

FORGESOLAR GLARE ANALYSIS

Project: **Brookside Solar**

Site configuration: **Brookside Solar Tracking 2055mm centroid V2**

Client: KeaX

Created 27 Jul, 2023

Updated 31 Jul, 2023

Time-step 1 minute

Timezone offset UTC12

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category > 1 GW

Site ID 96214.16345

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
	°	°	min	hr	min	hr	kWh
Tracking PV	SA tracking	SA tracking	3,462	57.7	2,741	45.7	-

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
BranchDrainRoad	0	0.0	0	0.0
BrooksideandIrwellRoad	410	6.8	290	4.8
BuckleysRoad	161	2.7	252	4.2
CaldwellsRoad	146	2.4	807	13.4
DunsandelandBrooksideRoad	0	0.0	0	0.0
GrahamsRoad	0	0.0	0	0.0
HanmerRoad	383	6.4	664	11.1
IrwellRakaiaRoad	0	0.0	0	0.0
SmythesRoad	23	0.4	0	0.0
StewartsRoad	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	94	1.6	0	0.0
OP 3	653	10.9	196	3.3
OP 4	280	4.7	22	0.4

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 5	192	3.2	24	0.4
OP 6	102	1.7	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	38	0.6	0	0.0
OP 12	303	5.0	148	2.5
OP 13	256	4.3	184	3.1
OP 14	280	4.7	154	2.6
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	53	0.9	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	88	1.5	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

Component Data

PV Arrays

Name: Tracking PV

Axis tracking: Single-axis rotation

Backtracking: Shade

Tracking axis orientation: 0.0°

Max tracking angle: 60.0°

Resting angle: 0.0°

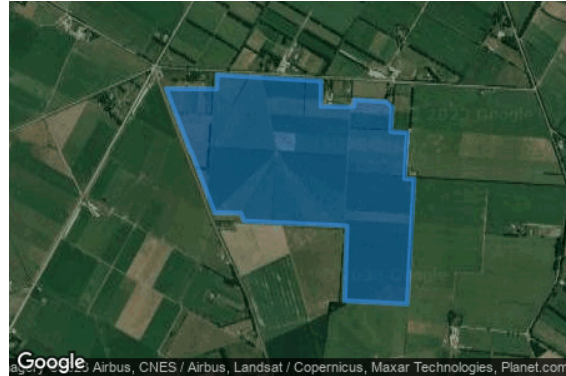
Ground Coverage Ratio: 0.5

Rated power: -

Panel material: Smooth glass without 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	-43.701097	172.280909	37.00	2.06	39.05
2	-43.701804	172.280891	37.00	2.06	39.05
3	-43.701781	172.277407	38.00	2.06	40.05
4	-43.704926	172.279086	36.00	2.06	38.05
5	-43.704926	172.279138	36.00	2.06	38.05
6	-43.707936	172.280745	35.00	2.06	37.05
7	-43.707958	172.282552	35.00	2.06	37.05
8	-43.708348	172.282760	35.00	2.06	37.05
9	-43.708589	172.289837	33.00	2.06	35.05
10	-43.712294	172.289681	32.00	2.06	34.05
11	-43.712458	172.293983	32.00	2.06	34.05
12	-43.706265	172.294457	33.00	2.06	35.05
13	-43.706237	172.293806	33.00	2.06	35.05
14	-43.703969	172.293996	33.00	2.06	35.05
15	-43.703913	172.292851	33.00	2.06	35.05
16	-43.702701	172.292951	33.00	2.06	35.05
17	-43.702429	172.292552	33.39	2.06	35.44
18	-43.702326	172.290337	34.00	2.06	36.05
19	-43.702687	172.290306	35.00	2.06	37.05
20	-43.702659	172.288053	36.00	2.06	38.05
21	-43.701410	172.288072	36.00	2.06	38.05

Route Receptors

Name: BranchDrainRoad

Path type: Two-way

Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.725065	172.288784	31.00	1.50	32.50
2	-43.724208	172.288404	31.00	1.50	32.50
3	-43.723350	172.288025	31.00	1.50	32.50
4	-43.722493	172.287646	32.00	1.50	33.50
5	-43.721636	172.287267	32.00	1.50	33.50
6	-43.720778	172.286887	32.00	1.50	33.50
7	-43.719924	172.286497	32.00	1.50	33.50
8	-43.719067	172.286117	32.00	1.50	33.50
9	-43.718210	172.285736	33.00	1.50	34.50
10	-43.717353	172.285356	33.00	1.50	34.50
11	-43.716496	172.284975	33.00	1.50	34.50
12	-43.715639	172.284595	33.00	1.50	34.50
13	-43.714782	172.284214	33.00	1.50	34.50
14	-43.713925	172.283834	33.00	1.50	34.50
15	-43.713068	172.283453	34.00	1.50	35.50
16	-43.712211	172.283073	34.00	1.50	35.50
17	-43.711378	172.282607	34.00	1.50	35.50
18	-43.710562	172.282082	34.00	1.50	35.50
19	-43.709746	172.281558	35.00	1.50	36.50
20	-43.708930	172.281034	35.00	1.50	36.50
21	-43.708104	172.280540	35.00	1.50	36.50
22	-43.707266	172.280087	36.00	1.50	37.50
23	-43.706427	172.279635	36.00	1.50	37.50
24	-43.705589	172.279182	36.00	1.50	37.50
25	-43.704751	172.278730	37.00	1.50	38.50
26	-43.703912	172.278278	37.00	1.50	38.50
27	-43.703074	172.277825	37.00	1.50	38.50
28	-43.702235	172.277373	38.00	1.50	39.50
29	-43.701392	172.276939	38.00	1.50	39.50

Name: BrooksideandIrwellRoad

Path type: Two-way

Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.710682	172.317275	29.00	1.50	30.50
2	-43.710154	172.316271	29.00	1.50	30.50
3	-43.709613	172.315278	30.00	1.50	31.50
4	-43.709072	172.314286	30.00	1.50	31.50
5	-43.708535	172.313290	30.00	1.50	31.50
6	-43.708025	172.312267	30.00	1.50	31.50
7	-43.707516	172.311244	30.00	1.50	31.50
8	-43.707006	172.310221	31.00	1.50	32.50
9	-43.706496	172.309198	31.00	1.50	32.50
10	-43.705986	172.308175	31.00	1.50	32.50
11	-43.705476	172.307152	31.00	1.50	32.50
12	-43.704967	172.306129	31.00	1.50	32.50
13	-43.704457	172.305106	31.00	1.50	32.50
14	-43.703956	172.304074	32.00	1.50	33.50
15	-43.703213	172.303485	32.00	1.50	33.50
16	-43.702363	172.303076	32.00	1.50	33.50
17	-43.701514	172.302663	32.00	1.50	33.50
18	-43.700667	172.302243	32.00	1.50	33.50
19	-43.699819	172.301823	33.00	1.50	34.50
20	-43.698972	172.301404	33.00	1.50	34.50
21	-43.698125	172.300984	33.00	1.50	34.50
22	-43.697278	172.300564	33.00	1.50	34.50
23	-43.696900	172.300367	33.00	1.50	34.50

Name: BuckleysRoad
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.701848	172.302829	32.00	1.50	33.50
2	-43.701782	172.301592	32.00	1.50	33.50
3	-43.701730	172.300353	32.00	1.50	33.50
4	-43.701679	172.299114	33.00	1.50	34.50
5	-43.701627	172.297875	33.00	1.50	34.50
6	-43.701576	172.296636	33.00	1.50	34.50
7	-43.701524	172.295397	33.00	1.50	34.50
8	-43.701472	172.294158	33.00	1.50	34.50
9	-43.701421	172.292919	34.00	1.50	35.50
10	-43.701369	172.291680	34.00	1.50	35.50
11	-43.701317	172.290441	34.00	1.50	35.50
12	-43.701266	172.289202	34.00	1.50	35.50
13	-43.701214	172.287963	35.00	1.50	36.50
14	-43.701162	172.286724	35.00	1.50	36.50
15	-43.701111	172.285485	35.00	1.50	36.50
16	-43.701059	172.284246	36.00	1.50	37.50
17	-43.701007	172.283007	36.00	1.50	37.50
18	-43.700955	172.281768	36.00	1.50	37.50
19	-43.700904	172.280529	37.00	1.50	38.50
20	-43.700852	172.279290	37.00	1.50	38.50
21	-43.700800	172.278051	38.00	1.50	39.50
22	-43.700734	172.276814	38.00	1.50	39.50

Name: Caldwell's Road
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.727979	172.309284	25.00	1.50	26.50
2	-43.727596	172.309091	25.00	1.50	26.50
3	-43.726750	172.308664	26.00	1.50	27.50
4	-43.725922	172.308245	26.00	1.50	27.50
5	-43.725060	172.307808	26.00	1.50	27.50
6	-43.724215	172.307380	26.00	1.50	27.50
7	-43.723369	172.306952	27.00	1.50	28.50
8	-43.722524	172.306524	27.00	1.50	28.50
9	-43.721679	172.306096	28.00	1.50	29.50
10	-43.720834	172.305668	28.00	1.50	29.50
11	-43.719989	172.305240	29.00	1.50	30.50
12	-43.719144	172.304812	29.00	1.50	30.50
13	-43.718299	172.304384	29.00	1.50	30.50
14	-43.717453	172.303956	29.29	1.50	30.79
15	-43.716608	172.303528	30.00	1.50	31.50
16	-43.715763	172.303100	30.00	1.50	31.50
17	-43.714918	172.302672	30.00	1.50	31.50
18	-43.713975	172.302267	30.00	1.50	31.50
19	-43.713181	172.302799	30.00	1.50	31.50
20	-43.712399	172.303414	30.00	1.50	31.50
21	-43.711617	172.304029	30.00	1.50	31.50
22	-43.710780	172.304418	30.00	1.50	31.50
23	-43.709887	172.304580	30.00	1.50	31.50
24	-43.708994	172.304741	31.00	1.50	32.50
25	-43.708102	172.304902	31.00	1.50	32.50
26	-43.707209	172.305063	31.00	1.50	32.50
27	-43.706330	172.305051	31.00	1.50	32.50
28	-43.705484	172.304628	31.00	1.50	32.50
29	-43.704637	172.304204	31.59	1.50	33.09

