

# FORGESOLAR GLARE ANALYSIS

Project: **23072 - Waipara Solar Farm**

144 MWp solar farm northeast of Waipara, New Zealand

Site configuration: **v3 no obstructions 5deg rest OP41-57**

**Client:** Far North Solar Farm

**Created** 29 May, 2024

**Updated** 29 May, 2024

**Time-step** 1 minute

**Timezone offset** UTC12

**Minimum sun altitude** 0.0 deg

**DNI peaks at** 1,000.0 W/m<sup>2</sup>

**Category** 100 MW to 1 GW

**Site ID** 120334.18562

**Ocular transmission coefficient** 0.5

**Pupil diameter** 0.002 m

**Eye focal length** 0.017 m

**Sun subtended angle** 9.3 mrad

**PV analysis methodology** V2



## Summary of Results No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh	Peak Luminance cd/m <sup>2</sup>
			min	hr	min	hr		
PV01	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV02	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV03	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV04	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV05	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV06	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV07	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV08	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV09	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV10	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV11	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV12	SA tracking	SA tracking	0	0.0	0	0.0	-	0

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0

# Component Data

## PV Arrays

**Name:** PV01  
**Axis tracking:** Single-axis rotation  
**Backtracking:** Shade  
**Tracking axis orientation:** 0.0°  
**Max tracking angle:** 55.0°  
**Resting angle:** 5.0°  
**Ground Coverage Ratio:** 0.45  
**Rated power:** -  
**Panel material:** Smooth glass with AR coating  
**Reflectivity:** Vary with sun  
**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.055052	172.745710	81.46	2.40	83.86
2	-43.055765	172.744487	83.19	2.40	85.59
3	-43.057218	172.745998	80.44	2.40	82.84
4	-43.056639	172.746992	77.25	2.40	79.65
5	-43.057267	172.746944	75.22	2.40	77.62
6	-43.057943	172.747353	73.29	2.40	75.69
7	-43.058653	172.747471	72.39	2.40	74.79
8	-43.058839	172.747655	72.07	2.40	74.47
9	-43.060338	172.747961	70.78	2.40	73.18
10	-43.061228	172.748494	69.17	2.40	71.57
11	-43.061552	172.748497	69.61	2.40	72.01
12	-43.061547	172.749547	67.67	2.40	70.07
13	-43.060351	172.749434	69.41	2.40	71.81
14	-43.059774	172.749504	67.93	2.40	70.33
15	-43.059253	172.749304	69.71	2.40	72.11
16	-43.058927	172.748911	70.05	2.40	72.45
17	-43.058252	172.748606	72.81	2.40	75.21
18	-43.056549	172.748535	72.50	2.40	74.90
19	-43.056352	172.748358	72.55	2.40	74.95
20	-43.056335	172.747947	73.11	2.40	75.51
21	-43.056447	172.747498	75.25	2.40	77.65
22	-43.055052	172.745710	81.46	2.40	83.86

**Name:** PV02

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.050625	172.739853	90.15	2.40	92.55
2	-43.051854	172.741910	87.82	2.40	90.22
3	-43.052907	172.743304	85.15	2.40	87.55
4	-43.053523	172.743663	83.67	2.40	86.07
5	-43.054875	172.745400	82.18	2.40	84.58
6	-43.055524	172.744253	83.66	2.40	86.06
7	-43.055001	172.743995	84.49	2.40	86.89
8	-43.054742	172.743753	85.54	2.40	87.94
9	-43.054349	172.743351	86.95	2.40	89.35
10	-43.052155	172.741379	90.03	2.40	92.43
11	-43.051999	172.740919	90.50	2.40	92.90
12	-43.050625	172.739853	90.15	2.40	92.55

**Name:** PV03

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.061882	172.744578	77.55	2.40	79.95
2	-43.061888	172.745414	78.09	2.40	80.49
3	-43.062150	172.745979	77.77	2.40	80.17
4	-43.062074	172.747741	76.74	2.40	79.14
5	-43.060645	172.747640	77.68	2.40	80.08
6	-43.059600	172.747158	78.66	2.40	81.06
7	-43.058884	172.747068	80.36	2.40	82.76
8	-43.055866	172.744222	84.04	2.40	86.44
9	-43.057551	172.740985	83.56	2.40	85.96
10	-43.060529	172.743900	79.57	2.40	81.97
11	-43.061882	172.744578	77.55	2.40	79.95

**Name:** PV04

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.046795	172.735908	86.18	2.40	88.58
2	-43.047598	172.736171	85.49	2.40	87.89
3	-43.047928	172.736204	85.75	2.40	88.15
4	-43.049198	172.737731	83.66	2.40	86.06
5	-43.049468	172.738278	83.24	2.40	85.64
6	-43.049779	172.739593	82.58	2.40	84.98
7	-43.049701	172.739624	82.49	2.40	84.89
8	-43.046795	172.735908	86.18	2.40	88.58

**Name:** PV05

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.057340	172.740785	84.18	2.40	86.58
2	-43.055582	172.744032	84.07	2.40	86.47
3	-43.055098	172.743785	85.22	2.40	87.62
4	-43.052386	172.741268	89.93	2.40	92.33
5	-43.052235	172.740716	90.30	2.40	92.70
6	-43.050519	172.739297	92.83	2.40	95.23
7	-43.050330	172.739721	90.98	2.40	93.38
8	-43.049994	172.739342	93.33	2.40	95.73
9	-43.049829	172.738240	93.84	2.40	96.24
10	-43.049005	172.736870	94.83	2.40	97.23
11	-43.048167	172.735969	95.99	2.40	98.39
12	-43.046790	172.735551	97.80	2.40	100.20
13	-43.046515	172.735189	98.22	2.40	100.62
14	-43.046170	172.735025	98.42	2.40	100.82
15	-43.045965	172.734847	98.76	2.40	101.16
16	-43.046879	172.732786	97.75	2.40	100.15
17	-43.045446	172.731412	100.56	2.40	102.96
18	-43.046275	172.729434	101.05	2.40	103.45
19	-43.057340	172.740785	84.18	2.40	86.58

**Name:** PV06

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.040502	172.730713	99.27	2.40	101.67
2	-43.040632	172.731265	98.65	2.40	101.05
3	-43.041156	172.732427	96.61	2.40	99.01
4	-43.041140	172.733344	96.15	2.40	98.55
5	-43.041653	172.734167	95.01	2.40	97.41
6	-43.041911	172.734922	92.99	2.40	95.39
7	-43.043369	172.735394	91.02	2.40	93.42
8	-43.043803	172.735112	91.11	2.40	93.51
9	-43.043669	172.733969	93.93	2.40	96.33
10	-43.042952	172.733446	95.00	2.40	97.40
11	-43.042572	172.732674	96.46	2.40	98.86
12	-43.041270	172.731022	98.54	2.40	100.94
13	-43.040502	172.730713	99.27	2.40	101.67

**Name:** PV07

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.032677	172.727741	102.92	2.40	105.32
2	-43.033076	172.727922	102.78	2.40	105.18
3	-43.033583	172.727292	102.55	2.40	104.95
4	-43.034748	172.727915	101.02	2.40	103.42
5	-43.034900	172.727172	99.17	2.40	101.57
6	-43.033849	172.724655	107.99	2.40	110.39
7	-43.032100	172.722210	108.19	2.40	110.59
8	-43.031828	172.722424	106.61	2.40	109.01
9	-43.032691	172.723991	106.49	2.40	108.89
10	-43.033043	172.726253	102.35	2.40	104.75
11	-43.032677	172.727741	102.92	2.40	105.32

**Name:** PV08

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.034389	172.725477	101.03	2.40	103.43
2	-43.034812	172.725302	100.44	2.40	102.84
3	-43.035603	172.725923	100.26	2.40	102.66
4	-43.036380	172.727029	101.18	2.40	103.58
5	-43.036527	172.727653	102.05	2.40	104.45
6	-43.035958	172.728596	96.45	2.40	98.85
7	-43.034993	172.728032	99.93	2.40	102.33
8	-43.035146	172.727160	100.00	2.40	102.40
9	-43.034389	172.725477	101.03	2.40	103.43

**Name:** PV09

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.036683	172.727857	102.49	2.40	104.89
2	-43.037131	172.728436	97.62	2.40	100.02
3	-43.037878	172.729230	95.91	2.40	98.31
4	-43.038156	172.729696	94.40	2.40	96.80
5	-43.038287	172.729965	94.04	2.40	96.44
6	-43.036551	172.728972	95.85	2.40	98.25
7	-43.036202	172.728736	96.29	2.40	98.69
8	-43.036683	172.727857	102.49	2.40	104.89

**Name:** PV10

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.032277	172.722068	108.29	2.40	110.69
2	-43.033877	172.724134	112.53	2.40	114.93
3	-43.034297	172.724821	109.19	2.40	111.59
4	-43.035658	172.725716	108.96	2.40	111.36
5	-43.036322	172.726668	104.14	2.40	106.54
6	-43.035792	172.725178	108.69	2.40	111.09
7	-43.032593	172.721747	109.15	2.40	111.55
8	-43.032277	172.722068	108.29	2.40	110.69

**Name:** PV11

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.043880	172.734708	91.21	2.40	93.61
2	-43.044455	172.733302	96.36	2.40	98.76
3	-43.042992	172.731458	99.16	2.40	101.56
4	-43.041304	172.728975	101.46	2.40	103.86
5	-43.040546	172.728424	102.86	2.40	105.26
6	-43.039864	172.727562	104.22	2.40	106.62
7	-43.037960	172.725594	109.08	2.40	111.48
8	-43.036091	172.724460	111.69	2.40	114.09
9	-43.033298	172.721176	116.97	2.40	119.37
10	-43.032690	172.721663	109.04	2.40	111.44
11	-43.035871	172.725056	108.53	2.40	110.93
12	-43.037231	172.728006	105.13	2.40	107.53
13	-43.038092	172.729055	100.67	2.40	103.07
14	-43.038682	172.729954	100.63	2.40	103.03
15	-43.039565	172.729850	101.28	2.40	103.68
16	-43.040179	172.730210	100.09	2.40	102.49
17	-43.040425	172.730503	99.47	2.40	101.87
18	-43.041280	172.730860	98.56	2.40	100.96
19	-43.042722	172.732538	96.36	2.40	98.76
20	-43.043047	172.733289	94.65	2.40	97.05
21	-43.043809	172.733810	95.04	2.40	97.44
22	-43.043880	172.734708	91.21	2.40	93.61

**Name:** PV12

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.033636	172.720890	122.51	2.40	124.91
2	-43.036412	172.723939	117.00	2.40	119.40
3	-43.038225	172.725444	113.52	2.40	115.92
4	-43.040353	172.727415	109.49	2.40	111.89
5	-43.040678	172.728095	108.82	2.40	111.22
6	-43.041208	172.728311	107.84	2.40	110.24
7	-43.042193	172.729544	105.83	2.40	108.23
8	-43.042535	172.730392	104.53	2.40	106.93
9	-43.044684	172.732710	100.67	2.40	103.07
10	-43.046144	172.729327	101.21	2.40	103.61
11	-43.035936	172.718889	120.03	2.40	122.43
12	-43.033636	172.720890	122.51	2.40	124.91

## Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (m)	Height (m)
OP 41	41	-43.073073	172.731003	89.72	1.65
OP 42	42	-43.079995	172.739165	77.26	1.65
OP 43	43	-43.077304	172.745811	73.98	1.65
OP 44	44	-43.078375	172.748972	71.83	1.65
OP 45	45	-43.065576	172.754403	63.74	1.65
OP 46	46	-43.053886	172.728442	90.27	1.65
OP 47	47	-43.044994	172.766797	77.79	1.65
OP 48	48	-43.045377	172.775900	68.55	1.65
OP 49	49	-43.030956	172.744031	116.32	1.65
OP 50	50	-43.050852	172.699879	113.38	1.65
OP 51	51	-43.051171	172.702703	107.75	1.65
OP 52	52	-43.074638	172.713507	96.42	1.65
OP 53	53	-43.071895	172.709494	97.11	1.65
OP 54	54	-43.083386	172.733025	80.47	1.65
OP 55	55	-43.047071	172.780996	65.00	1.65
OP 56	56	-43.071968	172.782301	46.92	1.65
OP 57	57	-43.051588	172.770599	68.38	1.65

# Glare Analysis Results

## Summary of Results No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh	Peak Luminance
			min	hr	min	hr		cd/m <sup>2</sup>
PV01	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV02	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV03	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV04	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV05	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV06	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV07	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV08	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV09	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV10	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV11	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV12	SA tracking	SA tracking	0	0.0	0	0.0	-	0

