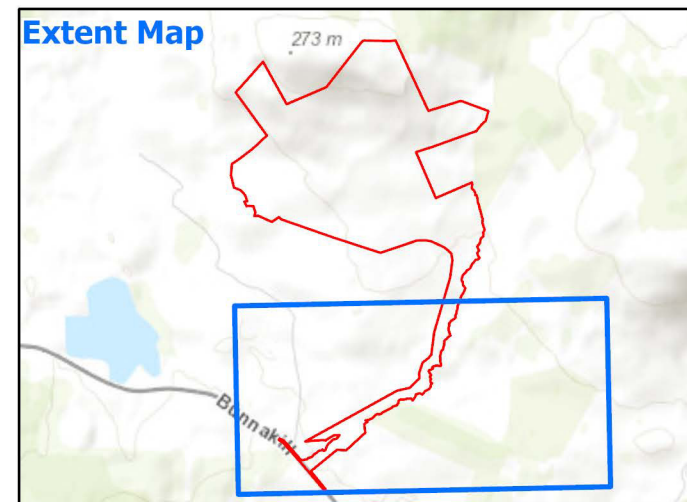


Legend

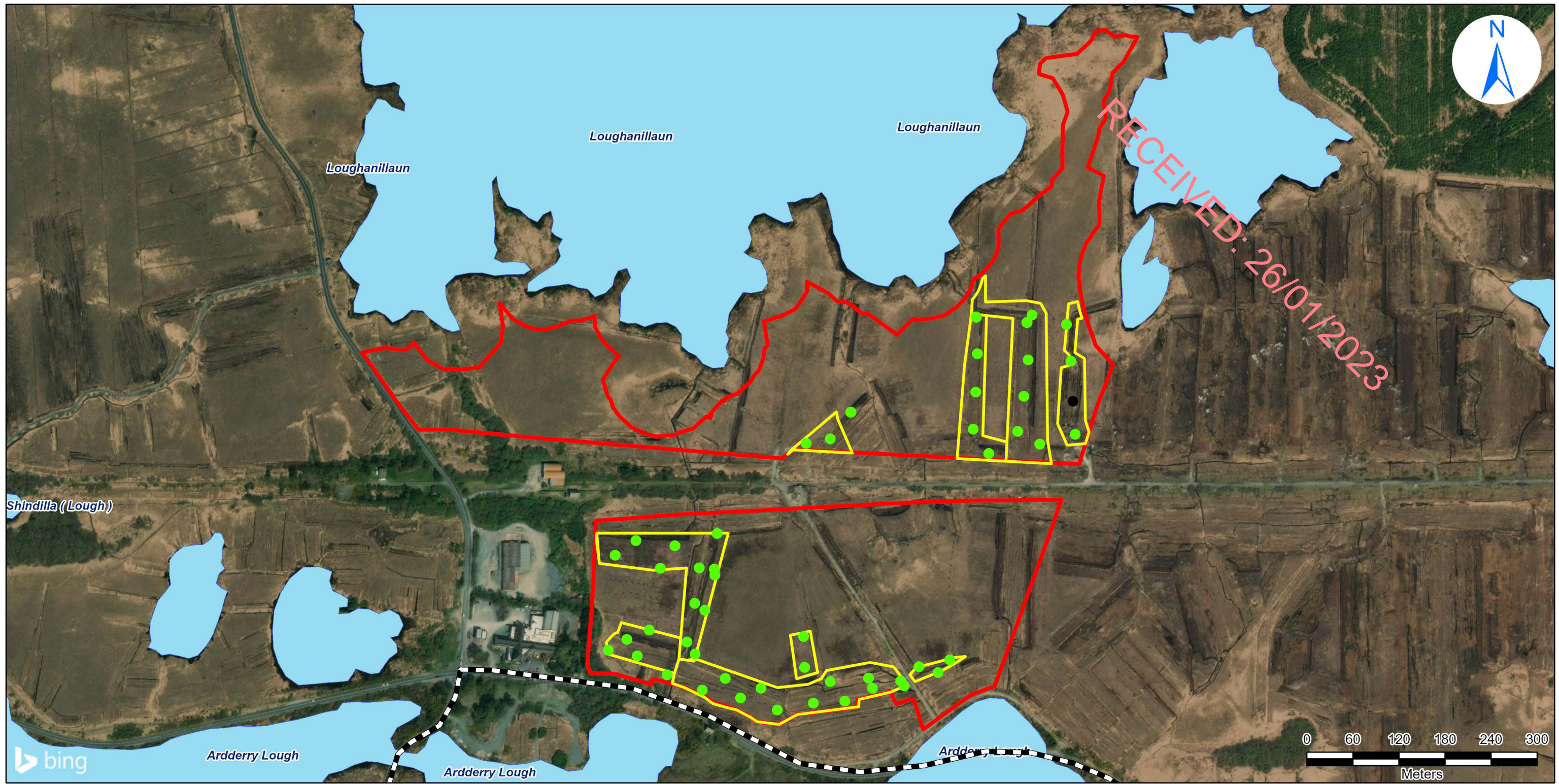
Safety Ratio +20 kPa Surcharge

- FOS N/A ($\leq 0.5m$ Peat)
- ≤ 1
- > 1

- Temporary Construction Compound
- Redline Boundary
- Hardstand and Roads
- Grid Connection Route



Client: Jennings O'Donovan & Partners	
Project: Tullaghmore Wind Farm	
Map Title: Calculated Safety Ratios + 20 kPa for Southern Extent of the Main Site	
Spatial Reference Name: IRENET95 Irish Transverse Mercator	
Figure Number: 12	Page Size: A3
Date Exported: 24/08/2022	Scale: 1:6,000
Revision Number: 5	Prepared By: DP
Tel: +353 (91) 897 583	Checked By: AG
Email: info@ecoquest.ie	
Web: www.ecoquest.ie	

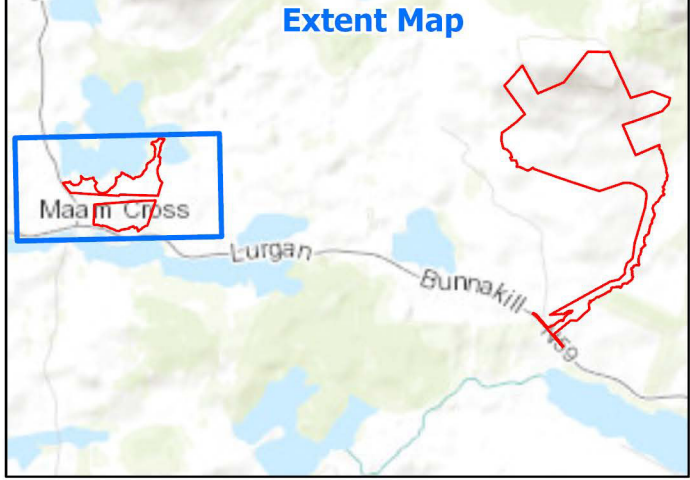


Legend

- Grid Connection Route
- Spoil Storage Areas
- Redline Boundary
- Lakes

Safety Ratio +20 kPa Surcharge

- FOS N/A ($\leq 0.5\text{m Peat}$)
- > 1



Client: Jennings O'Donovan & Partners	
Project: Tullaghmore Wind Farm	
Map Title: Calculated Safety Ratios + 20 kPa for Spoil Storage Areas	
Spatial Reference Name: IREN95 Irish Transverse Mercator	
Figure Number: 13	Page Size: A3
Date Exported: 24/08/2022	Scale: 1:5,000
Revision Number: 1	Prepared By: DP
Tel: +353 (91) 897 583	Checked By: AG
Email: info@ecoquest.ie	
Web: www.ecoquest.ie	

4.4. Slope Stability Analysis Conclusions

Based on the analyses presented, the locations of the turbines and the substation are considered to be stable. The results give rise to in-situ safety ratios for translational slides which are above the minimum required value for all locations analysed.

