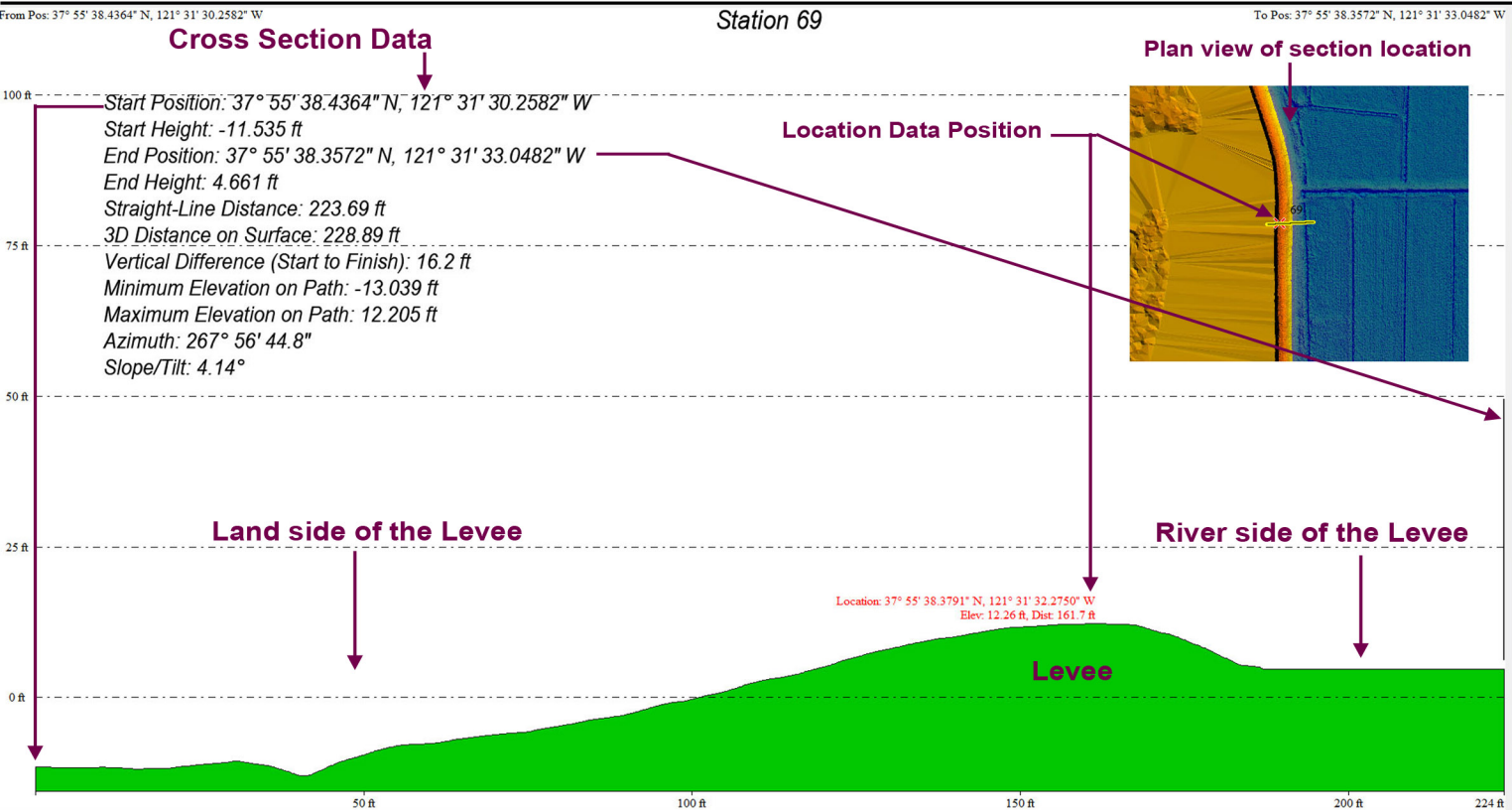


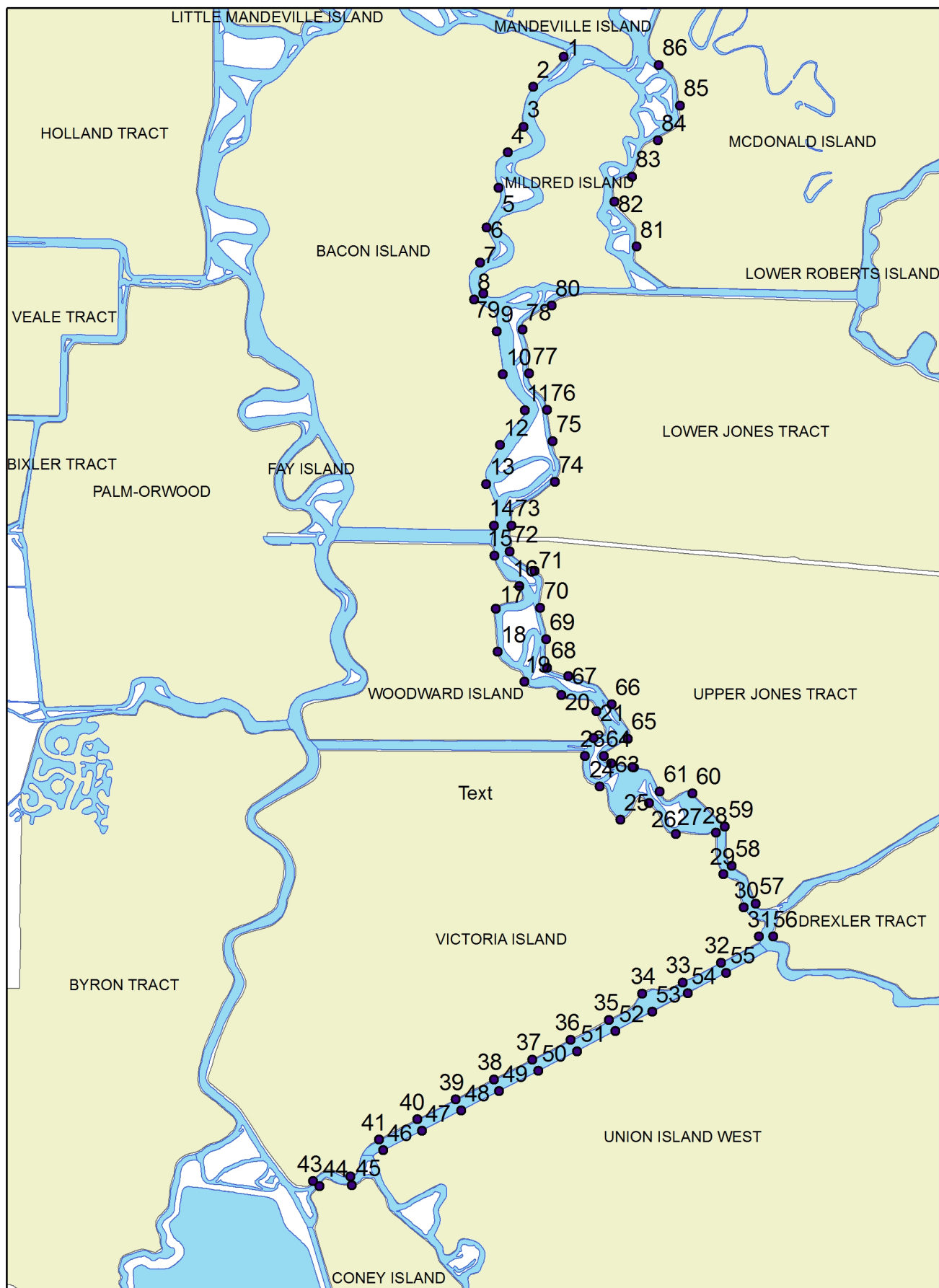
Middle River Cross Sections of Delta Lidar Data

November 2011

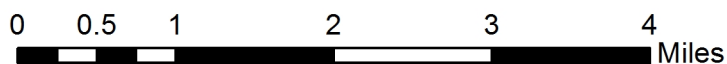
Cross Section Descriptor



See Appendix A for a full description of the Lidar dataset



Cross Section Spacing = 2,000 ft



Data Source Date: 11/06/2007

Data Source: The work was conducted under contract issued by California Department of Water Resources to URS Corporation. The prime LIDAR creation subcontractor was EarthData International.

Vertical accuracy: 95% at 0.6' (<18.5cm) and 90% at 0.5' (15cm)

Horizontal accuracy: 1.0' (30cm), 1 sigma.

