Proposed Wind Turbine.



Figure 3: RBAC Guideline Consultation Zones for FM Radio Transmitters. There are no FM Transmitters Located within 2.0 Km of the Proposed Wind Turbine.

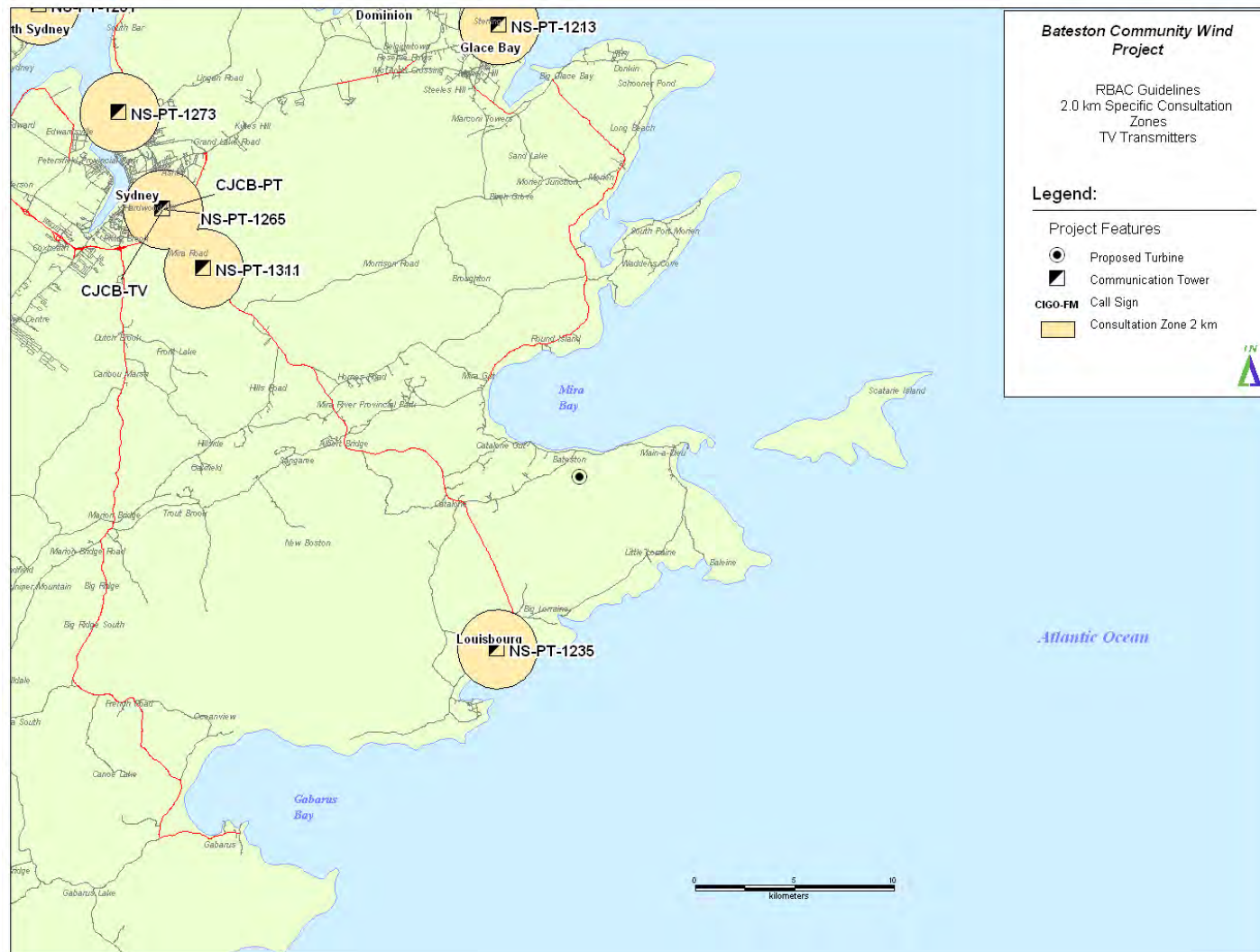


Figure 4: RBAC Guideline 2.0 km Consultation Zones for Television Transmitters. There are no TV Transmitters Located within 2.0 Km of the Proposed Wind Turbine.

3.4 CBC Radio Transmitters

The following section describes the components outlined in the *CBC/Radio-Canada Involvement and Requirements Concerning Wind Energy Projects*³ for a preliminary report.

The closest CBC radio transmitter site (FM) is located 22 km north of the proposed wind turbine and the site is situated at Mira Road, Nova Scotia. The next nearest CBC transmitter site (FM) is located 88 km west of the proposed wind turbine at North East Margaree, Nova Scotia (Table 2).

Table 2: Locations and Distances of the Two Closest CBC FM Transmitter Sites.

Location	Latitude	Longitude	Call Sign	Distance to Wind Farm (km)
Sydney	46,05,40	60,08,52	CBAF-FM-14	22
			CBI-FM	
North East Margaree	46,19,05	60,57,57	CBHFI-FM	88

There are no CBC FM Radio Transmitter sites located within 5 km of the proposed wind farm.

3.5 CBC Television Transmitters

On July 31, 2012, CBC phased out its analogue television service. This process involved the shut down and/or decommissioning of analogue transmitter sites across Canada.

There are no digital CBC Television Transmitters within 89 km of the wind turbine.

The closest Digital CBC television transmitter is located in Halifax, Nova Scotia which is approximately 326 km south west of the proposed wind turbine.

4.0 Over-the-Air Reception

As of August 31, 2011, the CRTC has required that all TV transmitters that serve markets with a population greater than 300,000 be converted to digital technology. Typically, digital signals have a shorter reception range than analog signals and in some cases, channels and associated frequencies have been changed to free up limited band spectrum in crowded markets. In most cases, transmitters in larger urban areas have been upgraded to digital and re-transmitters that serve a smaller population base continue to operate with analog equipment until August 31, 2012.

The RABC recommends television receiver consultation zones based on the whether the broadcast is delivered using analogue or digital signals with consultation zones of 15 km and 10 km respectively. Television signals received within close proximity to the proposed wind farm are currently broadcast using analogue signals.

The 15 km consultation zone covers a relatively large area that extends to Port Morien in the north, Sangaree in the west, Louisbourg to the south and the entire Main-a-Dieu Peninsula (Figure 6).

A Baseline Broadcast Reception Study is recommended to quantify the strength of current broadcast signals at various locations throughout the 15 km consultation zone. It is anticipated that this study will be initiated prior to the start of construction.

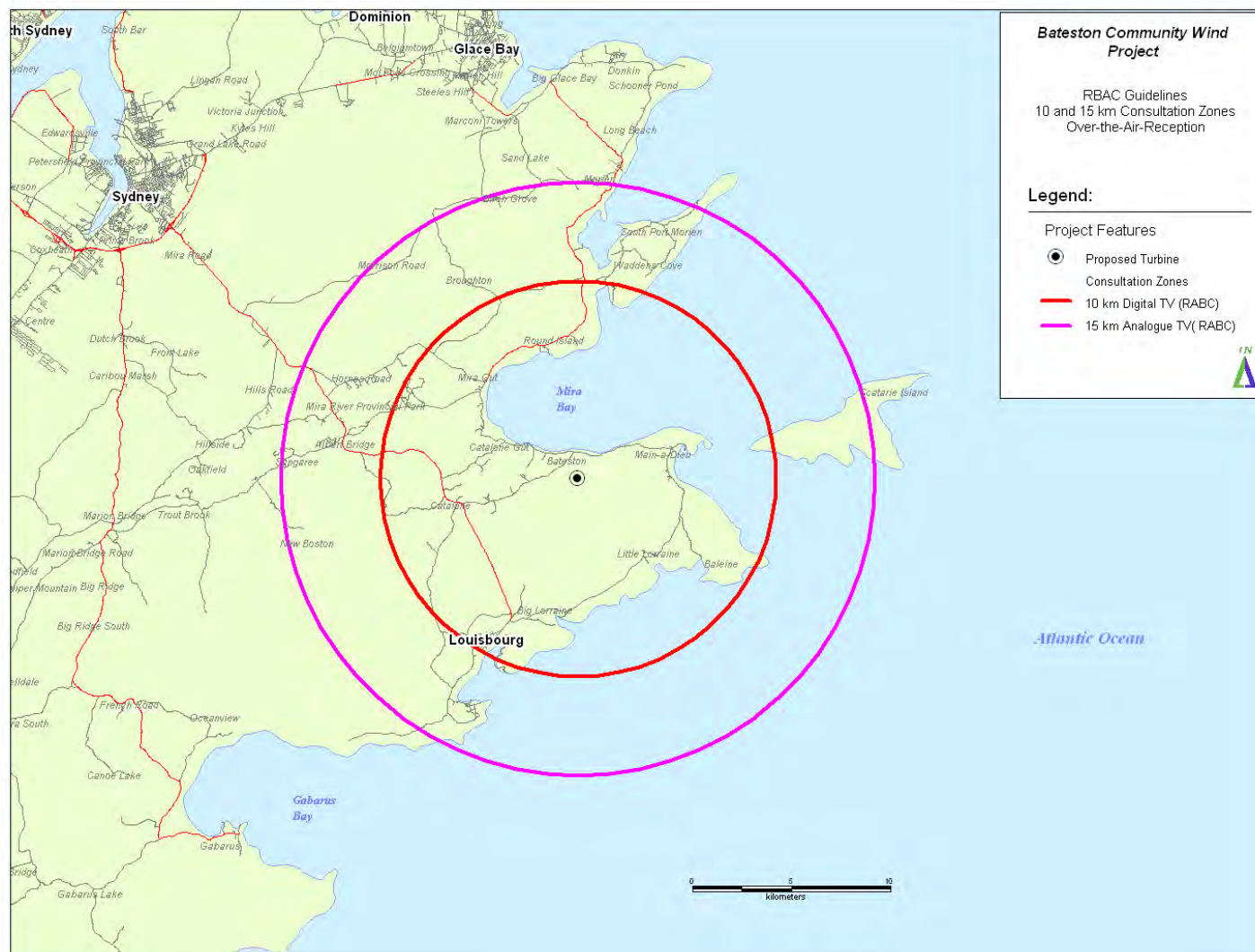


Figure 6: RBAC Guideline 10 km and 15 km Consultation Zones for Over-the-Air-Reception.