Name: DunsandelandBrooksideRoad

Path type: Two-way

Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.700231	172.275647	39.00	1.50	40.50
2	-43.699782	172.274571	39.00	1.50	40.50
3	-43.699334	172.273495	39.00	1.50	40.50
4	-43.698885	172.272419	40.00	1.50	41.50
5	-43.698436	172.271343	40.00	1.50	41.50
6	-43.697988	172.270267	41.00	1.50	42.50
7	-43.697539	172.269191	41.00	1.50	42.50
8	-43.697265	172.268533	42.00	1.50	43.50

Name: GrahamsRoad
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.725608	172.307082	27.00	1.50	28.50
2	-43.725287	172.305921	27.00	1.50	28.50
3	-43.724967	172.304761	27.00	1.50	28.50
4	-43.724647	172.303601	28.00	1.50	29.50
5	-43.724327	172.302440	28.00	1.50	29.50
6	-43.724007	172.301280	28.00	1.50	29.50
7	-43.723687	172.300120	28.00	1.50	29.50
8	-43.723366	172.298959	29.00	1.50	30.50
9	-43.723046	172.297799	29.00	1.50	30.50
10	-43.722726	172.296639	30.00	1.50	31.50
11	-43.722406	172.295478	30.00	1.50	31.50
12	-43.722085	172.294318	30.00	1.50	31.50
13	-43.721765	172.293158	30.00	1.50	31.50
14	-43.721445	172.291998	31.00	1.50	32.50
15	-43.721125	172.290837	31.00	1.50	32.50
16	-43.720804	172.289677	31.00	1.50	32.50
17	-43.720484	172.288517	32.00	1.50	33.50
18	-43.720164	172.287357	32.00	1.50	33.50
19	-43.719946	172.286507	32.00	1.50	33.50

Name: HanmerRoad
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.718082	172.311853	27.00	1.50	28.50
2	-43.717624	172.310784	27.00	1.50	28.50
3	-43.717168	172.309714	27.00	1.50	28.50
4	-43.716712	172.308644	28.00	1.50	29.50
5	-43.716255	172.307574	29.00	1.50	30.50
6	-43.715799	172.306503	29.00	1.50	30.50
7	-43.715343	172.305433	30.00	1.50	31.50
8	-43.714887	172.304363	30.00	1.50	31.50
9	-43.714430	172.303293	30.00	1.50	31.50

Name: IrwellRakaiaRoad
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.700743	172.276638	39.00	1.50	40.50
2	-43.701133	172.275523	39.00	1.50	40.50
3	-43.701498	172.274388	39.00	1.50	40.50
4	-43.701862	172.273253	39.00	1.50	40.50
5	-43.702227	172.272118	39.00	1.50	40.50
6	-43.702591	172.270984	39.00	1.50	40.50
7	-43.702955	172.269849	39.00	1.50	40.50
8	-43.703320	172.268714	39.00	1.50	40.50
9	-43.703684	172.267579	40.00	1.50	41.50
10	-43.704048	172.266444	40.00	1.50	41.50
11	-43.704413	172.265309	40.00	1.50	41.50
12	-43.704773	172.264187	41.00	1.50	42.50

Name: SmythesRoad
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.708312	172.270920	38.00	1.50	39.50
2	-43.707524	172.271522	38.00	1.50	39.50
3	-43.706737	172.272124	38.00	1.50	39.50
4	-43.705949	172.272725	38.00	1.50	39.50
5	-43.705162	172.273327	38.00	1.50	39.50
6	-43.704374	172.273929	38.00	1.50	39.50
7	-43.703587	172.274531	38.00	1.50	39.50
8	-43.702800	172.275132	38.00	1.50	39.50
9	-43.702012	172.275734	38.00	1.50	39.50
10	-43.701225	172.276336	38.00	1.50	39.50

Name: StewartsRoad
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-43.699987	172.277304	39.00	1.50	40.50
2	-43.699212	172.277936	38.00	1.50	39.50
3	-43.698438	172.278569	38.00	1.50	39.50
4	-43.697663	172.279201	38.00	1.50	39.50
5	-43.696889	172.279834	38.00	1.50	39.50
6	-43.696114	172.280466	37.00	1.50	38.50
7	-43.695939	172.280609	37.00	1.50	38.50

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (m)	Height (m)
OP 1	1	-43.701199	172.280025	37.00	1.80
OP 2	2	-43.700745	172.284686	36.00	1.80
OP 3	3	-43.701957	172.288641	34.00	1.80
OP 4	4	-43.701927	172.289858	34.00	1.80
OP 5	5	-43.701743	172.292807	34.00	1.80
OP 6	6	-43.701175	172.295232	33.00	1.80
OP 7	7	-43.702019	172.299039	33.00	1.80
OP 8	8	-43.704427	172.304607	31.48	1.80
OP 9	9	-43.706263	172.307928	31.00	1.80
OP 10	10	-43.706442	172.308488	31.00	1.80
OP 11	11	-43.707253	172.309372	31.00	1.80
OP 12	12	-43.710731	172.305301	30.00	1.80
OP 13	13	-43.708835	172.301892	31.00	1.80
OP 14	14	-43.713405	172.297355	31.00	1.80
OP 15	15	-43.719466	172.287119	32.00	1.80
OP 16	16	-43.719891	172.286002	32.00	1.80
OP 17	17	-43.717450	172.283961	33.00	1.80
OP 18	18	-43.716398	172.283152	33.00	1.80
OP 19	19	-43.713937	172.283424	33.00	1.80
OP 20	20	-43.712090	172.280581	34.18	1.80
OP 21	21	-43.710159	172.281167	35.00	1.80
OP 22	22	-43.708609	172.281496	35.00	1.80
OP 23	23	-43.706051	172.263789	41.00	1.80
OP 24	24	-43.702129	172.273681	39.00	1.80
OP 25	25	-43.699187	172.272123	40.00	1.80
OP 26	26	-43.699269	172.277433	38.00	1.80
OP 27	27	-43.700411	172.277929	38.00	1.80
OP 28	28	-43.701144	172.277003	38.00	1.80

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
	°	°	min	hr	min	hr	kWh
Tracking PV	SA tracking	SA tracking	3,462	57.7	2,741	45.7	-

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
BranchDrainRoad	0	0.0	0	0.0
BrooksideandIrwellRoad	410	6.8	290	4.8
BuckleysRoad	161	2.7	252	4.2
CaldwellsRoad	146	2.4	807	13.4
DunsandelandBrooksideRoad	0	0.0	0	0.0
GrahamsRoad	0	0.0	0	0.0
HanmerRoad	383	6.4	664	11.1
IrwellRakaiaRoad	0	0.0	0	0.0
SmythesRoad	23	0.4	0	0.0
StewartsRoad	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	94	1.6	0	0.0
OP 3	653	10.9	196	3.3
OP 4	280	4.7	22	0.4
OP 5	192	3.2	24	0.4
OP 6	102	1.7	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	38	0.6	0	0.0
OP 12	303	5.0	148	2.5
OP 13	256	4.3	184	3.1
OP 14	280	4.7	154	2.6
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	53	0.9	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	88	1.5	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
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

