

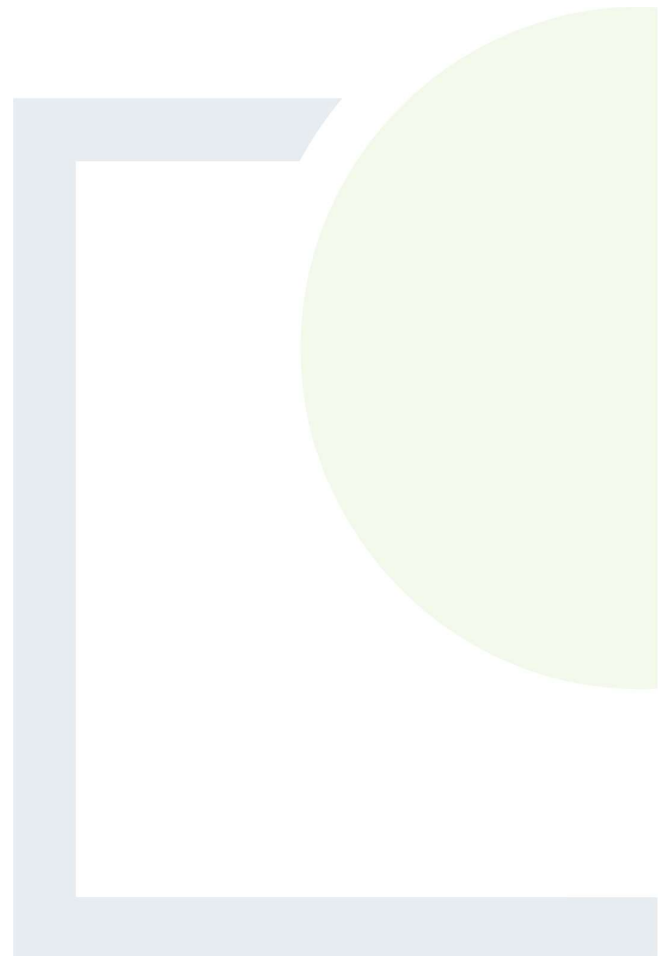


**FEHILY  
TIMONEY**

**CONSULTANTS IN ENGINEERING,  
ENVIRONMENTAL SCIENCE  
& PLANNING**

## **Appendix 12.4**

Theoretical Shadow Flicker Times  
per Turbine (Scenario 02)



**APPENDIX 12-4: Calculated Shadow Flicker Times that could occur on a turbine by turbine basis for Scenario 02  
Total Theoretical Shadow Flicker Times in UTC**

Turbine 1

No shadow flicker will result from this turbine

Turbine 2

No shadow flicker will result from this turbine

Turbine 3

No shadow flicker will result from this turbine

Turbine 4

No shadow flicker will result from this turbine

Turbine 5

Day-Month	Start Time	End Time	Duration
19-Apr	18:30:38	18:40:35	00:09:57
20-Apr	18:27:47	18:43:02	00:15:15
21-Apr	18:25:52	18:44:35	00:18:43
22-Apr	18:24:25	18:45:54	00:21:30
23-Apr	18:23:16	18:47:23	00:24:07
24-Apr	18:22:21	18:48:27	00:26:06
25-Apr	18:21:37	18:49:14	00:27:38
26-Apr	18:21:03	18:49:49	00:28:47
27-Apr	18:20:37	18:50:14	00:29:37
28-Apr	18:20:20	18:50:31	00:30:11
29-Apr	18:20:11	18:50:40	00:30:30
30-Apr	18:20:08	18:50:42	00:30:34
01-May	18:20:13	18:50:38	00:30:25
02-May	18:20:25	18:50:28	00:30:03
03-May	18:20:45	18:50:12	00:29:27
04-May	18:21:13	18:49:51	00:28:38
05-May	18:21:43	18:49:23	00:27:40
06-May	18:22:11	18:48:49	00:26:38
07-May	18:22:47	18:48:08	00:25:21
08-May	18:23:32	18:47:20	00:23:48
09-May	18:24:28	18:46:24	00:21:57
10-May	18:25:37	18:45:20	00:19:43
11-May	18:27:06	18:44:02	00:16:55
12-May	18:29:11	18:42:22	00:13:11
13-May	18:31:37	18:39:55	00:08:18
14-May	18:41:32	18:50:21	00:08:50
15-May	18:39:08	18:52:39	00:13:30
16-May	18:37:05	18:54:13	00:17:08
17-May	18:35:34	18:55:25	00:19:51
18-May	18:34:21	18:56:23	00:22:02
19-May	18:33:20	18:57:11	00:23:52
20-May	18:32:28	18:57:51	00:25:24
21-May	18:31:43	18:58:23	00:26:39