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0

## PV: PV01 no glare found

*Receptor results ordered by category of glare*

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

### PV01 and OP 41

No glare found

### PV01 and OP 42

No glare found

**PV01 and OP 43**

No glare found

**PV01 and OP 44**

No glare found

**PV01 and OP 45**

No glare found

**PV01 and OP 46**

No glare found

**PV01 and OP 47**

No glare found

**PV01 and OP 48**

No glare found

**PV01 and OP 49**

No glare found

**PV01 and OP 50**

No glare found

**PV01 and OP 51**

No glare found

**PV01 and OP 52**

No glare found

**PV01 and OP 53**

No glare found

**PV01 and OP 54**

No glare found

**PV01 and OP 55**

No glare found

**PV01 and OP 56**

No glare found

## PV01 and OP 57

No glare found

## PV: PV02 no glare found

*Receptor results ordered by category of glare*

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

## PV02 and OP 41

No glare found

## PV02 and OP 42

No glare found

## PV02 and OP 43

No glare found

## PV02 and OP 44

No glare found

## PV02 and OP 45

No glare found

**PV02 and OP 46**

No glare found

**PV02 and OP 47**

No glare found

**PV02 and OP 48**

No glare found

**PV02 and OP 49**

No glare found

**PV02 and OP 50**

No glare found

**PV02 and OP 51**

No glare found

**PV02 and OP 52**

No glare found

**PV02 and OP 53**

No glare found

**PV02 and OP 54**

No glare found

**PV02 and OP 55**

No glare found

**PV02 and OP 56**

No glare found

**PV02 and OP 57**

No glare found

**PV: PV03** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

**PV03 and OP 41**

No glare found

**PV03 and OP 42**

No glare found

**PV03 and OP 43**

No glare found

**PV03 and OP 44**

No glare found

**PV03 and OP 45**

No glare found

**PV03 and OP 46**

No glare found

**PV03 and OP 47**

No glare found

**PV03 and OP 48**

No glare found

**PV03 and OP 49**

No glare found

**PV03 and OP 50**

No glare found

**PV03 and OP 51**

No glare found

**PV03 and OP 52**

No glare found

**PV03 and OP 53**

No glare found

**PV03 and OP 54**

No glare found

**PV03 and OP 55**

No glare found

**PV03 and OP 56**

No glare found

**PV03 and OP 57**

No glare found

**PV: PV04** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

**PV04 and OP 41**

No glare found

**PV04 and OP 42**

No glare found

**PV04 and OP 43**

No glare found

**PV04 and OP 44**

No glare found

**PV04 and OP 45**

No glare found

**PV04 and OP 46**

No glare found

**PV04 and OP 47**

No glare found

**PV04 and OP 48**

No glare found

**PV04 and OP 49**

No glare found

**PV04 and OP 50**

No glare found

**PV04 and OP 51**

No glare found

**PV04 and OP 52**

No glare found

**PV04 and OP 53**

No glare found

**PV04 and OP 54**

No glare found

**PV04 and OP 55**

No glare found

**PV04 and OP 56**

No glare found

**PV04 and OP 57**

No glare found

**PV: PV05** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

**PV05 and OP 41**

No glare found

**PV05 and OP 42**

No glare found

**PV05 and OP 43**

No glare found

**PV05 and OP 44**

No glare found

**PV05 and OP 45**

No glare found

**PV05 and OP 46**

No glare found

**PV05 and OP 47**

No glare found

**PV05 and OP 48**

No glare found

**PV05 and OP 49**

No glare found

**PV05 and OP 50**

No glare found

**PV05 and OP 51**

No glare found

**PV05 and OP 52**

No glare found

**PV05 and OP 53**

No glare found

**PV05 and OP 54**

No glare found

**PV05 and OP 55**

No glare found

**PV05 and OP 56**

No glare found

**PV05 and OP 57**

No glare found

**PV: PV06** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

**PV06 and OP 41**

No glare found

**PV06 and OP 42**

No glare found

**PV06 and OP 43**

No glare found

**PV06 and OP 44**

No glare found

**PV06 and OP 45**

No glare found

**PV06 and OP 46**

No glare found

**PV06 and OP 47**

No glare found

**PV06 and OP 48**

No glare found

**PV06 and OP 49**

No glare found

**PV06 and OP 50**

No glare found

**PV06 and OP 51**

No glare found

**PV06 and OP 52**

No glare found

**PV06 and OP 53**

No glare found

**PV06 and OP 54**

No glare found

**PV06 and OP 55**

No glare found

**PV06 and OP 56**

No glare found

**PV06 and OP 57**

No glare found

**PV: PV07** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

**PV07 and OP 41**

No glare found

**PV07 and OP 42**

No glare found

**PV07 and OP 43**

No glare found

**PV07 and OP 44**

No glare found

**PV07 and OP 45**

No glare found

**PV07 and OP 46**

No glare found

**PV07 and OP 47**

No glare found

**PV07 and OP 48**

No glare found

**PV07 and OP 49**

No glare found

**PV07 and OP 50**

No glare found

**PV07 and OP 51**

No glare found

**PV07 and OP 52**

No glare found

**PV07 and OP 53**

No glare found

**PV07 and OP 54**

No glare found

**PV07 and OP 55**

No glare found

**PV07 and OP 56**

No glare found

**PV07 and OP 57**

No glare found

**PV: PV08** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

**PV08 and OP 41**

No glare found

**PV08 and OP 42**

No glare found

**PV08 and OP 43**

No glare found

**PV08 and OP 44**

No glare found

**PV08 and OP 45**

No glare found

**PV08 and OP 46**

No glare found

**PV08 and OP 47**

No glare found

**PV08 and OP 48**

No glare found

**PV08 and OP 49**

No glare found

**PV08 and OP 50**

No glare found

**PV08 and OP 51**

No glare found

**PV08 and OP 52**

No glare found

**PV08 and OP 53**

No glare found

**PV08 and OP 54**

No glare found

**PV08 and OP 55**

No glare found

**PV08 and OP 56**

No glare found

**PV08 and OP 57**

No glare found

**PV: PV09** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

**PV09 and OP 41**

No glare found

**PV09 and OP 42**

No glare found

**PV09 and OP 43**

No glare found

**PV09 and OP 44**

No glare found

**PV09 and OP 45**

No glare found

**PV09 and OP 46**

No glare found

**PV09 and OP 47**

No glare found

**PV09 and OP 48**

No glare found

**PV09 and OP 49**

No glare found

**PV09 and OP 50**

No glare found

**PV09 and OP 51**

No glare found

**PV09 and OP 52**

No glare found

**PV09 and OP 53**

No glare found

**PV09 and OP 54**

No glare found

**PV09 and OP 55**

No glare found

**PV09 and OP 56**

No glare found

**PV09 and OP 57**

No glare found

**PV: PV10** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

**PV10 and OP 41**

No glare found

**PV10 and OP 42**

No glare found

**PV10 and OP 43**

No glare found

**PV10 and OP 44**

No glare found

**PV10 and OP 45**

No glare found

**PV10 and OP 46**

No glare found

**PV10 and OP 47**

No glare found

**PV10 and OP 48**

No glare found

**PV10 and OP 49**

No glare found

**PV10 and OP 50**

No glare found

**PV10 and OP 51**

No glare found

**PV10 and OP 52**

No glare found

**PV10 and OP 53**

No glare found

**PV10 and OP 54**

No glare found

**PV10 and OP 55**

No glare found

**PV10 and OP 56**

No glare found

**PV10 and OP 57**

No glare found

**PV: PV11** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

**PV11 and OP 41**

No glare found

**PV11 and OP 42**

No glare found

**PV11 and OP 43**

No glare found

**PV11 and OP 44**

No glare found

**PV11 and OP 45**

No glare found

**PV11 and OP 46**

No glare found

**PV11 and OP 47**

No glare found

**PV11 and OP 48**

No glare found

**PV11 and OP 49**

No glare found

**PV11 and OP 50**

No glare found

**PV11 and OP 51**

No glare found

**PV11 and OP 52**

No glare found

**PV11 and OP 53**

No glare found

**PV11 and OP 54**

No glare found

**PV11 and OP 55**

No glare found

**PV11 and OP 56**

No glare found

**PV11 and OP 57**

No glare found

**PV: PV12** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 41	0	0.0	0	0.0	0
OP 42	0	0.0	0	0.0	0
OP 43	0	0.0	0	0.0	0
OP 44	0	0.0	0	0.0	0
OP 45	0	0.0	0	0.0	0
OP 46	0	0.0	0	0.0	0
OP 47	0	0.0	0	0.0	0
OP 48	0	0.0	0	0.0	0
OP 49	0	0.0	0	0.0	0
OP 50	0	0.0	0	0.0	0
OP 51	0	0.0	0	0.0	0
OP 52	0	0.0	0	0.0	0
OP 53	0	0.0	0	0.0	0
OP 54	0	0.0	0	0.0	0
OP 55	0	0.0	0	0.0	0
OP 56	0	0.0	0	0.0	0
OP 57	0	0.0	0	0.0	0

**PV12 and OP 41**

No glare found

**PV12 and OP 42**

No glare found

**PV12 and OP 43**

No glare found

**PV12 and OP 44**

No glare found

**PV12 and OP 45**

No glare found

**PV12 and OP 46**

No glare found

**PV12 and OP 47**

No glare found

**PV12 and OP 48**

No glare found

**PV12 and OP 49**

No glare found

**PV12 and OP 50**

No glare found

**PV12 and OP 51**

No glare found

**PV12 and OP 52**

No glare found

**PV12 and OP 53**

No glare found

**PV12 and OP 54**

No glare found

**PV12 and OP 55**

No glare found

**PV12 and OP 56**

No glare found

**PV12 and OP 57**

No glare found

# Assumptions

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"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at [www.forgesolar.com/help/](http://www.forgesolar.com/help/) for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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# FORGESOLAR GLARE ANALYSIS

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Project: **23072 - Waipara Solar Farm**

144 MWp solar farm northeast of Waipara, New Zealand

Site configuration: **v3 no obstructions 5deg rest OP01-40**

**Client:** Far North Solar Farm

**Created** 29 May, 2024

**Updated** 29 May, 2024

**Time-step** 1 minute

**Timezone offset** UTC12

**Minimum sun altitude** 0.0 deg

**DNI** peaks at 1,000.0 W/m<sup>2</sup>

**Category** 100 MW to 1 GW

**Site ID** 120332.18562

**Ocular transmission coefficient** 0.5

**Pupil diameter** 0.002 m

**Eye focal length** 0.017 m

**Sun subtended angle** 9.3 mrad

**PV analysis methodology** V2

## Summary of Results Glare with potential for temporary after-image predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh	Peak Luminance cd/m <sup>2</sup>
			min	hr	min	hr		
PV01	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV02	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV03	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV04	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV05	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV06	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV07	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV08	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV09	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV10	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV11	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV12	SA tracking	SA tracking	45	0.8	101	1.7	-	1,285,502

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RT01 Car NZ State Hwy 1	0	0.0	0	0.0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0
RT03 Church Rd	0	0.0	0	0.0
RT04 Kathryns Ln	0	0.0	0	0.0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0
RT06 Truck NZ State Hwy 7	45	0.8	101	1.7
RT07 Glenmark Rd South	0	0.0	0	0.0
RT08 McKenzies Rd	0	0.0	0	0.0
RT09 Barnetts Rd	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RT10 Darnley Rd	0	0.0	0	0.0
RT11 Georges Rd	0	0.0	0	0.0
RT12 Mount Cass Rd	0	0.0	0	0.0
RT13 Johnston St	0	0.0	0	0.0
RT14 Glenmark Dr North	0	0.0	0	0.0
RT15 Bain Rd	0	0.0	0	0.0
RT16 Loffhagen Dr	0	0.0	0	0.0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0
RT18 Fergusons Rd	0	0.0	0	0.0
RT19 Symonds Rd	0	0.0	0	0.0
RT20 Rail line	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

# Component Data

## PV Arrays

**Name:** PV01  
**Axis tracking:** Single-axis rotation  
**Backtracking:** Shade  
**Tracking axis orientation:** 0.0°  
**Max tracking angle:** 55.0°  
**Resting angle:** 5.0°  
**Ground Coverage Ratio:** 0.45  
**Rated power:** -  
**Panel material:** Smooth glass with AR coating  
**Reflectivity:** Vary with sun  
**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.055052	172.745710	81.46	2.40	83.86
2	-43.055765	172.744487	83.19	2.40	85.59
3	-43.057218	172.745998	80.44	2.40	82.84
4	-43.056639	172.746992	77.25	2.40	79.65
5	-43.057267	172.746944	75.22	2.40	77.62
6	-43.057943	172.747353	73.29	2.40	75.69
7	-43.058653	172.747471	72.39	2.40	74.79
8	-43.058839	172.747655	72.07	2.40	74.47
9	-43.060338	172.747961	70.78	2.40	73.18
10	-43.061228	172.748494	69.17	2.40	71.57
11	-43.061552	172.748497	69.61	2.40	72.01
12	-43.061547	172.749547	67.67	2.40	70.07
13	-43.060351	172.749434	69.41	2.40	71.81
14	-43.059774	172.749504	67.93	2.40	70.33
15	-43.059253	172.749304	69.71	2.40	72.11
16	-43.058927	172.748911	70.05	2.40	72.45
17	-43.058252	172.748606	72.81	2.40	75.21
18	-43.056549	172.748535	72.50	2.40	74.90
19	-43.056352	172.748358	72.55	2.40	74.95
20	-43.056335	172.747947	73.11	2.40	75.51
21	-43.056447	172.747498	75.25	2.40	77.65
22	-43.055052	172.745710	81.46	2.40	83.86

**Name:** PV02

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.050625	172.739853	90.15	2.40	92.55
2	-43.051854	172.741910	87.82	2.40	90.22
3	-43.052907	172.743304	85.15	2.40	87.55
4	-43.053523	172.743663	83.67	2.40	86.07
5	-43.054875	172.745400	82.18	2.40	84.58
6	-43.055524	172.744253	83.66	2.40	86.06
7	-43.055001	172.743995	84.49	2.40	86.89
8	-43.054742	172.743753	85.54	2.40	87.94
9	-43.054349	172.743351	86.95	2.40	89.35
10	-43.052155	172.741379	90.03	2.40	92.43
11	-43.051999	172.740919	90.50	2.40	92.90
12	-43.050625	172.739853	90.15	2.40	92.55

**Name:** PV03

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.061882	172.744578	77.55	2.40	79.95
2	-43.061888	172.745414	78.09	2.40	80.49
3	-43.062150	172.745979	77.77	2.40	80.17
4	-43.062074	172.747741	76.74	2.40	79.14
5	-43.060645	172.747640	77.68	2.40	80.08
6	-43.059600	172.747158	78.66	2.40	81.06
7	-43.058884	172.747068	80.36	2.40	82.76
8	-43.055866	172.744222	84.04	2.40	86.44
9	-43.057551	172.740985	83.56	2.40	85.96
10	-43.060529	172.743900	79.57	2.40	81.97
11	-43.061882	172.744578	77.55	2.40	79.95

**Name:** PV04

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.046795	172.735908	86.18	2.40	88.58
2	-43.047598	172.736171	85.49	2.40	87.89
3	-43.047928	172.736204	85.75	2.40	88.15
4	-43.049198	172.737731	83.66	2.40	86.06
5	-43.049468	172.738278	83.24	2.40	85.64
6	-43.049779	172.739593	82.58	2.40	84.98
7	-43.049701	172.739624	82.49	2.40	84.89
8	-43.046795	172.735908	86.18	2.40	88.58

**Name:** PV05

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.057340	172.740785	84.18	2.40	86.58
2	-43.055582	172.744032	84.07	2.40	86.47
3	-43.055098	172.743785	85.22	2.40	87.62
4	-43.052386	172.741268	89.93	2.40	92.33
5	-43.052235	172.740716	90.30	2.40	92.70
6	-43.050519	172.739297	92.83	2.40	95.23
7	-43.050330	172.739721	90.98	2.40	93.38
8	-43.049994	172.739342	93.33	2.40	95.73
9	-43.049829	172.738240	93.84	2.40	96.24
10	-43.049005	172.736870	94.83	2.40	97.23
11	-43.048167	172.735969	95.99	2.40	98.39
12	-43.046790	172.735551	97.80	2.40	100.20
13	-43.046515	172.735189	98.22	2.40	100.62
14	-43.046170	172.735025	98.42	2.40	100.82
15	-43.045965	172.734847	98.76	2.40	101.16
16	-43.046879	172.732786	97.75	2.40	100.15
17	-43.045446	172.731412	100.56	2.40	102.96
18	-43.046275	172.729434	101.05	2.40	103.45
19	-43.057340	172.740785	84.18	2.40	86.58

**Name:** PV06

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.040502	172.730713	99.27	2.40	101.67
2	-43.040632	172.731265	98.65	2.40	101.05
3	-43.041156	172.732427	96.61	2.40	99.01
4	-43.041140	172.733344	96.15	2.40	98.55
5	-43.041653	172.734167	95.01	2.40	97.41
6	-43.041911	172.734922	92.99	2.40	95.39
7	-43.043369	172.735394	91.02	2.40	93.42
8	-43.043803	172.735112	91.11	2.40	93.51
9	-43.043669	172.733969	93.93	2.40	96.33
10	-43.042952	172.733446	95.00	2.40	97.40
11	-43.042572	172.732674	96.46	2.40	98.86
12	-43.041270	172.731022	98.54	2.40	100.94
13	-43.040502	172.730713	99.27	2.40	101.67

**Name:** PV07

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.032677	172.727741	102.92	2.40	105.32
2	-43.033076	172.727922	102.78	2.40	105.18
3	-43.033583	172.727292	102.55	2.40	104.95
4	-43.034748	172.727915	101.02	2.40	103.42
5	-43.034900	172.727172	99.17	2.40	101.57
6	-43.033849	172.724655	107.99	2.40	110.39
7	-43.032100	172.722210	108.19	2.40	110.59
8	-43.031828	172.722424	106.61	2.40	109.01
9	-43.032691	172.723991	106.49	2.40	108.89
10	-43.033043	172.726253	102.35	2.40	104.75
11	-43.032677	172.727741	102.92	2.40	105.32

**Name:** PV08

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.034389	172.725477	101.03	2.40	103.43
2	-43.034812	172.725302	100.44	2.40	102.84
3	-43.035603	172.725923	100.26	2.40	102.66
4	-43.036380	172.727029	101.18	2.40	103.58
5	-43.036527	172.727653	102.05	2.40	104.45
6	-43.035958	172.728596	96.45	2.40	98.85
7	-43.034993	172.728032	99.93	2.40	102.33
8	-43.035146	172.727160	100.00	2.40	102.40
9	-43.034389	172.725477	101.03	2.40	103.43

**Name:** PV09

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.036683	172.727857	102.49	2.40	104.89
2	-43.037131	172.728436	97.62	2.40	100.02
3	-43.037878	172.729230	95.91	2.40	98.31
4	-43.038156	172.729696	94.40	2.40	96.80
5	-43.038287	172.729965	94.04	2.40	96.44
6	-43.036551	172.728972	95.85	2.40	98.25
7	-43.036202	172.728736	96.29	2.40	98.69
8	-43.036683	172.727857	102.49	2.40	104.89

**Name:** PV10

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.032277	172.722068	108.29	2.40	110.69
2	-43.033877	172.724134	112.53	2.40	114.93
3	-43.034297	172.724821	109.19	2.40	111.59
4	-43.035658	172.725716	108.96	2.40	111.36
5	-43.036322	172.726668	104.14	2.40	106.54
6	-43.035792	172.725178	108.69	2.40	111.09
7	-43.032593	172.721747	109.15	2.40	111.55
8	-43.032277	172.722068	108.29	2.40	110.69

**Name:** PV11

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.043880	172.734708	91.21	2.40	93.61
2	-43.044455	172.733302	96.36	2.40	98.76
3	-43.042992	172.731458	99.16	2.40	101.56
4	-43.041304	172.728975	101.46	2.40	103.86
5	-43.040546	172.728424	102.86	2.40	105.26
6	-43.039864	172.727562	104.22	2.40	106.62
7	-43.037960	172.725594	109.08	2.40	111.48
8	-43.036091	172.724460	111.69	2.40	114.09
9	-43.033298	172.721176	116.97	2.40	119.37
10	-43.032690	172.721663	109.04	2.40	111.44
11	-43.035871	172.725056	108.53	2.40	110.93
12	-43.037231	172.728006	105.13	2.40	107.53
13	-43.038092	172.729055	100.67	2.40	103.07
14	-43.038682	172.729954	100.63	2.40	103.03
15	-43.039565	172.729850	101.28	2.40	103.68
16	-43.040179	172.730210	100.09	2.40	102.49
17	-43.040425	172.730503	99.47	2.40	101.87
18	-43.041280	172.730860	98.56	2.40	100.96
19	-43.042722	172.732538	96.36	2.40	98.76
20	-43.043047	172.733289	94.65	2.40	97.05
21	-43.043809	172.733810	95.04	2.40	97.44
22	-43.043880	172.734708	91.21	2.40	93.61