PV: Tracking PV potential temporary after-image

Receptor results ordered by category of glare

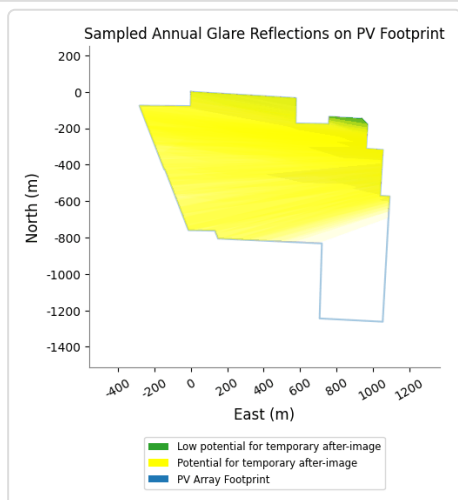
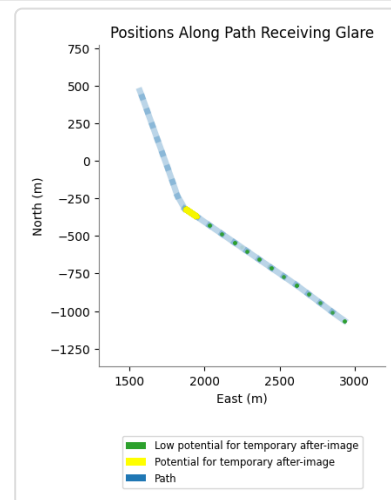
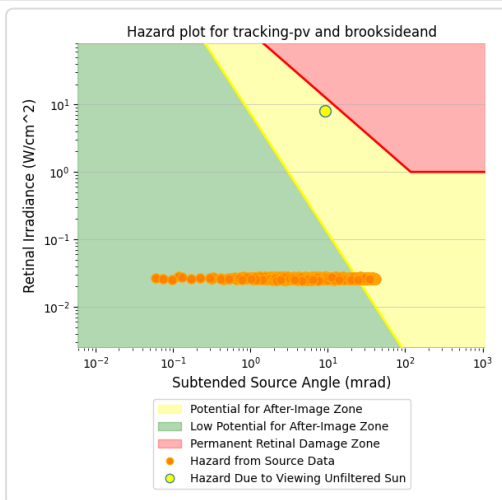
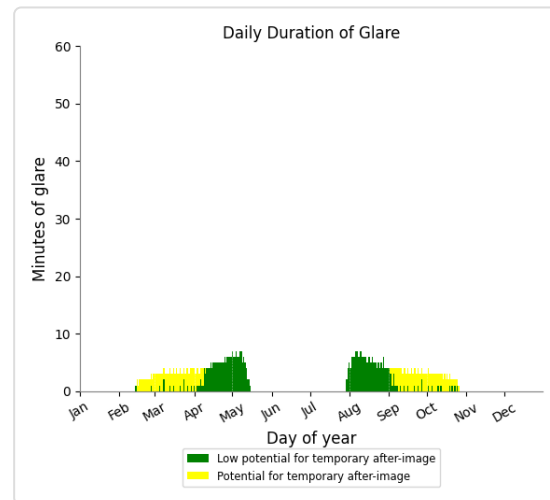
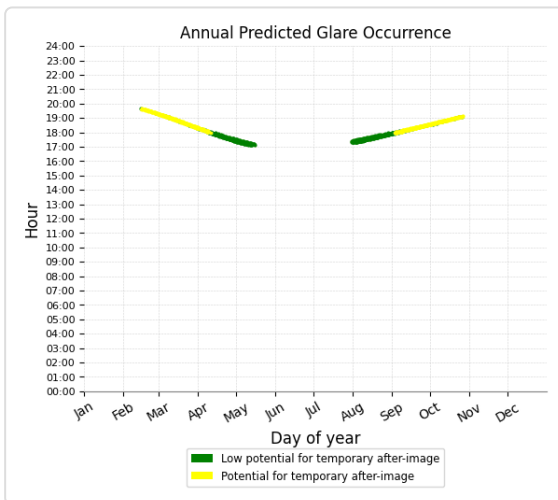
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
BrooksideandIrwellRoad	410	6.8	290	4.8
BuckleysRoad	161	2.7	252	4.2
CaldwellsRoad	146	2.4	807	13.4
HanmerRoad	383	6.4	664	11.1
SmythesRoad	23	0.4	0	0.0
BranchDrainRoad	0	0.0	0	0.0
DunsandelandBrooksideRoad	0	0.0	0	0.0
GrahamsRoad	0	0.0	0	0.0
IrwellRakaiaRoad	0	0.0	0	0.0
StewartsRoad	0	0.0	0	0.0
OP 3	653	10.9	196	3.3
OP 4	280	4.7	22	0.4
OP 5	192	3.2	24	0.4
OP 12	303	5.0	148	2.5
OP 13	256	4.3	184	3.1
OP 14	280	4.7	154	2.6
OP 2	94	1.6	0	0.0
OP 6	102	1.7	0	0.0
OP 11	38	0.6	0	0.0
OP 17	53	0.9	0	0.0
OP 21	88	1.5	0	0.0
OP 1	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 15	0	0.0	0	0.0
OP 16	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 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

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 28	0	0.0	0	0.0

Tracking PV and Route: BrooksideandIrwellRoad

Yellow glare: 290 min.

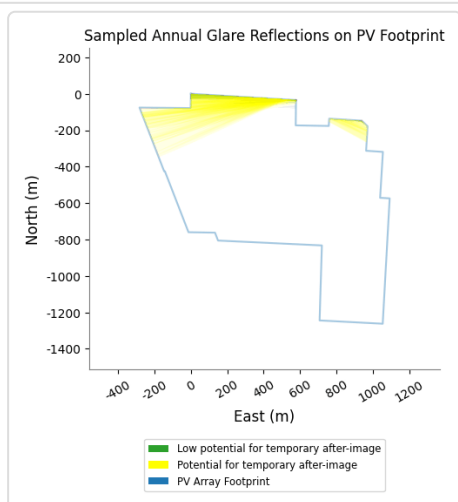
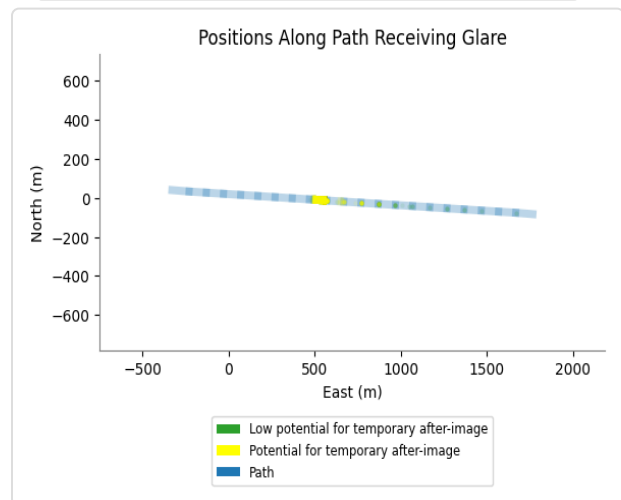
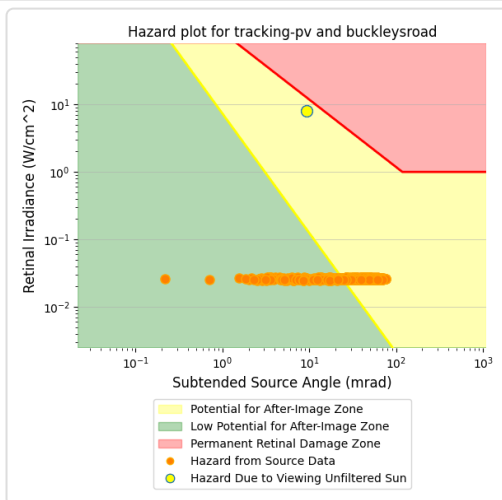
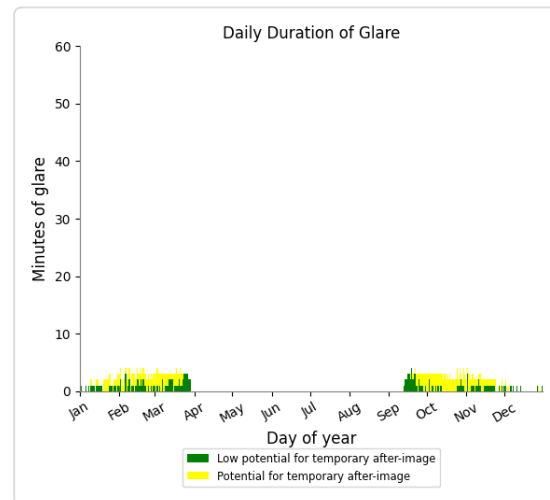
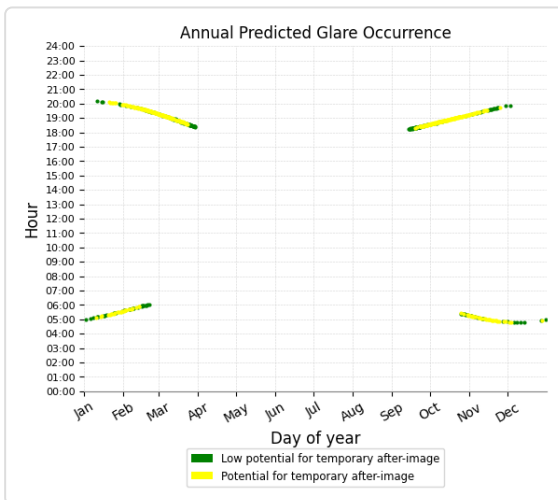
Green glare: 410 min.



Tracking PV and Route: BuckleysRoad

Yellow glare: 252 min.

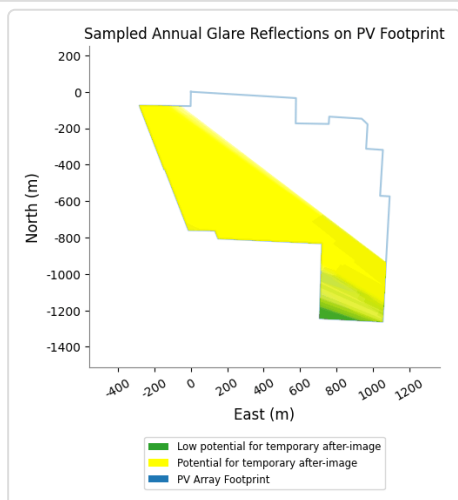
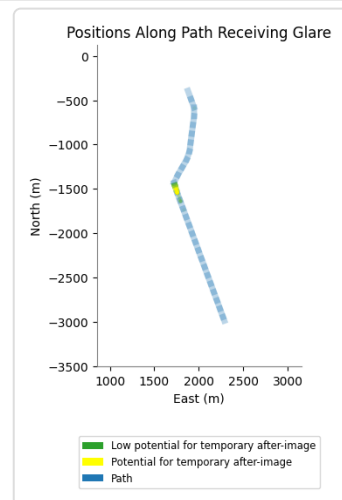
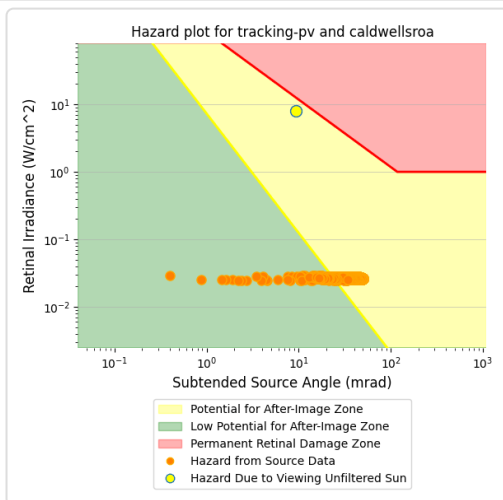
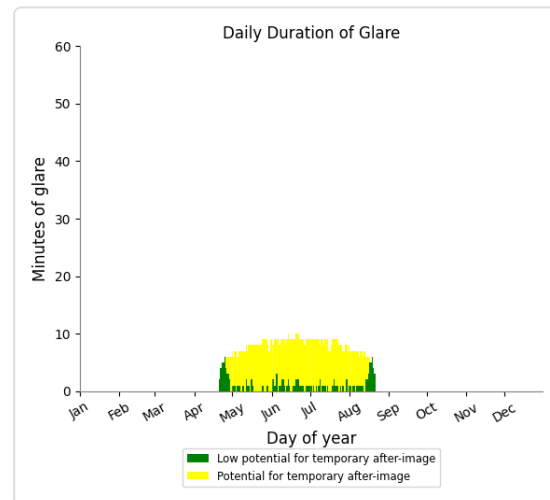
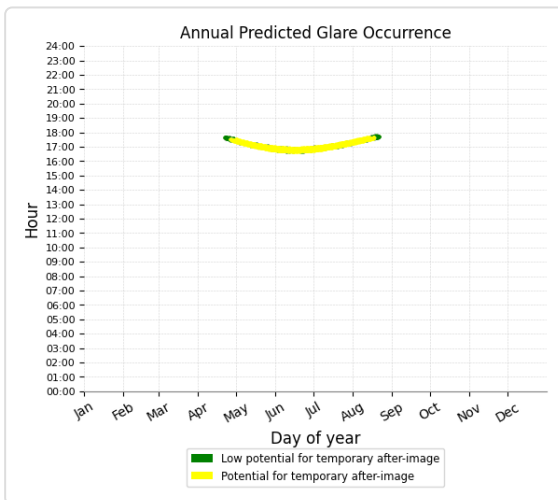
Green glare: 161 min.