22-May	18:31:06	18:58:46	00:27:41
23-May	18:30:25	18:59:03	00:28:38
24-May	18:29:45	18:59:12	00:29:27
25-May	18:29:12	18:59:14	00:30:02
26-May	18:28:45	18:59:10	00:30:25
27-May	18:28:24	18:58:59	00:30:34
28-May	18:28:09	18:58:40	00:30:31
29-May	18:28:00	18:58:14	00:30:13
30-May	18:27:58	18:57:39	00:29:41
31-May	18:28:02	18:56:55	00:28:53
01-Jun	18:28:13	18:56:00	00:27:47
02-Jun	18:28:33	18:54:53	00:26:20
03-Jun	18:29:02	18:53:29	00:24:26
04-Jun	18:29:44	18:51:41	00:21:57
05-Jun	18:30:42	18:49:55	00:19:13
06-Jun	18:32:03	18:48:03	00:15:59
07-Jun	18:34:09	18:45:25	00:11:16

Turbine 6

No shadow flicker will result from this turbine

Turbine 7

No shadow flicker will result from this turbine

Turbine 8

No shadow flicker will result from this turbine

Turbine 10

Day-Month	Start Time	End Time	Duration
25-Feb	17:18:45	17:26:35	00:07:50
26-Feb	17:15:05	17:29:54	00:14:49
27-Feb	17:12:50	17:31:48	00:18:59
28-Feb	17:11:09	17:33:54	00:22:45
29-Feb	17:09:50	17:35:24	00:25:34
01-Mar	17:08:46	17:36:27	00:27:40
02-Mar	17:07:56	17:37:11	00:29:15
03-Mar	17:07:17	17:37:40	00:30:22
04-Mar	17:06:49	17:37:56	00:31:07
05-Mar	17:06:30	17:38:00	00:31:30
06-Mar	17:06:21	17:37:53	00:31:32
07-Mar	17:06:23	17:37:36	00:31:13
08-Mar	17:06:35	17:37:08	00:30:33
09-Mar	17:06:59	17:36:28	00:29:29
10-Mar	17:07:38	17:35:36	00:27:58
11-Mar	17:08:24	17:34:29	00:26:06
12-Mar	17:09:19	17:33:07	00:23:48
13-Mar	17:10:39	17:31:26	00:20:47
14-Mar	17:12:41	17:29:12	00:16:31
15-Mar	17:16:11	17:25:49	00:09:38

25-Sep	16:58:12	17:09:10	00:10:59
26-Sep	16:54:20	17:11:36	00:17:17
27-Sep	16:51:51	17:13:05	00:21:15
28-Sep	16:49:59	17:14:05	00:24:06
29-Sep	16:48:31	17:14:49	00:26:18
30-Sep	16:47:11	17:15:18	00:28:08
01-Oct	16:45:59	17:15:34	00:29:35
02-Oct	16:45:02	17:15:38	00:30:36
03-Oct	16:44:17	17:15:32	00:31:15
04-Oct	16:43:44	17:15:16	00:31:33
05-Oct	16:43:20	17:14:51	00:31:30
06-Oct	16:43:08	17:14:15	00:31:08
07-Oct	16:43:05	17:13:29	00:30:24
08-Oct	16:43:14	17:12:32	00:29:18
09-Oct	16:43:34	17:11:20	00:27:46
10-Oct	16:44:08	17:09:52	00:25:44
11-Oct	16:44:58	17:07:59	00:23:01
12-Oct	16:46:09	17:05:28	00:19:19
13-Oct	16:47:54	17:03:16	00:15:22
14-Oct	16:50:49	16:59:53	00:09:04

Turbine 11

No shadow flicker will result from this turbine

Turbine 12

Day-Month	Start Time	End Time	Duration
07-Jan	15:55:16	15:58:27	00:03:11
08-Jan	15:52:50	16:01:45	00:08:55
09-Jan	15:51:36	16:03:49	00:12:13
10-Jan	15:50:44	16:05:32	00:14:48
11-Jan	15:50:03	16:07:02	00:16:59
12-Jan	15:49:29	16:08:26	00:18:57
13-Jan	15:49:02	16:10:26	00:21:24
14-Jan	15:48:39	16:12:05	00:23:26
15-Jan	15:48:20	16:13:31	00:25:12
16-Jan	15:48:04	16:14:49	00:26:44
17-Jan	15:47:52	16:15:58	00:28:06
18-Jan	15:47:43	16:17:01	00:29:18
19-Jan	15:47:37	16:17:58	00:30:21
20-Jan	15:47:33	16:18:49	00:31:16
21-Jan	15:47:33	16:19:35	00:32:02
22-Jan	15:47:36	16:20:16	00:32:41
23-Jan	15:47:41	16:20:52	00:33:11
24-Jan	15:47:49	16:21:22	00:33:33
25-Jan	15:47:58	16:21:47	00:33:50
26-Jan	15:48:10	16:22:07	00:33:57
27-Jan	15:48:25	16:22:21	00:33:56
28-Jan	15:48:45	16:22:30	00:33:45
29-Jan	15:49:10	16:22:32	00:33:23
30-Jan	08:44:20	08:51:57	00:07:37