Safety ratios which include a surcharge of 20kPa to simulate loading of the peat (by traffic, floating roads or stockpiling) are also shown in Tables 4 and 5. The ratios show that some of the locations are considered to be potentially unstable in the long term without suitable mitigation measures, if they are surcharged by 20kPa (highlighted in red in Tables 4 and 5).

5. PSRA Discussion and Mitigation Measures

The desk study has identified that the site geology comprises predominantly blanket peat overlying shallow granite or quartzite bedrock.

Multiple site walkovers were undertaken which comprised peat probes, hand-held shear vanes and gouge cores at turbine and substation locations with additional peat probes and hand-held shear vane along the proposed access routes at nominal 100m centres. The investigation found a maximum depth of peat of 5.5m.

A quantitative translational landslide stability analysis was also undertaken for the area using information gained from the site walkover, in particular slope angles and peat shear strengths. The results showed that the in-situ safety ratios throughout the site are predominantly above the minimum safety factor required for long-term stability (see Figures 6 to 9). However, when a surcharge is added to the peat, the factor of safety at several locations falls below the minimum ratio of 1.0 (see Figures 10 to 13). The developer has committed to additional safety mitigation measures as outlined below which will be undertaken at these locations to ensure stability during construction.

Loading of the peat during or after construction will be avoided at all times but particularly at the following locations where a Safety Ratio of below 1.0 was calculated with a traffic loading of 20kPa (see Figures 10 to 13):

- To the north and west of turbine T3 (Figure 10).
- Between turbines T2 and T5 (Figure 10).
- At the northern corner of the T6 hardstanding (Figure 11).
- Access tracks south and southwest of T1 (Figures 11 and 12).

Additional mitigation measures to reduce the risk of peat instability will comprise the following:

- Avoidance of stockpiling on the peat, particularly in areas of deep peat or areas with a low safety ratio.
- Additional drainage in areas of construction where a low safety ratio has been calculated.
- Avoidance of drains discharging onto areas of weak or deep peat or areas of low safety ratios.
- Avoidance of blasting, particularly within 1km of areas of low safety ratios.

It should be noted that vehicular access to any areas of deep peat (>1m) during construction will be restricted to low ground pressure vehicles, with all construction vehicles travelling on existing access tracks whenever possible.

The risk of a peat slide occurring at the proposed locations of turbine T2, turbine T5 and the substation are considered to be low, while the risk of a peat slide occurring at the remaining four turbine locations is considered to be negligible due to a recorded peat depth of less than 0.5m. The risk of a slide occurring along the proposed grid route is also considered to be negligible due to a combination of low slopes and generally thin or absent peat in addition to the grid route being located within existing roads and pavements. The risks associated with construction of access roads is considered to be low, with implementation of the above mitigation measures. The developer has committed to properly implement and monitor these mitigation measures.

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Appendix 1: Site Walkover Test Results

