



WISD

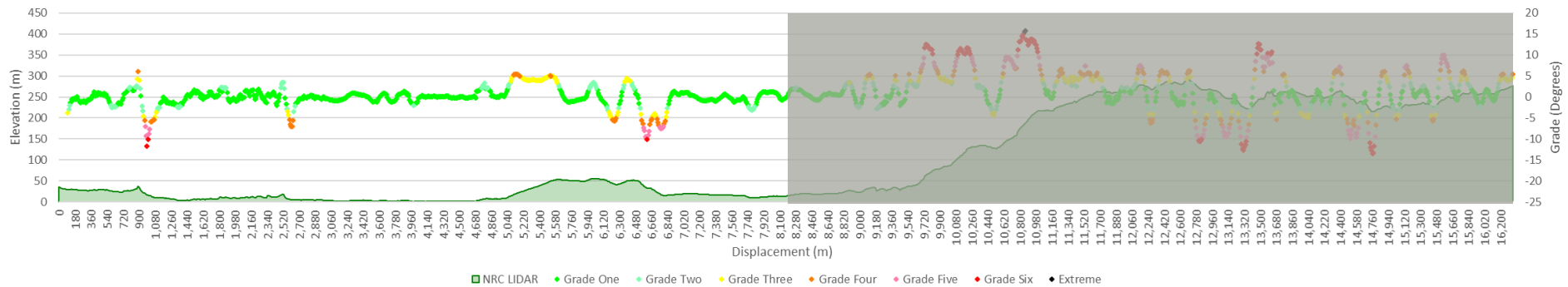
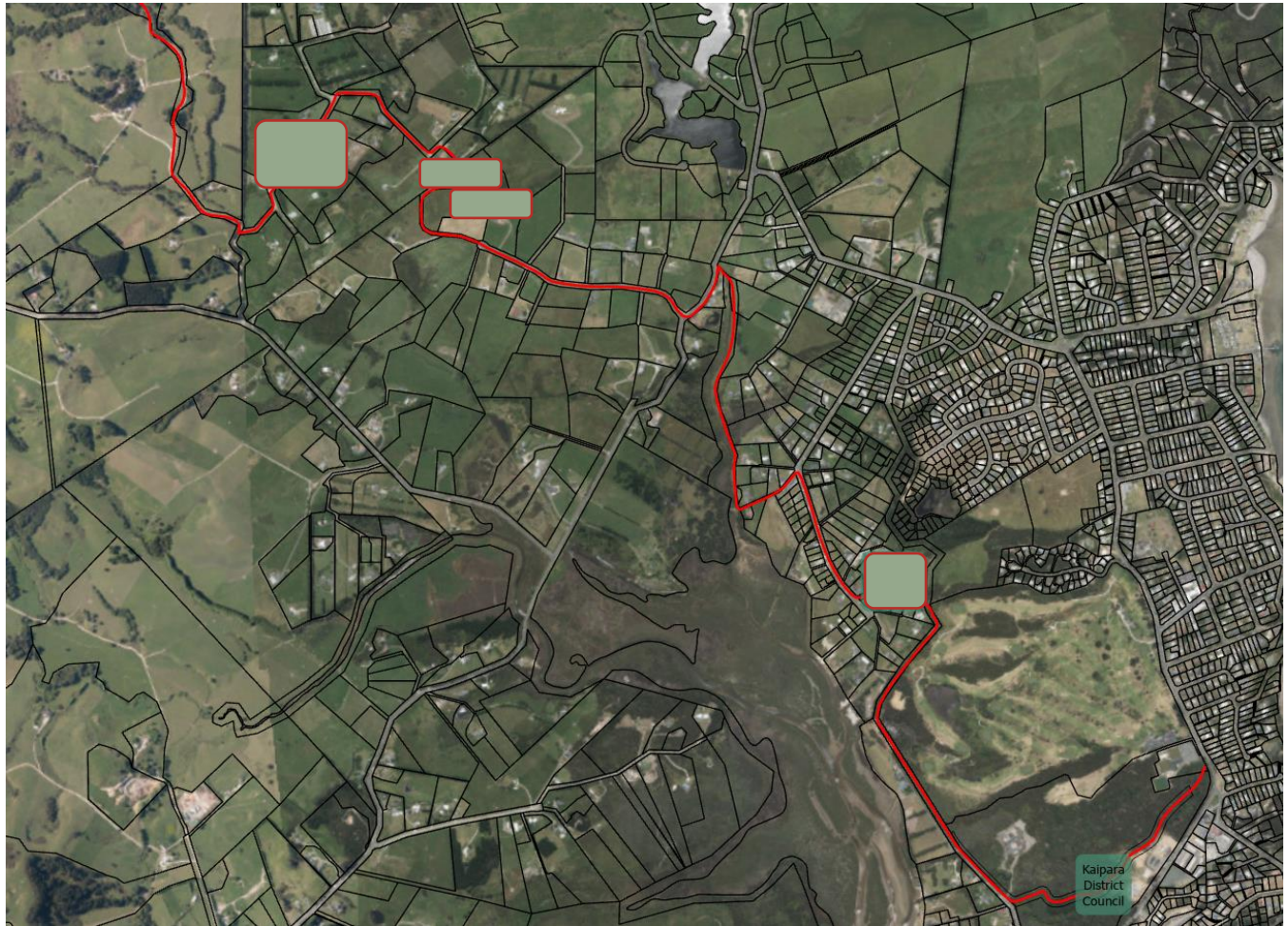
Mangawhai to Langs Cycleway Routes