Tracking PV and Route: Caldwell's Road

Yellow glare: 807 min.

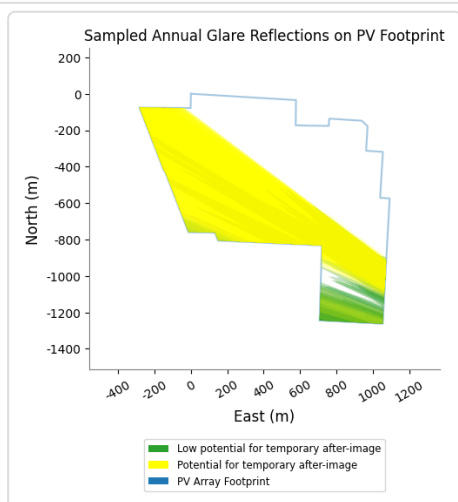
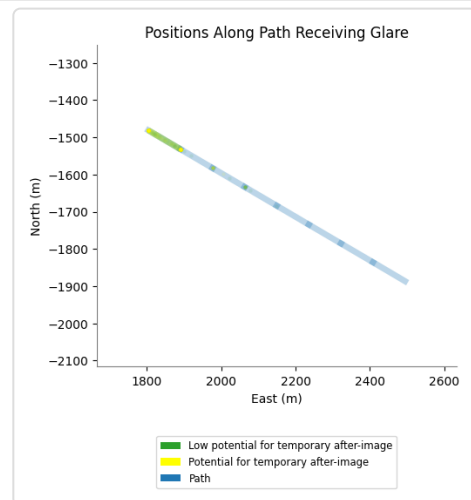
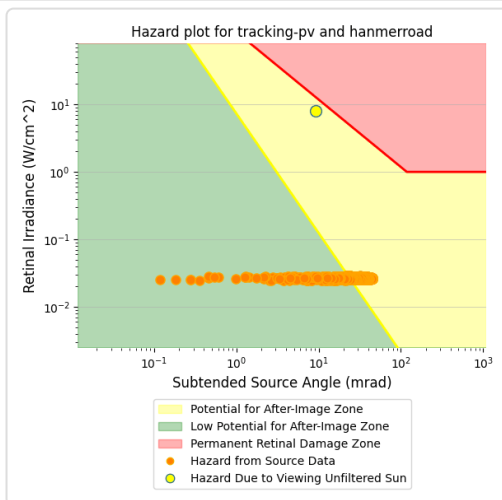
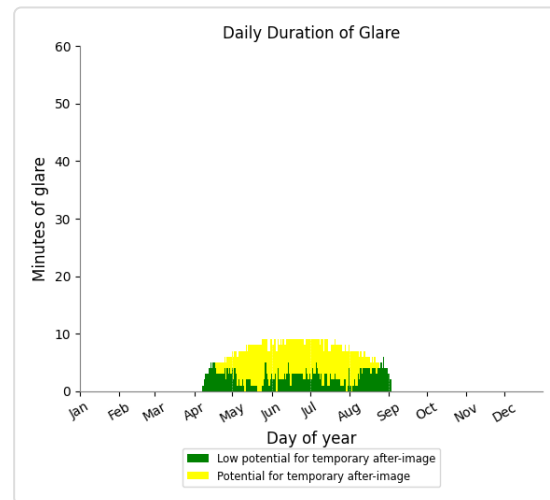
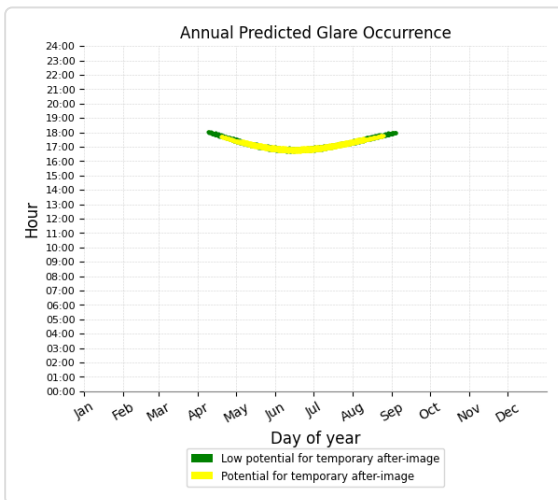
Green glare: 146 min.



Tracking PV and Route: HanmerRoad

Yellow glare: 664 min.

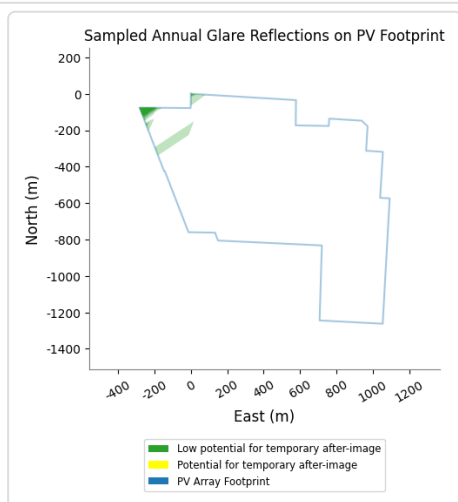
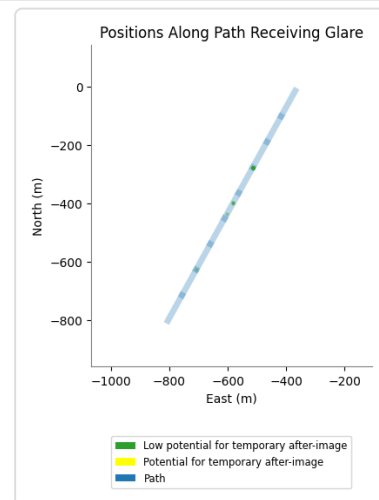
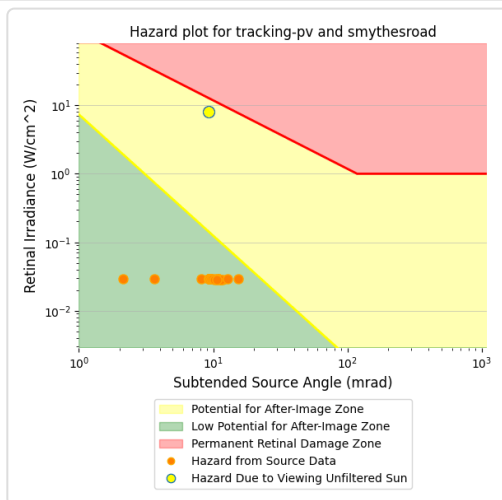
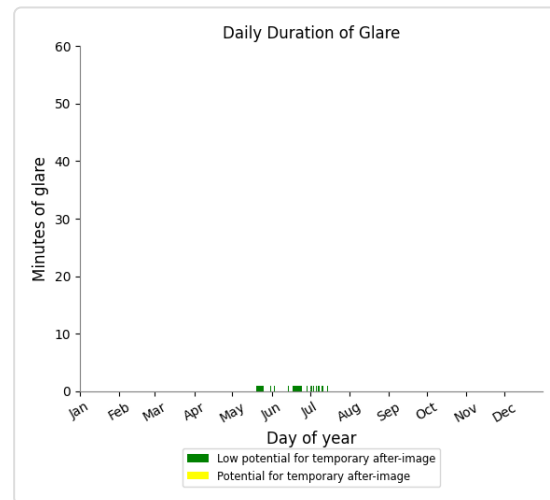
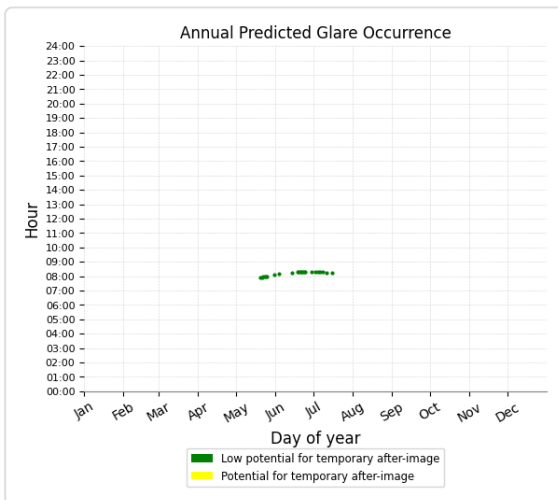
Green glare: 383 min.