**Name:** PV12

**Axis tracking:** Single-axis rotation

**Backtracking:** Shade

**Tracking axis orientation:** 0.0°

**Max tracking angle:** 55.0°

**Resting angle:** 5.0°

**Ground Coverage Ratio:** 0.45

**Rated power:** -

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.033636	172.720890	122.51	2.40	124.91
2	-43.036412	172.723939	117.00	2.40	119.40
3	-43.038225	172.725444	113.52	2.40	115.92
4	-43.040353	172.727415	109.49	2.40	111.89
5	-43.040678	172.728095	108.82	2.40	111.22
6	-43.041208	172.728311	107.84	2.40	110.24
7	-43.042193	172.729544	105.83	2.40	108.23
8	-43.042535	172.730392	104.53	2.40	106.93
9	-43.044684	172.732710	100.67	2.40	103.07
10	-43.046144	172.729327	101.21	2.40	103.61
11	-43.035936	172.718889	120.03	2.40	122.43
12	-43.033636	172.720890	122.51	2.40	124.91

# Route Receptors

**Name:** RT01 Car NZ State Hwy 1

**Path type:** Two-way

**Observer view angle:** 50.0°

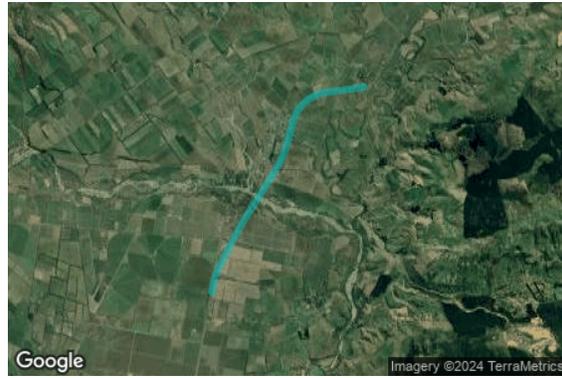


Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.047640	172.783322	61.48	1.50	62.98
2	-43.047938	172.781694	64.74	1.50	66.24
3	-43.048927	172.771820	70.56	1.50	72.06
4	-43.049397	172.770034	71.57	1.50	73.07
5	-43.049805	172.768974	71.76	1.50	73.26
6	-43.050261	172.767948	72.15	1.50	73.65
7	-43.051019	172.766789	72.41	1.50	73.91
8	-43.051866	172.765773	72.66	1.50	74.16
9	-43.052730	172.764921	73.20	1.50	74.70
10	-43.053640	172.764311	73.14	1.50	74.64
11	-43.054586	172.763865	72.57	1.50	74.07
12	-43.059899	172.761815	69.75	1.50	71.25
13	-43.060869	172.761392	70.06	1.50	71.56
14	-43.062006	172.760771	69.62	1.50	71.12
15	-43.063402	172.759856	67.67	1.50	69.17
16	-43.075357	172.749543	71.75	1.50	73.25
17	-43.077404	172.747999	73.59	1.50	75.09
18	-43.080206	172.746046	73.70	1.50	75.20
19	-43.084491	172.743023	73.69	1.50	75.19
20	-43.085900	172.742289	73.44	1.50	74.94
21	-43.086841	172.741922	72.86	1.50	74.36
22	-43.088999	172.741363	72.36	1.50	73.86

Name: RT02 Truck NZ State Hwy 1

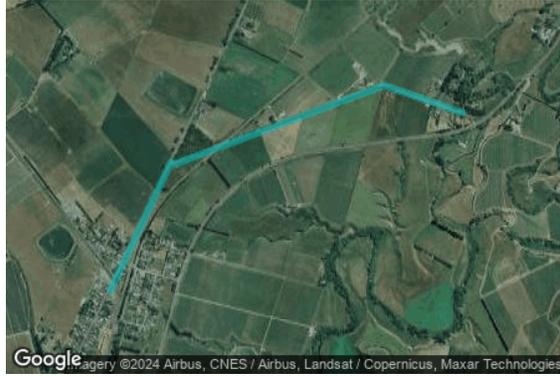
Path type: Two-way

Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.047640	172.783322	61.48	2.50	63.98
2	-43.047938	172.781694	64.74	2.50	67.24
3	-43.048927	172.771820	70.56	2.50	73.06
4	-43.049397	172.770034	71.57	2.50	74.07
5	-43.049805	172.768974	71.76	2.50	74.26
6	-43.050261	172.767948	72.15	2.50	74.65
7	-43.051019	172.766789	72.41	2.50	74.91
8	-43.051866	172.765773	72.66	2.50	75.16
9	-43.052730	172.764921	73.20	2.50	75.70
10	-43.053640	172.764311	73.14	2.50	75.64
11	-43.054586	172.763865	72.57	2.50	75.07
12	-43.059899	172.761815	69.75	2.50	72.25
13	-43.060869	172.761392	70.06	2.50	72.56
14	-43.062006	172.760771	69.62	2.50	72.12
15	-43.063402	172.759856	67.67	2.50	70.17
16	-43.075357	172.749543	71.75	2.50	74.25
17	-43.077404	172.747999	73.59	2.50	76.09
18	-43.080206	172.746046	73.70	2.50	76.20
19	-43.084491	172.743023	73.69	2.50	76.19
20	-43.085900	172.742289	73.44	2.50	75.94
21	-43.086841	172.741922	72.86	2.50	75.36
22	-43.088999	172.741363	72.36	2.50	74.86

**Name:** RT03 Church Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.046801	172.783001	64.62	1.50	66.12
2	-43.045436	172.777597	68.06	1.50	69.56
3	-43.049395	172.763132	76.86	1.50	78.36
4	-43.049310	172.762867	77.20	1.50	78.70
5	-43.055749	172.758706	74.17	1.50	75.67

**Name:** RT04 Kathryn's Ln  
**Path type:** Two-way  
**Observer view angle:** 50.0°

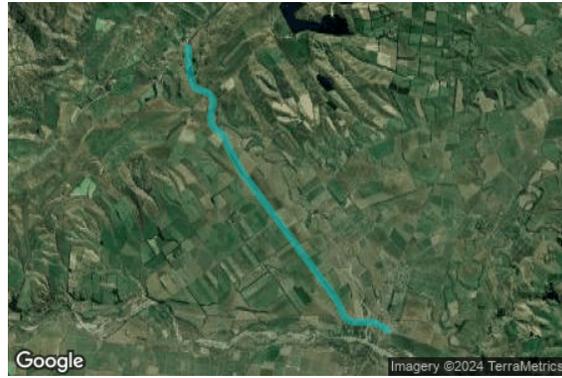


Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.079198	172.746748	73.68	1.50	75.18
2	-43.079364	172.747136	73.29	1.50	74.79
3	-43.079336	172.747368	73.14	1.50	74.64
4	-43.079183	172.747523	73.02	1.50	74.52
5	-43.078863	172.747641	72.85	1.50	74.35
6	-43.078697	172.747914	72.30	1.50	73.80
7	-43.078897	172.748174	72.14	1.50	73.64
8	-43.081460	172.765354	63.01	1.50	64.51

Name: RT05 Car NZ State Hwy 7

Path type: Two-way

Observer view angle: 50.0°

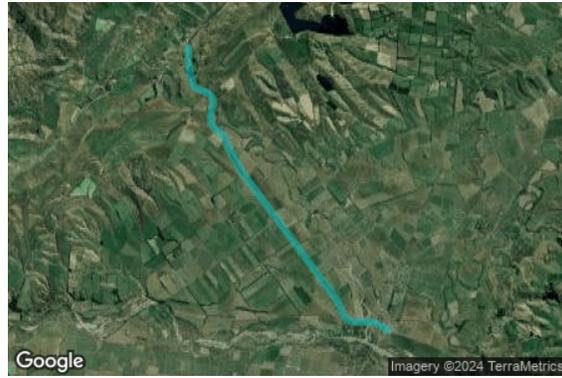


Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.009483	172.702129	167.12	1.50	168.62
2	-43.010371	172.702356	169.47	1.50	170.97
3	-43.011471	172.702087	177.30	1.50	178.80
4	-43.012495	172.702419	168.21	1.50	169.71
5	-43.013837	172.702403	166.06	1.50	167.56
6	-43.016299	172.703198	159.38	1.50	160.88
7	-43.016781	172.703441	158.34	1.50	159.84
8	-43.017413	172.704097	153.96	1.50	155.46
9	-43.017864	172.704982	150.98	1.50	152.48
10	-43.018185	172.706394	147.08	1.50	148.58
11	-43.018592	172.707755	143.09	1.50	144.59
12	-43.019163	172.708525	139.85	1.50	141.35
13	-43.019649	172.708900	137.93	1.50	139.43
14	-43.020494	172.709107	134.81	1.50	136.31
15	-43.023272	172.708425	130.20	1.50	131.70
16	-43.024011	172.708462	131.99	1.50	133.49
17	-43.025035	172.708868	135.29	1.50	136.79
18	-43.025872	172.709732	138.42	1.50	139.92
19	-43.026797	172.711471	139.24	1.50	140.74
20	-43.027455	172.712136	137.49	1.50	138.99
21	-43.029953	172.713574	132.34	1.50	133.84
22	-43.035036	172.717609	122.43	1.50	123.93
23	-43.060591	172.743559	80.35	1.50	81.85
24	-43.063139	172.744907	71.05	1.50	72.55
25	-43.063930	172.745750	68.40	1.50	69.90
26	-43.064440	172.746675	67.26	1.50	68.76
27	-43.064696	172.747957	65.79	1.50	67.29
28	-43.064761	172.753529	64.53	1.50	66.03
29	-43.065976	172.756847	63.61	1.50	65.11
30	-43.066356	172.757310	61.72	1.50	63.22

Name: RT06 Truck NZ State Hwy 7

Path type: Two-way

Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.009483	172.702129	167.12	2.50	169.62
2	-43.010371	172.702356	169.47	2.50	171.97
3	-43.011471	172.702087	177.30	2.50	179.80
4	-43.012495	172.702419	168.21	2.50	170.71
5	-43.013837	172.702403	166.06	2.50	168.56
6	-43.016299	172.703198	159.38	2.50	161.88
7	-43.016781	172.703441	158.34	2.50	160.84
8	-43.017413	172.704097	153.96	2.50	156.46
9	-43.017864	172.704982	150.98	2.50	153.48
10	-43.018185	172.706394	147.08	2.50	149.58
11	-43.018592	172.707755	143.09	2.50	145.59
12	-43.019163	172.708525	139.85	2.50	142.35
13	-43.019649	172.708900	137.93	2.50	140.43
14	-43.020494	172.709107	134.81	2.50	137.31
15	-43.023272	172.708425	130.20	2.50	132.70
16	-43.024011	172.708462	131.99	2.50	134.49
17	-43.025035	172.708868	135.29	2.50	137.79
18	-43.025872	172.709732	138.42	2.50	140.92
19	-43.026797	172.711471	139.24	2.50	141.74
20	-43.027455	172.712136	137.49	2.50	139.99
21	-43.029953	172.713574	132.34	2.50	134.84
22	-43.035036	172.717609	122.43	2.50	124.93
23	-43.060591	172.743559	80.35	2.50	82.85
24	-43.063139	172.744907	71.05	2.50	73.55
25	-43.063930	172.745750	68.40	2.50	70.90
26	-43.064440	172.746675	67.26	2.50	69.76
27	-43.064696	172.747957	65.79	2.50	68.29
28	-43.064761	172.753529	64.53	2.50	67.03
29	-43.065976	172.756847	63.61	2.50	66.11
30	-43.066356	172.757310	61.72	2.50	64.22

**Name:** RT07 Glenmark Rd South

**Path type:** Two-way

**Observer view angle:** 50.0°

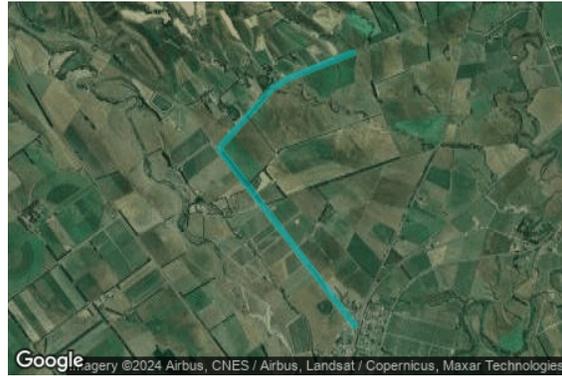


Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.060288	172.756011	74.13	1.50	75.63
2	-43.060907	172.755939	70.85	1.50	72.35
3	-43.064867	172.753843	64.46	1.50	65.96

**Name:** RT08 McKenzies Rd

**Path type:** Two-way

**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.027729	172.758751	111.51	1.50	113.01
2	-43.030355	172.749720	114.37	1.50	115.87
3	-43.031130	172.748102	112.43	1.50	113.93
4	-43.031247	172.747747	110.75	1.50	112.25
5	-43.037078	172.740622	103.78	1.50	105.28
6	-43.037338	172.740525	103.64	1.50	105.14
7	-43.037556	172.740565	103.77	1.50	105.27
8	-43.055151	172.759084	74.31	1.50	75.81

**Name:** RT09 Barnetts Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.064696	172.748470	65.02	1.50	66.52
2	-43.064880	172.748399	64.55	1.50	66.05
3	-43.065219	172.747793	63.22	1.50	64.72
4	-43.065814	172.747233	60.68	1.50	62.18
5	-43.066686	172.746837	61.16	1.50	62.66
6	-43.067029	172.748390	62.08	1.50	63.58
7	-43.067163	172.748978	59.47	1.50	60.97
8	-43.067176	172.749567	58.90	1.50	60.40
9	-43.067084	172.749812	64.34	1.50	65.84
10	-43.065649	172.750343	60.34	1.50	61.84
11	-43.065178	172.750708	61.04	1.50	62.54
12	-43.064880	172.751129	62.57	1.50	64.07
13	-43.064749	172.751151	63.12	1.50	64.62

**Name:** RT10 Darnley Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.068964	172.746292	61.99	1.50	63.49
2	-43.070441	172.746378	63.15	1.50	64.65
3	-43.071355	172.746148	69.30	1.50	70.80
4	-43.080140	172.743689	74.61	1.50	76.11

**Name:** RT11 Georges Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



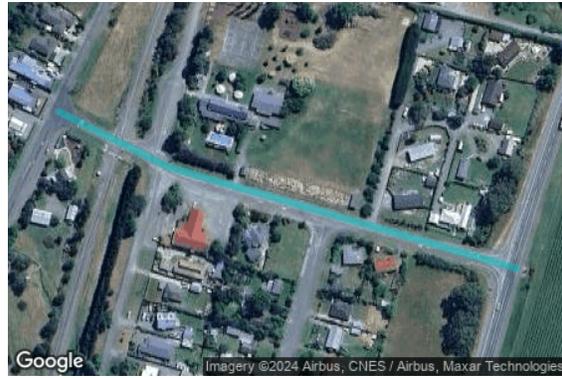
Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.079218	172.746756	73.63	1.50	75.13
2	-43.078885	172.745793	74.17	1.50	75.67
3	-43.078728	172.744904	74.62	1.50	76.12
4	-43.076780	172.713853	95.86	1.50	97.36

**Name:** RT12 Mount Cass Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.074454	172.781710	51.25	1.50	52.75
2	-43.073709	172.779091	48.70	1.50	50.20
3	-43.072022	172.776762	51.50	1.50	53.00
4	-43.069083	172.768290	56.01	1.50	57.51
5	-43.067270	172.760900	59.91	1.50	61.41
6	-43.066779	172.759361	61.32	1.50	62.82
7	-43.066631	172.758594	61.40	1.50	62.90
8	-43.066602	172.757923	61.50	1.50	63.00
9	-43.066368	172.757326	61.73	1.50	63.23

**Name:** RT13 Johnston St  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.054313	172.759633	74.77	1.50	76.27
2	-43.054661	172.760577	73.54	1.50	75.04
3	-43.055297	172.763583	71.91	1.50	73.41

**Name:** RT14 Glenmark Dr North  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.033352	172.772151	78.54	1.50	80.04
2	-43.037092	172.770933	78.08	1.50	79.58
3	-43.049319	172.762870	77.20	1.50	78.70