Preliminary Study (Draft Version 1)

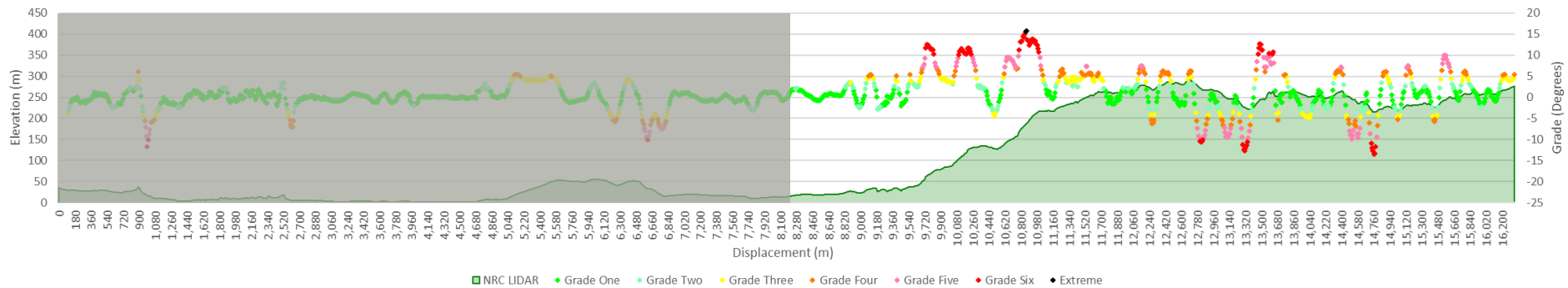
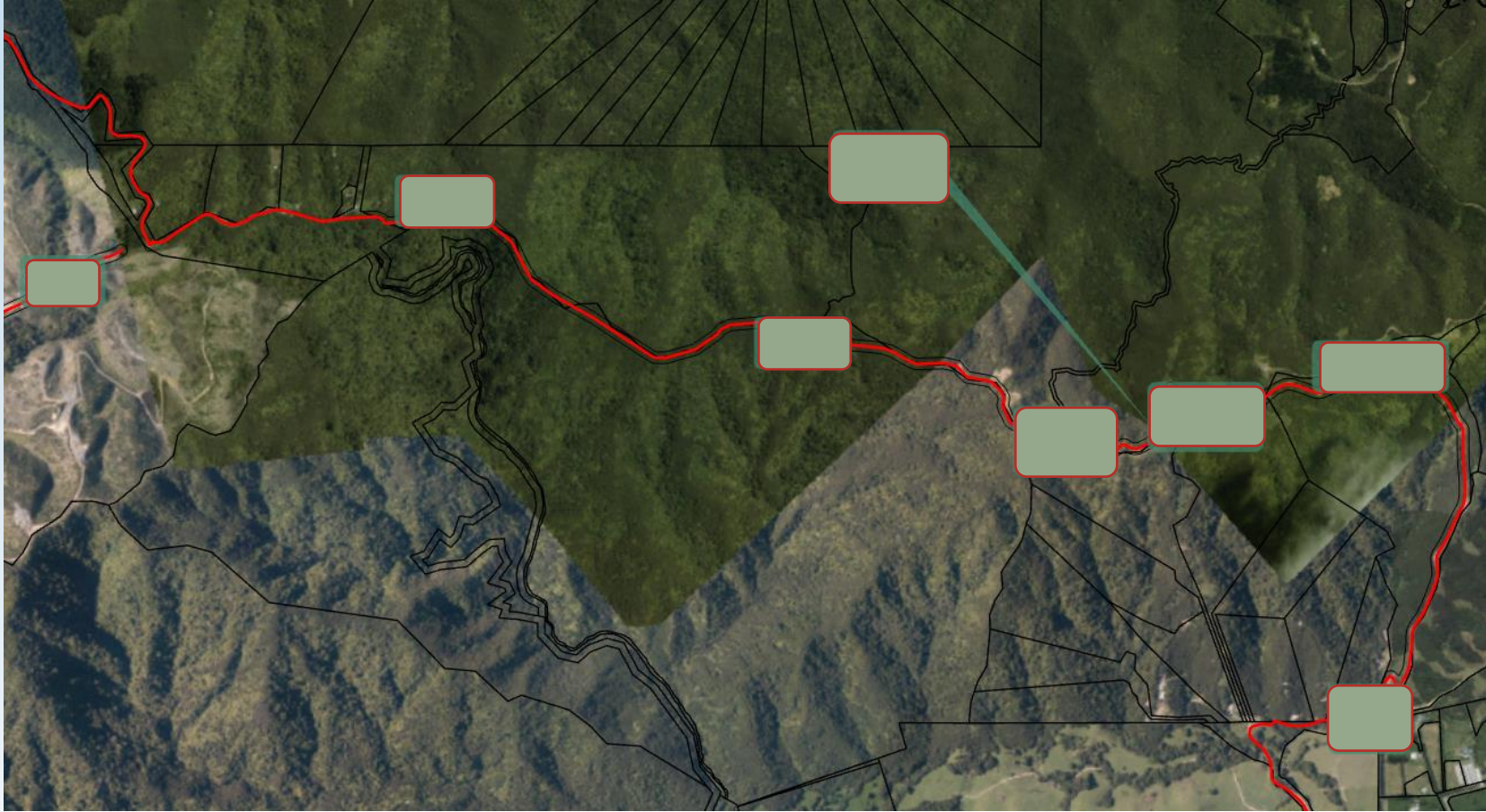