From Pos: 38° 00' 5.2107" N, 121° 31' 28.6719" W
125 ft

Station 1

To Pos: 38° 00' 3.9616" N, 121° 31' 26.2425" W

Start Position: 38° 00' 5.2107" N, 121° 31' 28.6719" W

Start Height: -4.566 ft

End Position: 38° 00' 3.9616" N, 121° 31' 26.2425" W

End Height: 4.226 ft

Straight-Line Distance: 231.89 ft

3D Distance on Surface: 236.04 ft

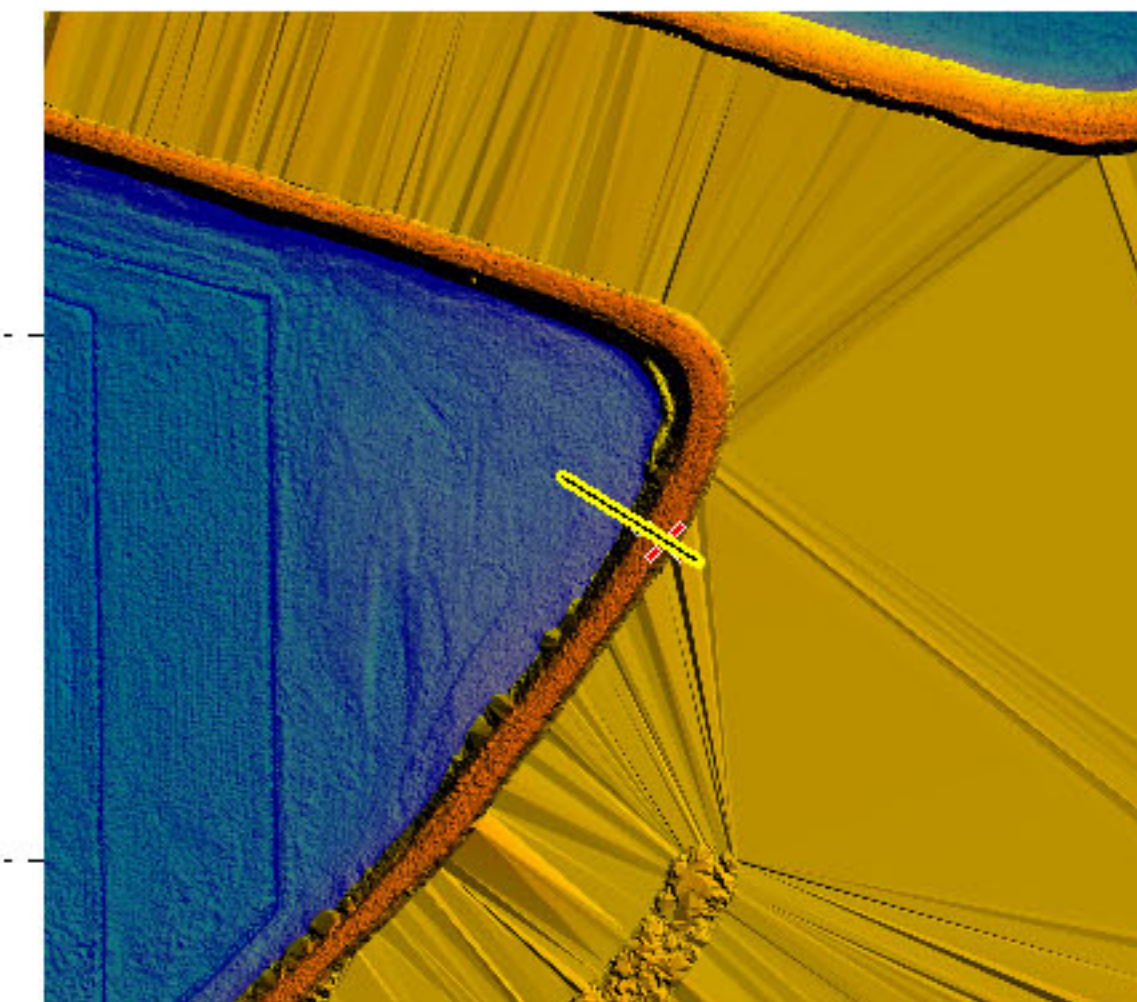
Vertical Difference (Start to Finish): 8.8 ft

Minimum Elevation on Path: -4.566 ft

Maximum Elevation on Path: 11.881 ft

Azimuth: 123° 00' 53.1"