5.0 Cellular Type Networks

There are no cell phone transmitter sites located within the 1.0 km consultation zone recommended by the RABC (Figure 7). The closest cell phone tower is located over 6.9 km from the proposed wind farm.

There are no cellular transmitters located within the 1.0 km consultation zone as outlined in RABC.

6.0 Land Mobile Radio Networks and Point-to-Point Systems below 890MHz.

6.1 Land Mobile Radio Networks

There are no radio networks (< 890 MHz) that are located within 1.0 km of the proposed wind farm (Figure 7). There is a radio network system located at the Bateston Fire Department which is located approximately 1.1 km from the proposed wind turbine. The local fire department is aware of the project and will be formally consulted prior to the commencement of construction.

6.2 Non Disclosed Radio Operators

The RCMP were contacted on Sept 24 via email as per the RBAC Guidelines (Appendix 2). No issues are expected to be identified.

6.3 Point-to-Point Systems below 890 MHz

There are no radio links that operate below 890 MHz that are located within the 1.0 km recommended consultation zone (Figure 7).

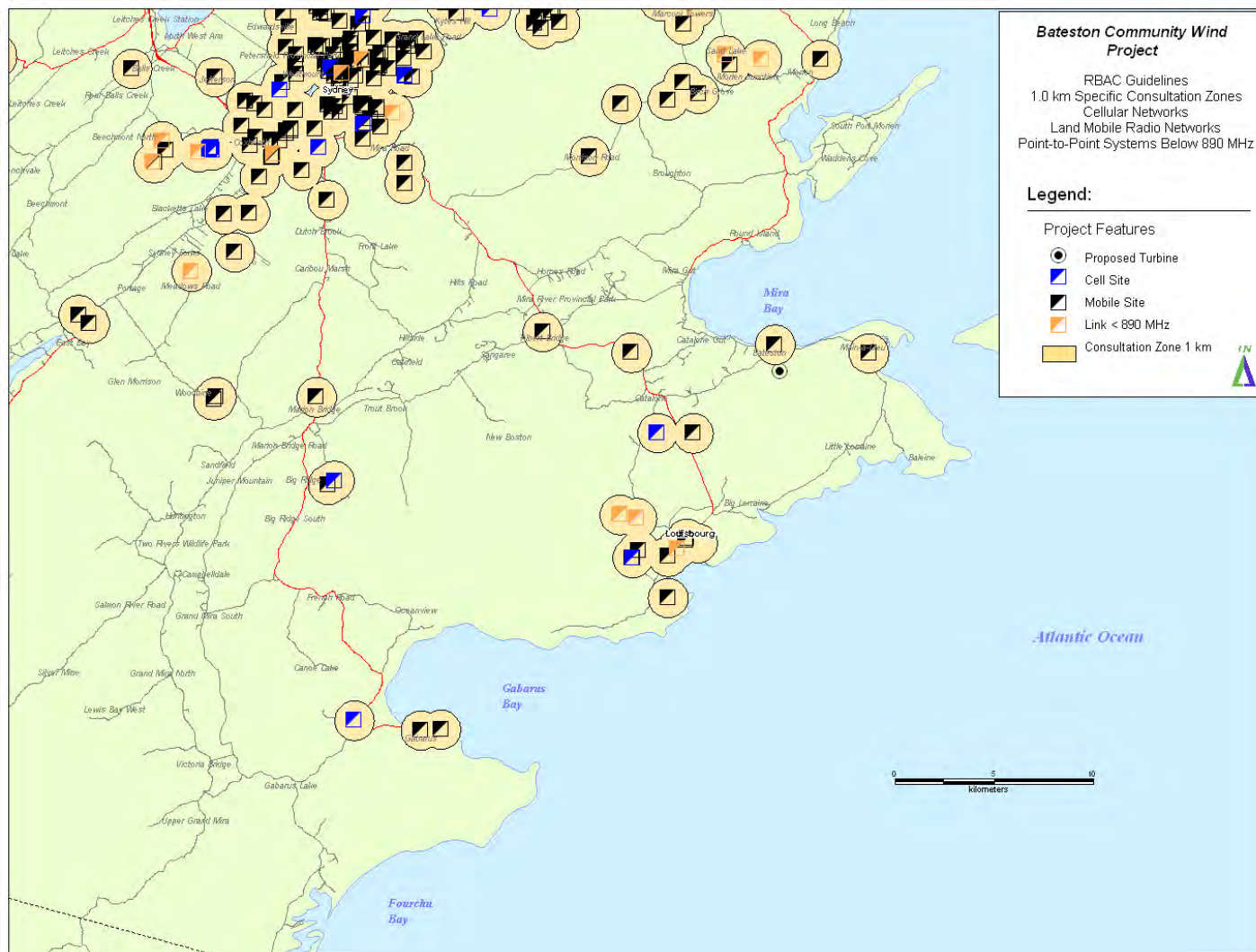


Figure 7: RBAC Guideline 1.0 km Consultation Zones for Cellular Networks, Land Mobile Networks and Point-to-Point Systems Below 890 MHz.

7.0 Satellite Systems

7.1 Satellite Ground Stations

There are no satellite ground stations located within 500 m of the proposed wind farm. A 500 m consultation zone is recommended by RABC.

7.2 DTH Receivers

A preliminary review of Direct to Home Satellite receivers has been completed. The analysis is based on the physical turbine dimensions which are:

Hub Height = 98 m
Rotor Diameter = 92.0 m

The RABC recommends the following formula for determining the size of the cone:

$$L_{c(m)} = R + 104\sqrt{D/F}$$

where: L_c = Diameter of the cylinder (m)
D = Distance from the ground satellite receiver (km)
F = Frequency in GHz (11.7)
R = Rotor Diameter (92.0 m)

$$L_c (1 \text{ km}) = 122.4 \text{ m}$$

$$L_c (10 \text{ km}) = 177.2 \text{ m}$$

A cone based on 11.7 GHz was calculated and the satellite data from Table 3 were used for the analysis. The analysis involved identifying both horizontal and vertical zones where dwellings may be impacted by a wind turbine. The intersect of these two zones resulted in the final consultation zone (Figure 8).

There are no buildings located within the consultation zones identified in this analysis.

Table 3: Direct-To-Home Geostationary Satellite Parameters.

Service Provider	Satellite ID	Geostationary Satellite Orbit (Lat, Long)	Local Azimuth (True North)	Local Inclination
Bell Expressvu	Nimiq 1 Nimiq 2	0° N, 91° W	220.0°	28.9°
Bell Expressvu	Nimiq 4iR	0° N, 82° W	209.5°	32.4°
Star Choice	Anik F2	0° N, 111.1° W	240.0°	17.5°