Tracking PV and Route: SmythesRoad

Yellow glare: none

Green glare: 23 min.



Tracking PV and Route: BranchDrainRoad

No glare found

Tracking PV and Route: DunsandelandBrooksideRoad

No glare found

Tracking PV and Route: GrahamsRoad

No glare found

Tracking PV and Route: IrwellRakaiaRoad

No glare found

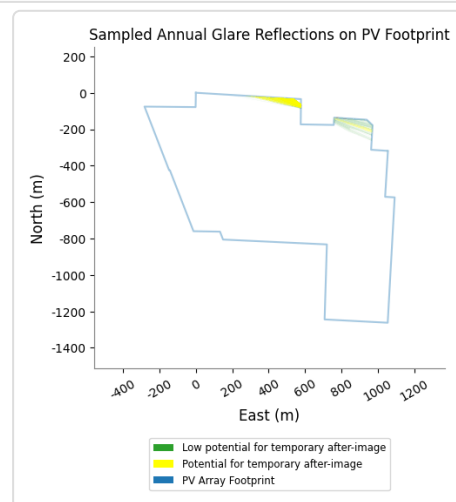
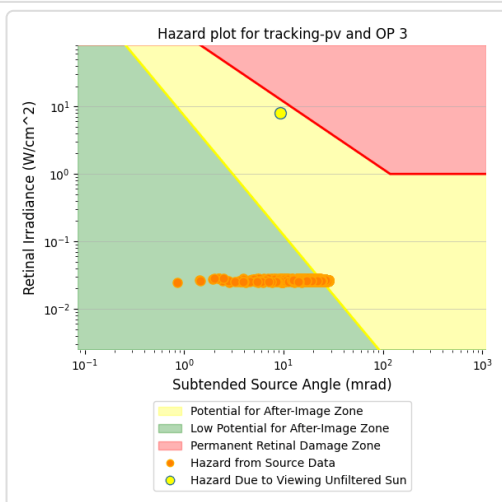
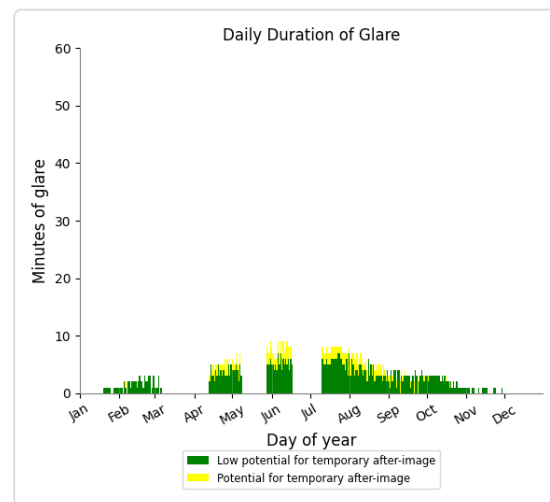
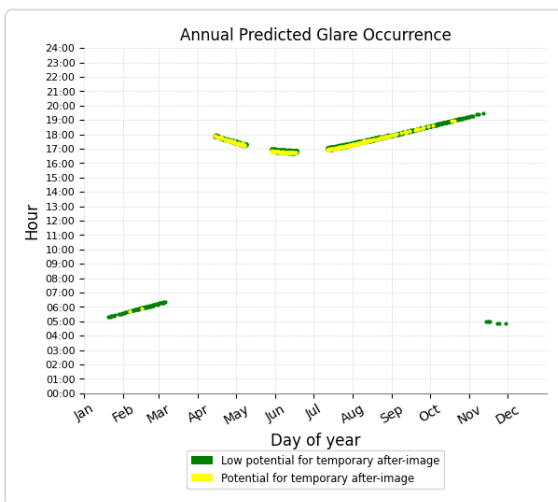
Tracking PV and Route: StewartsRoad

No glare found

Tracking PV and OP 3

Yellow glare: 196 min.

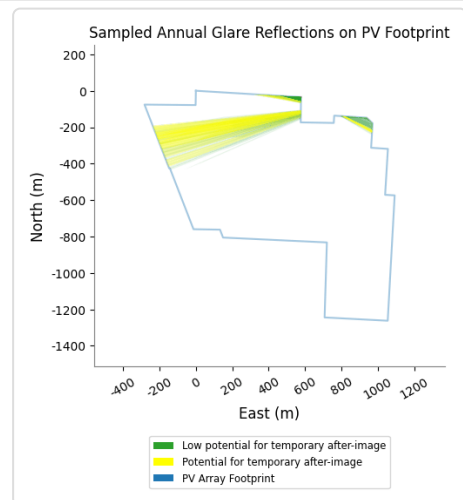
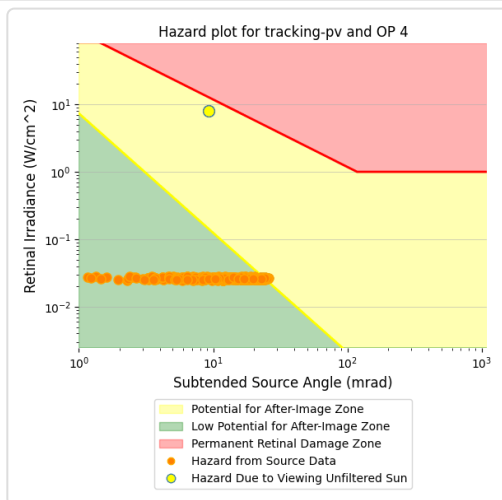
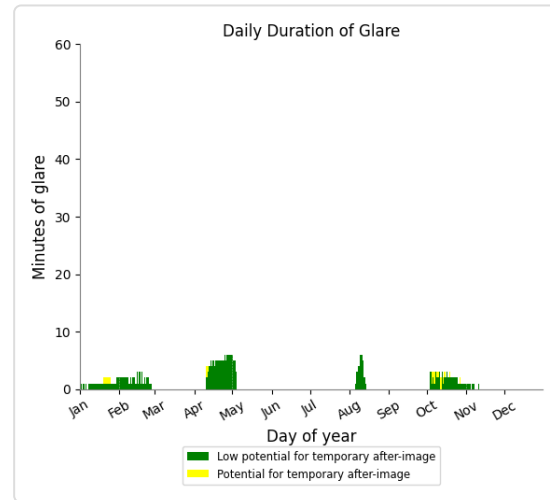
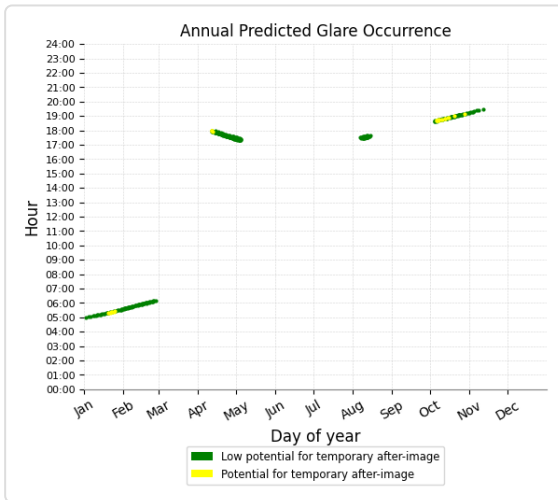
Green glare: 653 min.



Tracking PV and OP 4

Yellow glare: 22 min.

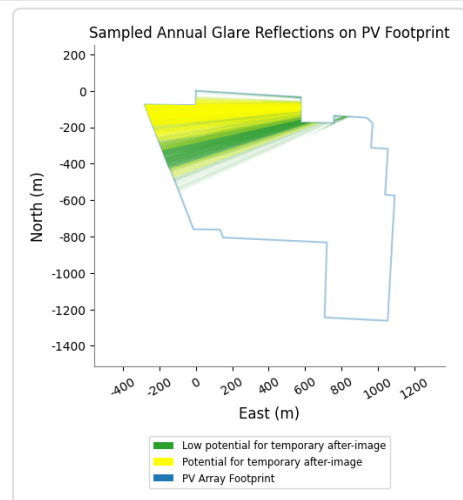
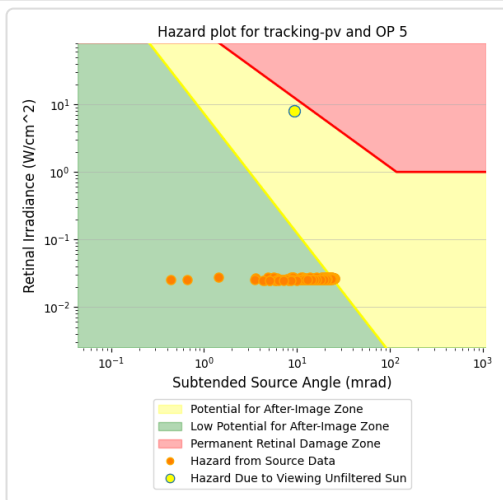
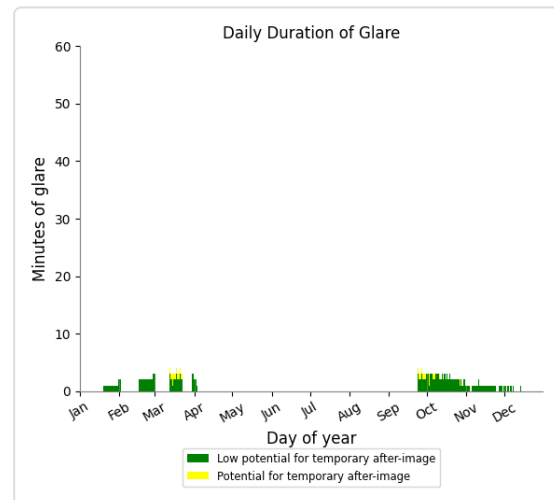
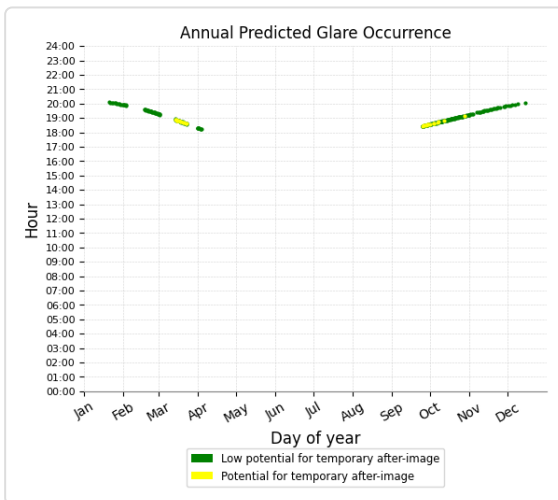
Green glare: 280 min.