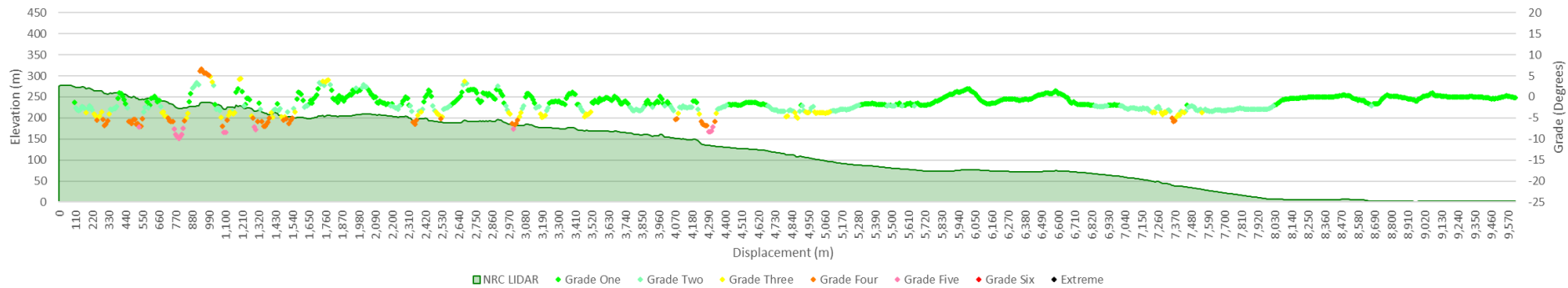
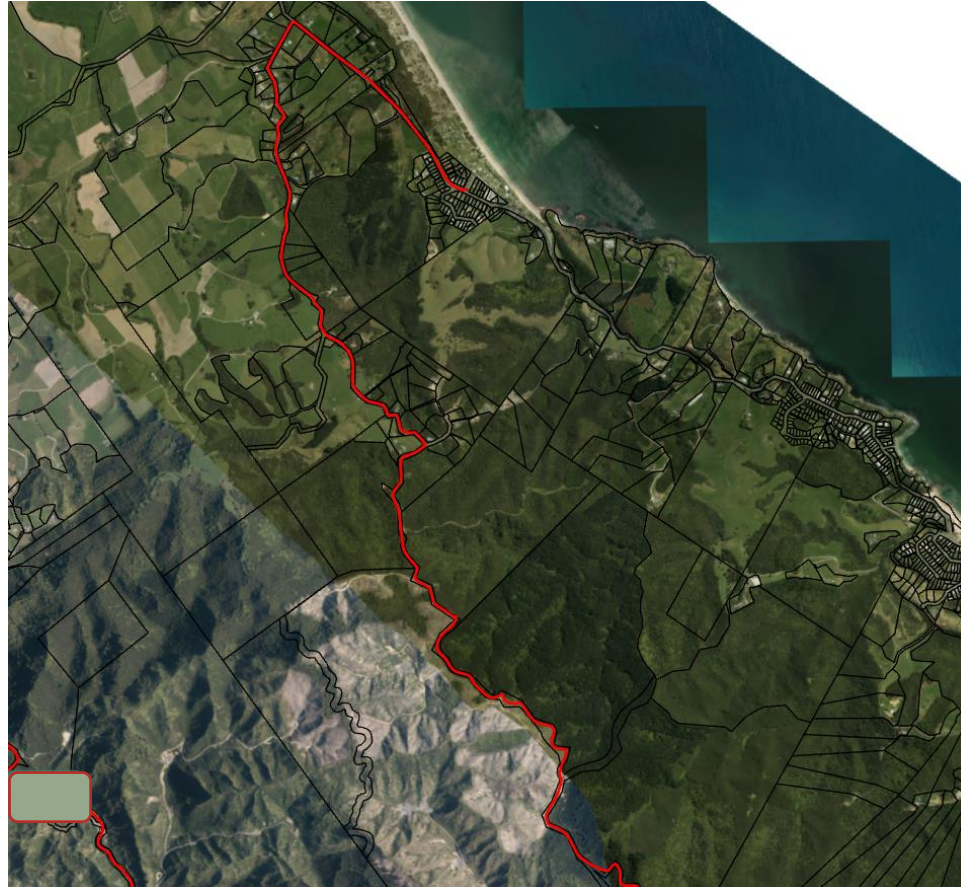
Mangawhai Heads to Cullen Road (One)