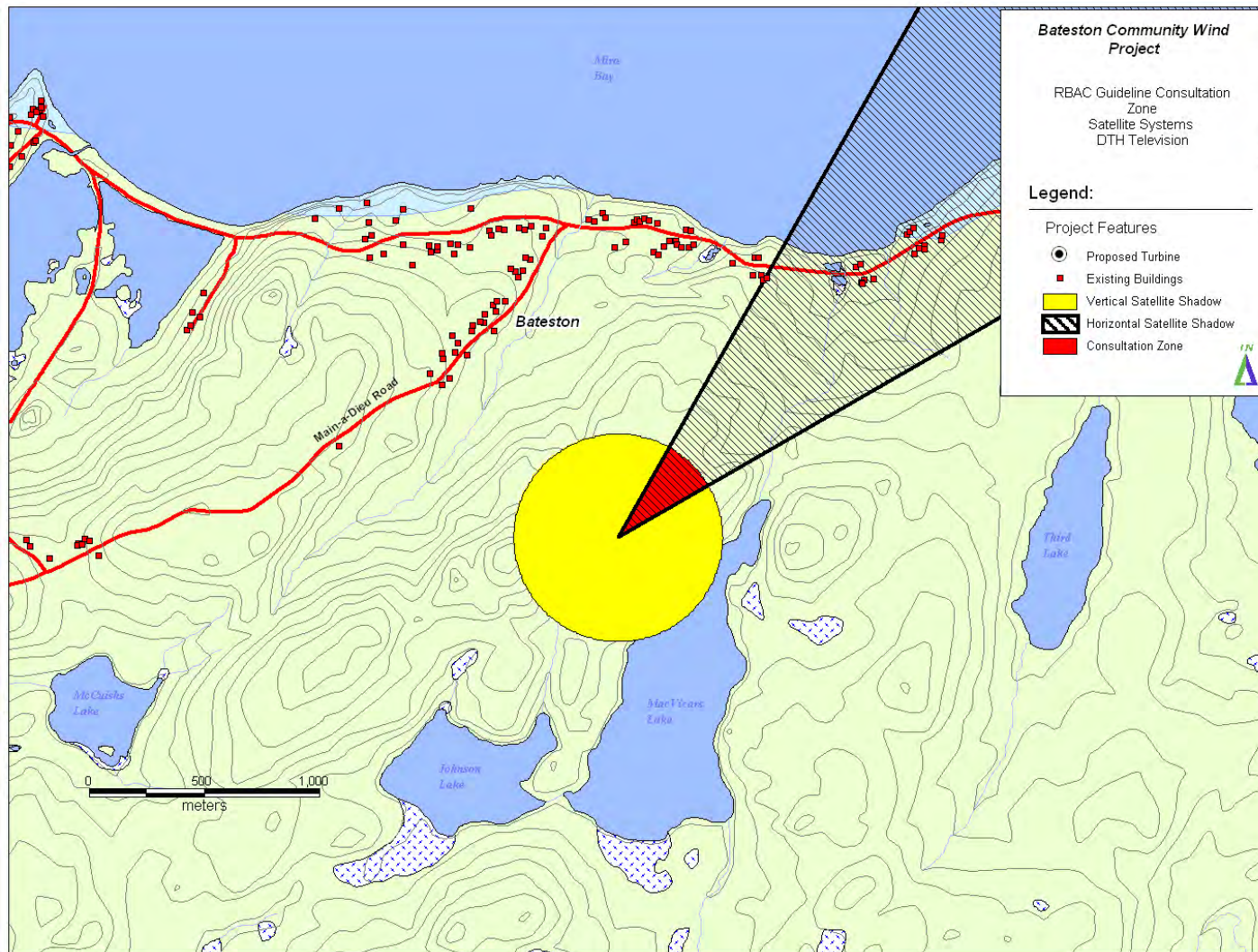


Figure 8: RABC Guideline Consultation Zones for Satellite Receivers Based on Line of Sight Cones.

8.0 Radar Systems

8.1 Air Defence Radar

DND has completed an internal analysis of the proposed project to determine if the wind turbine may impact existing radar installations. The project proponents will work with DND to develop a mitigation plan if there is a deemed impact on existing radar systems (Appendix 2).

DND analysis completed. There are no expected impact or concerns with the proposed wind turbine.

8.2 Vessel Traffic Radar

The Canadian Coast Guard (CCG) monitors vessel traffic through a series of radar installations. The RABC has recommended a 60 km consultation zone around existing stations. The Eddy Point radar installation is designed to monitor vessel traffic that enters Chedabucto Bay bound for Ship Point and Point Tupper. The radar installation is located 120 km from the proposed wind farm and therefore is outside of the 60 km consultation zone. The Canadian Coast Guard has been contacted and they are not concerned with any interference issues (Appendix 2).

No issues in regard to interference with existing vessel traffic radar systems.

8.3 Air Traffic Control Radars

Air Traffic Control Primary Surveillance Radars (PSR) are a critical component for aircraft safety. The three closest civilian ATC radars to the proposed wind farm are located in Sydney, Charlottetown, Halifax and Moncton (Table 4). The RABC recommends that an 80 km consultation zone be applied around PSR's and there are no PSR sites located within the 80 km consultation zone. Nav Canada has been contacted to verify that they have no concerns in regard to the proposed wind farm (Appendix 2).

Table 4: Nearest Air Traffic Control Radars.

ID	Latitude	Longitude	Distance to Wind Farm (km)
Sydney (SSR)	46.153	-60.056	21
Charlottetown (PSR)	44.910	-63.429	249
Halifax (PSR)	44.910	-63.429	301
Moncton (PSR)	46.189	-64.570	360

RABC recommends a 10 km consultation zone be established around the proposed wind farm in regard to existing Secondary Surveillance Radar (SSR) sites. The closest SSR site is located at Sydney Airport which is approximately 21 km from the proposed wind farm (Table 4).

Additionally, RABC recommends a 10 km consultation zone be applied around major civilian and military airfields. There are no major civilian airfields located within the 10 km consultation zone. The closest civilian airfield is Sydney (CYQY) which is located approximately 21 km north west of the proposed wind turbine.

There are no Primary Surveillance Air Traffic Control radars located within 80 km of the proposed wind farm. Additionally, there are no Secondary Surveillance Air Traffic Control radars located within 10 km of the proposed wind farm. Nav Canada is currently completing an internal review of the project.

8.4 Weather Radars

Environment Canada operates a network of Doppler radar sites across the country that collectively is known as the Canadian Weather Radar Network. The radars are used for meteorological forecasting and detecting severe weather events as they occur. Weather radar picks up the Doppler signal from the tips of the rotating blades and the wake turbulence produced as the blades pass through the air.

There are two Doppler weather radar stations that are located in Nova Scotia and one in New Brunswick (Table 5). The closest weather radar site is located 23 km away from the proposed wind turbine and is located at Marion Bridge, NS. This site is located within the 50 km consultation zone recommended by RABC and Environment Canada has been contacted and they are not concerned with any interference issues (Appendix 2).

Table 5: Nearest Weather Radar Sites.

ID and Location	Latitude	Longitude	Distance to Wind Farm (km)
XMB Marion Bridge, NS	45.984	-60.212	23
XGO Halifax, NS	45.114	-63.711	310
XNC Chipman, NB	46.220	-65.726	455

There is one Environment Canada Doppler radar site located within the recommended 50 km consultation zone. Environment Canada has been contacted and has confirmed that they are not concerned with interference issues.

9.0 VHF Omnidirectional Range (VOR)

These systems are ground based, short distance navigation aids which provide pilots with 360 degree directional information to or from a station. The frequency range is 108.1 to 117.956 MHz.

There are no VOR sites located within 15 km of the proposed wind farm. The Sydney (114.9 MHz) VOR site is located 21 km from the proposed wind farm and the next closest station is the Charlottetown (113.8 MHz) VOR site located 247 km from the proposed wind farm.

10.0 Summary

Table 6: Summary Results from the Preliminary EMI Report

System	Result
Point-to-Point Systems above 890 MHz	There are no radio link transmitters or receivers that are within 1.0 km of the proposed wind farm. Additionally, there are no links that pass within the recommended consultation zone.
Broadcast Transmitters	No AM transmitters within the 5 or 15 km consultation zones. No FM Transmitters located within the 2.0 km consultation zone. No TV Transmitters within the 2.0 km consultation zone.
Over-the-Air Reception	A number of potential receivers are located within the 10 km consultation zone recommended by the RABC for digital Television transmitters. A Baseline Broadcast Reception Study is recommended.
Cellular Type Networks	No cellular networks located within the 1.0 km consultation zone.
Land Mobile Radio Networks and Point-to-point Systems below 890 MHz	Non within the 1.0 km consultation zone
Satellite Systems	No ground satellite stations located within 500 m of the proposed wind farm. No dwellings or buildings located within the projected consultation cone.
Air Defence Radars, Vessel Traffic Radars, Air Traffic Control Radars and Weather Radars	DND contacted – No Issues. Nav Canada Contacted – Final Analysis pending. Vessel Traffic Systems – No Issues Weather Radar – Environment Canada contacted – No Issues.
CBC Preliminary Report	CBC has been contacted in regard to the proposed wind project. No digital TV Transmitters within 89 km of the site. No CBC FM Transmitters located within 5 km of the project.
VOR	There are no VOR sites located within the 15 km consultation zone.

11.0 References

- [1] Radio Advisory Board of Canada and Canadian Wind Energy Association (CanWEA), *Technical Information and Coordination Process Between Wind Turbines and Radiocommunication and Radar Systems*, December, 2010.
- [2] Strategis data base, Industry Canada, TAFL database, <<http://spectrum.ic.gc.ca/tafl/tafindxe.html>>, Accessed April 2012.
- [3] CBC/Radio-Canada Involvement and Requirements Concerning Wind Energy Projects, CBC, 1400 Rene-Levesque Blvd. East, Montreal, Quebec. H2L 2M2.

Appendix 1
Proposed Turbine Coordinates
and Elevations

Bateston Community Wind Project - Proposed Turbine Coordinates and Base Elevations

Turbine	UTM, NAD83, Zone20		Base	Hub	Rotor	Tip	WGS84	
ID	Easting	Northing	Elev (m)	Height (m)	Dia. (m)	Elev. (m)	Long	Lat
1	739,474	5,097,949	70	98	92	214	-59.9076	45.9933

Appendix 2

Correspondence with Key Agencies

NAV Canada

Subject: RE: 13-3460: 3 (Mulgrave Wind Farm, Mulgrave, NS) - Mulgrave, NS

Hi Kirk,

I'm waiting on one more assessment from our stakeholders. I hope to have an answer for you by the beginning of next week. For your records, the file number for this project is 13-3489.