**Name:** RT15 Bain Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.044167	172.726864	105.53	1.50	107.03
2	-43.052597	172.711293	95.90	1.50	97.40
3	-43.052718	172.710959	96.55	1.50	98.05
4	-43.052737	172.710530	97.08	1.50	98.58
5	-43.052612	172.710165	97.46	1.50	98.96
6	-43.052452	172.709907	97.61	1.50	99.11
7	-43.051259	172.708932	99.70	1.50	101.20
8	-43.050327	172.707404	101.48	1.50	102.98
9	-43.050254	172.707081	102.03	1.50	103.53
10	-43.050190	172.706565	102.79	1.50	104.29
11	-43.049846	172.705412	104.73	1.50	106.23
12	-43.049759	172.704926	105.68	1.50	107.18
13	-43.049732	172.704482	106.63	1.50	108.13
14	-43.049778	172.704115	107.04	1.50	108.54
15	-43.050092	172.703278	108.30	1.50	109.80
16	-43.050145	172.702960	108.85	1.50	110.35
17	-43.050111	172.702577	109.39	1.50	110.89
18	-43.050092	172.701658	112.53	1.50	114.03
19	-43.050490	172.700831	111.27	1.50	112.77
20	-43.050572	172.700467	122.87	1.50	124.37
21	-43.050941	172.699794	113.47	1.50	114.97
22	-43.051168	172.698458	115.21	1.50	116.71
23	-43.051238	172.698127	115.78	1.50	117.28
24	-43.051565	172.697288	117.12	1.50	118.62

**Name:** RT16 Loffhagen Dr  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.054633	172.760494	73.70	1.50	75.20
2	-43.054099	172.760654	74.13	1.50	75.63

**Name:** RT17 Weka Pass Loop Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



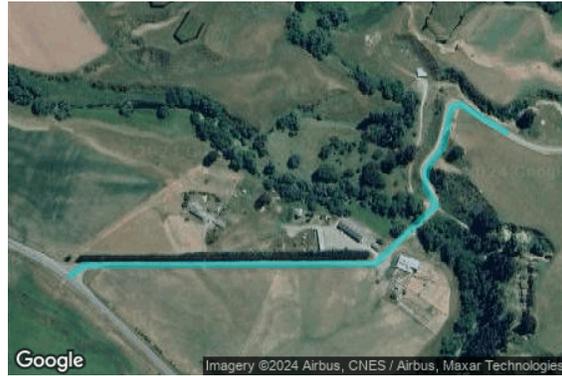
Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.014836	172.702728	164.89	1.50	166.39
2	-43.014700	172.702556	174.48	1.50	175.98
3	-43.014548	172.702453	183.35	1.50	184.85
4	-43.013931	172.701877	175.47	1.50	176.97
5	-43.013704	172.701530	177.99	1.50	179.49
6	-43.013487	172.701070	178.92	1.50	180.42
7	-43.013091	172.700451	181.90	1.50	183.40
8	-43.012699	172.700177	186.48	1.50	187.98
9	-43.012254	172.700207	191.36	1.50	192.86
10	-43.011579	172.700500	198.73	1.50	200.23
11	-43.010888	172.700503	200.00	1.50	201.50
12	-43.010717	172.700402	198.92	1.50	200.42
13	-43.010591	172.700090	196.25	1.50	197.75

**Name:** RT18 Fergusons Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



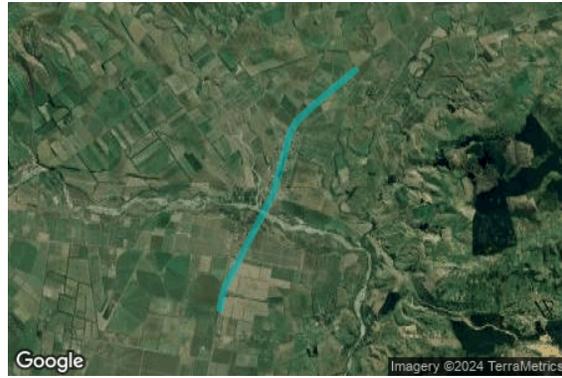
Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.011441	172.700514	199.72	1.50	201.22
2	-43.011966	172.699475	202.76	1.50	204.26
3	-43.012433	172.698601	200.57	1.50	202.07

**Name:** RT19 Symonds Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.072054	172.776819	51.40	1.50	52.90
2	-43.071932	172.777040	51.53	1.50	53.03
3	-43.071914	172.782065	47.83	1.50	49.33
4	-43.071175	172.783129	47.83	1.50	49.33
5	-43.071174	172.783119	47.72	1.50	49.22
6	-43.070954	172.782929	48.45	1.50	49.95
7	-43.070718	172.782958	54.12	1.50	55.62
8	-43.070459	172.783232	59.33	1.50	60.83
9	-43.069952	172.783390	67.46	1.50	68.96
10	-43.069906	172.783527	68.72	1.50	70.22
11	-43.070261	172.784332	78.00	1.50	79.50

**Name:** RT20 Rail line  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.040827	172.778583	69.93	2.50	72.43
2	-43.048332	172.766416	75.57	2.50	78.07
3	-43.050669	172.763067	76.56	2.50	79.06
4	-43.051706	172.761896	76.67	2.50	79.17
5	-43.053352	172.760657	75.59	2.50	78.09
6	-43.065684	172.755918	64.44	2.50	66.94
7	-43.084550	172.742622	73.50	2.50	76.00
8	-43.086146	172.741929	73.67	2.50	76.17
9	-43.088952	172.741239	72.43	2.50	74.93

## Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (m)	Height (m)
OP 1	1	-43.044671	172.734156	95.95	1.65
OP 2	2	-43.043545	172.737405	92.02	1.65
OP 3	3	-43.043789	172.741426	97.24	1.65
OP 4	4	-43.040808	172.739148	102.66	1.65
OP 5	5	-43.033783	172.741254	113.04	1.65
OP 6	6	-43.032584	172.743365	114.49	1.65
OP 7	7	-43.042969	172.747922	92.64	1.65
OP 8	8	-43.035648	172.734629	111.02	1.65
OP 9	9	-43.040860	172.745739	97.23	1.65
OP 10	10	-43.028902	172.743994	145.68	1.65
OP 11	11	-43.030411	172.748518	116.75	1.65
OP 12	12	-43.046139	172.752651	86.11	1.65
OP 13	13	-43.032708	172.738800	124.48	1.65
OP 14	14	-43.050011	172.746651	80.86	1.65
OP 15	15	-43.057682	172.753839	79.08	1.65
OP 16	16	-43.043636	172.715769	111.54	1.65
OP 17	17	-43.046060	172.716090	104.35	1.65
OP 18	18	-43.020438	172.707747	147.73	1.65
OP 19	19	-43.053186	172.757256	85.45	1.65
OP 20	20	-43.053668	172.757745	76.06	1.65
OP 21	21	-43.054268	172.758860	76.74	1.65
OP 22	22	-43.054905	172.759530	74.20	1.65
OP 23	23	-43.055986	172.757695	74.57	1.65
OP 24	24	-43.055561	172.757922	74.63	1.65
OP 25	25	-43.057273	172.756899	75.15	1.65
OP 26	26	-43.057736	172.756751	75.06	1.65
OP 27	27	-43.058011	172.756240	75.58	1.65
OP 28	28	-43.067007	172.773318	54.55	1.65
OP 29	29	-43.058511	172.755986	75.69	1.65
OP 30	30	-43.058972	172.755687	80.88	1.65
OP 31	31	-43.059421	172.755472	75.89	1.65
OP 32	32	-43.063322	172.753999	64.29	1.65
OP 33	33	-43.062592	172.754415	67.11	1.65
OP 34	34	-43.061866	172.754687	68.88	1.65
OP 35	35	-43.060939	172.754559	70.04	1.65
OP 36	36	-43.064996	172.748930	64.73	1.65
OP 37	37	-43.071538	172.746715	75.67	1.65
OP 38	38	-43.065503	172.755240	65.04	1.65
OP 39	39	-43.066090	172.763290	61.03	1.65
OP 40	40	-43.065872	172.753448	59.54	1.65

# Glare Analysis Results

## Summary of Results Glare with potential for temporary after-image predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh	Peak Luminance cd/m <sup>2</sup>
			min	hr	min	hr		
PV01	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV02	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV03	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV04	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV05	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV06	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV07	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV08	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV09	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV10	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV11	SA tracking	SA tracking	0	0.0	0	0.0	-	0
PV12	SA tracking	SA tracking	45	0.8	101	1.7	-	1,285,502

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RT01 Car NZ State Hwy 1	0	0.0	0	0.0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0
RT03 Church Rd	0	0.0	0	0.0
RT04 Kathryns Ln	0	0.0	0	0.0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0
RT06 Truck NZ State Hwy 7	45	0.8	101	1.7

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RT07 Glenmark Rd South	0	0.0	0	0.0
RT08 McKenzies Rd	0	0.0	0	0.0
RT09 Barnetts Rd	0	0.0	0	0.0
RT10 Darnley Rd	0	0.0	0	0.0
RT11 Georges Rd	0	0.0	0	0.0
RT12 Mount Cass Rd	0	0.0	0	0.0
RT13 Johnston St	0	0.0	0	0.0
RT14 Glenmark Dr North	0	0.0	0	0.0
RT15 Bain Rd	0	0.0	0	0.0
RT16 Loffhagen Dr	0	0.0	0	0.0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0
RT18 Fergusons Rd	0	0.0	0	0.0
RT19 Symonds Rd	0	0.0	0	0.0
RT20 Rail line	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

**PV: PV01** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV01 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV01 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV01 and Route: RT03 Church Rd**

No glare found

**PV01 and Route: RT04 Kathryns Ln**

No glare found

**PV01 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV01 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV01 and Route: RT07 Glenmark Rd South**

No glare found

**PV01 and Route: RT08 McKenzies Rd**

No glare found

**PV01 and Route: RT09 Barnetts Rd**

No glare found

**PV01 and Route: RT10 Darnley Rd**

No glare found

**PV01 and Route: RT11 Georges Rd**

No glare found

**PV01 and Route: RT12 Mount Cass Rd**

No glare found

**PV01 and Route: RT13 Johnston St**

No glare found

**PV01 and Route: RT14 Glenmark Dr North**

No glare found

**PV01 and Route: RT15 Bain Rd**

No glare found

**PV01 and Route: RT16 Loffhagen Dr**

No glare found

**PV01 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV01 and Route: RT18 Fergusons Rd**

No glare found

**PV01 and Route: RT19 Symonds Rd**

No glare found

**PV01 and Route: RT20 Rail line**

No glare found

**PV01 and OP 1**

No glare found

**PV01 and OP 2**

No glare found

**PV01 and OP 3**

No glare found

**PV01 and OP 4**

No glare found

**PV01 and OP 5**

No glare found

**PV01 and OP 6**

No glare found

**PV01 and OP 7**

No glare found

**PV01 and OP 8**

No glare found

**PV01 and OP 9**

No glare found

**PV01 and OP 10**

No glare found

**PV01 and OP 11**

No glare found

**PV01 and OP 12**

No glare found

**PV01 and OP 13**

No glare found

**PV01 and OP 14**

No glare found

**PV01 and OP 15**

No glare found

**PV01 and OP 16**

No glare found

**PV01 and OP 17**

No glare found

**PV01 and OP 18**

No glare found

**PV01 and OP 19**

No glare found

**PV01 and OP 20**

No glare found

**PV01 and OP 21**

No glare found

**PV01 and OP 22**

No glare found

**PV01 and OP 23**

No glare found

**PV01 and OP 24**

No glare found

**PV01 and OP 25**

No glare found

**PV01 and OP 26**

No glare found

**PV01 and OP 27**

No glare found

**PV01 and OP 28**

No glare found

**PV01 and OP 29**

No glare found

**PV01 and OP 30**

No glare found

**PV01 and OP 31**

No glare found

**PV01 and OP 32**

No glare found

**PV01 and OP 33**

No glare found

**PV01 and OP 34**

No glare found

**PV01 and OP 35**

No glare found

**PV01 and OP 36**

No glare found

**PV01 and OP 37**

No glare found

**PV01 and OP 38**

No glare found

**PV01 and OP 39**

No glare found

**PV01 and OP 40**

No glare found

**PV: PV02** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV02 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV02 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV02 and Route: RT03 Church Rd**

No glare found

**PV02 and Route: RT04 Kathryns Ln**

No glare found

**PV02 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV02 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV02 and Route: RT07 Glenmark Rd South**

No glare found

**PV02 and Route: RT08 McKenzies Rd**

No glare found

**PV02 and Route: RT09 Barnetts Rd**

No glare found

**PV02 and Route: RT10 Darnley Rd**

No glare found

**PV02 and Route: RT11 Georges Rd**

No glare found

**PV02 and Route: RT12 Mount Cass Rd**

No glare found

**PV02 and Route: RT13 Johnston St**

No glare found

**PV02 and Route: RT14 Glenmark Dr North**

No glare found

**PV02 and Route: RT15 Bain Rd**

No glare found

**PV02 and Route: RT16 Loffhagen Dr**

No glare found

**PV02 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV02 and Route: RT18 Fergusons Rd**

No glare found

**PV02 and Route: RT19 Symonds Rd**

No glare found

**PV02 and Route: RT20 Rail line**

No glare found

**PV02 and OP 1**

No glare found

**PV02 and OP 2**

No glare found

**PV02 and OP 3**

No glare found

**PV02 and OP 4**

No glare found

**PV02 and OP 5**

No glare found

**PV02 and OP 6**

No glare found

**PV02 and OP 7**

No glare found

**PV02 and OP 8**

No glare found

**PV02 and OP 9**

No glare found

**PV02 and OP 10**

No glare found

**PV02 and OP 11**

No glare found

**PV02 and OP 12**

No glare found

**PV02 and OP 13**

No glare found

**PV02 and OP 14**

No glare found

**PV02 and OP 15**

No glare found

**PV02 and OP 16**

No glare found

**PV02 and OP 17**

No glare found

**PV02 and OP 18**

No glare found

**PV02 and OP 19**

No glare found

**PV02 and OP 20**

No glare found

**PV02 and OP 21**

No glare found

**PV02 and OP 22**

No glare found

**PV02 and OP 23**

No glare found

**PV02 and OP 24**

No glare found

**PV02 and OP 25**

No glare found

**PV02 and OP 26**

No glare found

**PV02 and OP 27**

No glare found

**PV02 and OP 28**

No glare found

**PV02 and OP 29**

No glare found

**PV02 and OP 30**

No glare found

**PV02 and OP 31**

No glare found

**PV02 and OP 32**

No glare found

**PV02 and OP 33**

No glare found

**PV02 and OP 34**

No glare found

**PV02 and OP 35**

No glare found

**PV02 and OP 36**

No glare found

**PV02 and OP 37**

No glare found

**PV02 and OP 38**

No glare found

**PV02 and OP 39**

No glare found

**PV02 and OP 40**

No glare found

**PV: PV03** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV03 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV03 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV03 and Route: RT03 Church Rd**

No glare found

**PV03 and Route: RT04 Kathryns Ln**

No glare found

**PV03 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV03 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV03 and Route: RT07 Glenmark Rd South**

No glare found

**PV03 and Route: RT08 McKenzies Rd**

No glare found

**PV03 and Route: RT09 Barnetts Rd**

No glare found

**PV03 and Route: RT10 Darnley Rd**

No glare found

**PV03 and Route: RT11 Georges Rd**

No glare found

**PV03 and Route: RT12 Mount Cass Rd**

No glare found

**PV03 and Route: RT13 Johnston St**

No glare found

**PV03 and Route: RT14 Glenmark Dr North**

No glare found

**PV03 and Route: RT15 Bain Rd**

No glare found

**PV03 and Route: RT16 Loffhagen Dr**

No glare found

**PV03 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV03 and Route: RT18 Fergusons Rd**

No glare found

**PV03 and Route: RT19 Symonds Rd**

No glare found

**PV03 and Route: RT20 Rail line**

No glare found

**PV03 and OP 1**

No glare found

**PV03 and OP 2**

No glare found

**PV03 and OP 3**

No glare found

**PV03 and OP 4**

No glare found

**PV03 and OP 5**

No glare found

**PV03 and OP 6**

No glare found

**PV03 and OP 7**

No glare found

**PV03 and OP 8**

No glare found

**PV03 and OP 9**

No glare found

**PV03 and OP 10**

No glare found

**PV03 and OP 11**

No glare found

**PV03 and OP 12**

No glare found

**PV03 and OP 13**

No glare found

**PV03 and OP 14**

No glare found

**PV03 and OP 15**

No glare found

**PV03 and OP 16**

No glare found

**PV03 and OP 17**

No glare found

**PV03 and OP 18**

No glare found

**PV03 and OP 19**

No glare found

**PV03 and OP 20**

No glare found

**PV03 and OP 21**

No glare found

**PV03 and OP 22**

No glare found

**PV03 and OP 23**

No glare found

**PV03 and OP 24**

No glare found

**PV03 and OP 25**

No glare found

**PV03 and OP 26**

No glare found

**PV03 and OP 27**

No glare found

**PV03 and OP 28**

No glare found

**PV03 and OP 29**

No glare found

**PV03 and OP 30**

No glare found

**PV03 and OP 31**

No glare found

**PV03 and OP 32**

No glare found

**PV03 and OP 33**

No glare found

**PV03 and OP 34**

No glare found

**PV03 and OP 35**

No glare found

**PV03 and OP 36**

No glare found

**PV03 and OP 37**

No glare found

**PV03 and OP 38**

No glare found

**PV03 and OP 39**

No glare found

**PV03 and OP 40**

No glare found

**PV: PV04** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV04 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV04 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV04 and Route: RT03 Church Rd**