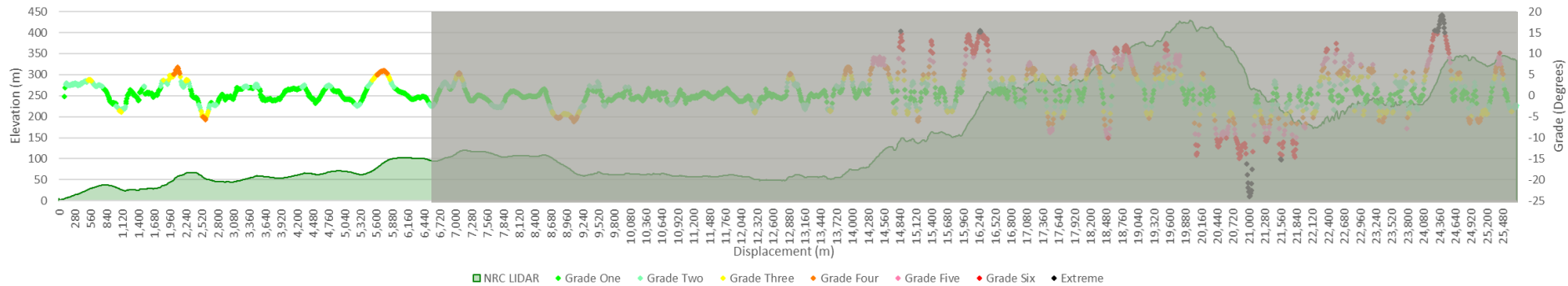
Mangawhai Heads to Cullen Road (Two)



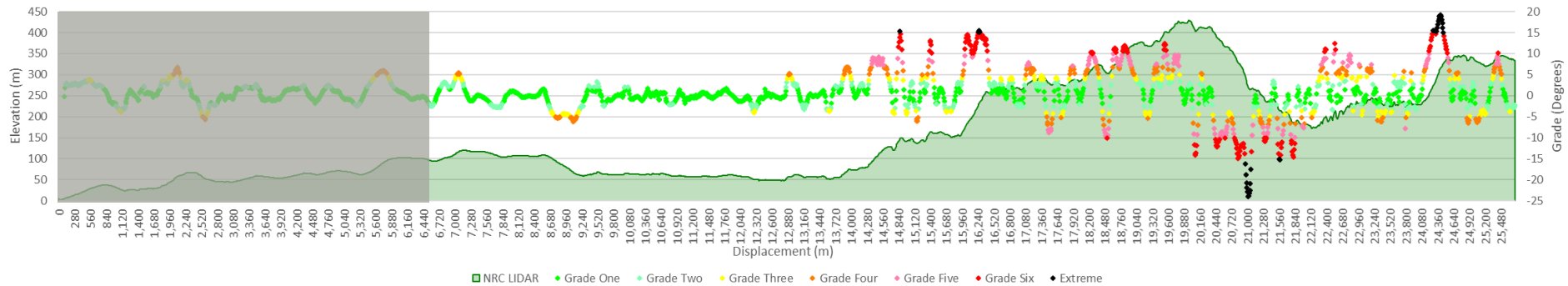
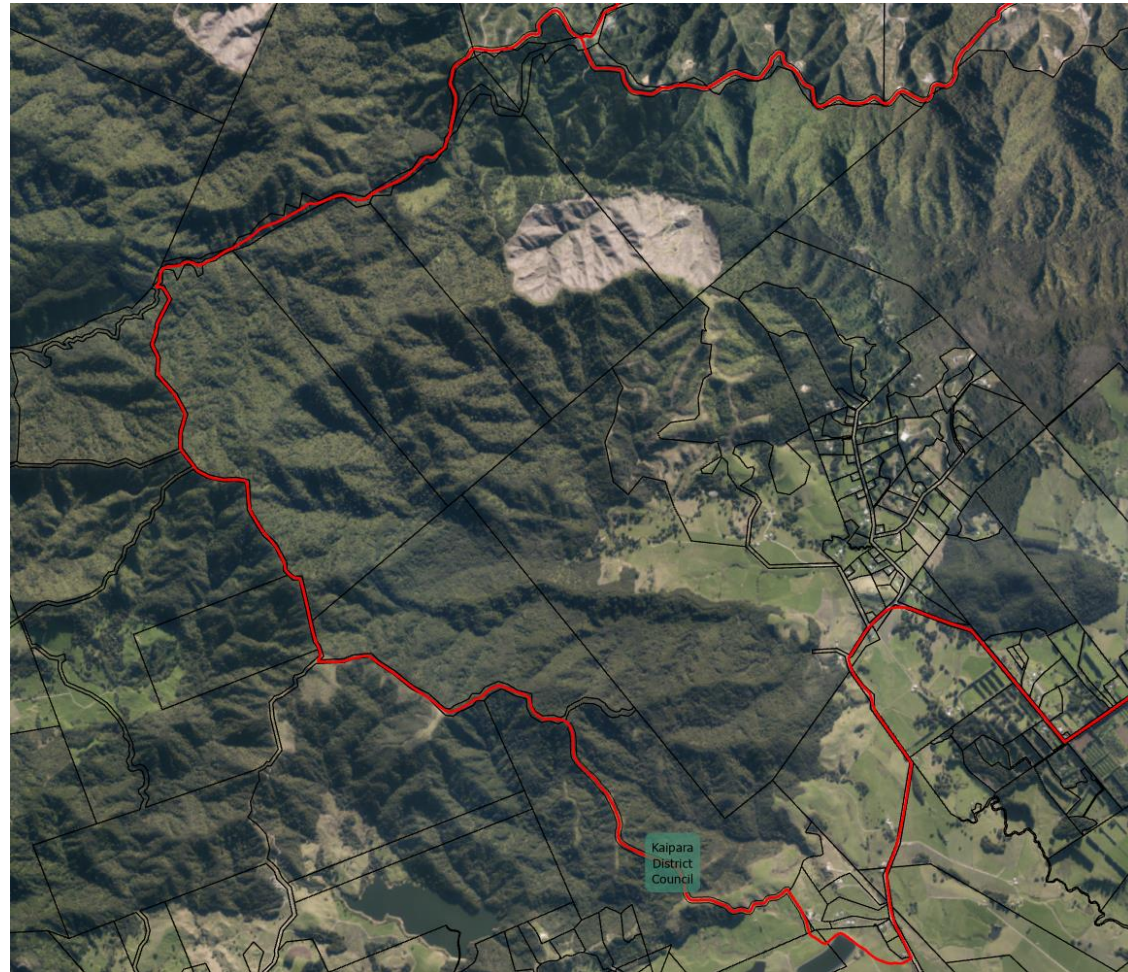
Cullen Road to Waipu