Thanks,

Jean Séguin

Land Use Specialist

Aeronautical Information Services

NAV CANADA

Tel: 613-248-4150

Toll free: 1-866-577-0247

Fax: 613-248-4094

Email: sequinj@navcanada.ca

From: Kirk Schmidt [<mailto:kirk@nortekresources.com>]

Sent: December-17-13 8:38 AM

To: Seguin, Jean

Subject: RE: 13-3460: 3 (Mulgrave Wind Farm, Mulgrave, NS) - Mulgrave, NS

Hi Jean:

Can you give me an update on the status of the Bateston Wind Turbine(email notification Sept 24, 2013)

Thanks for the help.

Kirk Schmidt

General Manager

Nortek Resource Solutions Inc.

RR # 1

Thorburn, NS

B0K 1W0

Tel (902) 922-3607

Fax (902) 922-3274

www.nortekresources.com

Air Defence Radars and Communications

-----Original Message-----

From: ADIN.SWITZER@forces.gc.ca [<mailto:ADIN.SWITZER@forces.gc.ca>]

Sent: Tuesday, December 17, 2013 3:08 PM

To: kirk@nortekresources.com

Cc: vinceph@navcanada.ca

Subject: Detailed Analysis Results - Bateston Wind Turbine - Cape Breton County, NS - WTA-3047

Kirk,

Thank you for your patience on this matter and for considering DND radar and airport facilities in your project development process.

We have completed the detailed analysis of your proposed site, Bateston Wind Turbine, located in Capt Breton County, NS (WTA-3047). The results of the detailed analysis and subsequent technical and operational impact assessments have confirmed there is likely to be minimal interference with DND radar and flight operations.

Therefore, as a result of these findings we have no objections with your project as submitted (attached).

If however, the layout were to change/move, please re-submit that proposal for another assessment using the assigned WTA number listed above. The concurrence for this site is valid for 24 months from date of this correspondence. If the project should be cancelled or delayed during this timeframe please advise my point of contact.

It should be noted that each submission is assessed on a case by case basis and as such, concurrence on this submission in no way constitutes a concurrence for similar projects in the same area, nor does it indicate that similar concurrence might be offered in another region.

The issuance of this Letter of Non-Objection shall not constitute a waiver or alienation of any existing or future legal rights of the DND/CF nor shall it be construed to create any exemptions, indemnification, approvals, rights, acceptances in favour of Celtic Current LP. The DND/CF expressly reserves its rights to take legal action or seek remedy for any and all liability, loss, harm, degradation of services or equipment, mitigation costs, damages, judgements or expenses that arise from the adverse effects, whether incidental, indirect or causal, of the Celtic Current LP Bateston Wind Turbine upon the DND/CF radars, equipment and its provision of Air Traffic Services. I trust that you will find this satisfactory. If you have any technical questions or concerns regarding any aspect of this investigation, please contact the ATESS Liaison Officer at (613) 392-2811 extension 4834, or at

+windturbines@forces.gc.ca.

A hard-copy of this response will be mailed separately.

<<Bateston Wind Turbine Coordinates Apr26.xls>> Sincerely,

Adin Switzer

Capt

AEC Liaison Officer/C2SS0

CCISF/ESICC

ATESS/ESTTMA

Défense nationale | National Defence

8 Wing Trenton, Astra, ON K0K 3W0

TEL: 613 392-2811 Ext4834 (CSN: 827-4834)

FAX: 613 965-3200

Gouvernement du Canada | Government of Canada ü Please consider the environment before printing this email | S'il vous plaît pensez à l'environnement a

Public Safety Agencies

From: Cook, Norman [mailto:COOKNB@gov.ns.ca]

Sent: Thursday, September 26, 2013 2:59 PM

To: 'Kirk Schmidt'

Cc: 'Meghan Milloy'; Brown, Todd A

Subject: RE: Bateston Wind Turbine

Hi, Kirk,

The submissions you have provided with your email below, for the Subject Project, include site data which is not anticipated to interfere with The Province's public safety mobile radio Network.

Regards,

Norm Cook, P.Eng.

From: Kirk Schmidt [mailto:kirk@nortekresources.com]

Sent: Tuesday, September 24, 2013 2:04 PM

To: Cook, Norman

Cc: 'Meghan Milloy'

Subject: Bateston Wind Turbine

Hi Norm:

I am forwarding this message on behalf of Celtic Current LP. which is currently developing the Bateston Wind Turbine which is located in Cape Breton County, Nova Scotia. I have attached the proposed turbine coordinates and pertinent data, as well as a general location map for your perusal. Can I ask you to open a file for this wind turbine project and complete your internal review to determine if you anticipate any interference issues with your existing communication systems.

Please let me know if you have any questions or require any additional data.

Regards

Kirk Schmidt, M.Sc.F., RPF

Manager

Nortek Resource Solutions Inc.

Nova Scotia, Canada

Tel: 902.922.3607

Fax: 902.922.3274

Web: nortekresources.comEmail: kirk@nortekresources.com**Vessel Traffic Radars****From:** XNCR, Windfarm Coordinator [mailto:Windfarm.Coordinator@DFO-MPO.GC.CA]**Sent:** Thursday, September 26, 2013 11:48 AM**To:** Kirk Schmidt**Cc:** Meghan Milloy**Subject:** RE: Bateston Wind Turbine

Hello,

There is no CCG communication or radar site in the vicinity of the proposed wind Farm (Bateston). Therefore, we do not anticipate any interference problems.

Regards,

Martin Grégoire, P. Eng

Canadian Coast Guard

From: Kirk Schmidt [mailto:kirk@nortekresources.com]**Sent:** September 24, 2013 1:01 PM**To:** XNCR, Windfarm Coordinator**Cc:** 'Meghan Milloy'**Subject:** Bateston Wind Turbine

To Whom it May Concern:

I am forwarding this message on behalf of Celtic Current LP. which is currently developing the Bateston Wind Turbine which is located in Cape Breton County, Nova Scotia. I have attached the proposed turbine coordinates and pertinent data, as well as a general location map for your perusal. Can I ask you to open a file for this wind turbine project and complete your internal

review to determine if you anticipate any interference issues with your existing radar or communication systems.

Please let me know if you have any questions or require any additional data.

Regards

Kirk Schmidt, M.Sc.F., RPF

Manager

Nortek Resource Solutions Inc.

Nova Scotia, Canada

Tel: 902.922.3607

Fax: 902.922.3274

Web: nortekresources.com

Email: kirk@nortekresources.com

Weather Radars

Dear Mr. Kirk Schmidt,

Thank you for contacting the Meteorological Service of Canada, a branch of Environment Canada, regarding your wind energy intentions.

Our preliminary assessment of the information provided to us via e-mail on September 24, 2013 indicates that any potential interference that may be created by the Bateston Wind Turbine located in Cape Benton County, NS will not be severe. Although we would prefer our radar view to be interference free, this is not always reasonable. As a consequence, we do not have strong objections to the current proposal.

If your plans are modified in any manner (e.g. number of turbines, height, placement or materials) this analysis would no longer be valid. An updated analysis must be conducted.

Please contact us at: weatherradars@ec.gc.ca.

Thank you for your ongoing cooperation and we wish you success.

Best Regards,

Carolyn Wilson

Carolyn Wilson (*Rennie*)
National Radar Program
Meteorological Service of Canada
Environment Canada
4905 Dufferin Street
Toronto, Ontario M3H 5T4
Office : 3N-WS12
NEW Carolyn.Wilson@ec.gc.ca
Phone : 416-739-4931

Carolyn Wilson (*Rennie*)
Le Programme Nationale de Radar
Service météorologique du Canada
Environnement Canada
4905, rue Dufferin
Toronto, Ontario M3H 5T4
Bureau : 3N-WS12
NOUVEAU Carolyn.Wilson@ec.gc.ca
Téléphone : 416-739-4931

Appendix X. OPEN HOUSE SIGN IN SHEET AND COMMENT CARDS



Bateston Community Wind Project May 16, 2013

	Print Name	Address	Phone Number	E-mail address
1	Jeanne Wilcox	Bateston	733-2645	jeanne.1@hotmail.com
2	Hans Pennock	Bateston	733-2328	1hpm@aol.com
3	Chad Wilcox	bateston	733-3238	C.Wilcox@hotmail.ca
4	Rob O'neil	Bateston	733-2337	
5	Maura O'Neil	Bateston	61	mackee@oneil.com
6	Anne Kennedy	Catalone	733-2309	
7	Frances Kennedy	Catalone	733-2309	fraserkenedy@seaside.n.s.ca
8	John Breen	Bateston	733-2776	
9	Paul White	Bateston	733-3410	
10	Pat Bates	Bateston	733-2568	



CELTIC CURRENT
COMMUNITY WIND DEVELOPMENT

Bateston Community Wind Project May 16, 2013

	Print Name	Address	Phone Number	E-mail address
11	Kelly Bates	1512 N. A. BAY DR ALICIA	733-2730	KS.bates@scmshc. ns.ca
12	Laura Sanders	1128 Trout Brook Rd. Albert Bridge	727-2894	
13	Trane Lehey	1135 Main-A-Dun Rd Bateston	733-2756	
14	Ray L. Lehey	1135 Main-A-Dun Bateston	733-2756	
15				
16				
17				
18				
19				
20				