No glare found

**PV04 and Route: RT04 Kathryns Ln**

No glare found

**PV04 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV04 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV04 and Route: RT07 Glenmark Rd South**

No glare found

**PV04 and Route: RT08 McKenzies Rd**

No glare found

**PV04 and Route: RT09 Barnetts Rd**

No glare found

**PV04 and Route: RT10 Darnley Rd**

No glare found

**PV04 and Route: RT11 Georges Rd**

No glare found

**PV04 and Route: RT12 Mount Cass Rd**

No glare found

**PV04 and Route: RT13 Johnston St**

No glare found

**PV04 and Route: RT14 Glenmark Dr North**

No glare found

**PV04 and Route: RT15 Bain Rd**

No glare found

**PV04 and Route: RT16 Loffhagen Dr**

No glare found

**PV04 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV04 and Route: RT18 Fergusons Rd**

No glare found

**PV04 and Route: RT19 Symonds Rd**

No glare found

**PV04 and Route: RT20 Rail line**

No glare found

**PV04 and OP 1**

No glare found

**PV04 and OP 2**

No glare found

**PV04 and OP 3**

No glare found

**PV04 and OP 4**

No glare found

**PV04 and OP 5**

No glare found

**PV04 and OP 6**

No glare found

**PV04 and OP 7**

No glare found

**PV04 and OP 8**

No glare found

**PV04 and OP 9**

No glare found

**PV04 and OP 10**

No glare found

**PV04 and OP 11**

No glare found

**PV04 and OP 12**

No glare found

**PV04 and OP 13**

No glare found

**PV04 and OP 14**

No glare found

**PV04 and OP 15**

No glare found

**PV04 and OP 16**

No glare found

**PV04 and OP 17**

No glare found

**PV04 and OP 18**

No glare found

**PV04 and OP 19**

No glare found

**PV04 and OP 20**

No glare found

**PV04 and OP 21**

No glare found

**PV04 and OP 22**

No glare found

**PV04 and OP 23**

No glare found

**PV04 and OP 24**

No glare found

**PV04 and OP 25**

No glare found

**PV04 and OP 26**

No glare found

**PV04 and OP 27**

No glare found

**PV04 and OP 28**

No glare found

**PV04 and OP 29**

No glare found

**PV04 and OP 30**

No glare found

**PV04 and OP 31**

No glare found

**PV04 and OP 32**

No glare found

**PV04 and OP 33**

No glare found

**PV04 and OP 34**

No glare found

**PV04 and OP 35**

No glare found

**PV04 and OP 36**

No glare found

**PV04 and OP 37**

No glare found

**PV04 and OP 38**

No glare found

**PV04 and OP 39**

No glare found

**PV04 and OP 40**

No glare found

**PV: PV05** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV05 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV05 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV05 and Route: RT03 Church Rd**

No glare found

**PV05 and Route: RT04 Kathryns Ln**

No glare found

**PV05 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV05 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV05 and Route: RT07 Glenmark Rd South**

No glare found

**PV05 and Route: RT08 McKenzies Rd**

No glare found

**PV05 and Route: RT09 Barnetts Rd**

No glare found

**PV05 and Route: RT10 Darnley Rd**

No glare found

**PV05 and Route: RT11 Georges Rd**

No glare found

**PV05 and Route: RT12 Mount Cass Rd**

No glare found

**PV05 and Route: RT13 Johnston St**

No glare found

**PV05 and Route: RT14 Glenmark Dr North**

No glare found

**PV05 and Route: RT15 Bain Rd**

No glare found

**PV05 and Route: RT16 Loffhagen Dr**

No glare found

**PV05 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV05 and Route: RT18 Fergusons Rd**

No glare found

**PV05 and Route: RT19 Symonds Rd**

No glare found

**PV05 and Route: RT20 Rail line**

No glare found

**PV05 and OP 1**

No glare found

**PV05 and OP 2**

No glare found

**PV05 and OP 3**

No glare found

**PV05 and OP 4**

No glare found

**PV05 and OP 5**

No glare found

**PV05 and OP 6**

No glare found

**PV05 and OP 7**

No glare found

**PV05 and OP 8**

No glare found

**PV05 and OP 9**

No glare found

**PV05 and OP 10**

No glare found

**PV05 and OP 11**

No glare found

**PV05 and OP 12**

No glare found

**PV05 and OP 13**

No glare found

**PV05 and OP 14**

No glare found

**PV05 and OP 15**

No glare found

**PV05 and OP 16**

No glare found

**PV05 and OP 17**

No glare found

**PV05 and OP 18**

No glare found

**PV05 and OP 19**

No glare found

**PV05 and OP 20**

No glare found

**PV05 and OP 21**

No glare found

**PV05 and OP 22**

No glare found

**PV05 and OP 23**

No glare found

**PV05 and OP 24**

No glare found

**PV05 and OP 25**

No glare found

**PV05 and OP 26**

No glare found

**PV05 and OP 27**

No glare found

**PV05 and OP 28**

No glare found

**PV05 and OP 29**

No glare found

**PV05 and OP 30**

No glare found

**PV05 and OP 31**

No glare found

**PV05 and OP 32**

No glare found

**PV05 and OP 33**

No glare found

**PV05 and OP 34**

No glare found

**PV05 and OP 35**

No glare found

**PV05 and OP 36**

No glare found

**PV05 and OP 37**

No glare found

**PV05 and OP 38**

No glare found

**PV05 and OP 39**

No glare found

**PV05 and OP 40**

No glare found

**PV: PV06** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV06 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV06 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV06 and Route: RT03 Church Rd**

No glare found

**PV06 and Route: RT04 Kathryns Ln**

No glare found

**PV06 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV06 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV06 and Route: RT07 Glenmark Rd South**

No glare found

**PV06 and Route: RT08 McKenzies Rd**

No glare found

**PV06 and Route: RT09 Barnetts Rd**

No glare found

**PV06 and Route: RT10 Darnley Rd**

No glare found

**PV06 and Route: RT11 Georges Rd**

No glare found

**PV06 and Route: RT12 Mount Cass Rd**

No glare found

**PV06 and Route: RT13 Johnston St**

No glare found

**PV06 and Route: RT14 Glenmark Dr North**

No glare found

**PV06 and Route: RT15 Bain Rd**

No glare found

**PV06 and Route: RT16 Loffhagen Dr**

No glare found

**PV06 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV06 and Route: RT18 Fergusons Rd**

No glare found

**PV06 and Route: RT19 Symonds Rd**

No glare found

**PV06 and Route: RT20 Rail line**

No glare found

**PV06 and OP 1**

No glare found

**PV06 and OP 2**

No glare found

**PV06 and OP 3**

No glare found

**PV06 and OP 4**

No glare found

**PV06 and OP 5**

No glare found

**PV06 and OP 6**

No glare found

**PV06 and OP 7**

No glare found

**PV06 and OP 8**

No glare found

**PV06 and OP 9**

No glare found

**PV06 and OP 10**

No glare found

**PV06 and OP 11**

No glare found

**PV06 and OP 12**

No glare found

**PV06 and OP 13**

No glare found

**PV06 and OP 14**

No glare found

**PV06 and OP 15**

No glare found

**PV06 and OP 16**

No glare found

**PV06 and OP 17**

No glare found

**PV06 and OP 18**

No glare found

**PV06 and OP 19**

No glare found

**PV06 and OP 20**

No glare found

**PV06 and OP 21**

No glare found

**PV06 and OP 22**

No glare found

**PV06 and OP 23**

No glare found

**PV06 and OP 24**

No glare found

**PV06 and OP 25**

No glare found

**PV06 and OP 26**

No glare found

**PV06 and OP 27**

No glare found

**PV06 and OP 28**

No glare found

**PV06 and OP 29**

No glare found

**PV06 and OP 30**

No glare found

**PV06 and OP 31**

No glare found

**PV06 and OP 32**

No glare found

**PV06 and OP 33**

No glare found

**PV06 and OP 34**

No glare found

**PV06 and OP 35**

No glare found

**PV06 and OP 36**

No glare found

**PV06 and OP 37**

No glare found

**PV06 and OP 38**

No glare found

**PV06 and OP 39**

No glare found

**PV06 and OP 40**

No glare found

**PV: PV07** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV07 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV07 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV07 and Route: RT03 Church Rd**

No glare found

**PV07 and Route: RT04 Kathryns Ln**

No glare found

**PV07 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV07 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV07 and Route: RT07 Glenmark Rd South**

No glare found

**PV07 and Route: RT08 McKenzies Rd**

No glare found

**PV07 and Route: RT09 Barnetts Rd**

No glare found

**PV07 and Route: RT10 Darnley Rd**

No glare found

**PV07 and Route: RT11 Georges Rd**

No glare found

**PV07 and Route: RT12 Mount Cass Rd**

No glare found

**PV07 and Route: RT13 Johnston St**

No glare found

**PV07 and Route: RT14 Glenmark Dr North**

No glare found

**PV07 and Route: RT15 Bain Rd**

No glare found

**PV07 and Route: RT16 Loffhagen Dr**

No glare found

**PV07 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV07 and Route: RT18 Fergusons Rd**

No glare found

**PV07 and Route: RT19 Symonds Rd**

No glare found

**PV07 and Route: RT20 Rail line**

No glare found

**PV07 and OP 1**

No glare found

**PV07 and OP 2**

No glare found

**PV07 and OP 3**

No glare found

**PV07 and OP 4**

No glare found

**PV07 and OP 5**

No glare found

**PV07 and OP 6**

No glare found

**PV07 and OP 7**

No glare found

**PV07 and OP 8**

No glare found

**PV07 and OP 9**

No glare found

**PV07 and OP 10**

No glare found

**PV07 and OP 11**

No glare found

**PV07 and OP 12**

No glare found

**PV07 and OP 13**

No glare found

**PV07 and OP 14**

No glare found

**PV07 and OP 15**

No glare found

**PV07 and OP 16**

No glare found

**PV07 and OP 17**

No glare found

**PV07 and OP 18**

No glare found

**PV07 and OP 19**

No glare found

**PV07 and OP 20**

No glare found

**PV07 and OP 21**

No glare found

**PV07 and OP 22**

No glare found

**PV07 and OP 23**

No glare found

**PV07 and OP 24**

No glare found

**PV07 and OP 25**

No glare found

**PV07 and OP 26**

No glare found

**PV07 and OP 27**

No glare found

**PV07 and OP 28**

No glare found

**PV07 and OP 29**

No glare found

**PV07 and OP 30**

No glare found

**PV07 and OP 31**

No glare found

**PV07 and OP 32**

No glare found

**PV07 and OP 33**

No glare found

**PV07 and OP 34**

No glare found

**PV07 and OP 35**

No glare found

**PV07 and OP 36**

No glare found

**PV07 and OP 37**

No glare found

**PV07 and OP 38**

No glare found

**PV07 and OP 39**

No glare found

**PV07 and OP 40**

No glare found

**PV: PV08** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV08 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV08 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV08 and Route: RT03 Church Rd**

No glare found

**PV08 and Route: RT04 Kathryns Ln**

No glare found

**PV08 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV08 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV08 and Route: RT07 Glenmark Rd South**

No glare found

**PV08 and Route: RT08 McKenzies Rd**

No glare found

**PV08 and Route: RT09 Barnetts Rd**

No glare found

**PV08 and Route: RT10 Darnley Rd**

No glare found

**PV08 and Route: RT11 Georges Rd**

No glare found

**PV08 and Route: RT12 Mount Cass Rd**

No glare found

**PV08 and Route: RT13 Johnston St**

No glare found

**PV08 and Route: RT14 Glenmark Dr North**

No glare found

**PV08 and Route: RT15 Bain Rd**

No glare found

**PV08 and Route: RT16 Loffhagen Dr**

No glare found

**PV08 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV08 and Route: RT18 Fergusons Rd**

No glare found

**PV08 and Route: RT19 Symonds Rd**

No glare found

**PV08 and Route: RT20 Rail line**

No glare found

**PV08 and OP 1**

No glare found

**PV08 and OP 2**

No glare found

**PV08 and OP 3**

No glare found

**PV08 and OP 4**

No glare found

**PV08 and OP 5**

No glare found

**PV08 and OP 6**

No glare found

**PV08 and OP 7**

No glare found

**PV08 and OP 8**

No glare found

**PV08 and OP 9**

No glare found

**PV08 and OP 10**

No glare found

**PV08 and OP 11**

No glare found

**PV08 and OP 12**

No glare found

**PV08 and OP 13**

No glare found

**PV08 and OP 14**

No glare found

**PV08 and OP 15**

No glare found

**PV08 and OP 16**

No glare found

**PV08 and OP 17**

No glare found

**PV08 and OP 18**

No glare found

**PV08 and OP 19**

No glare found

**PV08 and OP 20**

No glare found

**PV08 and OP 21**

No glare found

**PV08 and OP 22**

No glare found

**PV08 and OP 23**

No glare found

**PV08 and OP 24**

No glare found

**PV08 and OP 25**

No glare found

**PV08 and OP 26**

No glare found

**PV08 and OP 27**

No glare found

**PV08 and OP 28**

No glare found

**PV08 and OP 29**

No glare found

**PV08 and OP 30**

No glare found

**PV08 and OP 31**

No glare found

**PV08 and OP 32**

No glare found

**PV08 and OP 33**

No glare found

**PV08 and OP 34**

No glare found

**PV08 and OP 35**

No glare found

**PV08 and OP 36**

No glare found

**PV08 and OP 37**

No glare found

**PV08 and OP 38**

No glare found

**PV08 and OP 39**

No glare found

**PV08 and OP 40**

No glare found

**PV: PV09** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV09 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV09 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV09 and Route: RT03 Church Rd**

No glare found

**PV09 and Route: RT04 Kathryns Ln**

No glare found

**PV09 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV09 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV09 and Route: RT07 Glenmark Rd South**

No glare found

**PV09 and Route: RT08 McKenzies Rd**

No glare found

**PV09 and Route: RT09 Barnetts Rd**

No glare found

**PV09 and Route: RT10 Darnley Rd**

No glare found

**PV09 and Route: RT11 Georges Rd**

No glare found

**PV09 and Route: RT12 Mount Cass Rd**

No glare found

**PV09 and Route: RT13 Johnston St**

No glare found

**PV09 and Route: RT14 Glenmark Dr North**

No glare found

**PV09 and Route: RT15 Bain Rd**

No glare found

**PV09 and Route: RT16 Loffhagen Dr**

No glare found

**PV09 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV09 and Route: RT18 Fergusons Rd**

No glare found

**PV09 and Route: RT19 Symonds Rd**

No glare found

**PV09 and Route: RT20 Rail line**

No glare found

**PV09 and OP 1**

No glare found

**PV09 and OP 2**

No glare found

**PV09 and OP 3**

No glare found

**PV09 and OP 4**

No glare found

**PV09 and OP 5**

No glare found

**PV09 and OP 6**

No glare found

**PV09 and OP 7**

No glare found

**PV09 and OP 8**

No glare found

**PV09 and OP 9**

No glare found

**PV09 and OP 10**

No glare found

**PV09 and OP 11**

No glare found

**PV09 and OP 12**

No glare found

**PV09 and OP 13**

No glare found

**PV09 and OP 14**

No glare found

**PV09 and OP 15**

No glare found

**PV09 and OP 16**

No glare found

**PV09 and OP 17**

No glare found

**PV09 and OP 18**

No glare found

**PV09 and OP 19**

No glare found

**PV09 and OP 20**

No glare found

**PV09 and OP 21**

No glare found

**PV09 and OP 22**

No glare found

**PV09 and OP 23**

No glare found

**PV09 and OP 24**

No glare found

**PV09 and OP 25**

No glare found

**PV09 and OP 26**

No glare found

**PV09 and OP 27**

No glare found

**PV09 and OP 28**

No glare found

**PV09 and OP 29**

No glare found

**PV09 and OP 30**

No glare found

**PV09 and OP 31**

No glare found

**PV09 and OP 32**

No glare found

**PV09 and OP 33**

No glare found

**PV09 and OP 34**

No glare found

**PV09 and OP 35**

No glare found

**PV09 and OP 36**

No glare found

**PV09 and OP 37**

No glare found

**PV09 and OP 38**

No glare found

**PV09 and OP 39**

No glare found

**PV09 and OP 40**

No glare found

**PV: PV10** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV10 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV10 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV10 and Route: RT03 Church Rd**