30-Jan	15:49:39	16:22:28	00:32:49
31-Jan	08:41:14	08:55:20	00:14:06
31-Jan	15:50:14	16:22:17	00:32:03
01-Feb	08:39:19	08:57:30	00:18:11
01-Feb	15:50:56	16:21:58	00:31:02
02-Feb	08:37:39	08:59:09	00:21:31
02-Feb	15:51:47	16:21:31	00:29:44
03-Feb	08:35:58	09:00:29	00:24:31
03-Feb	15:52:47	16:20:55	00:28:08
04-Feb	08:34:38	09:01:35	00:26:58
04-Feb	15:54:00	16:20:10	00:26:09
05-Feb	08:33:33	09:02:30	00:28:57
05-Feb	15:55:32	16:19:10	00:23:38
06-Feb	08:32:41	09:03:18	00:30:37
06-Feb	15:57:36	16:17:52	00:20:16
07-Feb	08:31:58	09:03:57	00:31:59
07-Feb	16:00:41	16:16:06	00:15:25
08-Feb	08:31:23	09:04:27	00:33:04
08-Feb	16:03:27	16:13:23	00:09:56
09-Feb	08:30:56	09:04:50	00:33:54
10-Feb	08:30:35	09:05:04	00:34:29
11-Feb	08:30:22	09:05:11	00:34:50
12-Feb	08:30:14	09:05:11	00:34:56
13-Feb	08:30:13	09:05:02	00:34:49
14-Feb	08:30:19	09:04:45	00:34:26
15-Feb	08:30:32	09:04:20	00:33:48
15-Feb	16:59:49	17:09:37	00:09:48
16-Feb	08:30:53	09:03:45	00:32:52
16-Feb	16:57:07	17:12:12	00:15:05
17-Feb	08:31:22	09:02:59	00:31:37
17-Feb	16:55:19	17:13:54	00:18:35
18-Feb	08:32:01	09:02:01	00:30:00
18-Feb	16:53:59	17:15:45	00:21:46
19-Feb	08:32:52	09:00:48	00:27:57
19-Feb	16:52:56	17:17:14	00:24:18
20-Feb	08:03:45	08:10:55	00:07:11
20-Feb	08:33:57	08:59:15	00:25:18
20-Feb	16:52:07	17:18:17	00:26:10
21-Feb	08:00:06	08:14:20	00:14:15
21-Feb	08:35:23	08:57:12	00:21:49
21-Feb	16:51:30	17:19:03	00:27:33
22-Feb	07:57:54	08:16:16	00:18:22
22-Feb	08:37:19	08:55:09	00:17:49
22-Feb	16:51:03	17:19:34	00:28:30
23-Feb	07:55:46	08:17:36	00:21:50
23-Feb	08:39:55	08:52:18	00:12:23
23-Feb	16:50:46	17:19:52	00:29:05
24-Feb	07:54:04	08:18:35	00:24:31
24-Feb	16:50:39	17:19:58	00:29:19
25-Feb	07:52:44	08:19:20	00:26:36