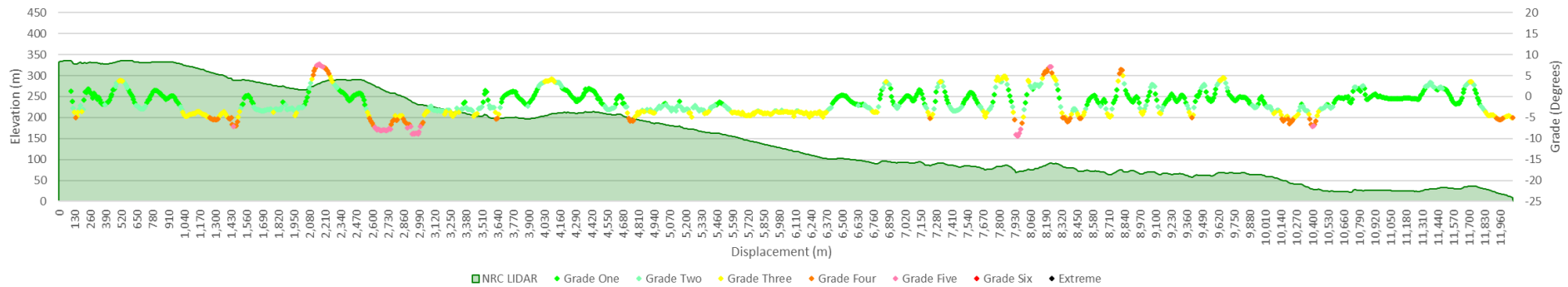
Mangawhai to Artillery Road (One)



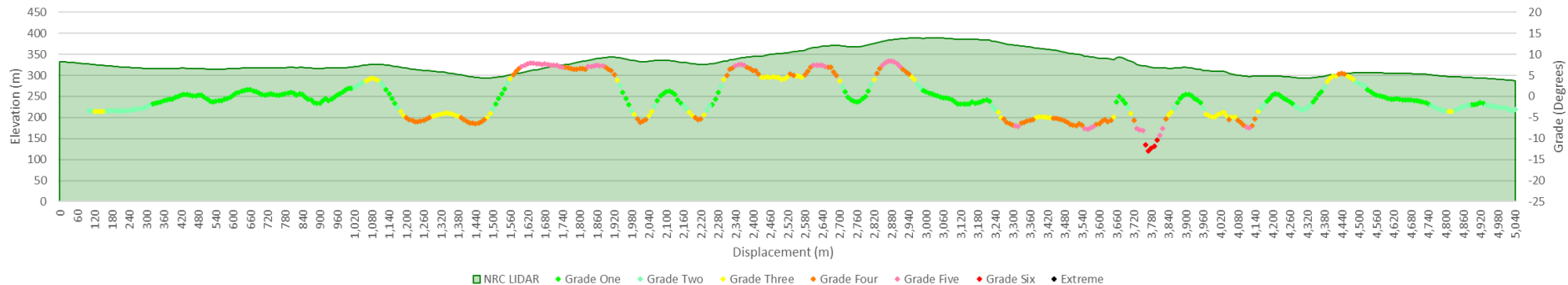
Mangawhai to Artillery Road (Two)