CELTIC CURRENT
COMMUNITY WIND DEVELOPMENT

**BATESTON COMMUNITY
WIND POWER PROJECT
OPEN HOUSE**

Name: <i>Fred White</i>	Please provide your comments
Address: <i>1452 MIRA Bay Dr.</i>	<i>My MAIN CONCERNS WERE People getting sick, HEADACHES, SLEEP DEPRIVED. AFTER TALKING to the Reps. I Felt Better ABOUT these matters, But Still WORRY ABOUT the VALUE OF the houses AND LAND IN the AREA LOWERING BECAUSE OF the WIND Power Project.</i>
Phone: <i>733-3410</i>	
Email: <i>WF9989@hotmail.com</i>	
Additional Questions? Please contact Martha at martha@celticcurrent.ca or call us at (902) 945-2300	



CELTIC CURRENT
COMMUNITY WIND DEVELOPMENT

**BATESTON COMMUNITY
WIND POWER PROJECT
OPEN HOUSE**

Name: <i>Anne Kennedy</i>	Please provide your comments
Address: <i>20 Paddy's Lane Catalone, CB, NS</i>	<i>Very informative presentation! Thank You! Good Luck!</i>
Phone: <i>1-902-733-2309</i>	
Email:	
Additional Questions? Please contact Martha at martha@celticcurrent.ca or call us at (902) 945-2300	



CELTIC CURRENT
COMMUNITY WIND DEVELOPMENT

**BATESTON COMMUNITY
WIND POWER PROJECT
OPEN HOUSE**

Name: Frances Lahy	Please provide your comments
Address: 1135 Mans-A-Dieu Rd	I thought this was to be a community meeting. (NOT)
Phone: 733-2756	We were promised a community meeting!!
Email:	
Additional Questions? Please contact Martha at martha@celticcurrent.ca or call us at (902) 945-2300	



CELTIC CURRENT
COMMUNITY WIND DEVELOPMENT

**BATESTON COMMUNITY
WIND POWER PROJECT
OPEN HOUSE**

Name: Kelly Bates	Please provide your comments
Address: 1512 MIRA BAY DR BATESTON NS B1C 2A8	VERY INTERESTING AND HELPFUL
Phone: 902-733-2730	
Email:	
Additional Questions? Please contact Martha at martha@celticcurrent.ca or call us at (902) 945-2300	



CELTIC CURRENT
COMMUNITY WIND DEVELOPMENT

**BATESTON COMMUNITY
WIND POWER PROJECT
OPEN HOUSE**

Name: Jeanne Wilcox	Please provide your comments Requesting Env.m't Assessment Results Additional Questions? Please contact Martha at martha@celticcurrent.ca or call us at (902) 945-2300
Address: Bateston	
Phone:	
Email: jeanne.1@hotmail.com	



CELTIC CURRENT
COMMUNITY WIND DEVELOPMENT

**BATESTON COMMUNITY
WIND POWER PROJECT
OPEN HOUSE**

Name: Fraser Kennedy	Please provide your comments Additional Questions? Please contact Martha at martha@celticcurrent.ca or call us at (902) 945-2300
Address: 20 Paddy's Lane Catalone CB NS	
Phone: 1-902-733-2309	
Email: fraserkennedy@seaside.ns.ca	

Appendix XI. PROJECT TEAM MEMBERS' CVs

Years in Practice

13

Certifications

Nova Scotia Advanced
Wetlands Delineator and
Evaluator

Memberships

Nova Scotia Wetlands
Delineation, Maritime
College of Forest
Technology

Education

- Master in Environmental Studies (MES), York University, Toronto, Ontario, 1997-1999
- BSc. (Biology), Dalhousie University, 1992-1997
- BA (Political Science), Honours, Dalhousie University, 1992-1997

Training

- Urban Wetland Restoration: A Watershed Approach, 2012
- Nova Scotia Advanced Wetlands Delineation and Evaluation Course, 2009;
- Water Management and Wetland Restoration Training Course, 2009;
- Identifying and Delineating Wetlands for Nova Scotia, 2008
- Saint John Ambulance Standard First Aid, AED, CPR(C). 2013

Summary

Ms. Milloy oversees, manages, and executes environmental projects. She completes wetland delineations and characterizations, and guides clients through the environmental and permitting stages of development projects. Ms. Milloy also guides clients through provincial and federal environmental assessment requirements. Ms. Milloy has submitted multiple applications for Transport Canada, under the Navigable Waters Protection Program, has submitted numerous Department of Fisheries and Oceans HADD applications (freshwater and marine) and has developed HADD compensation programs. Ms. Milloy regularly completes applications for wetland alteration and development across Atlantic Canada, and has developed and implemented wetland compensation programs. Ms. Milloy is a trained wetland restoration professional. Ms. Milloy is also knowledgeable in preparing Environmental Management Plans and Emergency Preparedness Plans for development projects.

Ms. Milloy is also involved with programs including the remediation of contaminated commercial and residential sites, and the execution of Phased Site Assessments in accordance with the Nova Scotia Management of Contaminated Sites Guidelines and CSA. Ms. Milloy is knowledgeable in risk assessment processes, and completes both qualitative and quantitative risk assessments for commercial and residential properties. Ms. Milloy has extensive experience working with the Atlantic Risk Based Corrective Action (RBCA) risk assessment process for hydrocarbon-impacted sites, and is proficient in plume characterization and exposure assessment.

Selected Project Experience

- Completed watershed planning for the Sackville River Secondary watershed to evaluation wetland restoration potential and to aid in better land use planning, source water protection and management of water resources.
- Completion of 35-45 projects involving watershed evaluation, land use classification, wetland delineation and alteration and infill, and compensation planning for numerous residential and commercial large-scale developments across Nova Scotia and New Brunswick.
- Completion of a wetland alteration application and associated compensation for 24 individual wetlands associated with road development in support of a planned residential development in Sackville Nova Scotia.
- Completed the Provincial Environmental Assessment for the 80 MW Glen Dhu South Wind Power Project, Nova Scotia, for Shear Wind Inc. The Project received Ministerial approval on March 16, 2012.
- Project Management of regulatory permitting and environmental assessments for a 50 MW Wind Power Project in Nova Scotia for Sprott Power Corp.
- Completion of wetland delineation and watercourse identification for two large scale developments (200 ha and 400 ha) in 2012.
- Completion of provincial permitting requirements including wetland alteration and compensation planning, and watercourse alteration for a proposed marine terminal and associated 20 km rail and transmission line in Nova Scotia.
- Developed and implemented wetland restoration and creation projects as

compensation for wetland losses for numerous development clients.

- Completion of more than 50 phased site assessment and remediation projects
- Phase I, II, III and risk assessment for commercial property transfers.

Experience

McCallum Environmental Ltd., Nova Scotia, 2010-Present

Vice President/Senior Project Manager - Provides project management expertise for site and/or route selection, constraints mapping, regulatory consultation, environmental assessments, wetland alteration and restoration planning, environmental protection plan development, regulatory applications, construction monitoring, and reclamation for small and large scale industrial projects. Other responsibilities include marketing, budget management, report preparation and client service.

Strum Environmental Services Ltd., Nova Scotia 2000-2010

Project Manager- From 2000- 2010, provided project management expertise for development clients across Atlantic Canada. Projects included environmental assessment, large scale commercial and residential developments, wetland alteration projects, wetland compensation planning and implementation, wetland restoration and creation projects, phased site assessments, and risk assessment and management.

Environmental Sciences Group, Kingston, ON 1998

Environmental Scientist- in 1998, provided contaminant and project management expertise to Department of National Defense in the Canadian Arctic in support of remediation of several remote military sites. Identified areas required for remediation and completed associated boundary soil and sediment confirmatory sampling and analysis.

Years in Practice

16

Memberships

Alberta Society of Professional Biologists (ASPB), 2001
AB# 875

Certifications

Watercourse Alteration Certification, Nova Scotia.
#10044385

Education

Bachelor of Science, Biology/ Environmental Studies, University of Victoria, BC

Recent Training

- ♦ Project Management Fundamentals, 2010
- ♦ ISO 14064-1 Essentials: Greenhouse Gas Inventories
- ♦ ISO 14064-2 Expert – Greenhouse Gas Projects (Carbon Emissions Reduction Expert Course)
- ♦ Standard First Aid w/ CPR Level C
- ♦ H2S Alive

Recent Clients

- ♦ Altagas Ltd.
- ♦ Sprott Power Corp.
- ♦ Goldworx
- ♦ BluEarth Renewables
- ♦ Joss Wind Inc.
- ♦ Alva Construction
- ♦ Shear Wind Inc.

Skills

Extensive project management experience in an owner and consulting environment.

Extensive experience in project planning, environmental assessments, regulatory compliance, construction planning and project execution.

Understand appropriate environmental assessment methodologies and project management to successfully permit both large and small scale projects.

Understand and can articulate environmental and regulatory requirements and constraints, technical, business and project management functions associated with project development and execution.

Understand construction practices, requirements and deliverables associated with project stages.

Understand typical owner company project sanctioning / funding cycles and business drivers.

Demonstrated dedication to safe project execution and a safe workplace in support of zero incident targets.

Selected Project Experience

MINING & CONSTRUCTION

- Completion of environmental baseline surveys for Nova Scotian provincial environmental assessment process for Goldworx for a proposed re-development of a gold mine in eastern Nova Scotia.
- Completion of environmental baseline surveys for Quebec based company for a proposed gold mine expansion in eastern Nova Scotia.
- Completion of environmental baseline surveys for three Nova Scotian quarry expansion projects in 2012-2013.