25-Feb	16:50:41	17:19:53	00:29:11
26-Feb	07:51:41	08:19:50	00:28:09
26-Feb	16:50:54	17:19:37	00:28:43
27-Feb	07:50:52	08:20:08	00:29:16
27-Feb	16:51:19	17:19:09	00:27:51
28-Feb	07:50:13	08:20:14	00:30:01
28-Feb	16:51:57	17:18:30	00:26:33
29-Feb	07:49:45	08:20:10	00:30:25
29-Feb	16:52:46	17:17:37	00:24:50
01-Mar	07:49:27	08:19:55	00:30:28
01-Mar	16:53:39	17:16:27	00:22:48
02-Mar	07:49:19	08:19:29	00:30:10
02-Mar	16:54:55	17:15:02	00:20:06
03-Mar	07:49:21	08:18:52	00:29:31
03-Mar	16:56:51	17:13:08	00:16:17
04-Mar	07:49:34	08:18:03	00:28:29
04-Mar	16:59:26	17:10:20	00:10:55
05-Mar	07:49:58	08:16:59	00:27:01
06-Mar	07:50:37	08:15:38	00:25:01
07-Mar	07:51:33	08:14:02	00:22:28
08-Mar	07:52:55	08:11:59	00:19:05
09-Mar	07:54:59	08:09:02	00:14:02
10-Mar	07:59:55	08:02:38	00:02:43
01-Oct	07:36:48	07:44:28	00:07:40
02-Oct	07:32:59	07:48:45	00:15:45
03-Oct	07:30:38	07:50:46	00:20:07
04-Oct	07:28:53	07:52:04	00:23:11
05-Oct	07:27:30	07:53:04	00:25:34
06-Oct	07:26:24	07:53:48	00:27:25
06-Oct	16:35:52	16:46:36	00:10:45
07-Oct	07:25:31	07:54:17	00:28:46
07-Oct	16:32:49	16:48:54	00:16:05
08-Oct	07:24:51	07:54:33	00:29:42
08-Oct	16:30:22	16:50:18	00:19:56
09-Oct	07:24:22	07:54:39	00:30:16
09-Oct	16:28:37	16:51:15	00:22:39
10-Oct	07:24:04	07:54:34	00:30:30
10-Oct	16:27:15	16:51:57	00:24:42
11-Oct	07:23:56	07:54:20	00:30:23
11-Oct	16:26:01	16:52:24	00:26:24
12-Oct	07:23:59	07:53:56	00:29:57
12-Oct	16:24:56	16:52:39	00:27:44
13-Oct	07:24:13	07:53:23	00:29:10
13-Oct	16:24:05	16:52:43	00:28:38
14-Oct	07:24:40	07:52:40	00:28:01
14-Oct	16:23:27	16:52:36	00:29:09
15-Oct	07:25:20	07:51:46	00:26:26
15-Oct	16:23:01	16:52:20	00:29:19
16-Oct	07:26:18	07:50:39	00:24:20
16-Oct	16:22:45	16:51:54	00:29:09

17-Oct	07:27:41	07:49:19	00:21:38
17-Oct	08:11:19	08:24:35	00:13:16
17-Oct	16:22:40	16:51:19	00:28:39
18-Oct	07:29:27	07:47:39	00:18:11
18-Oct	08:08:35	08:26:55	00:18:19
18-Oct	16:22:45	16:50:32	00:27:47
19-Oct	07:31:21	07:45:24	00:14:03
19-Oct	08:06:25	08:28:39	00:22:14
19-Oct	16:23:02	16:49:32	00:26:31
20-Oct	07:34:46	07:41:39	00:06:53
20-Oct	08:04:45	08:30:20	00:25:35
20-Oct	16:23:31	16:48:18	00:24:47
21-Oct	08:03:26	08:31:34	00:28:08
21-Oct	16:24:14	16:46:41	00:22:27
22-Oct	08:02:23	08:32:31	00:30:08
22-Oct	16:25:15	16:44:40	00:19:26
23-Oct	08:01:32	08:33:15	00:31:42
23-Oct	16:26:40	16:42:50	00:16:10
24-Oct	08:00:53	08:33:48	00:32:55
24-Oct	16:28:48	16:40:27	00:11:38
25-Oct	08:00:22	08:34:12	00:33:49
26-Oct	08:00:01	08:34:28	00:34:27
27-Oct	07:59:48	08:34:38	00:34:49
28-Oct	07:59:44	08:34:41	00:34:57
29-Oct	07:59:47	08:34:38	00:34:51
30-Oct	07:59:58	08:34:28	00:34:31
31-Oct	08:00:16	08:34:13	00:33:57
31-Oct	15:34:59	15:40:41	00:05:42
01-Nov	08:00:44	08:33:52	00:33:09
01-Nov	15:31:11	15:44:28	00:13:17
02-Nov	08:01:20	08:33:25	00:32:06
02-Nov	15:28:23	15:46:36	00:18:12
03-Nov	08:02:05	08:32:51	00:30:46
03-Nov	15:25:59	15:48:08	00:22:09
04-Nov	08:03:02	08:32:10	00:29:09
04-Nov	15:24:21	15:49:21	00:25:00
05-Nov	08:04:11	08:31:24	00:27:13
05-Nov	15:23:08	15:50:20	00:27:12
06-Nov	08:05:37	08:30:29	00:24:52
06-Nov	15:22:11	15:51:09	00:28:57
07-Nov	08:07:24	08:29:22	00:21:58
07-Nov	15:21:27	15:51:51	00:30:24
08-Nov	08:09:17	08:27:58	00:18:41
08-Nov	15:20:54	15:52:27	00:31:33
09-Nov	08:11:19	08:26:09	00:14:50
09-Nov	15:20:30	15:52:56	00:32:26
10-Nov	08:14:20	08:23:23	00:09:02
10-Nov	15:20:13	15:53:19	00:33:06
11-Nov	15:20:03	15:53:37	00:33:34
12-Nov	15:20:00	15:53:51	00:33:51