Slope/Tilt: 2.17°



100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

232 ft

Location: 38° 00' 4.2454" N, 121° 31' 26.7944" W
Elev: 11.94 ft, Dist: 179.22 ft

Station 2

175 ft

150 ft

125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Start Position: 37° 59' 52.1124" N, 121° 31' 47.0282" W

Start Height: -14.212 ft

End Position: 37° 59' 49.8265" N, 121° 31' 43.8979" W

End Height: 4.106 ft

Straight-Line Distance: 340.97 ft

3D Distance on Surface: 348.42 ft

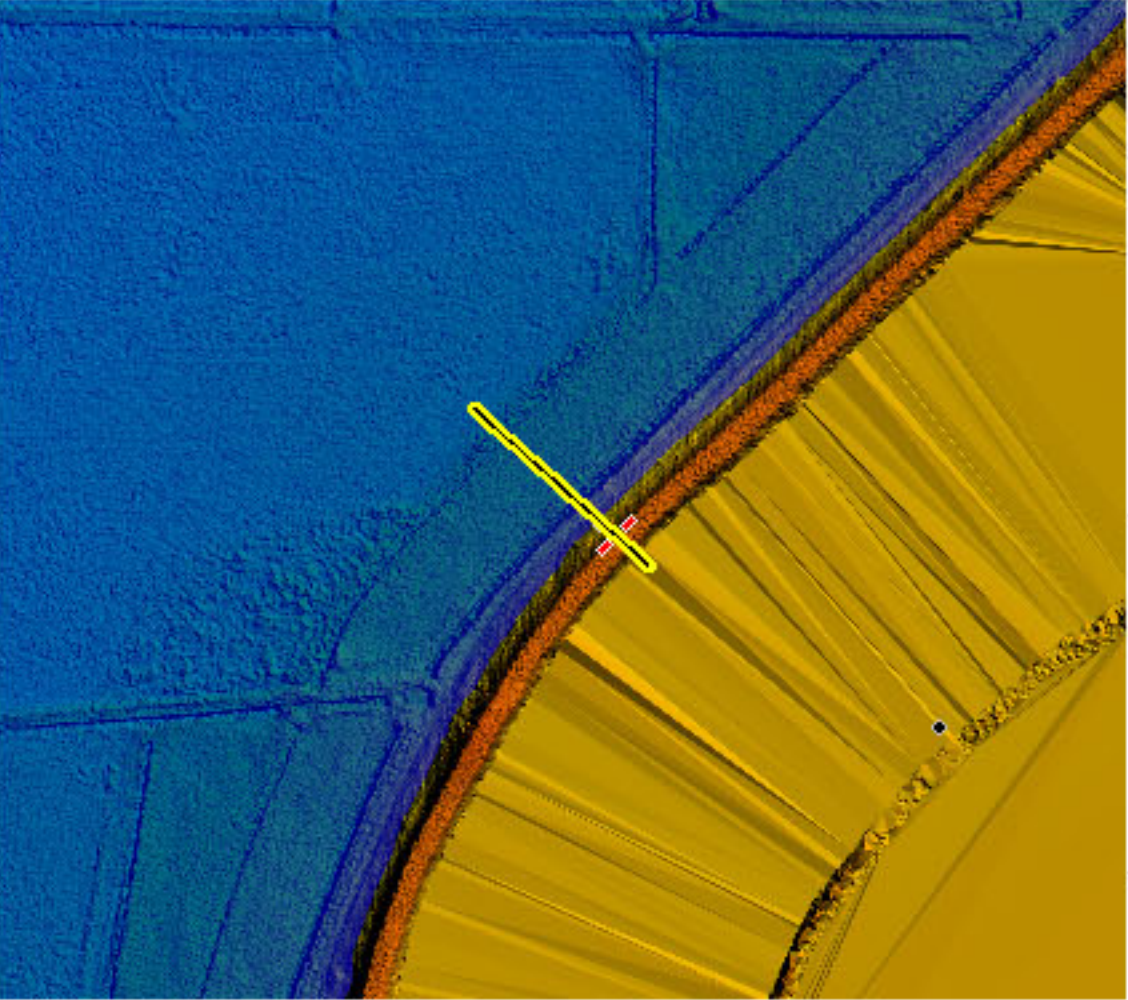
Vertical Difference (Start to Finish): 18.3 ft

Minimum Elevation on Path: -14.212 ft

Maximum Elevation on Path: 11.099 ft

Azimuth: 132° 42' 0.2"