OIL & GAS

- Project manager for environmental approvals and compliance for 68 kilometres of pipeline development in Alberta. Project components included pipeline route selection, first nation/public consultation, regulatory consultation, environmental assessments, survey supervision, regulatory applications for licenses/permits, construction monitoring, and reclamation of the right-of-ways.
- Completion of environmental assessments for 53 oil and gas developments on the Hay Lake I.R. #209, Alberta, since 2001. Conducted construction compliance monitoring, reclamation, and completed regulatory compliance audits for ongoing activities.
- Working as part of the Nexen Abandonment and Reclamation team, completed the AENV facility amendment application, and the Decommissioning, Remediation and Land Reclamation Plan for the Balzac

- ◆ Nexen Inc.
- ◆ Husky Energy
- ◆ Bonavista Energy
- ◆ Canadian Natural Resources
- ◆ Enhance Energy
- ◆ Nuvista Energy
- ◆ Advantage Energy
- ◆ Cenovus Energy
- ◆ Eiger Energy
- ◆ Devon Canada
- ◆ Penn West Petroleum
- ◆ Shell Canada
- ◆ Talisman Energy
- ◆ Taqa North
- ◆ Hatch Mott MacDonald
- ◆ AllNorth Consultants
- ◆ Armco Capital
- ◆ Ramar Development

References

(contact info available upon request)

- ◆ Greg Denham – A&R Coordinator, Nexen Inc.
- ◆ Louise Clarke – V.P. Sprott Power Corp.
- ◆ Don Bartlett, COO – Sprott Power Corp.
- ◆ Colin Fisher – Division Manager, Allnorth
- ◆ Tim Benko, Project Manager-Facilities, Enhance Energy

Gas Plant for Nexen Inc.

- Completed the Cumulative Effects Assessment and Environmental Protection Plan for a 107 shallow gas well program on federally regulated lands in Saskatchewan for submission to the Canadian Wildlife Service and Environment Canada.
- Environmental Coordinator for Baytex Energy Ltd. from 2004-2006. Responsible for regulatory approvals and compliance for all business operations in Alberta, Saskatchewan, and British Columbia.
- Completion of hundreds of regulatory compliance audits for oil and gas clients in Alberta.
- Completed hundreds of watercourse crossing applications for upstream oil and gas development in Alberta.
- Completion of site selection, CEAA screening documents, first nation consultation, regulatory consultation, and surface land applications for 10 wellsites, access road, and pipelines for Maverick Oil & Gas Ltd on the Louis Bull First Nation since 2006.

ALTERNATIVE ENERGY

- Construction monitoring for EPP compliance, and reclamation management, for Kettle Hills Wind Power Project, Alberta.
- Completed Environmental Protection Plan, Erosion & Sedimentation Control Plan, acting as Environmental Monitor and regulatory specialist, and completion of the Federal Cumulative Effects Assessment for the Glen Dhu Wind Power Project in Nova Scotia for Shear Wind Inc.
- Coordination and completion of the 10 year Alberta Environment renewal application for the 105 MW Balzac Thermal Power generating station for Nexen Inc. This application encompasses the same requirements as a new facility application.
- Completed winter wildlife and fall migration survey of the Glenridge Wind Power Project, Alberta for Altagas Ltd.
- Completed environmental assessment and Alberta Utility Commission (AUC) Application for the 79 MW HandHills Wind Power Project in Central Alberta, for Nexen Inc/Joss Wind Power Inc.
- Coordination of the environmental assessment and Alberta Utility Commission (AUC) Application for the 100 MW Willowridge Wind Power Project in Southern Alberta for Shear Wind Inc.
- Completed initial site assessment of turbine locations for constructability, access and environmental constraints for an 80 MW Wind Power Project in North East British Columbia, for Sprott Power Corp. This Project was recently cancelled.
- Completed the Provincial Environmental Assessment for the 80 MW Glen Dhu South Wind Power Project, Nova Scotia, for Shear Wind Inc. The Project received Ministerial approval on March 16, 2012.
- Completed the Provincial Environmental Assessment for the 25.2 MW Hampton Mountain Wind Power Project, Bridgetown, Nova Scotia. The

Robert McCallum, P.Biol

robert@mccallumenvironmental.com

902-292-0514

Project received Ministerial approval on January 10, 2011.

- Completed Environmental Assessment amendment application for a 32 MW Amherst Wind Power Project, Nova Scotia, for Sprott Power Corp. This Project was acquired from Acciona.
- Project Management of regulatory permitting and environmental assessments for the 50 MW Canaan Mountain Wind Power Project in Nova Scotia for Shear Wind Inc.
- Completed constraints and regulatory analysis for 2 different wind power projects in Saskatchewan for Joss Wind Power Inc. for the 2011/12 RFP.
- Completed constraints and regulatory analysis, and Fall and Winter wildlife surveys for the 80 MW Burstall Wind Power Project in Saskatchewan for Shear Wind Inc. for the 2011/12 RFP.
- Project Management of regulatory permitting and environmental assessments for a 65 – 100 MW Wind Power Project in New Brunswick for Shear Wind Inc.

OTHER PROJECTS

- Completing an Evaluation of Wetland Restoration Potential (EWRP) within the Sackville Watershed, Halifax, N.S. to identify priority wetland restoration sites. The goal is to reduce overland water flow within developed areas to reduce municipal liabilities.
- Completed fisheries assessments and applications for numerous bridge crossings in Nova Scotia.
- Assistance with project management and regulatory permitting for the 2010 Heritage Gas pipeline expansion within the Halifax Regional Municipality, Halifax, N.S.
- Completion of the CEAA screening document and NAV Canada application for the Deer Lake Regional Airport Authority (Newfoundland) Runway expansion, access road relocation, and transmission line relocation, including DFO and NAV Waters application.

Experience

McCallum Environmental Ltd.,

President - Since 2001, has provided project management expertise for site and/or route selection, constraints mapping, land acquisition, first nation/public consultation, regulatory consultation, environmental assessments, environmental protection plan development, survey supervision, regulatory applications, license and permit acquisitions, construction monitoring, and reclamation for small and large scale industrial projects. Other responsibilities include marketing, budget management, report preparation and client service.

Indian Oil & Gas Canada, Department of Indian & Northern Affairs, AB

Environmental & Surface Land Analyst (Responsible Authority under CEAA) - applied federal environmental legislation (CEAA, CEPA, Fisheries Act, and Indian Oil & Gas regulations (1995), which incorporate provincial legislation, on oil and gas producing Indian reserves in Canada. Analyzed

Robert McCallum, P.Biol

robert@mccallumenvironmental.com

902-292-0514

environmental assessments for proposed projects and conducted site inspections where required (acting as the Responsible Authority under CEAA). Audited projects to ensure compliance with federal and provincial legislation. Negotiated and resolved environmental issues while maintaining an effective working relationship with First Nations, industry, IOGC and other federal and provincial regulators. Conducted reclamation inquiries to ensure compliance with reclamation criteria.

Stantec Consulting Ltd., AB

Project Manager - responsibilities included marketing, budget management, report preparation and client service. Project experience related to reclamation and environmental monitoring of construction projects. Completed federal and provincial environmental assessments, conservation and reclamation plans, designed and monitored environmental Protection Plans for developments in environmentally sensitive areas. Completed Phase I and Phase II Contamination Assessments and dig & dump supervision and closure sampling.

Pioneer Land Services Ltd., Calgary, AB

Assistant Environmental Manager - responsibilities included employee time management, billings, report preparation and quality control, marketing and client service. Consulting responsibilities included project management of reclamation programs, environmental monitoring of pipeline and wellsite construction projects. Completed environmental assessments as per provincial and federal requirements, designed and monitored environmental protection plans for developments in environmentally sensitive areas, Phase I and Phase II Contamination Assessments. Developed Emergency Response Plans for field personnel.

Pioneer Land Services Ltd., Grande Prairie, AB

Environmental Division Manager - responsibilities included employee time management, billings, report preparation and quality control, marketing and client service. Consulting responsibilities included project management of reclamation programs, environmental monitoring of pipeline and wellsite construction projects. Designed and monitored environmental Protection Plans for developments in environmentally sensitive areas. Completed Phase I and Phase II Contamination Assessments. Developed Emergency Response Plans for field personnel.

Great White North Environmental Services Ltd., AB

Senior Environmental Scientist - responsible for the preparation and implementation of Phase I and Phase II Contamination Assessments and Risk Assessments. Conducted Waste Auditing, Soil Vapor Surveys, and site remediation.

Years in Practice

8

Education

Masters of Resource and Environmental Management, Dalhousie University, 2009-2011

B.Sc. Advanced Major in Biology & Interdisciplinary Studies in Aquatic Resources, St. Francis Xavier University, 2001-2005

Training

- ◆ Wetland Delineation Certification, 2013
- ◆ Saint John Ambulance Standard First Aid, AED, CPR(C), 2013
- ◆ Health Safety and Environmental Leadership training and Advanced Safety Audit training, 2009
- ◆ Emergency Operations Centre crisis management training, 2006-2008
- ◆ Introduction to the Fisheries Act and Navigable Waters Protection Act course – ESAA
- ◆ Bear Awareness training and ATV training – Alberta Safety Council, 2006
- ◆ Site Supervisor Safety Training, Construction Safety Training System and W.H.M.I.S., 2005

Summary

Ms. MacDonald has been in the environmental consulting profession since 2005. She has worked on both project related and research related field assessments in Nova Scotia, Prince Edward Island, and Alberta.