No glare found

**PV10 and Route: RT04 Kathryns Ln**

No glare found

**PV10 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV10 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV10 and Route: RT07 Glenmark Rd South**

No glare found

**PV10 and Route: RT08 McKenzies Rd**

No glare found

**PV10 and Route: RT09 Barnetts Rd**

No glare found

**PV10 and Route: RT10 Darnley Rd**

No glare found

**PV10 and Route: RT11 Georges Rd**

No glare found

**PV10 and Route: RT12 Mount Cass Rd**

No glare found

**PV10 and Route: RT13 Johnston St**

No glare found

**PV10 and Route: RT14 Glenmark Dr North**

No glare found

**PV10 and Route: RT15 Bain Rd**

No glare found

**PV10 and Route: RT16 Loffhagen Dr**

No glare found

**PV10 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV10 and Route: RT18 Fergusons Rd**

No glare found

**PV10 and Route: RT19 Symonds Rd**

No glare found

**PV10 and Route: RT20 Rail line**

No glare found

**PV10 and OP 1**

No glare found

**PV10 and OP 2**

No glare found

**PV10 and OP 3**

No glare found

**PV10 and OP 4**

No glare found

**PV10 and OP 5**

No glare found

**PV10 and OP 6**

No glare found

**PV10 and OP 7**

No glare found

**PV10 and OP 8**

No glare found

**PV10 and OP 9**

No glare found

**PV10 and OP 10**

No glare found

**PV10 and OP 11**

No glare found

**PV10 and OP 12**

No glare found

**PV10 and OP 13**

No glare found

**PV10 and OP 14**

No glare found

**PV10 and OP 15**

No glare found

**PV10 and OP 16**

No glare found

**PV10 and OP 17**

No glare found

**PV10 and OP 18**

No glare found

**PV10 and OP 19**

No glare found

**PV10 and OP 20**

No glare found

**PV10 and OP 21**

No glare found

**PV10 and OP 22**

No glare found

**PV10 and OP 23**

No glare found

**PV10 and OP 24**

No glare found

**PV10 and OP 25**

No glare found

**PV10 and OP 26**

No glare found

**PV10 and OP 27**

No glare found

**PV10 and OP 28**

No glare found

**PV10 and OP 29**

No glare found

**PV10 and OP 30**

No glare found

**PV10 and OP 31**

No glare found

**PV10 and OP 32**

No glare found

**PV10 and OP 33**

No glare found

**PV10 and OP 34**

No glare found

**PV10 and OP 35**

No glare found

**PV10 and OP 36**

No glare found

**PV10 and OP 37**

No glare found

**PV10 and OP 38**

No glare found

**PV10 and OP 39**

No glare found

**PV10 and OP 40**

No glare found

**PV: PV11** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV11 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV11 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV11 and Route: RT03 Church Rd**

No glare found

**PV11 and Route: RT04 Kathryns Ln**

No glare found

**PV11 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV11 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV11 and Route: RT07 Glenmark Rd South**

No glare found

**PV11 and Route: RT08 McKenzies Rd**

No glare found

**PV11 and Route: RT09 Barnetts Rd**

No glare found

**PV11 and Route: RT10 Darnley Rd**

No glare found

**PV11 and Route: RT11 Georges Rd**

No glare found

**PV11 and Route: RT12 Mount Cass Rd**

No glare found

**PV11 and Route: RT13 Johnston St**

No glare found

**PV11 and Route: RT14 Glenmark Dr North**

No glare found

**PV11 and Route: RT15 Bain Rd**

No glare found

**PV11 and Route: RT16 Loffhagen Dr**

No glare found

**PV11 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV11 and Route: RT18 Fergusons Rd**

No glare found

**PV11 and Route: RT19 Symonds Rd**

No glare found

**PV11 and Route: RT20 Rail line**

No glare found

**PV11 and OP 1**

No glare found

**PV11 and OP 2**

No glare found

**PV11 and OP 3**

No glare found

**PV11 and OP 4**

No glare found

**PV11 and OP 5**

No glare found

**PV11 and OP 6**

No glare found

**PV11 and OP 7**

No glare found

**PV11 and OP 8**

No glare found

**PV11 and OP 9**

No glare found

**PV11 and OP 10**

No glare found

**PV11 and OP 11**

No glare found

**PV11 and OP 12**

No glare found

**PV11 and OP 13**

No glare found

**PV11 and OP 14**

No glare found

**PV11 and OP 15**

No glare found

**PV11 and OP 16**

No glare found

**PV11 and OP 17**

No glare found

**PV11 and OP 18**

No glare found

**PV11 and OP 19**

No glare found

**PV11 and OP 20**

No glare found

**PV11 and OP 21**

No glare found

**PV11 and OP 22**

No glare found

**PV11 and OP 23**

No glare found

**PV11 and OP 24**

No glare found

**PV11 and OP 25**

No glare found

**PV11 and OP 26**

No glare found

**PV11 and OP 27**

No glare found

**PV11 and OP 28**

No glare found

**PV11 and OP 29**

No glare found

**PV11 and OP 30**

No glare found

**PV11 and OP 31**

No glare found

**PV11 and OP 32**

No glare found

**PV11 and OP 33**

No glare found

**PV11 and OP 34**

No glare found

**PV11 and OP 35**

No glare found

**PV11 and OP 36**

No glare found

**PV11 and OP 37**

No glare found

**PV11 and OP 38**

No glare found

**PV11 and OP 39**

No glare found

**PV11 and OP 40**

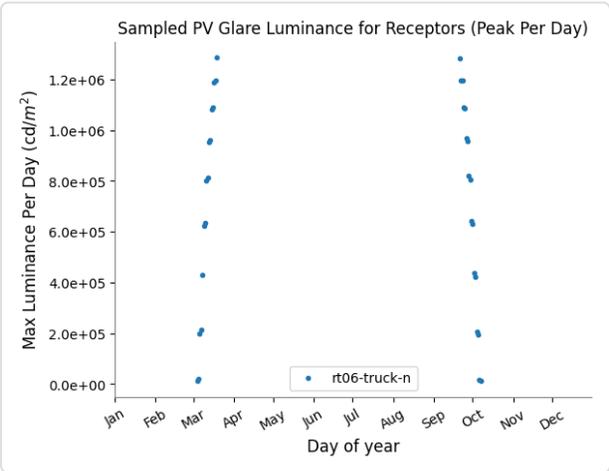
No glare found

**PV: PV12** potential temporary after-image

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT06 Truck NZ State Hwy 7	45	0.8	101	1.7	1,285,502
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0

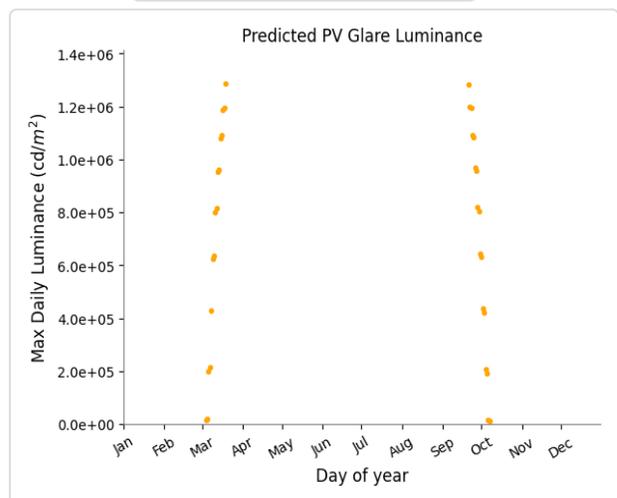
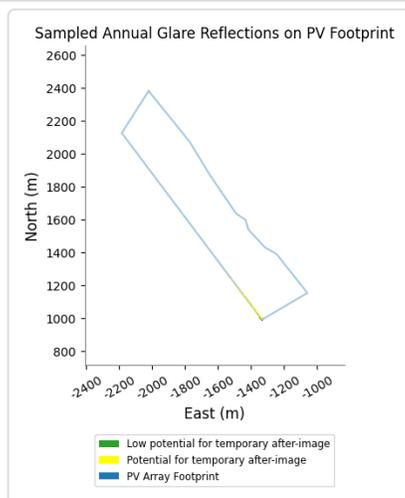
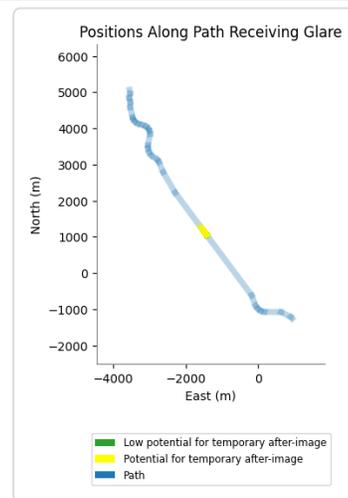
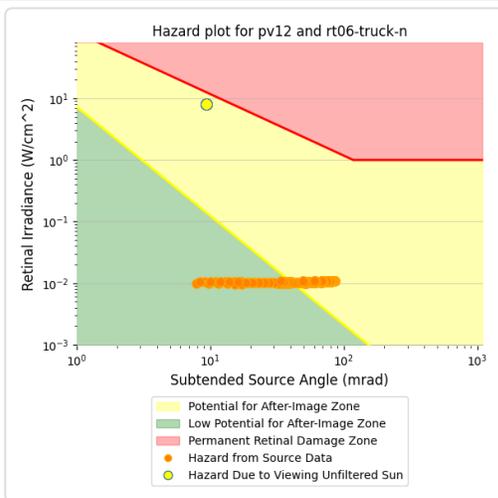
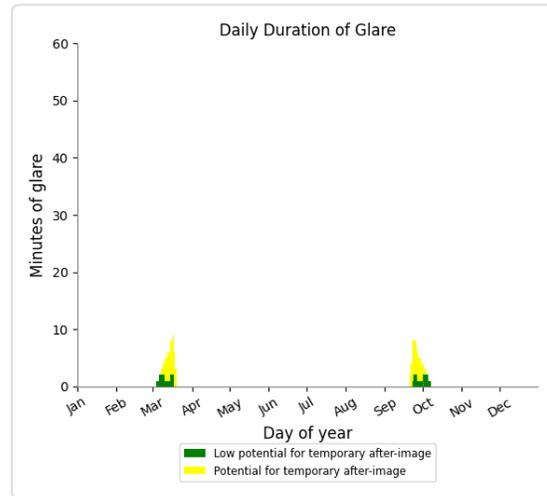
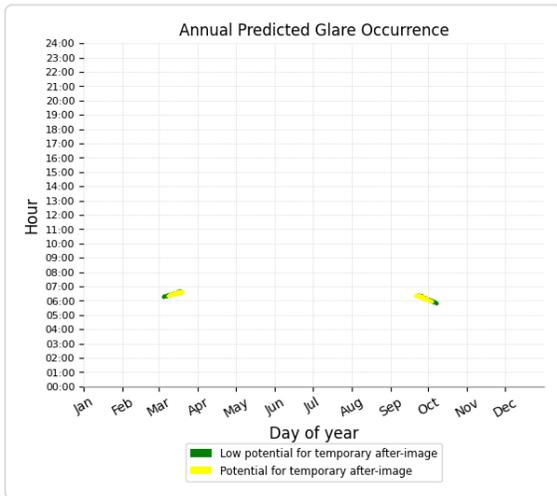
Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0



## PV12 and Route: RT06 Truck NZ State Hwy 7

Yellow glare: 101 min.

Green glare: 45 min.



## PV12 and Route: RT01 Car NZ State Hwy 1

No glare found

**PV12 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV12 and Route: RT03 Church Rd**

No glare found

**PV12 and Route: RT04 Kathryns Ln**

No glare found

**PV12 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV12 and Route: RT07 Glenmark Rd South**

No glare found

**PV12 and Route: RT08 McKenzies Rd**

No glare found

**PV12 and Route: RT09 Barnetts Rd**

No glare found

**PV12 and Route: RT10 Darnley Rd**

No glare found

**PV12 and Route: RT11 Georges Rd**

No glare found

**PV12 and Route: RT12 Mount Cass Rd**

No glare found

**PV12 and Route: RT13 Johnston St**

No glare found

**PV12 and Route: RT14 Glenmark Dr North**

No glare found

**PV12 and Route: RT15 Bain Rd**

No glare found

**PV12 and Route: RT16 Loffhagen Dr**

No glare found

**PV12 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV12 and Route: RT18 Fergusons Rd**

No glare found

**PV12 and Route: RT19 Symonds Rd**

No glare found

**PV12 and Route: RT20 Rail line**

No glare found

**PV12 and OP 1**

No glare found

**PV12 and OP 2**

No glare found

**PV12 and OP 3**

No glare found

**PV12 and OP 4**

No glare found

**PV12 and OP 5**

No glare found

**PV12 and OP 6**

No glare found

**PV12 and OP 7**

No glare found

**PV12 and OP 8**

No glare found

**PV12 and OP 9**

No glare found

**PV12 and OP 10**

No glare found

**PV12 and OP 11**

No glare found

**PV12 and OP 12**

No glare found

**PV12 and OP 13**

No glare found

**PV12 and OP 14**

No glare found

**PV12 and OP 15**

No glare found

**PV12 and OP 16**

No glare found

**PV12 and OP 17**

No glare found

**PV12 and OP 18**

No glare found

**PV12 and OP 19**

No glare found

**PV12 and OP 20**

No glare found

**PV12 and OP 21**

No glare found

**PV12 and OP 22**

No glare found

**PV12 and OP 23**

No glare found

**PV12 and OP 24**

No glare found

**PV12 and OP 25**

No glare found

**PV12 and OP 26**

No glare found

**PV12 and OP 27**

No glare found

**PV12 and OP 28**

No glare found

**PV12 and OP 29**

No glare found

**PV12 and OP 30**

No glare found

**PV12 and OP 31**

No glare found

**PV12 and OP 32**

No glare found

**PV12 and OP 33**

No glare found

**PV12 and OP 34**

No glare found

**PV12 and OP 35**

No glare found

**PV12 and OP 36**

No glare found

**PV12 and OP 37**

No glare found

**PV12 and OP 38**

No glare found

## PV12 and OP 39

No glare found

## PV12 and OP 40

No glare found

# Assumptions

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"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at [www.forgesolar.com/help/](http://www.forgesolar.com/help/) for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians



# FORGESOLAR GLARE ANALYSIS

Project: **23072 - Waipara Solar Farm**

144 MWp solar farm northeast of Waipara, New Zealand

Site configuration: **v3 no obstructions 10deg rest OP01-40**

**Client:** Far North Solar Farm

**Created** 29 May, 2024

**Updated** 29 May, 2024

**Time-step** 1 minute

**Timezone offset** UTC12

**Minimum sun altitude** 0.0 deg

**DNI** peaks at 1,000.0 W/m<sup>2</sup>

**Category** 100 MW to 1 GW

**Site ID** 120340.18562

**Ocular transmission coefficient** 0.5

**Pupil diameter** 0.002 m

**Eye focal length** 0.017 m

**Sun subtended angle** 9.3 mrad

**PV analysis methodology** V2

## Summary of Results No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh	Peak Luminance cd/m <sup>2</sup>
			min	hr	min	hr		
PV12	SA tracking	SA tracking	0	0.0	0	0.0	-	0

*Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.*

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RT01 Car NZ State Hwy 1	0	0.0	0	0.0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0
RT03 Church Rd	0	0.0	0	0.0
RT04 Kathryns Ln	0	0.0	0	0.0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0
RT07 Glenmark Rd South	0	0.0	0	0.0
RT08 McKenzies Rd	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RT09 Barnetts Rd	0	0.0	0	0.0
RT10 Darnley Rd	0	0.0	0	0.0
RT11 Georges Rd	0	0.0	0	0.0
RT12 Mount Cass Rd	0	0.0	0	0.0
RT13 Johnston St	0	0.0	0	0.0
RT14 Glenmark Dr North	0	0.0	0	0.0
RT15 Bain Rd	0	0.0	0	0.0
RT16 Loffhagen Dr	0	0.0	0	0.0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0
RT18 Fergusons Rd	0	0.0	0	0.0
RT19 Symonds Rd	0	0.0	0	0.0
RT20 Rail line	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