Artillery Road to Waipu

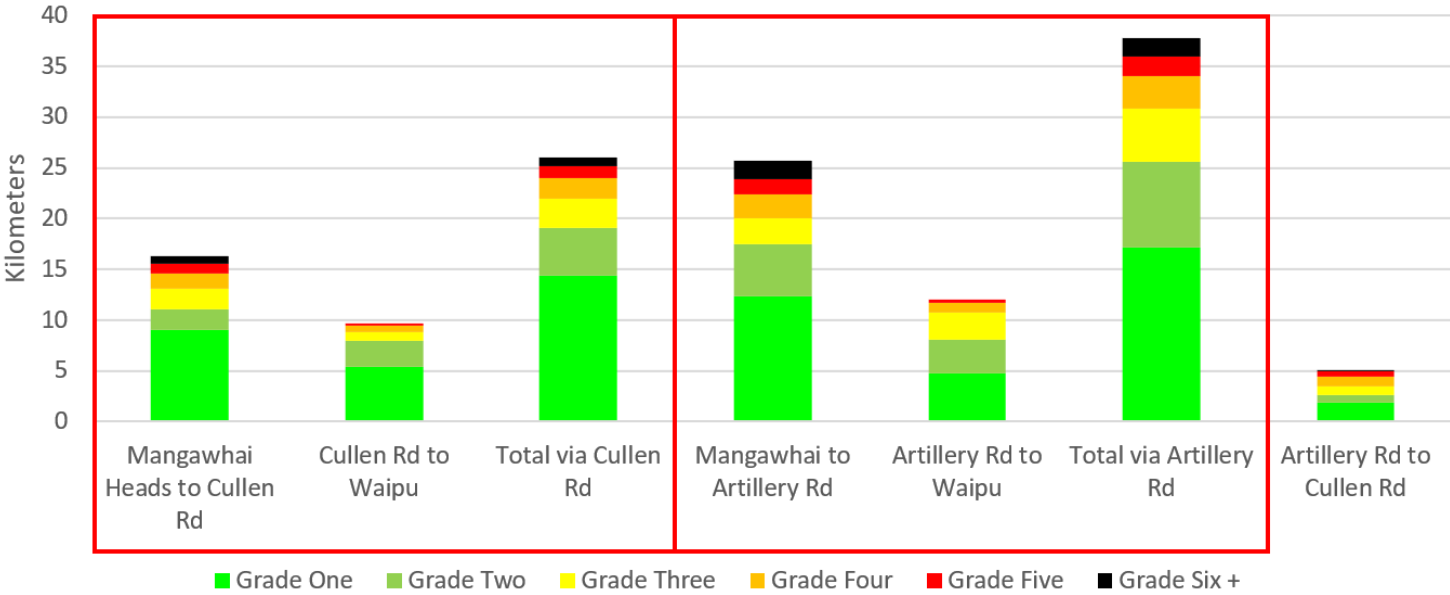


Artillery Road to Cullen Road

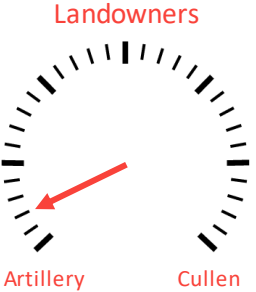
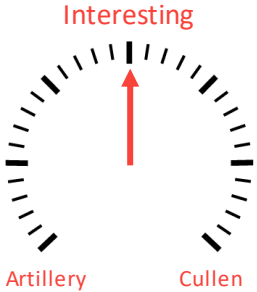
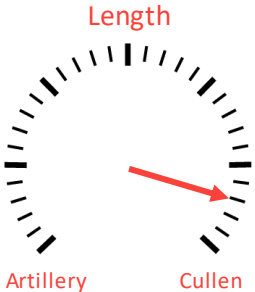
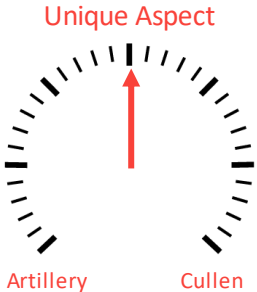
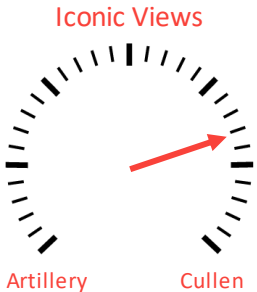
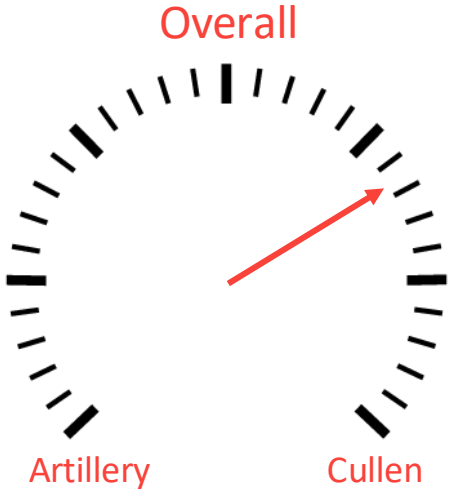


Route Summary

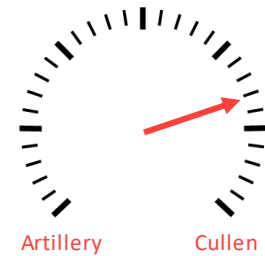
Route	Distance (km)	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six +	Total ≤ Four
Mangawhai Heads to Cullen Rd	16.4	55%	12%	12%	9%	6%	5%	88%
Cullen Rd to Waipu	9.6	56%	27%	9%	6%	2%	0%	98%
Total via Cullen Rd	26	55%	18%	11%	8%	5%	3%	92%
Mangawhai to Artillery Rd	25.7	48%	20%	10%	9%	6%	7%	87%
Artillery Rd to Waipu	12.1	39%	28%	22%	7%	3%	0%	96%
Total via Artillery Rd	37.8	45%	22%	14%	9%	5%	5%	90%
Artillery Rd to Cullen Rd	5.1	36%	16%	16%	20%	10%	1%	86%
Total	68.9	48%	20%	13%	9%	5%	4%	90%



Route Marketability

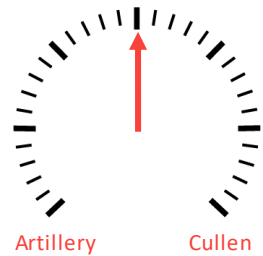


Iconic Views



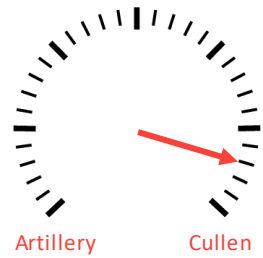
- The Cullen Route passes closer to the coast, and will have more / better coastal lookouts along the way
- Both routes start and end at Waipu and Mangawhai respectively
- Both routes will pass through the Brynderwyn Range
 - The Artillery route has a maximum elevation of almost 450m which could provide some great views over the land to the ocean
 - The Cullen route has a maximum elevation of nearly 300m which will also provide good great views to the users of the track
- The views of natural forest (large trees and landscape) could be iconic on both routes