Ms. MacDonald's academic credentials include a Bachelor's degree in Biology and Interdisciplinary Studies in Aquatic Resources, and a Masters' degree in Resource and Environmental Management. Melanie has been able to apply the lessons from these inter-disciplinary programs through a variety of projects throughout her professional career. Most recently, Ms. MacDonald has been responsible for completing biophysical assessments, including flora and fauna surveys, avian surveys, and species at risk evaluations, primarily for clients in the energy sector, mining sector, and commercial development sector. Ms. MacDonald coordinates all field staff required to complete all environmental baseline programs for Provincial Environmental Assessment registration. Ms. MacDonald has been responsible for the implementation of six environmental baseline programs for mining, quarry development and energy sector development projects in Nova Scotia in advance of environmental assessment registration.

Ms. MacDonald is specialized in wetland and watercourse delineations and functional assessments and fish habitat surveys, having delineated approximately 300 wetlands and their associated watercourses within the past 2 years. Ms. MacDonald brings considerable experience in fisheries monitoring projects in both marine and freshwater environments. As a certified electrofishing crew leader, Melanie has logged hundreds of hours performing electrofishing surveys for various DFO HADD monitoring programs and associated compensation projects. Specifically, Ms. MacDonald was pivotal in planning and completion of a watercourse alteration, fish salvage and diversion of 38km of the Tar River, and in the construction of a 77 hectare lake for fish habitat compensation. Ms. MacDonald is experienced in watercourse habitat assessments, various types of fisheries assessments, and has overseen multiple watercourse (both road and pipeline) crossings in Alberta and Nova Scotia. Throughout her career, Ms. MacDonald has gained experience in regulatory compliance and permitting, including DFO HADD and NWPA permits.

Selected Project Experience

- Completion of environmental baseline surveys for the provincial environmental assessment process for Goldworx for a proposed re-development of a gold mine in eastern Nova Scotia.
- Completion of environmental baseline surveys for Quebec based company for a proposed gold mine expansion in eastern Nova Scotia.
- Completion of environmental baseline surveys for three Nova Scotian quarry expansion projects in 2012-2013.

- Completed watershed planning for the Sackville River Secondary watershed to evaluation wetland restoration potential and to aid in better land use planning, source water protection and management of water resources.
- Completion of field work associated with a wetland alteration application and associated compensation for 24 individual wetlands associated with road development in support of a planned residential development in Sackville Nova Scotia.
- Completed field programs and reporting associated with the Provincial Environmental Assessment for the 80 MW Glen Dhu South Wind Power Project, Nova Scotia, for Shear Wind Inc. The Project received Ministerial approval on March 16, 2012.
- Completion of wetland delineation and watercourse identification for four large scale developments (2 - 200 ha, 400 ha, and 450 ha) in 2012 and 2013.

Experience

McCallum Environmental Ltd., Halifax, Nova Scotia

Biologist and Environmental Specialist/Coordinator:

May-Aug 2011, Jan 2012-Present

Completing biophysical assessments, including flora and fauna surveys, with emphasis on species at risk. Completing wetland and watercourse delineations and assessments and coordinating migratory bird and bat monitoring. Communicating field survey results and methodologies for Environmental Assessments and other Provincial regulatory applications.

Amec Colt, Shell/Albian Sands Expansion 1 - Fort McMurray, Alberta.

Environmental Specialist and Area Environmental Lead

July 2008 – October 2009.

Proactively monitored construction activities via inspections, audits and Environmental Work Permits & Protection Plans to ensure compliance with regulatory approvals, the projects' Environmental Control Plan, and best management practices. Investigated and reported incidents, and liaised between contractors and project owners. Implemented Environmental Awareness and communicated issues via weekly newsletters. Developed a greater business sense, working as an independent contractor to Amec Colt.

Canadian Natural Resources Ltd. - Fort McMurray, Alberta

Regulatory and Environmental Specialist

October 2005 – July 2008

Conducted extensive field work in various fish and wildlife programs. Communicated issues with government agencies, contractors and external stakeholders. Performed on-call duties, spill response, and non-compliance reporting and response. Expanded upon site wide procedures for protection of water, wildlife and waterbirds. Played a pivotal role in planning & completion of a fish salvage of 38 km of the Tar River, and in construction of a 77 hectare fish habitat compensation lake (Horizon Lake). Horizon Lake earned CAPP Steward of Excellence Award for Environmental Performance. Hired, trained, and supervised teams of up to four summer interns. Chaired the regional 'Oil Sands Bird and Wildlife Protection Committee'.



DAP-PL-3770.00

Akkreditiert nach
DIN EN ISO/IEC 17025:2005



Zertifiziert nach
ISO 9001: 2000

AL-PRO Wind Energy Consulting Canada Inc.

AL-PRO Wind Energy Consulting Canada Inc. is a Canadian subsidiary of AL-PRO GmbH & CO. KG, a German, independent, internationally active and DAP accredited consulting firm that specializes in wind energy modeling and assessment. Our main focus is site specific wind and yield analysis for wind farm developments. We use industry standard software that include models like WAsP for relatively simple terrain conditions and Meteodyn WT for complex nonlinear three-dimensional flow models to determine the wind fields for sites with complex or rough terrain.

AL-PRO's founder, Mr. Carsten Albrecht is a member of the wind consultancy advisory board of the Federal Association for Wind Energy e. V. - a forum of wind consultants as well as specialists and experts from institutes and research establishments. Mr. Albrecht held the position of chairman of the advisory board in 2005. AL-PRO is committed to maintaining the current standards for the preparation of wind reports as well as the restrictions of the latest "Technical Guideline for Wind Turbines" part 6, revision 7, for the preparation and documentation of wind reports. An overview of the regulations for the preparation of wind reports as well as additional information of the BWE is available on the following website: www.wind-energie.de.

Our core services are certified by the Germanischer Lloyd to DIN ISO 9001. In our third year of operation, we became the first wind energy consulting firm to be accredited in the world to the DIN EN ISO 17025 standard. Our accreditation includes the determination of wind potential and energy yields, shadow and noise calculations, the reference yield determination due to the EEG and the development of 60% certificates, which have been required since 2005 for the promotion of wind energy farms.

AL-PRO specializes in the use of three-dimensional flow models for the determination of wind conditions in complex terrain and has extensive experience using this approach. The application of three-dimensional flow models includes traditional tasks such as the determination of wind potential and energy yields and more sophisticated analyses which include load studies that consider turbulence, incident flow values, vertical wind shear, etc. All wind energy modeling meets or exceeds the existing technical guidelines TR5 (1) and TR6 (2).

AL-PRO also offers additional services which include wind farm optimization and configuration, turbulence determination, three-dimensional flow modeling, visualisations and visibility studies as well as long-term risk and performance analysis of existing wind farms.

Tel (902) 692-3606

AL-PRO Wind Energy Consulting Canada Inc.

390 Marsh St, New Glasgow, NS

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Fax: (+49) 4936 6986-46

AL-PRO GmbH & Co. KG
Geschäftsführer:
Dipl. Inf. Carsten Albrecht

e-mail: info@al-pro.de
Internet: www.al-pro.de



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Our typical customers are project developers, turbine manufacturers, banks and wind farm operators located within Europe, South America and Canada.

Our staff consists of 7 full time and three part time individuals with a broad range of expertise and experience. Our managing directors are Mr. Carsten Albrecht, M.Sc.

Mr. Carsten Albrecht, M.Sc. has been active in the field of wind energy for over a decade and is responsible for the technical and scientific support. Dr. Raimund Pauen is responsible for project management and oversees the computations and the modeling of wind resources.

Our headquarters are located in Großheide, Germany and the majority of the analysis work is completed at our main office, however we operate AL-PRO Wind Energy Consulting Canada Inc. which provides support for the Canadian and American Markets. The staff at AL-PRO travel extensively to complete site inspections for a variety of global clients.

Recently, AL-PRO added to the range of services it provides by developing and marketing the Global Windmapping Service (GWS). The Global Windmapping Service includes a variety of products that provide strategic and site specific wind resource mapping products. For further information please visit our web shop at: www.gws-alpro.com.

Since 2001, AL-PRO has completed in excess of 700 projects of which the majority have been located in Germany, although in recent years, we have pursued an increasing number of international projects (*Europe: France, Poland, Italy, Austria, Greece, Bulgaria, Switzerland and Hungary, Argentina, Brazil, USA and Canada*).

For our customers there is always the possibility of getting information about us and our services. Close contact to our customer as well as their feedback is very important for us. Detailed information can be found on our website: www.al-pro.de

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Technical guidelines:

- (1) Technische Richtlinien für Windenergieanlagen, Teil 6: Bestimmung von Windpotenzial und Energieerträgen (*Technical Guidelines for Wind Turbines, Part 6: Determination of Wind Potential and Energy Yields*), Revision 7, 10.09.2007; Fördergesellschaft Windenergie e.V.
- (2) Technische Richtlinien für Windenergieanlagen, Teil 5: Bestimmung und Anwendung des Referenzertrages (*Technical Guidelines for Wind Turbines, Part 5: Determination and Application of the Reference Yield*), Revision 4, 01.06.2008; Fördergesellschaft Windenergie e.V.