13-Nov	15:20:03	15:54:01	00:33:58
14-Nov	15:20:11	15:54:07	00:33:56
15-Nov	15:20:24	15:54:09	00:33:44
16-Nov	15:20:42	15:54:07	00:33:25
17-Nov	15:21:01	15:54:02	00:33:00
18-Nov	15:21:26	15:53:53	00:32:28
19-Nov	15:21:54	15:53:41	00:31:47
20-Nov	15:22:28	15:53:25	00:30:58
21-Nov	15:23:05	15:53:06	00:30:00
22-Nov	15:23:48	15:52:42	00:28:55
23-Nov	15:24:34	15:52:14	00:27:40
24-Nov	15:25:25	15:51:41	00:26:15
25-Nov	15:26:21	15:51:01	00:24:40
26-Nov	15:27:22	15:50:12	00:22:50
27-Nov	15:28:29	15:49:11	00:20:42
28-Nov	15:29:41	15:48:02	00:18:21
29-Nov	15:31:01	15:47:24	00:16:23
30-Nov	15:32:31	15:46:38	00:14:07
01-Dec	15:34:15	15:45:39	00:11:23
02-Dec	15:36:27	15:44:13	00:07:46

Turbine 13

No shadow flicker will result from this turbine

Turbine 14

No shadow flicker will result from this turbine

Turbine 15

No shadow flicker will result from this turbine

Turbine 16

No shadow flicker will result from this turbine

Turbine 17

Day-Month	Start Time	End Time	Duration
31-May	05:30:04	05:35:55	00:05:51
01-Jun	05:28:18	05:37:58	00:09:40
02-Jun	05:27:12	05:39:21	00:12:08
03-Jun	05:26:25	05:40:27	00:14:01
04-Jun	05:25:50	05:41:22	00:15:32
05-Jun	05:25:23	05:42:09	00:16:47
06-Jun	05:25:02	05:42:51	00:17:50
07-Jun	05:24:46	05:43:29	00:18:43
08-Jun	05:24:34	05:44:03	00:19:29
09-Jun	05:24:26	05:44:34	00:20:08
10-Jun	05:24:21	05:45:03	00:20:42
11-Jun	05:24:09	05:45:29	00:21:20
12-Jun	05:23:59	05:45:54	00:21:54
13-Jun	05:23:54	05:46:17	00:22:23
14-Jun	05:23:52	05:46:38	00:22:46

15-Jun	05:23:52	05:46:58	00:23:06
16-Jun	05:23:55	05:47:16	00:23:21
17-Jun	05:24:01	05:47:33	00:23:32
18-Jun	05:24:09	05:47:49	00:23:40
19-Jun	05:24:19	05:48:04	00:23:45
20-Jun	05:24:31	05:48:17	00:23:46
21-Jun	05:24:45	05:48:30	00:23:44
22-Jun	05:25:02	05:48:41	00:23:39
23-Jun	05:25:20	05:48:50	00:23:30
24-Jun	05:25:40	05:48:59	00:23:19
25-Jun	05:26:03	05:49:06	00:23:03
26-Jun	05:26:28	05:49:11	00:22:43
27-Jun	05:26:56	05:49:15	00:22:19
28-Jun	05:27:27	05:49:16	00:21:50
29-Jun	05:28:01	05:49:16	00:21:15
30-Jun	05:28:36	05:49:13	00:20:37
01-Jul	05:29:05	05:49:08	00:20:03
02-Jul	05:29:36	05:48:59	00:19:23
03-Jul	05:30:11	05:48:48	00:18:36
04-Jul	05:30:50	05:48:31	00:17:42
05-Jul	05:31:32	05:48:10	00:16:38
06-Jul	05:32:21	05:47:42	00:15:21
07-Jul	05:33:18	05:47:06	00:13:49
08-Jul	05:34:25	05:46:19	00:11:53
09-Jul	05:35:52	05:45:11	00:09:19
10-Jul	05:38:04	05:43:18	00:05:14

Turbine 18

No shadow flicker will result from this turbine

Turbine 19

No shadow flicker will result from this turbine

Turbine 20

No shadow flicker will result from this turbine