Tracking PV and OP 5

Yellow glare: 24 min.

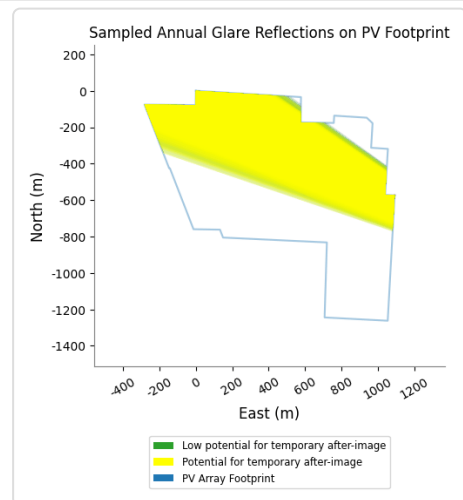
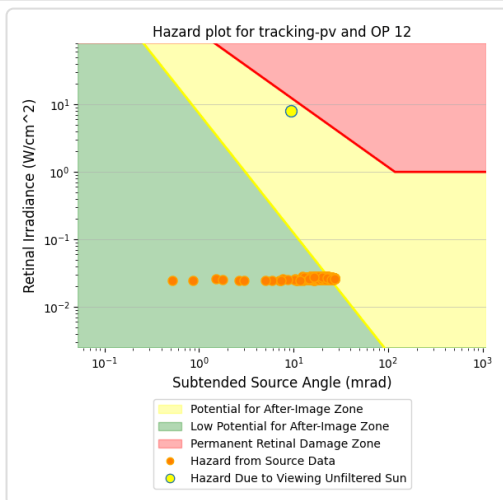
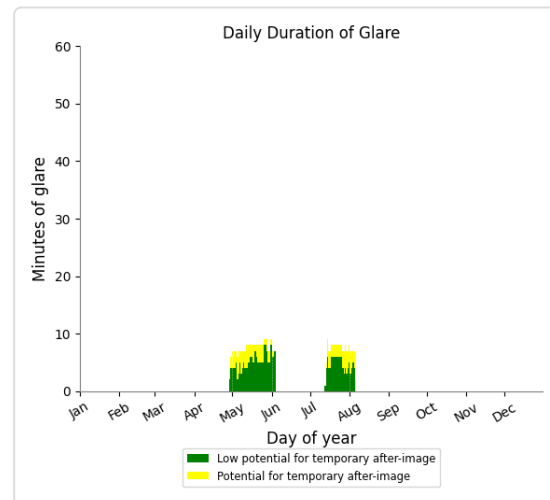
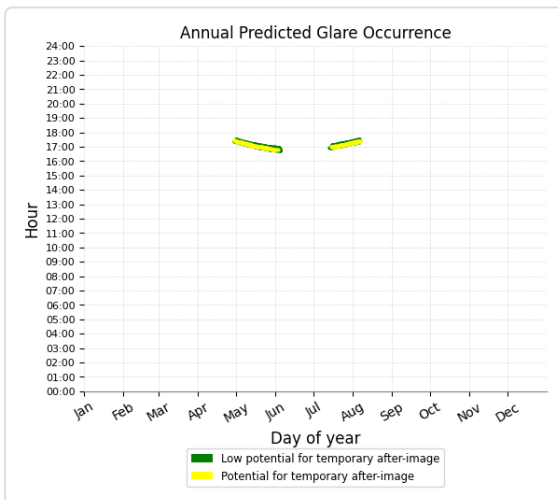
Green glare: 192 min.



Tracking PV and OP 12

Yellow glare: 148 min.

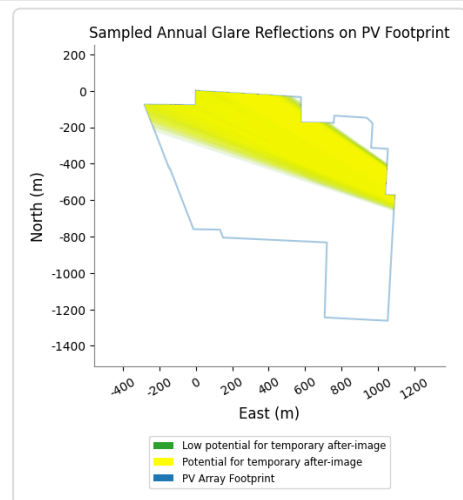
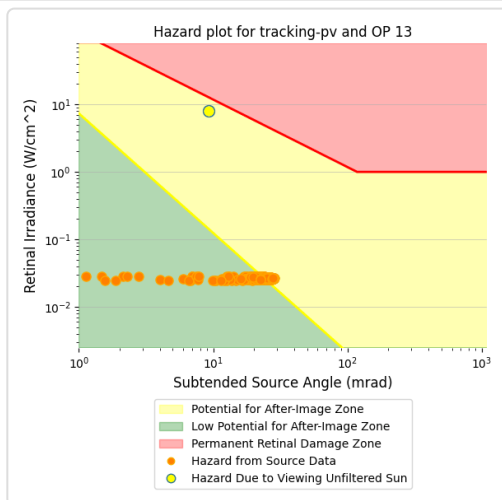
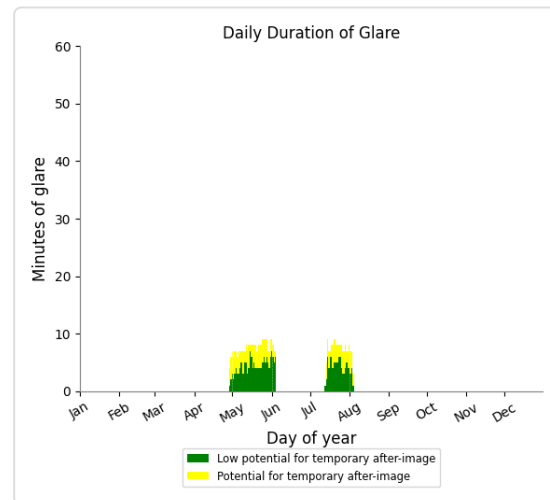
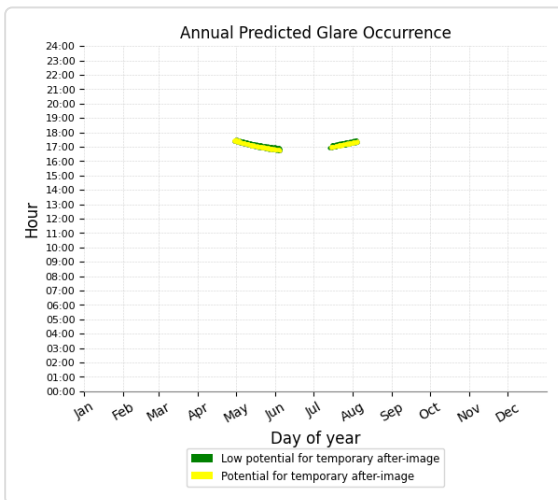
Green glare: 303 min.



Tracking PV and OP 13

Yellow glare: 184 min.

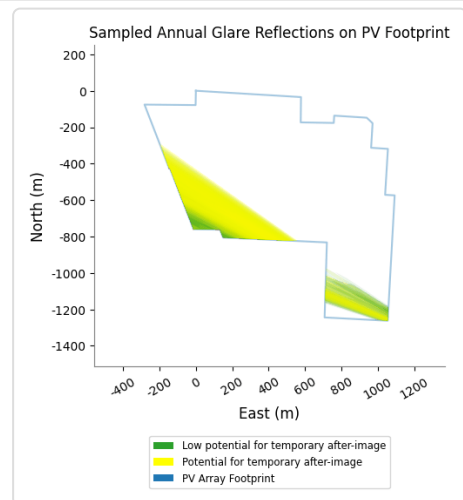
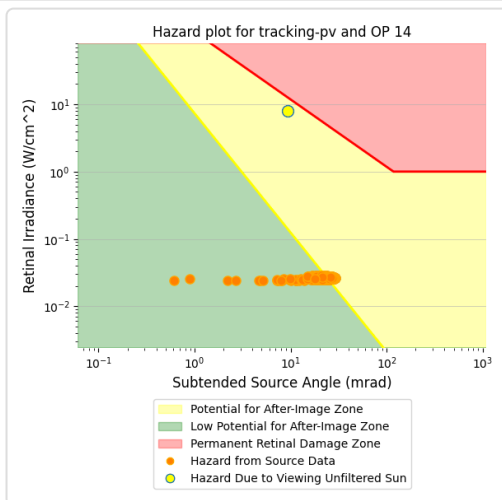
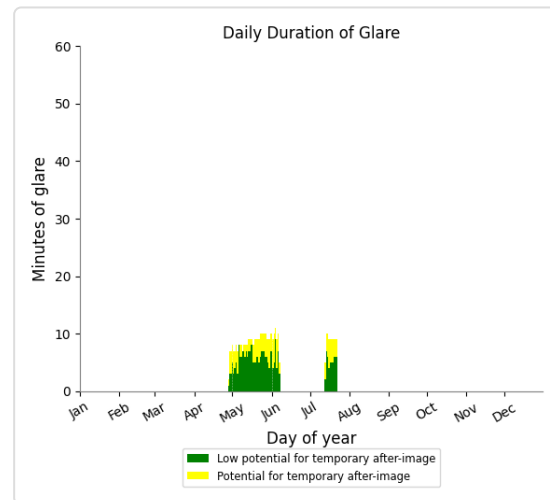
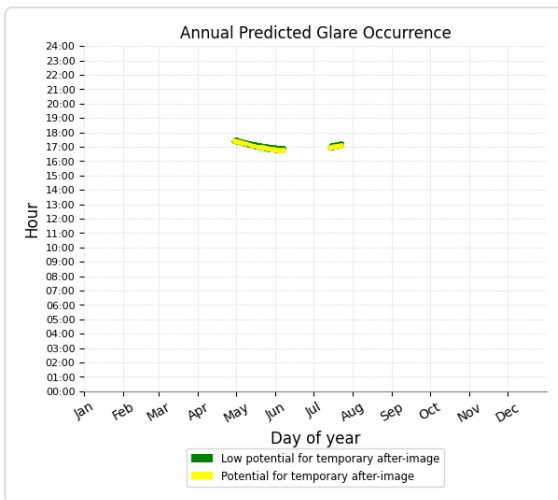
Green glare: 256 min.