# Component Data

## PV Arrays

**Name:** PV12  
**Axis tracking:** Single-axis rotation  
**Backtracking:** Shade  
**Tracking axis orientation:** 0.0°  
**Max tracking angle:** 55.0°  
**Resting angle:** 10.0°  
**Ground Coverage Ratio:** 0.45  
**Rated power:** -  
**Panel material:** Smooth glass with AR coating  
**Reflectivity:** Vary with sun  
**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.033636	172.720890	122.51	2.40	124.91
2	-43.036412	172.723939	117.00	2.40	119.40
3	-43.038225	172.725444	113.52	2.40	115.92
4	-43.040353	172.727415	109.49	2.40	111.89
5	-43.040678	172.728095	108.82	2.40	111.22
6	-43.041208	172.728311	107.84	2.40	110.24
7	-43.042193	172.729544	105.83	2.40	108.23
8	-43.042535	172.730392	104.53	2.40	106.93
9	-43.044684	172.732710	100.67	2.40	103.07
10	-43.046144	172.729327	101.21	2.40	103.61
11	-43.035936	172.718889	120.03	2.40	122.43
12	-43.033636	172.720890	122.51	2.40	124.91

# Route Receptors

**Name:** RT01 Car NZ State Hwy 1

**Path type:** Two-way

**Observer view angle:** 50.0°

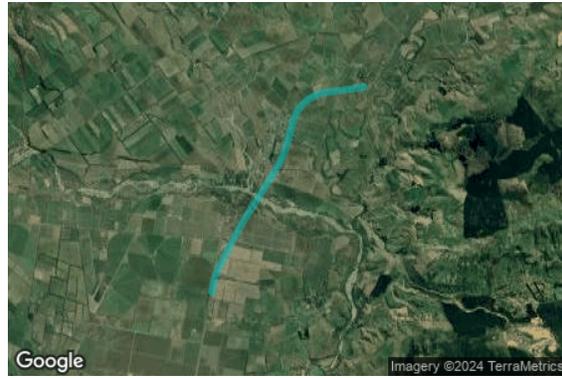


Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.047640	172.783322	61.48	1.50	62.98
2	-43.047938	172.781694	64.74	1.50	66.24
3	-43.048927	172.771820	70.56	1.50	72.06
4	-43.049397	172.770034	71.57	1.50	73.07
5	-43.049805	172.768974	71.76	1.50	73.26
6	-43.050261	172.767948	72.15	1.50	73.65
7	-43.051019	172.766789	72.41	1.50	73.91
8	-43.051866	172.765773	72.66	1.50	74.16
9	-43.052730	172.764921	73.20	1.50	74.70
10	-43.053640	172.764311	73.14	1.50	74.64
11	-43.054586	172.763865	72.57	1.50	74.07
12	-43.059899	172.761815	69.75	1.50	71.25
13	-43.060869	172.761392	70.06	1.50	71.56
14	-43.062006	172.760771	69.62	1.50	71.12
15	-43.063402	172.759856	67.67	1.50	69.17
16	-43.075357	172.749543	71.75	1.50	73.25
17	-43.077404	172.747999	73.59	1.50	75.09
18	-43.080206	172.746046	73.70	1.50	75.20
19	-43.084491	172.743023	73.69	1.50	75.19
20	-43.085900	172.742289	73.44	1.50	74.94
21	-43.086841	172.741922	72.86	1.50	74.36
22	-43.088999	172.741363	72.36	1.50	73.86

Name: RT02 Truck NZ State Hwy 1

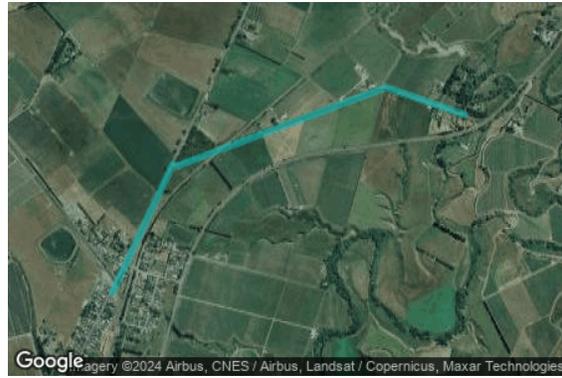
Path type: Two-way

Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.047640	172.783322	61.48	2.50	63.98
2	-43.047938	172.781694	64.74	2.50	67.24
3	-43.048927	172.771820	70.56	2.50	73.06
4	-43.049397	172.770034	71.57	2.50	74.07
5	-43.049805	172.768974	71.76	2.50	74.26
6	-43.050261	172.767948	72.15	2.50	74.65
7	-43.051019	172.766789	72.41	2.50	74.91
8	-43.051866	172.765773	72.66	2.50	75.16
9	-43.052730	172.764921	73.20	2.50	75.70
10	-43.053640	172.764311	73.14	2.50	75.64
11	-43.054586	172.763865	72.57	2.50	75.07
12	-43.059899	172.761815	69.75	2.50	72.25
13	-43.060869	172.761392	70.06	2.50	72.56
14	-43.062006	172.760771	69.62	2.50	72.12
15	-43.063402	172.759856	67.67	2.50	70.17
16	-43.075357	172.749543	71.75	2.50	74.25
17	-43.077404	172.747999	73.59	2.50	76.09
18	-43.080206	172.746046	73.70	2.50	76.20
19	-43.084491	172.743023	73.69	2.50	76.19
20	-43.085900	172.742289	73.44	2.50	75.94
21	-43.086841	172.741922	72.86	2.50	75.36
22	-43.088999	172.741363	72.36	2.50	74.86

**Name:** RT03 Church Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.046801	172.783001	64.62	1.50	66.12
2	-43.045436	172.777597	68.06	1.50	69.56
3	-43.049395	172.763132	76.86	1.50	78.36
4	-43.049310	172.762867	77.20	1.50	78.70
5	-43.055749	172.758706	74.17	1.50	75.67

**Name:** RT04 Kathryn's Ln  
**Path type:** Two-way  
**Observer view angle:** 50.0°

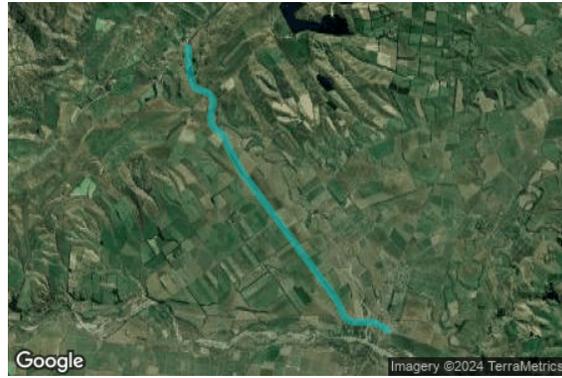


Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.079198	172.746748	73.68	1.50	75.18
2	-43.079364	172.747136	73.29	1.50	74.79
3	-43.079336	172.747368	73.14	1.50	74.64
4	-43.079183	172.747523	73.02	1.50	74.52
5	-43.078863	172.747641	72.85	1.50	74.35
6	-43.078697	172.747914	72.30	1.50	73.80
7	-43.078897	172.748174	72.14	1.50	73.64
8	-43.081460	172.765354	63.01	1.50	64.51

Name: RT05 Car NZ State Hwy 7

Path type: Two-way

Observer view angle: 50.0°

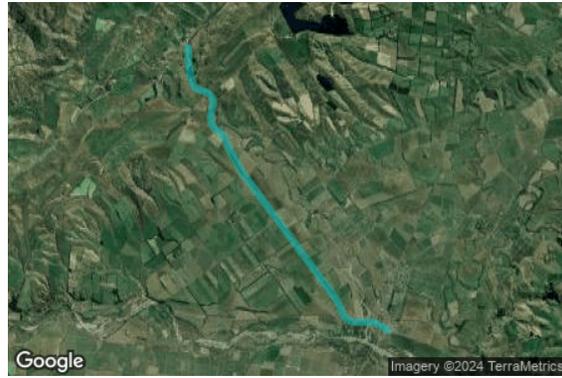


Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.009483	172.702129	167.12	1.50	168.62
2	-43.010371	172.702356	169.47	1.50	170.97
3	-43.011471	172.702087	177.30	1.50	178.80
4	-43.012495	172.702419	168.21	1.50	169.71
5	-43.013837	172.702403	166.06	1.50	167.56
6	-43.016299	172.703198	159.38	1.50	160.88
7	-43.016781	172.703441	158.34	1.50	159.84
8	-43.017413	172.704097	153.96	1.50	155.46
9	-43.017864	172.704982	150.98	1.50	152.48
10	-43.018185	172.706394	147.08	1.50	148.58
11	-43.018592	172.707755	143.09	1.50	144.59
12	-43.019163	172.708525	139.85	1.50	141.35
13	-43.019649	172.708900	137.93	1.50	139.43
14	-43.020494	172.709107	134.81	1.50	136.31
15	-43.023272	172.708425	130.20	1.50	131.70
16	-43.024011	172.708462	131.99	1.50	133.49
17	-43.025035	172.708868	135.29	1.50	136.79
18	-43.025872	172.709732	138.42	1.50	139.92
19	-43.026797	172.711471	139.24	1.50	140.74
20	-43.027455	172.712136	137.49	1.50	138.99
21	-43.029953	172.713574	132.34	1.50	133.84
22	-43.035036	172.717609	122.43	1.50	123.93
23	-43.060591	172.743559	80.35	1.50	81.85
24	-43.063139	172.744907	71.05	1.50	72.55
25	-43.063930	172.745750	68.40	1.50	69.90
26	-43.064440	172.746675	67.26	1.50	68.76
27	-43.064696	172.747957	65.79	1.50	67.29
28	-43.064761	172.753529	64.53	1.50	66.03
29	-43.065976	172.756847	63.61	1.50	65.11
30	-43.066356	172.757310	61.72	1.50	63.22

Name: RT06 Truck NZ State Hwy 7

Path type: Two-way

Observer view angle: 50.0°

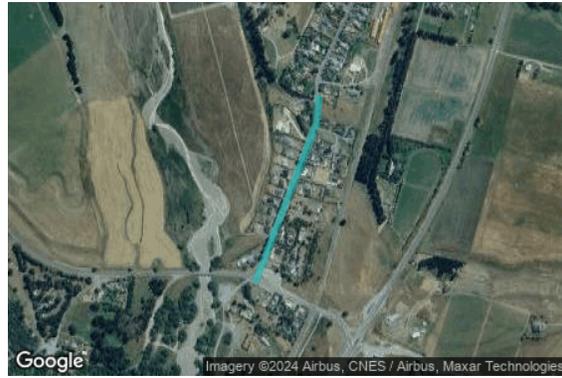


Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.009483	172.702129	167.12	2.50	169.62
2	-43.010371	172.702356	169.47	2.50	171.97
3	-43.011471	172.702087	177.30	2.50	179.80
4	-43.012495	172.702419	168.21	2.50	170.71
5	-43.013837	172.702403	166.06	2.50	168.56
6	-43.016299	172.703198	159.38	2.50	161.88
7	-43.016781	172.703441	158.34	2.50	160.84
8	-43.017413	172.704097	153.96	2.50	156.46
9	-43.017864	172.704982	150.98	2.50	153.48
10	-43.018185	172.706394	147.08	2.50	149.58
11	-43.018592	172.707755	143.09	2.50	145.59
12	-43.019163	172.708525	139.85	2.50	142.35
13	-43.019649	172.708900	137.93	2.50	140.43
14	-43.020494	172.709107	134.81	2.50	137.31
15	-43.023272	172.708425	130.20	2.50	132.70
16	-43.024011	172.708462	131.99	2.50	134.49
17	-43.025035	172.708868	135.29	2.50	137.79
18	-43.025872	172.709732	138.42	2.50	140.92
19	-43.026797	172.711471	139.24	2.50	141.74
20	-43.027455	172.712136	137.49	2.50	139.99
21	-43.029953	172.713574	132.34	2.50	134.84
22	-43.035036	172.717609	122.43	2.50	124.93
23	-43.060591	172.743559	80.35	2.50	82.85
24	-43.063139	172.744907	71.05	2.50	73.55
25	-43.063930	172.745750	68.40	2.50	70.90
26	-43.064440	172.746675	67.26	2.50	69.76
27	-43.064696	172.747957	65.79	2.50	68.29
28	-43.064761	172.753529	64.53	2.50	67.03
29	-43.065976	172.756847	63.61	2.50	66.11
30	-43.066356	172.757310	61.72	2.50	64.22

**Name:** RT07 Glenmark Rd South

**Path type:** Two-way

**Observer view angle:** 50.0°

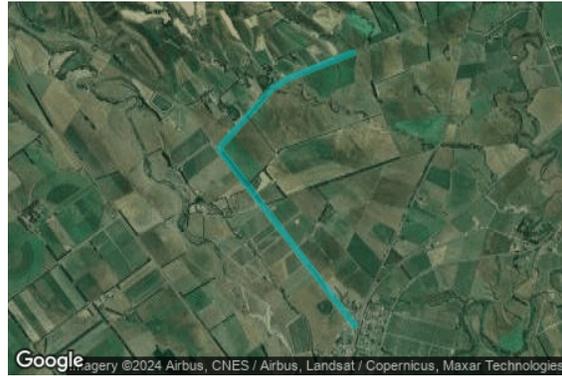


Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.060288	172.756011	74.13	1.50	75.63
2	-43.060907	172.755939	70.85	1.50	72.35
3	-43.064867	172.753843	64.46	1.50	65.96

**Name:** RT08 McKenzies Rd

**Path type:** Two-way

**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.027729	172.758751	111.51	1.50	113.01
2	-43.030355	172.749720	114.37	1.50	115.87
3	-43.031130	172.748102	112.43	1.50	113.93
4	-43.031247	172.747747	110.75	1.50	112.25
5	-43.037078	172.740622	103.78	1.50	105.28
6	-43.037338	172.740525	103.64	1.50	105.14
7	-43.037556	172.740565	103.77	1.50	105.27
8	-43.055151	172.759084	74.31	1.50	75.81

**Name:** RT09 Barnetts Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.064696	172.748470	65.02	1.50	66.52
2	-43.064880	172.748399	64.55	1.50	66.05
3	-43.065219	172.747793	63.22	1.50	64.72
4	-43.065814	172.747233	60.68	1.50	62.18
5	-43.066686	172.746837	61.16	1.50	62.66
6	-43.067029	172.748390	62.08	1.50	63.58
7	-43.067163	172.748978	59.47	1.50	60.97
8	-43.067176	172.749567	58.90	1.50	60.40
9	-43.067084	172.749812	64.34	1.50	65.84
10	-43.065649	172.750343	60.34	1.50	61.84
11	-43.065178	172.750708	61.04	1.50	62.54
12	-43.064880	172.751129	62.57	1.50	64.07
13	-43.064749	172.751151	63.12	1.50	64.62

**Name:** RT10 Darnley Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.068964	172.746292	61.99	1.50	63.49
2	-43.070441	172.746378	63.15	1.50	64.65
3	-43.071355	172.746148	69.30	1.50	70.80
4	-43.080140	172.743689	74.61	1.50	76.11

**Name:** RT11 Georges Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



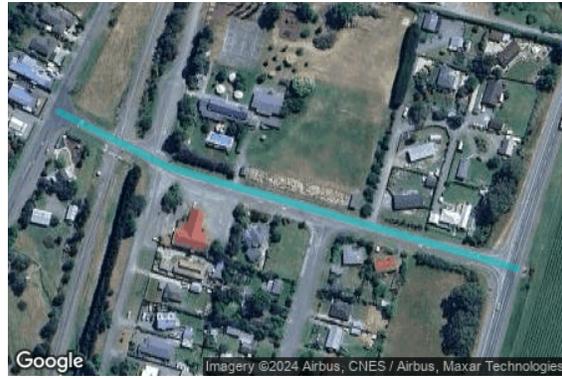
Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.079218	172.746756	73.63	1.50	75.13
2	-43.078885	172.745793	74.17	1.50	75.67
3	-43.078728	172.744904	74.62	1.50	76.12
4	-43.076780	172.713853	95.86	1.50	97.36