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Current software:

- (1) WAsP, Wind Atlas Analysis and Application Program, Version 8.1, Build 8.01.0057, Risø National Laboratory, Denmark.
- (2) Meteodyn WT, Version 4.5.2, France
- (3) WindPRO, Version 2.9 207, April 2013, EMD International A/S, Denmark.
- (4) World-Wind-Atlas, Version 01/2005-3.6 Sander + Partner GmbH, Switzerland
- (5) Matlab, The MathWorks, Version 7.5.0.342 (R2007b) 15. August 2007
- (6) AnemoScope, Version 1.5.10, 2007, Canadian Hydraulics Centre/National Research Council, Canada

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Overview of key customers:

- Plambeck Neue Energien AG, Cuxhaven, Germany
- ENERCON GmbH, Germany
- DEWIND Ltd., Lübeck, Germany
- AN Windenergie GmbH, Bremen, Germany
- Unigea Erneuerbaren Energien GmbH, Cuxhaven, Germany
- Deutsche Kreditbank AG, Berlin, Germany
- Eolica-Energia sarl, Italy
- Gamesa Energie Deutschland GmbH, Oldenburg, Germany
- REE Sarl. Régie d`Energie Eolienne, France
- WWU GmbH, Münster, Germany
- RESEC, Liberecký kraj (Tschechien), Czech Republic
- ENOVA Beratungs- und Vermittlungs- GmbH, Germany
- EFI Energy Farming International AG, Germany
- Shear Wind Inc., Nova Scotia, Canada
- Celtic Current GP, Nova Scotia, Canada
- Aeolis Wind Corp., British Columbia, Canada
- Wind Energy Developers, Rhode Island, USA
- Affinity Renewables Inc, Nova Scotia, Canada
- RESL, Nova Scotia, Canada
- BluEarth Renewables, Alberta, Canada
- Renewable Energy Developers, Ontario, Canada

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ARCHAEOLOGIST / PRINCIPAL INVESTIGATOR

STEPHEN DAVIS, D.Phil

Phone: (902) 441-9481

E-mail : steve.davis@eastlink.ca

Years of experience: 40+

Years with DM&A (formerly DAC) : 22

ARCHAEOLOGICAL IMPACT ASSESSMENT

ENVIRONMENTAL EFFECTS MONITORING

MITIGATION DESIGN

CULTURAL RESOURCE DATA ANALYSIS

ARCHAEOLOGICAL SENSITIVITY TRAINING

EDUCATION

1987 D.Phil. Prehistory - University of Oxford, England.

1975 Master of Arts, Anthropology – Memorial University of Newfoundland.

1971 Bachelor of Arts, Honours in Anthropology - University of New Brunswick

PROFESSIONAL DEVELOPMENT AND CERTIFICATION

WHMIS: Certified 2008

PROFESSIONAL MEMBERSHIPS AND AFFILIATIONS

Federal Heritage Legislation Committee for the protection of heritage resources on Federal lands.

Atlantic Province consultant for the "Proposed Act respecting the protection of archaeological heritage in Canada". The Bastion Group Heritage Consultants, Victoria, B. C.; for the Department of Communications, Canada.

Member of the Canadian Archaeological Association

Member of the Council for Northeast Historical Archaeology

RELEVANT PROJECTS AND RESPONSIBILITIES

Stephen Davis is President of Davis MacIntyre & Associates Limited. After teaching archaeology for thirty-seven years he is presently Professor Emeritus of Anthropology at Saint Mary's University, Halifax. He has been granted the President's Award for Excellence in Research (Saint Mary's University) and most recently the 2011 Smith-Wintenburg Award for outstanding contribution to the field of archaeology in Canada (Canadian Archaeological Association).

The principal investigator for archaeology has had field experience in the Canadian High Arctic, the Barrens and Eastern Arctic. This includes field surveys and excavations of sites on Dundas and Devon Islands in Nunavut as well as work in the interior Barrens along the northeastern shore of Dubawnt Lake. His experience in the Eastern Arctic dealt with First Nations sites in southern Labrador, which included a sacred burial site. While employed by the Archaeological Survey of Canada he dealt with the full range of cultural traditions defined in the Arctic from early Independence 1 sites through Dorset and Thule.

Through research and consultancy experience over a forty-year period, Dr. Davis has worked on projects in Spain, Norway, Maine, the British Isles, N.W.T., Ontario and the Canadian Arctic. With a growing public interest in protecting cultural resources of all types, Dr. Davis has become involved with numerous projects involving historic site archaeology. During his professional career he has directed archaeological investigations of prehistoric sites, historic sites and conducted hundreds of cultural resource assessment surveys under the guidelines for a Category C Permit (Nova Scotia Museum). These activities have resulted in over 100 publications in the form of books, book chapters, journal articles and contractual documents.

Representative projects include:

- [Little River Reservoir Project, Saint John NB](#) – Dillon Consulting / City of Saint John: heritage resource impact assessment including refining and field-truthing a predictive model based on changing water levels.
- [Muggah Creek Shipwreck, Sydney NS](#) - Sydney Tar Ponds Agency: archaeological assessment and recording of a beached shipwreck in the Sydney Tar Ponds, also known as Muggah Creek.
- [Route 11 Pokemouche to Janeville, NB](#) - New Brunswick Department of Transportation: CEAA Screening and Provincial EIA. Archaeological background study and reconnaissance of a proposed highway corridor over 50km in length.
- [Deep Panuke Landfall Preparation, Goldboro NS](#) - EnCana Corporation: monitoring and mitigation of the near shore development of the Deep Panuke natural gas project, and heritage sensitivity training.
- [Morell Lagoon Upgrade, PEI](#) – Community of Morell: Monitoring of lagoon upgrades in the vicinity of a known Acadian / Mi'kmaq cemetery.

Davis MacIntyre & Associates Limited

SENIOR ARCHAEOLOGIST

LAURA DE BOER, M.A.

Phone: (902) 209-4004

E-Mail: laura.deboer@eastlink.ca

ARCHAEOLOGICAL IMPACT ASSESSMENT

ENVIRONMENTAL EFFECTS MONITORING

DESKTOP STUDIES

ARCHIVAL RESEARCH

STRUCTURAL RECORDING

EDUCATION

Master of Arts, European Historical Archaeology – University of Sheffield (UK)

Bachelor of Arts, Honours in Anthropology – Saint Mary's University

PROFESSIONAL DEVELOPMENT AND CERTIFICATION

WHMIS: Certified 2008

Emergency First Aid & CPR Level A certified (St. John Ambulance) 2010

PROFESSIONAL MEMBERSHIPS, AWARDS, AND AFFILIATIONS

Board member, Industrial Heritage Nova Scotia

Member, Canadian Archaeological Association

Member, Nova Scotia Archaeology Society

John Harvey Memorial Writing Award, Nova Scotia Archaeology Society

Prince John Loewenstein Anthropology Award (Writing), Saint Mary's University Anthropology Department

AUUHC Conference award – Best Presentation, University of Prince Edward Island

Nelly B. Grey Memorial Scholarship, Saint Mary's University

RELEVANT PROJECTS AND RESPONSIBILITIES

Ms. de Boer is a Senior Archaeologist who has been involved in archaeological field survey and excavations since 2006. She began working in the consulting field in 2008. She is experienced in a range of work pertaining to the historical or post-contact period of Nova Scotia, with a focus on the archaeology of standing buildings and of industrialization. Her projects as a consultant and previously as a student have included cemeteries, populous urban sites, areas reclaimed by wilderness, and industrial sites. She has also been involved in archaeological field surveys in Italy and the United Kingdom. Ms. de Boer has held archaeological research permits in Nova Scotia under the Special Places Protection Act, is qualified to hold permits in PEI, and has conducted archaeological research in New Brunswick.

As a senior and previously as a junior archaeologist, her responsibilities have included conducting field reconnaissance and excavation (test units, forest and mountain field surveys, and large-scale construction site excavation and monitoring, recording and profiling of test units); extensive research in public and private archives; analysis of historical mapping; compiling museum reports under Special Places Protection Act legislation; laboratory processing of artifacts; and the recording and drafting of sites, structures, and shipwrecks. Ms. de Boer's academic experience prior to her consulting work has included the use of basic AutoCAD programming, Leica Total Station survey, vector-based graphics work, and geophysical surveying.

Representative projects include:

- [Wilkes Subdivision, Rusagonis NB](#) – Dillon Consulting: Archaeological background study and survey to ground-truth predictive modelling.
- [Route 11 Pokemouche to Janeville, NB](#) - New Brunswick Department of Transportation: CEAA Screening and Provincial EIA. Archaeological background study and reconnaissance of a proposed highway corridor over 50km in length.
- [Muggah Creek Shipwreck Recording, Sydney NS](#) - Sydney Tar Ponds Agency: archaeological recording and drafting of a beached shipwreck prior to its removal during the Tar Ponds Clean-up.
- [Melford International Terminal, Melford NS](#) - AMEC Earth & Environmental: archaeological resource impact assessment including recording and mitigation of archaeological and built heritage resources.
- [Point Pleasant Park Archaeological Research, Halifax NS](#) - Halifax Regional Municipality: Design and execution of archaeological research program for management and rehabilitation of historic roadways
- [Digby Wastewater Treatment Project](#) – Town of Digby: Archaeological testing and recording following an impact assessment also conducted by DM&A.
- [Bailey's Cemetery](#) – Xstrata Coal: Archaeological excavation to identify fourteen grave shafts at Bailey's Cemetery, Donkin, Cape Breton.

Davis MacIntyre & Associates Limited