Tracking PV and OP 14

Yellow glare: 154 min.

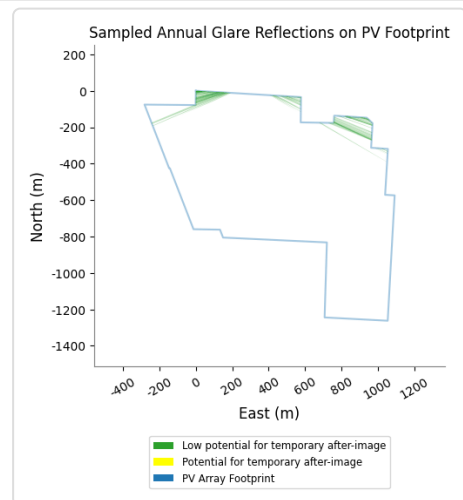
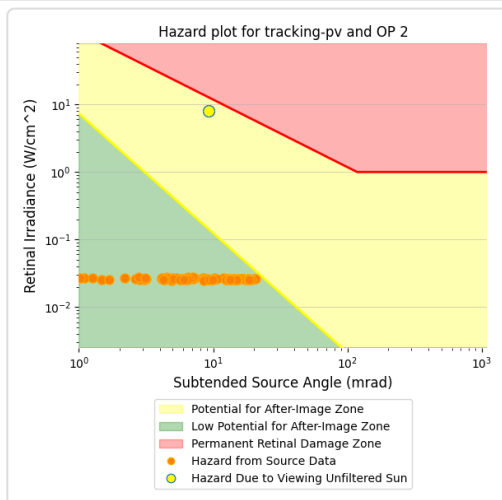
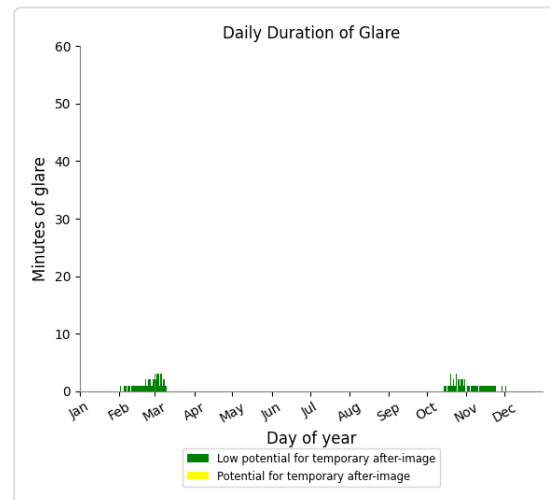
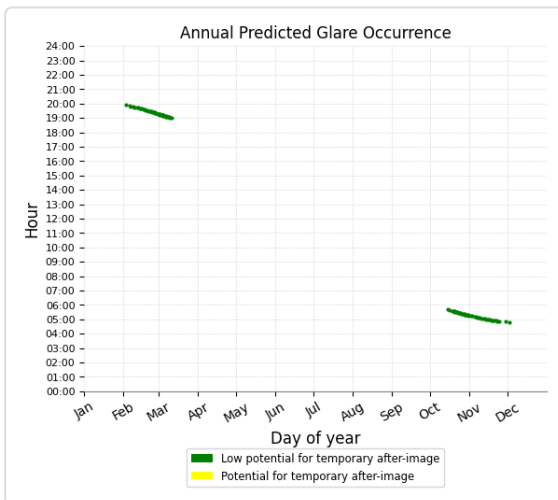
Green glare: 280 min.



Tracking PV and OP 2

Yellow glare: none

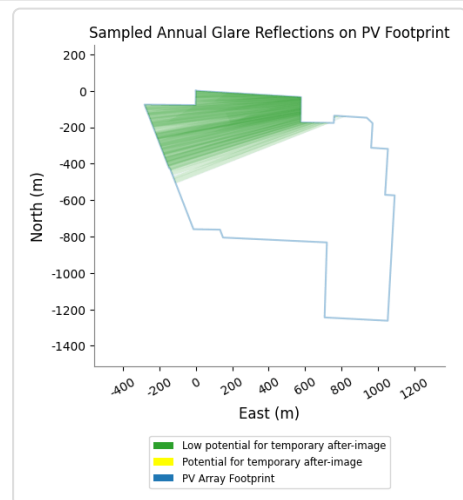
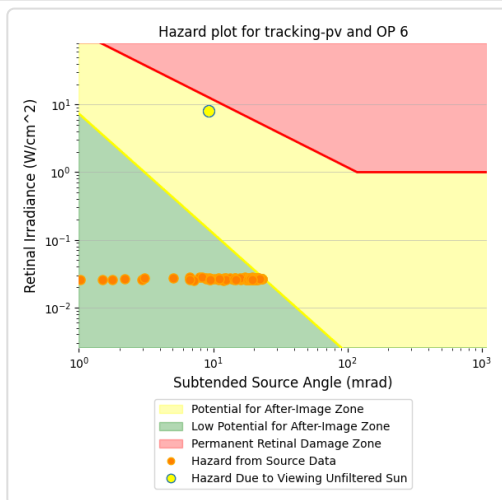
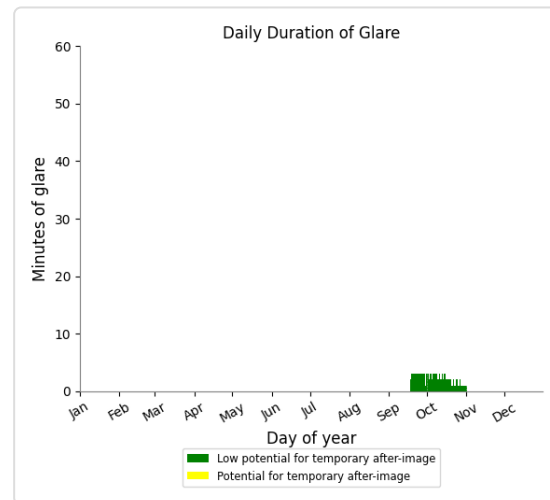
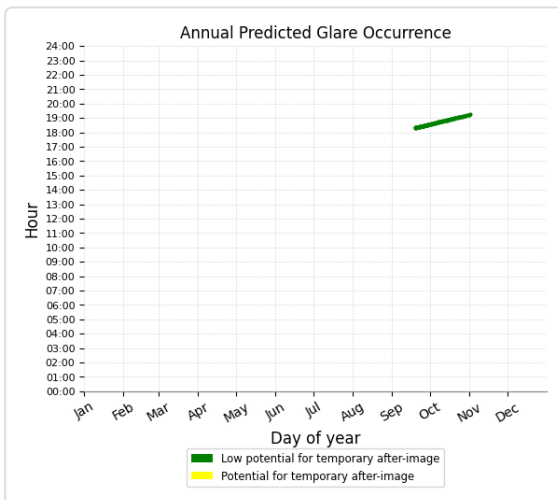
Green glare: 94 min.