Unique Aspect



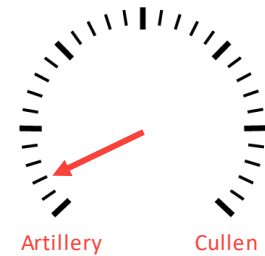
- Both routes will explore the untamed forest of the Brynderwyn range, there are currently no cycleways through the range
- The view through each route will be equally unique

Length



- Mangawhai to Waipu via Cullen = 26.0km
- Mangawhai to Waipu via Artillery = 37.8km
- The route via Cullen is over 10km (30%) shorter than the Artillery route. Most of this additional length is through the Brynderwyn range and will add significant time and difficulty to the average cyclist.

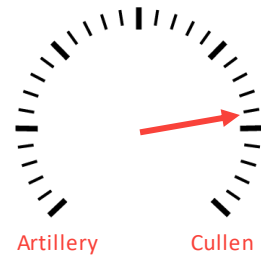
Land Owners



- Cullen
 - Council 1
 - Other Govt 1
 - Company 2
 - Private 6
 - Shared Driveway 1
 - Forestry 1
- Artillery
 - Council 1
 - Company 1

There are many more landowners to deal with if on the Cullen route, while the Artillery route has only a few landowners who are likely to be much easier to deal with.

Track Grade



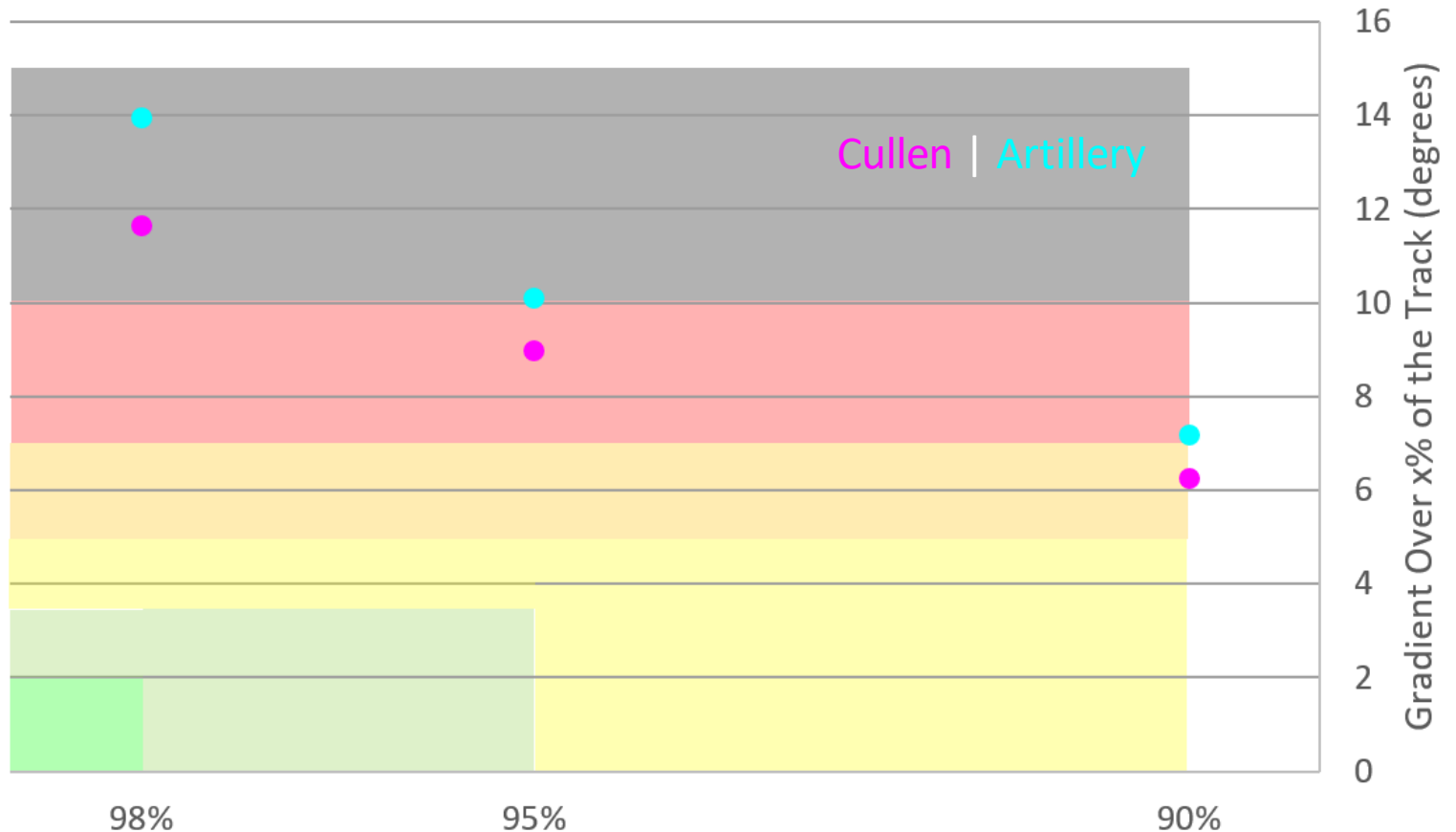
- Grade 3 Requirement
 - 90% length: 0 – 5 degrees
 - Max 100m: 5 – 7 degrees
 - Max 10m: 7 – 10 degrees
- Grade 4 Requirement
 - 90% length: 0 – 7 degrees
 - Max 100m: 7 – 9 degrees
 - Max 10m: 9 – 12 degrees
- Grade 5 Requirement
 - 90% length: 0 – 10 degrees
 - Max 100m: 10 – 13 degrees
 - Max 10m: 10 – 15 degrees