Tullaghmore Windfarm. Site Walkover 1 Results 31st August to 3rd September 2020				
Point ID	Latitude	Longitude	Elevation	Probe Depth
1	53.45376098	-9.45720504	82.577873	0.8
2	53.45476798	-9.459832013	87.672867	4.1
3	53.45456203	-9.459765963	87.624695	3.5
4	53.45426297	-9.459777027	85.235786	2.7
5	53.45473101	-9.460193021	87.198959	4.1
6	53.45479103	-9.459483996	87.886169	3.2
7	53.45494702	-9.459940977	88.906212	3.6
8	53.455146	-9.460239038	91.43573	0.5
9	53.45585796	-9.461002965	98.901367	5.2
10	53.45651904	-9.461726993	99.310356	2.8
11	53.457389	-9.462659983	114.118149	1
12	53.45811697	-9.463479985	113.141838	3.6
13	53.45889498	-9.464290012	112.426315	4.1
14	53.45875299	-9.463986	114.336723	2.4
15	53.45867503	-9.464391014	111.196899	4.7
16	53.45906898	-9.464099994	113.615128	1.7
17	53.45902699	-9.464459997	112.757393	2.4
18	53.45922799	-9.464781024	113.596954	2.4
19	53.45982503	-9.465590967	112.822433	0.6
20	53.460308	-9.466066975	108.642319	0.1
21	53.46066398	-9.466513982	106.971741	0.3
22	53.46123101	-9.467410007	104.728493	1.6
23	53.46189603	-9.468428995	104.145363	1.8
24	53.46265996	-9.469189988	113.26017	0.3
25	53.46215302	-9.46872496	102.947632	0.9
26	53.46249903	-9.469058979	107.028969	0.9
27	53.46282701	-9.46904297	113.522011	0.3
28	53.46254898	-9.469482014	105.429405	0.3
29	53.46277697	-9.469438009	110.16423	0.4
30	53.46313496	-9.469889961	110.098145	0.7
31	53.46394197	-9.470610972	106.986366	0.8
32	53.464608	-9.471724005	104.273781	1
33	53.46523597	-9.472786998	106.292297	0.4
34	53.46586503	-9.473869018	109.951416	0.3
35	53.46664304	-9.474889012	116.550957	0.5
36	53.467269	-9.475362003	122.39225	0.5
37	53.46744401	-9.475395028	122.632431	0.6
38	53.46733798	-9.475653023	116.703224	0.3
39	53.46758399	-9.475540034	123.410065	0.3
40	53.46757703	-9.475156981	128.881424	0.3
41	53.46895603	-9.475606	148.939575	0.3
42	53.46753404	-9.472581977	170.923279	0.2
43	53.46821297	-9.470855976	207.114517	0.4

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44	53.46990301	-9.468942974	248.807388	0.7
45	53.47062998	-9.467200963	273.944275	0.3
46	53.47094002	-9.465973014	253.587921	2.7
47	53.471023	-9.46550698	254.527008	2.9
48	53.47109701	-9.465218978	250.932999	0.3
49	53.47120497	-9.465181008	249.778152	0.4
50	53.47107899	-9.46492997	254.241745	0.2
51	53.47088101	-9.46522099	255.453064	2.4
52	53.47068697	-9.464658983	247.593628	1.1
53	53.47002698	-9.463418964	236.866333	1.2
54	53.46949196	-9.462296041	225.008453	3.2
55	53.46915904	-9.462184981	223.721756	0.3
56	53.46863098	-9.461211003	208.633926	1
57	53.46804902	-9.460073998	195.772125	0.8
58	53.46804701	-9.460072992	198.071991	1
59	53.46757402	-9.459029026	180.251205	1
60	53.467743	-9.459200017	183.003448	1
61	53.46770704	-9.458836997	178.878479	1
62	53.46744502	-9.458830962	176.390839	0.5
63	53.46742096	-9.459266989	178.999329	0.5
64	53.46710597	-9.458640022	171.824982	0.3
65	53.46636099	-9.458140042	155.879517	1.2
66	53.46544703	-9.457719019	141.490173	1.8
67	53.46449601	-9.457565965	134.553528	2.4
68	53.46366202	-9.456854006	124.604164	1.4
69	53.46303999	-9.455756983	121.187187	1.1
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71	53.46318098	-9.45592504	121.123482	1.5
72	53.462911	-9.45597399	120.419174	0.9
73	53.46293899	-9.455534024	119.837234	0.9
74	53.462451	-9.454696001	114.35511	0.7
75	53.46207297	-9.453527983	109.363533	0.8
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79	53.45507199	-9.454071969	86.901314	0.5
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82	53.45448903	-9.451173004	99.874886	1.7
83	53.45466496	-9.450145969	100.684235	0.7
84	53.45473797	-9.450072041	100.784195	0.6
85	53.45483302	-9.450034993	100.635376	0.3
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94	53.46059298	-9.447087999	153.218094	0.2
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96	53.460827	-9.446850959	154.091217	0.2
97	53.46148901	-9.447031002	154.850098	0.3
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124	53.46742096	-9.434855031	279.292358	2.2
125	53.46769597	-9.43473299	276.483917	0.7
126	53.46618497	-9.436815977	279.441132	3.4
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128	53.46217398	-9.435897991	268.274078	0.5
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137	53.46214296	-9.445202993	174.650482	0.3