Tracking PV and OP 6

Yellow glare: none

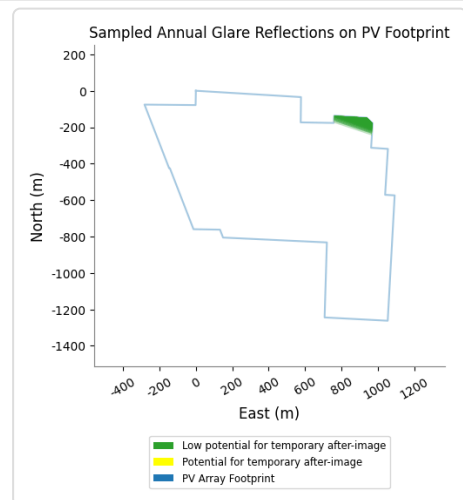
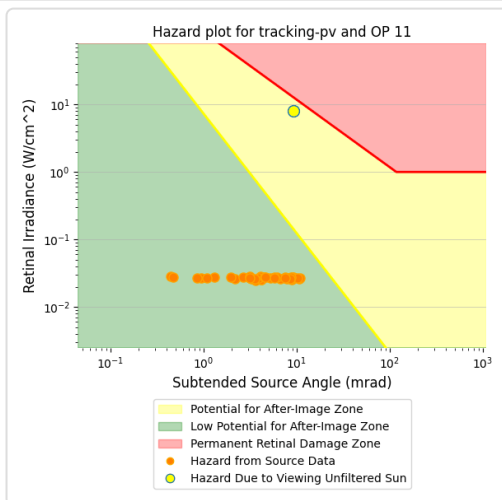
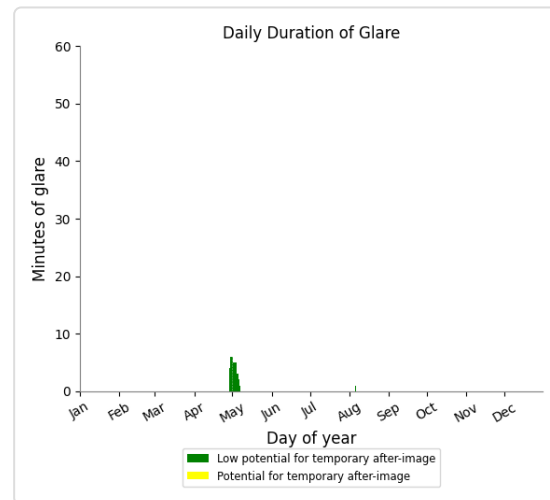
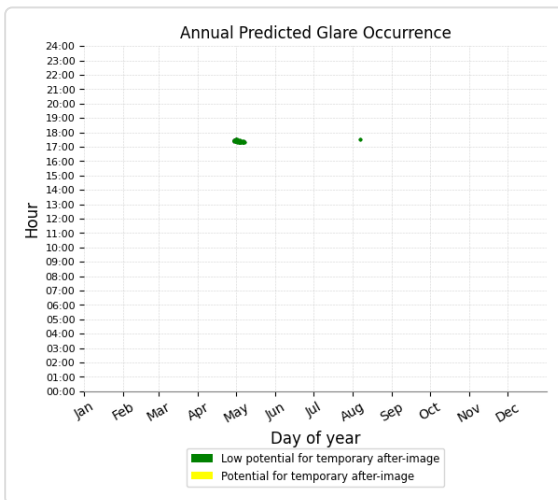
Green glare: 102 min.



Tracking PV and OP 11

Yellow glare: none

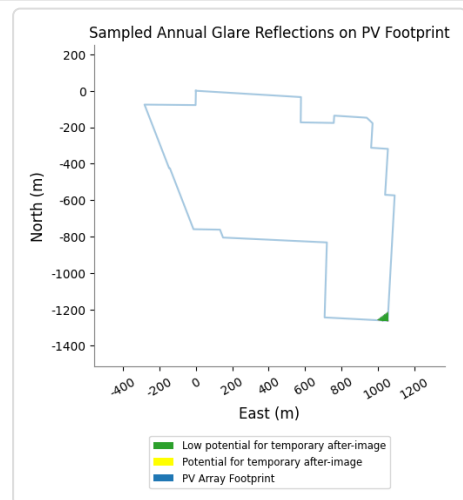
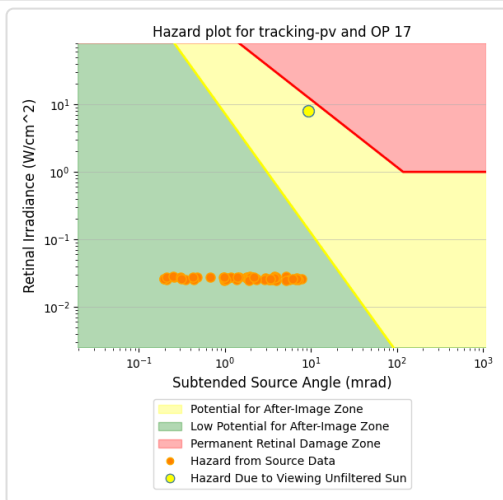
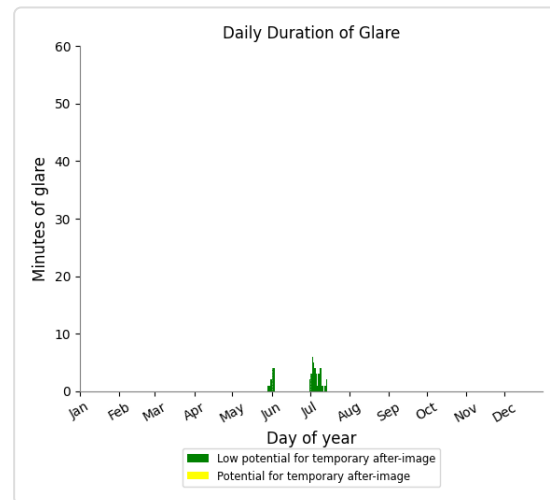
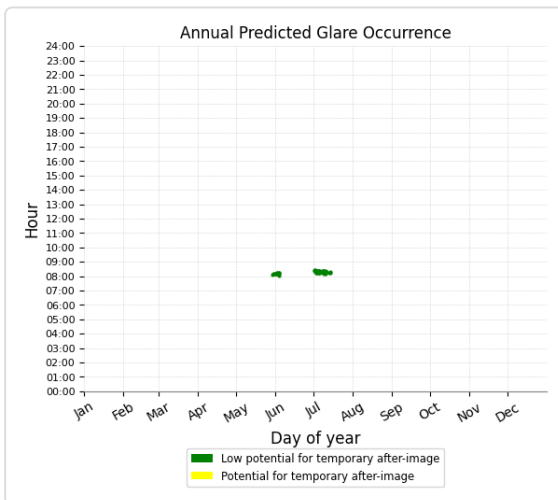
Green glare: 38 min.



Tracking PV and OP 17

Yellow glare: none

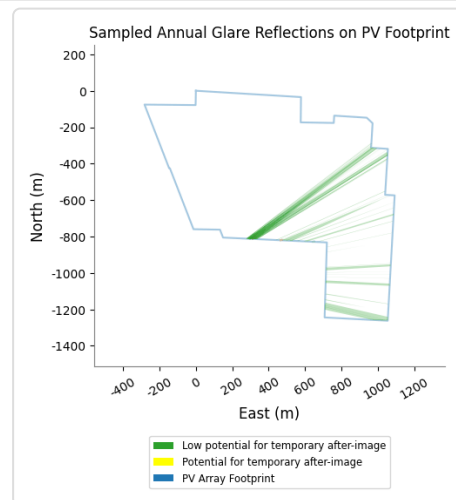
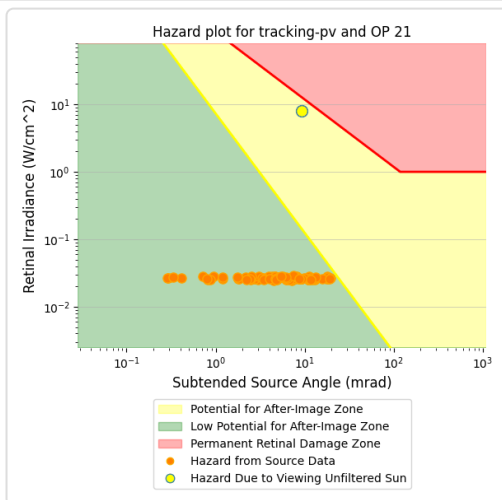
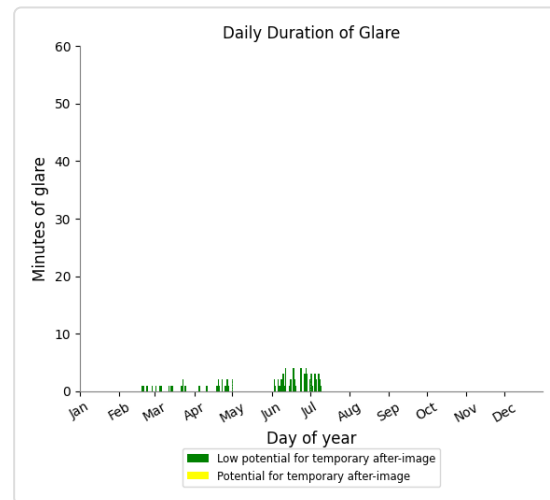
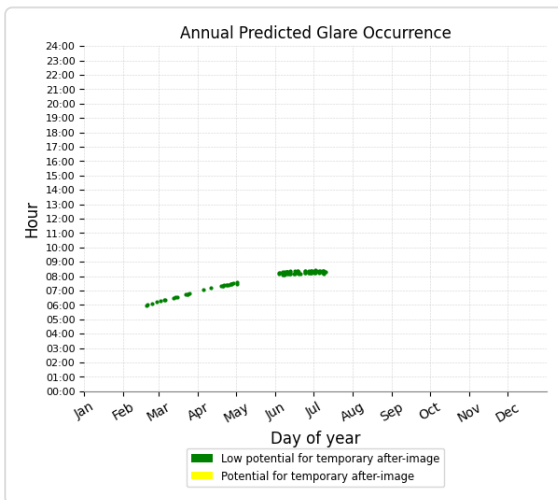
Green glare: 53 min.



Tracking PV and OP 21

Yellow glare: none

Green glare: 88 min.



Tracking PV and OP 1

No glare found

Tracking PV and OP 7

No glare found

Tracking PV and OP 8

No glare found

Tracking PV and OP 9

No glare found

Tracking PV and OP 10

No glare found

Tracking PV and OP 15

No glare found

Tracking PV and OP 16

No glare found

Tracking PV and OP 18

No glare found

Tracking PV and OP 19

No glare found

Tracking PV and OP 20

No glare found

Tracking PV and OP 22

No glare found

Tracking PV and OP 23

No glare found

Tracking PV and OP 24

No glare found

Tracking PV and OP 25

No glare found

Tracking PV and OP 26

No glare found

Tracking PV and OP 27

No glare found

Tracking PV and OP 28

No glare found

Assumptions

"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/ 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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