Percentage of Length	Artillery	Cullen
0.98	13.95	11.65
0.95	10.11	8.98
0.9	7.18	6.24

100m Slope	Artillery	Cullen
0 to 2	1704	1431
2 to 3	576	327
3 to 5	785	418
5 to 7	321	207
7 to 9	145	79
9 to 13	149	98
13 to 17	62	18
17 +	18	0

10m Slope	Artillery	Cullen
0 to 3	1953	1472
3 to 4	389	264
4 to 6	530	327
6 to 10	492	310
10 to 12	131	68
12 to 15	120	68
15 to 20	97	60
20 +	65	26

Track Gradient - % Length



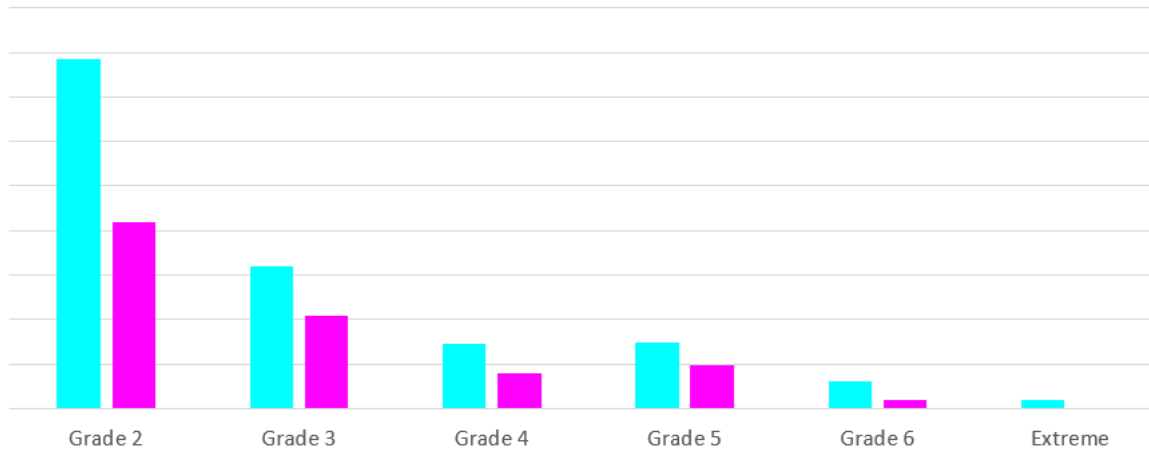
The above data is collected from Northland LIDAR. It shows the maximum gradient at 90, 95 and 98 percent for each of the proposed trails.

Without any earthworks, Cullen sits in the middle of the Grade 4 band, while Artillery sits at the bottom of the Grade 5 band.

Neither route is close to meeting the 98 or 95% criteria for Grade 1 and 2 respectively.

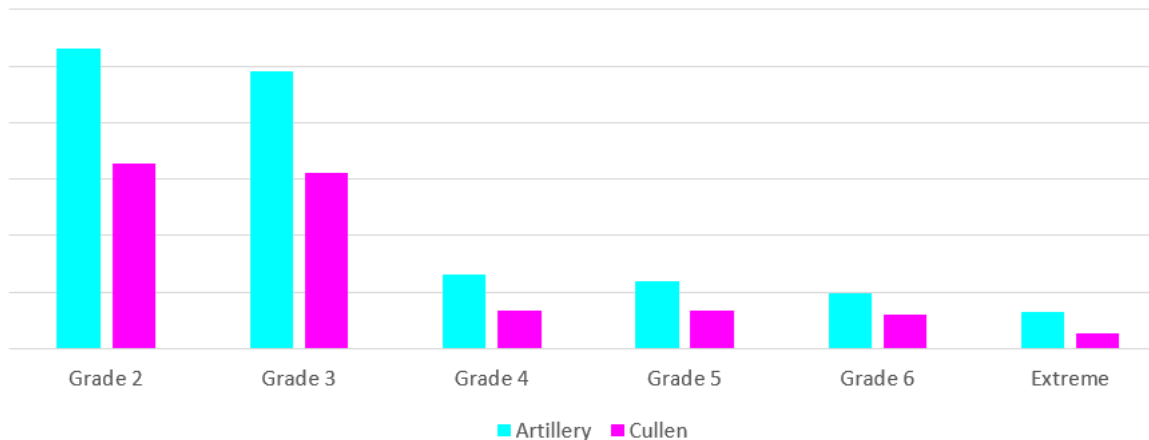
Track Gradient – Maximum Gradient

Maximum 100m Gradient



Over any 100m stretch, the gradient on the Cullen route matches the Grade 6 requirements while the Artillery route exceeds grade 6.

Maximum 10m Gradient



LIDAR over 10m sections could have some errors, so the 10m graph is indicative only, and majority of steep sections over 10m could probably be smoothed out with earthworks.

We still see a trend that the Cullen route has a better grade than Artillery.