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139	53.455893	-9.452238008	99.805328	0.3
140	53.45441602	-9.455742985	84.534943	0.9
141	53.45361597	-9.457187019	81.741257	0.5
142	53.45276898	-9.457521038	76.288376	1.2
143	53.45208501	-9.458502978	73.085373	1.5
144	53.45130198	-9.458452016	71.419807	0.3
145	53.45078004	-9.459603019	70.366905	0.7
146	53.45043898	-9.460891988	67.619125	0..6
147	53.45000203	-9.462168971	67.839516	0.8
148	53.44957204	-9.463533964	61.930588	0.3
149	53.44920097	-9.464892	62.148785	0.3
150	53.44883099	-9.466223968	59.171219	0.2
151	53.44833403	-9.467327027	56.913158	0.1
152	53.45490402	-9.446111005	129.349045	0.1
153	53.45430002	-9.444387015	133.913116	0.3
154	53.45378302	-9.441467011	142.387329	0.3
155	53.45387296	-9.44118496	147.256882	0.3
156	53.45369602	-9.440841973	146.540375	0.2
157	53.45343199	-9.440662013	144.714249	1.8
158	53.446445	-9.44665499	102.27813	0.7
159	53.44653603	-9.447062016	101.583359	2.2
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161	53.44902	-9.45891696	83.79406	1.5
162	53.44908999	-9.459181996	82.556564	2.9
163	53.44912302	-9.459303031	78.332939	0.8
164	53.44886301	-9.459135979	77.807182	1.5
165	53.44942703	-9.459219966	78.009567	1
166	53.45494299	-9.454457033	94.018059	0.2
167	53.45538304	-9.453180972	100.444138	1.1
168	53.45601101	-9.452097025	106.191811	0.7
169	53.45680403	-9.451179039	110.685715	0.3
170	53.45795503	-9.451012993	114.337349	0.2
171	53.45883102	-9.451248022	112.437088	0.2
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180	53.46421304	-9.456066024	130.951752	1.8
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182	53.46395002	-9.459477039	133.795013	0.8
183	53.46397801	-9.460742036	132.791138	0.6
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194	53.45181302	-9.543718016	44.2085	1.1
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196	53.44887299	-9.543741988	43.443512	2.2
197	53.44740397	-9.543712987	46.431938	0.3
198	53.44612598	-9.544248004	40.020012	0.2
199	53.444619	-9.54482602	38.140587	1.2
200	53.44380897	-9.545460027	38.13306	0.1
201	53.44291697	-9.545606039	39.795071	3.8
202	53.44169204	-9.54461203	36.799824	0.5
203	53.44092401	-9.544337019	36.043213	3.6
204	53.44044004	-9.544119006	34.239067	0.3
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206	53.43828396	-9.543799991	34.944813	0.8
207	53.43721803	-9.543315014	35.814468	1.7
208	53.43548398	-9.543538978	34.542713	1.8
209	53.43431102	-9.543770989	35.370724	1.5
210	53.43320997	-9.544070978	36.268158	1.1
211	53.43151297	-9.543942986	34.815357	1.7
212	53.43069004	-9.543677028	33.196659	0.3
213	53.42895498	-9.544314975	33.494728	0.3
214	53.42784698	-9.545694971	36.144257	1.1
215	53.42716302	-9.547157027	36.901398	0.5
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218	53.42369299	-9.550516997	31.114046	0.2
219	53.42248499	-9.550055992	32.585533	0.3
220	53.42173699	-9.548764005	32.888306	0.2
221	53.42099503	-9.54729801	32.082592	0.7
222	53.42028801	-9.545585001	31.86355	0.3
223	53.41923801	-9.545328012	27.385502	0.3
224	53.41840301	-9.544585962	25.115406	0.5
225	53.41762098	-9.544135015	23.609667	0.4
226	53.41676703	-9.543421967	21.483723	0.6
227	53.41560597	-9.542630967	24.657139	0.4
228	53.41462998	-9.540630039	20.679695	1.3
229	53.41308502	-9.539025994	20.013466	0.3
230	53.41131301	-9.53909196	22.644917	0.7
231	53.410477	-9.540237011	22.669479	0.3