**Name:** RT12 Mount Cass Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.074454	172.781710	51.25	1.50	52.75
2	-43.073709	172.779091	48.70	1.50	50.20
3	-43.072022	172.776762	51.50	1.50	53.00
4	-43.069083	172.768290	56.01	1.50	57.51
5	-43.067270	172.760900	59.91	1.50	61.41
6	-43.066779	172.759361	61.32	1.50	62.82
7	-43.066631	172.758594	61.40	1.50	62.90
8	-43.066602	172.757923	61.50	1.50	63.00
9	-43.066368	172.757326	61.73	1.50	63.23

**Name:** RT13 Johnston St  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.054313	172.759633	74.77	1.50	76.27
2	-43.054661	172.760577	73.54	1.50	75.04
3	-43.055297	172.763583	71.91	1.50	73.41

**Name:** RT14 Glenmark Dr North  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.033352	172.772151	78.54	1.50	80.04
2	-43.037092	172.770933	78.08	1.50	79.58
3	-43.049319	172.762870	77.20	1.50	78.70

**Name:** RT15 Bain Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.044167	172.726864	105.53	1.50	107.03
2	-43.052597	172.711293	95.90	1.50	97.40
3	-43.052718	172.710959	96.55	1.50	98.05
4	-43.052737	172.710530	97.08	1.50	98.58
5	-43.052612	172.710165	97.46	1.50	98.96
6	-43.052452	172.709907	97.61	1.50	99.11
7	-43.051259	172.708932	99.70	1.50	101.20
8	-43.050327	172.707404	101.48	1.50	102.98
9	-43.050254	172.707081	102.03	1.50	103.53
10	-43.050190	172.706565	102.79	1.50	104.29
11	-43.049846	172.705412	104.73	1.50	106.23
12	-43.049759	172.704926	105.68	1.50	107.18
13	-43.049732	172.704482	106.63	1.50	108.13
14	-43.049778	172.704115	107.04	1.50	108.54
15	-43.050092	172.703278	108.30	1.50	109.80
16	-43.050145	172.702960	108.85	1.50	110.35
17	-43.050111	172.702577	109.39	1.50	110.89
18	-43.050092	172.701658	112.53	1.50	114.03
19	-43.050490	172.700831	111.27	1.50	112.77
20	-43.050572	172.700467	122.87	1.50	124.37
21	-43.050941	172.699794	113.47	1.50	114.97
22	-43.051168	172.698458	115.21	1.50	116.71
23	-43.051238	172.698127	115.78	1.50	117.28
24	-43.051565	172.697288	117.12	1.50	118.62

**Name:** RT16 Loffhagen Dr  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.054633	172.760494	73.70	1.50	75.20
2	-43.054099	172.760654	74.13	1.50	75.63

**Name:** RT17 Weka Pass Loop Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



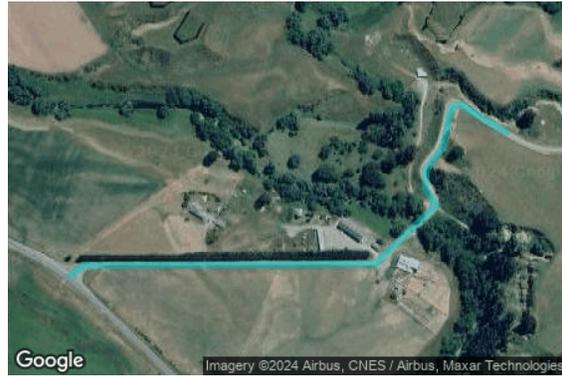
Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.014836	172.702728	164.89	1.50	166.39
2	-43.014700	172.702556	174.48	1.50	175.98
3	-43.014548	172.702453	183.35	1.50	184.85
4	-43.013931	172.701877	175.47	1.50	176.97
5	-43.013704	172.701530	177.99	1.50	179.49
6	-43.013487	172.701070	178.92	1.50	180.42
7	-43.013091	172.700451	181.90	1.50	183.40
8	-43.012699	172.700177	186.48	1.50	187.98
9	-43.012254	172.700207	191.36	1.50	192.86
10	-43.011579	172.700500	198.73	1.50	200.23
11	-43.010888	172.700503	200.00	1.50	201.50
12	-43.010717	172.700402	198.92	1.50	200.42
13	-43.010591	172.700090	196.25	1.50	197.75

**Name:** RT18 Fergusons Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



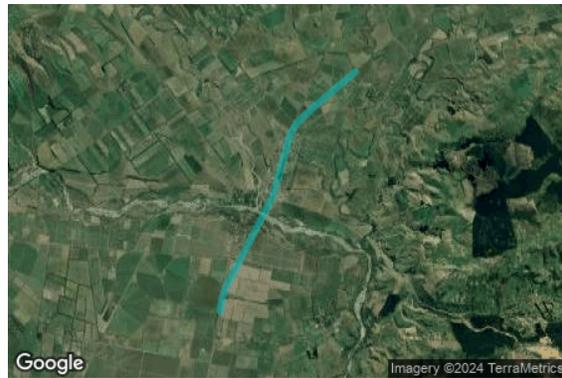
Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.011441	172.700514	199.72	1.50	201.22
2	-43.011966	172.699475	202.76	1.50	204.26
3	-43.012433	172.698601	200.57	1.50	202.07

**Name:** RT19 Symonds Rd  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.072054	172.776819	51.40	1.50	52.90
2	-43.071932	172.777040	51.53	1.50	53.03
3	-43.071914	172.782065	47.83	1.50	49.33
4	-43.071175	172.783129	47.83	1.50	49.33
5	-43.071174	172.783119	47.72	1.50	49.22
6	-43.070954	172.782929	48.45	1.50	49.95
7	-43.070718	172.782958	54.12	1.50	55.62
8	-43.070459	172.783232	59.33	1.50	60.83
9	-43.069952	172.783390	67.46	1.50	68.96
10	-43.069906	172.783527	68.72	1.50	70.22
11	-43.070261	172.784332	78.00	1.50	79.50

**Name:** RT20 Rail line  
**Path type:** Two-way  
**Observer view angle:** 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.040827	172.778583	69.93	2.50	72.43
2	-43.048332	172.766416	75.57	2.50	78.07
3	-43.050669	172.763067	76.56	2.50	79.06
4	-43.051706	172.761896	76.67	2.50	79.17
5	-43.053352	172.760657	75.59	2.50	78.09
6	-43.065684	172.755918	64.44	2.50	66.94
7	-43.084550	172.742622	73.50	2.50	76.00
8	-43.086146	172.741929	73.67	2.50	76.17
9	-43.088952	172.741239	72.43	2.50	74.93

## Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (m)	Height (m)
OP 1	1	-43.044671	172.734156	95.95	1.65
OP 2	2	-43.043545	172.737405	92.02	1.65
OP 3	3	-43.043789	172.741426	97.24	1.65
OP 4	4	-43.040808	172.739148	102.66	1.65
OP 5	5	-43.033783	172.741254	113.04	1.65
OP 6	6	-43.032584	172.743365	114.49	1.65
OP 7	7	-43.042969	172.747922	92.64	1.65
OP 8	8	-43.035648	172.734629	111.02	1.65
OP 9	9	-43.040860	172.745739	97.23	1.65
OP 10	10	-43.028902	172.743994	145.68	1.65
OP 11	11	-43.030411	172.748518	116.75	1.65
OP 12	12	-43.046139	172.752651	86.11	1.65
OP 13	13	-43.032708	172.738800	124.48	1.65
OP 14	14	-43.050011	172.746651	80.86	1.65
OP 15	15	-43.057682	172.753839	79.08	1.65
OP 16	16	-43.043636	172.715769	111.54	1.65
OP 17	17	-43.046060	172.716090	104.35	1.65
OP 18	18	-43.020438	172.707747	147.73	1.65
OP 19	19	-43.053186	172.757256	85.45	1.65
OP 20	20	-43.053668	172.757745	76.06	1.65
OP 21	21	-43.054268	172.758860	76.74	1.65
OP 22	22	-43.054905	172.759530	74.20	1.65
OP 23	23	-43.055986	172.757695	74.57	1.65
OP 24	24	-43.055561	172.757922	74.63	1.65
OP 25	25	-43.057273	172.756899	75.15	1.65
OP 26	26	-43.057736	172.756751	75.06	1.65
OP 27	27	-43.058011	172.756240	75.58	1.65
OP 28	28	-43.067007	172.773318	54.55	1.65
OP 29	29	-43.058511	172.755986	75.69	1.65
OP 30	30	-43.058972	172.755687	80.88	1.65
OP 31	31	-43.059421	172.755472	75.89	1.65
OP 32	32	-43.063322	172.753999	64.29	1.65
OP 33	33	-43.062592	172.754415	67.11	1.65
OP 34	34	-43.061866	172.754687	68.88	1.65
OP 35	35	-43.060939	172.754559	70.04	1.65
OP 36	36	-43.064996	172.748930	64.73	1.65
OP 37	37	-43.071538	172.746715	75.67	1.65
OP 38	38	-43.065503	172.755240	65.04	1.65
OP 39	39	-43.066090	172.763290	61.03	1.65
OP 40	40	-43.065872	172.753448	59.54	1.65

# Glare Analysis Results

## Summary of Results No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy kWh	Peak Luminance
			min	hr	min	hr		cd/m <sup>2</sup>
PV12	SA tracking	SA tracking	0	0.0	0	0.0	-	0

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
RT01 Car NZ State Hwy 1	0	0.0	0	0.0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0
RT03 Church Rd	0	0.0	0	0.0
RT04 Kathryns Ln	0	0.0	0	0.0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0
RT07 Glenmark Rd South	0	0.0	0	0.0
RT08 McKenzies Rd	0	0.0	0	0.0
RT09 Barnetts Rd	0	0.0	0	0.0
RT10 Darnley Rd	0	0.0	0	0.0
RT11 Georges Rd	0	0.0	0	0.0
RT12 Mount Cass Rd	0	0.0	0	0.0
RT13 Johnston St	0	0.0	0	0.0
RT14 Glenmark Dr North	0	0.0	0	0.0
RT15 Bain Rd	0	0.0	0	0.0
RT16 Loffhagen Dr	0	0.0	0	0.0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0
RT18 Fergusons Rd	0	0.0	0	0.0
RT19 Symonds Rd	0	0.0	0	0.0
RT20 Rail line	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

**PV: PV12** no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
RT01 Car NZ State Hwy 1	0	0.0	0	0.0	0
RT02 Truck NZ State Hwy 1	0	0.0	0	0.0	0
RT03 Church Rd	0	0.0	0	0.0	0
RT04 Kathryns Ln	0	0.0	0	0.0	0
RT05 Car NZ State Hwy 7	0	0.0	0	0.0	0
RT06 Truck NZ State Hwy 7	0	0.0	0	0.0	0
RT07 Glenmark Rd South	0	0.0	0	0.0	0
RT08 McKenzies Rd	0	0.0	0	0.0	0
RT09 Barnetts Rd	0	0.0	0	0.0	0
RT10 Darnley Rd	0	0.0	0	0.0	0
RT11 Georges Rd	0	0.0	0	0.0	0
RT12 Mount Cass Rd	0	0.0	0	0.0	0
RT13 Johnston St	0	0.0	0	0.0	0
RT14 Glenmark Dr North	0	0.0	0	0.0	0
RT15 Bain Rd	0	0.0	0	0.0	0
RT16 Loffhagen Dr	0	0.0	0	0.0	0
RT17 Weka Pass Loop Rd	0	0.0	0	0.0	0
RT18 Fergusons Rd	0	0.0	0	0.0	0
RT19 Symonds Rd	0	0.0	0	0.0	0
RT20 Rail line	0	0.0	0	0.0	0
OP 1	0	0.0	0	0.0	0
OP 2	0	0.0	0	0.0	0
OP 3	0	0.0	0	0.0	0
OP 4	0	0.0	0	0.0	0
OP 5	0	0.0	0	0.0	0
OP 6	0	0.0	0	0.0	0
OP 7	0	0.0	0	0.0	0
OP 8	0	0.0	0	0.0	0
OP 9	0	0.0	0	0.0	0
OP 10	0	0.0	0	0.0	0
OP 11	0	0.0	0	0.0	0
OP 12	0	0.0	0	0.0	0
OP 13	0	0.0	0	0.0	0
OP 14	0	0.0	0	0.0	0
OP 15	0	0.0	0	0.0	0
OP 16	0	0.0	0	0.0	0

Receptor	Annual Green Glare		Annual Yellow Glare		Peak Luminance
	min	hr	min	hr	cd/m <sup>2</sup>
OP 17	0	0.0	0	0.0	0
OP 18	0	0.0	0	0.0	0
OP 19	0	0.0	0	0.0	0
OP 20	0	0.0	0	0.0	0
OP 21	0	0.0	0	0.0	0
OP 22	0	0.0	0	0.0	0
OP 23	0	0.0	0	0.0	0
OP 24	0	0.0	0	0.0	0
OP 25	0	0.0	0	0.0	0
OP 26	0	0.0	0	0.0	0
OP 27	0	0.0	0	0.0	0
OP 28	0	0.0	0	0.0	0
OP 29	0	0.0	0	0.0	0
OP 30	0	0.0	0	0.0	0
OP 31	0	0.0	0	0.0	0
OP 32	0	0.0	0	0.0	0
OP 33	0	0.0	0	0.0	0
OP 34	0	0.0	0	0.0	0
OP 35	0	0.0	0	0.0	0
OP 36	0	0.0	0	0.0	0
OP 37	0	0.0	0	0.0	0
OP 38	0	0.0	0	0.0	0
OP 39	0	0.0	0	0.0	0
OP 40	0	0.0	0	0.0	0

**PV12 and Route: RT01 Car NZ State Hwy 1**

No glare found

**PV12 and Route: RT02 Truck NZ State Hwy 1**

No glare found

**PV12 and Route: RT03 Church Rd**

No glare found

**PV12 and Route: RT04 Kathryns Ln**

No glare found

**PV12 and Route: RT05 Car NZ State Hwy 7**

No glare found

**PV12 and Route: RT06 Truck NZ State Hwy 7**

No glare found

**PV12 and Route: RT07 Glenmark Rd South**

No glare found

**PV12 and Route: RT08 McKenzies Rd**

No glare found

**PV12 and Route: RT09 Barnetts Rd**

No glare found

**PV12 and Route: RT10 Darnley Rd**

No glare found

**PV12 and Route: RT11 Georges Rd**

No glare found

**PV12 and Route: RT12 Mount Cass Rd**

No glare found

**PV12 and Route: RT13 Johnston St**

No glare found

**PV12 and Route: RT14 Glenmark Dr North**

No glare found

**PV12 and Route: RT15 Bain Rd**

No glare found

**PV12 and Route: RT16 Loffhagen Dr**

No glare found

**PV12 and Route: RT17 Weka Pass Loop Rd**

No glare found

**PV12 and Route: RT18 Fergusons Rd**

No glare found

**PV12 and Route: RT19 Symonds Rd**

No glare found

**PV12 and Route: RT20 Rail line**

No glare found

**PV12 and OP 1**

No glare found

**PV12 and OP 2**

No glare found

**PV12 and OP 3**

No glare found

**PV12 and OP 4**

No glare found

**PV12 and OP 5**

No glare found

**PV12 and OP 6**

No glare found

**PV12 and OP 7**

No glare found

**PV12 and OP 8**

No glare found

**PV12 and OP 9**

No glare found

**PV12 and OP 10**

No glare found

**PV12 and OP 11**

No glare found

**PV12 and OP 12**

No glare found

**PV12 and OP 13**

No glare found

**PV12 and OP 14**

No glare found

**PV12 and OP 15**

No glare found

**PV12 and OP 16**

No glare found

**PV12 and OP 17**

No glare found

**PV12 and OP 18**

No glare found

**PV12 and OP 19**

No glare found

**PV12 and OP 20**

No glare found

**PV12 and OP 21**

No glare found

**PV12 and OP 22**

No glare found

**PV12 and OP 23**

No glare found

**PV12 and OP 24**

No glare found

**PV12 and OP 25**

No glare found

**PV12 and OP 26**

No glare found

**PV12 and OP 27**

No glare found

**PV12 and OP 28**

No glare found

**PV12 and OP 29**

No glare found

**PV12 and OP 30**

No glare found

**PV12 and OP 31**

No glare found

**PV12 and OP 32**

No glare found

**PV12 and OP 33**

No glare found

**PV12 and OP 34**

No glare found

**PV12 and OP 35**

No glare found

**PV12 and OP 36**

No glare found

**PV12 and OP 37**

No glare found

**PV12 and OP 38**

No glare found

**PV12 and OP 39**

No glare found

**PV12 and OP 40**

No glare found

# Assumptions

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"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.

Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.

Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.

The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.

The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.

The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Refer to the Help page at [www.forgesolar.com/help/](http://www.forgesolar.com/help/) for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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