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232	53.40894797	-9.54078896	22.070173	0.2
233	53.40808497	-9.542103997	22.679953	0.4
234	53.40691301	-9.54244799	12.903727	0.4
235	53.40582403	-9.542140961	9.155997	0.3
236	53.40440799	-9.542120006	7.931431	0.3
237	53.40255601	-9.543509977	3.237064	2.1
238	53.40083999	-9.544422012	3.124165	1.9
239	53.39958102	-9.544731975	6.029983	1.2
240	53.39864099	-9.545084015	7.600652	2.1
241	53.397117	-9.546171986	8.240019	1.8
242	53.39548303	-9.547491968	9.033074	1.5
243	53.39391301	-9.546975978	7.011837	0.5
244	53.39284801	-9.545998983	10.206551	1
245	53.391754	-9.54536397	11.126297	1.2
246	53.39082596	-9.545567986	10.190065	0.7
247	53.38981703	-9.547233973	14.052756	0.4
248	53.38842404	-9.549330035	16.78602	0.3
249	53.38754	-9.55023	22.315189	0.3
250	53.38586597	-9.551634975	20.774914	0.3
251	53.38504496	-9.553255029	14.864775	0.2
252	53.38466702	-9.554333026	15.220066	0.2
253	53.38428598	-9.557367023	7.431934	0.3
254	53.38446602	-9.558601007	10.019199	0.5
255	53.38496097	-9.561053971	7.822348	0.5
256	53.38447499	-9.563617995	7.868964	2.5
257	53.38374401	-9.567195978	9.521697	2.8
258	53.38372196	-9.569205036	11.697447	1.3
259	53.38390896	-9.572799029	14.113009	0.8
260	53.38443803	-9.575699	2.979757	0.9
261	53.38432202	-9.578051968	6.437558	0.5
262	53.38255503	-9.580422034	8.795775	0.5
263	53.38140403	-9.582555983	7.688953	0.2
264	53.38071403	-9.584694039	7.278439	0.5
265	53.45583298	-9.539189022	45.557404	0.5
266	53.454872	-9.532704027	43.556396	2.6
267	53.45510501	-9.528913982	42.719723	2.4
268	53.45452096	-9.527236009	39.710911	1.7
269	53.45345596	-9.525485029	46.637932	1.5
270	53.45312697	-9.523528023	46.769634	1.2
271	53.45342897	-9.518671967	43.765453	0.9
272	53.45376299	-9.515419034	41.404118	0.3
273	53.45375997	-9.513037987	43.379921	0.5
274	53.45395301	-9.510497013	45.464767	0.8
275	53.45395703	-9.507926032	41.902966	2.1
276	53.45366299	-9.50659004	42.609348	3
277	53.45360801	-9.503066037	48.655746	2.5
278	53.45348898	-9.500354994	43.855637	2.2

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279	53.45328597	-9.497121004	45.727081	1
280	53.45292899	-9.494674997	49.619598	0.3
281	53.45214402	-9.492609026	47.979141	1.8
282	53.45174496	-9.491368001	47.021183	1.8
283	53.45118002	-9.489276968	46.675083	2.2
284	53.45085296	-9.485708959	48.702251	1.3
285	53.45090501	-9.484322006	50.697739	3
286	53.45080904	-9.481932996	56.581097	0.3
287	53.45072002	-9.480283018	60.492817	0.5
288	53.44994201	-9.477539035	58.225567	1.5
289	53.44848901	-9.474001033	50.007256	1.6
290	53.447811	-9.47244904	48.566151	0.5

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