Slope/Tilt: 3.08°



Location: 37° 59' 50.2505" N, 121° 31' 44.4785" W
Elev: 10.79 ft, Dist: 277.72 ft



Start Position: 37° 59' 31.3144" N, 121° 31' 52.6403" W

Start Height: -8.529 ft

End Position: 37° 59' 32.4120" N, 121° 31' 49.0576" W

End Height: 4.174 ft

Straight-Line Distance: 307.55 ft

3D Distance on Surface: 316 ft

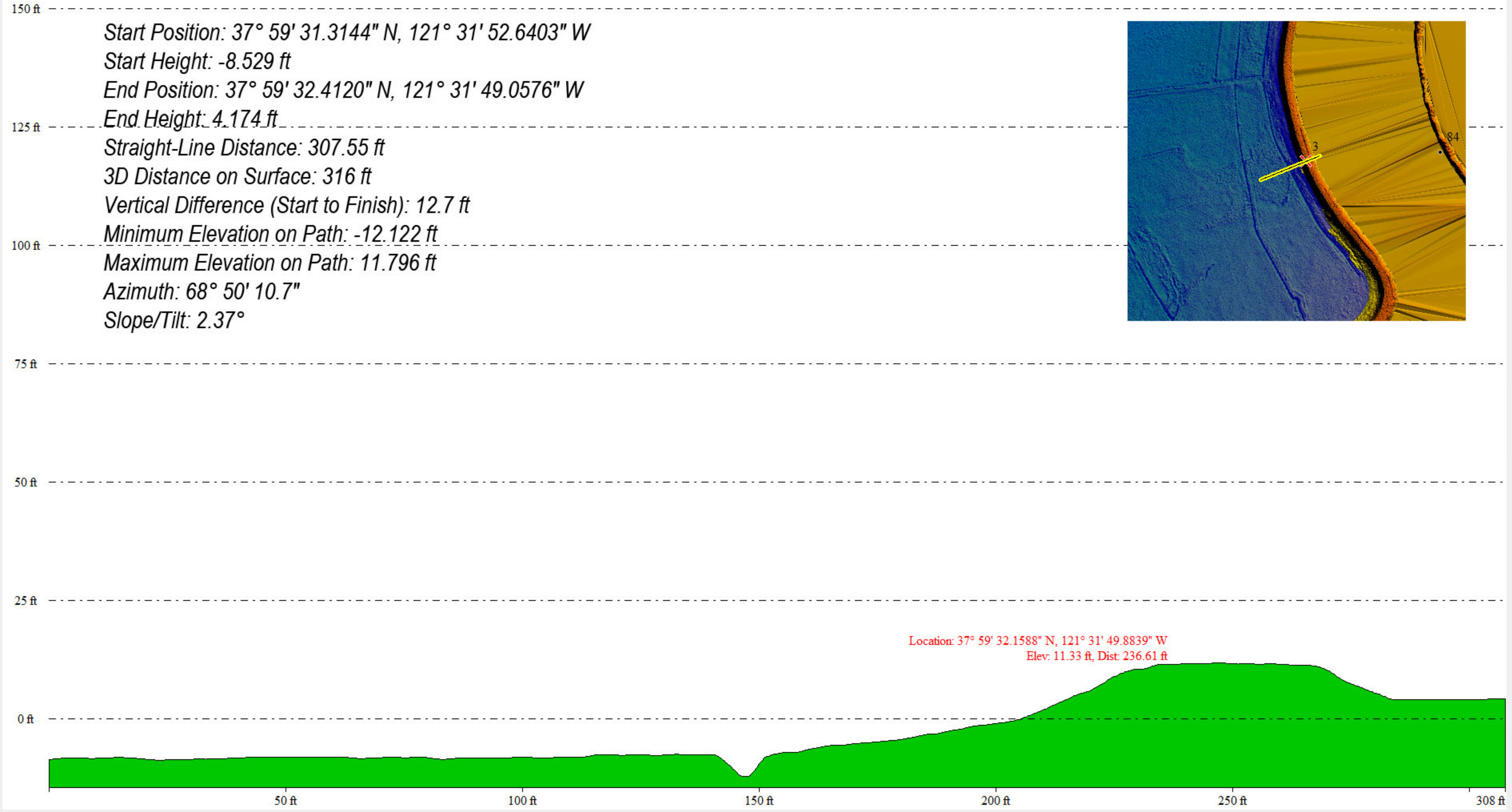
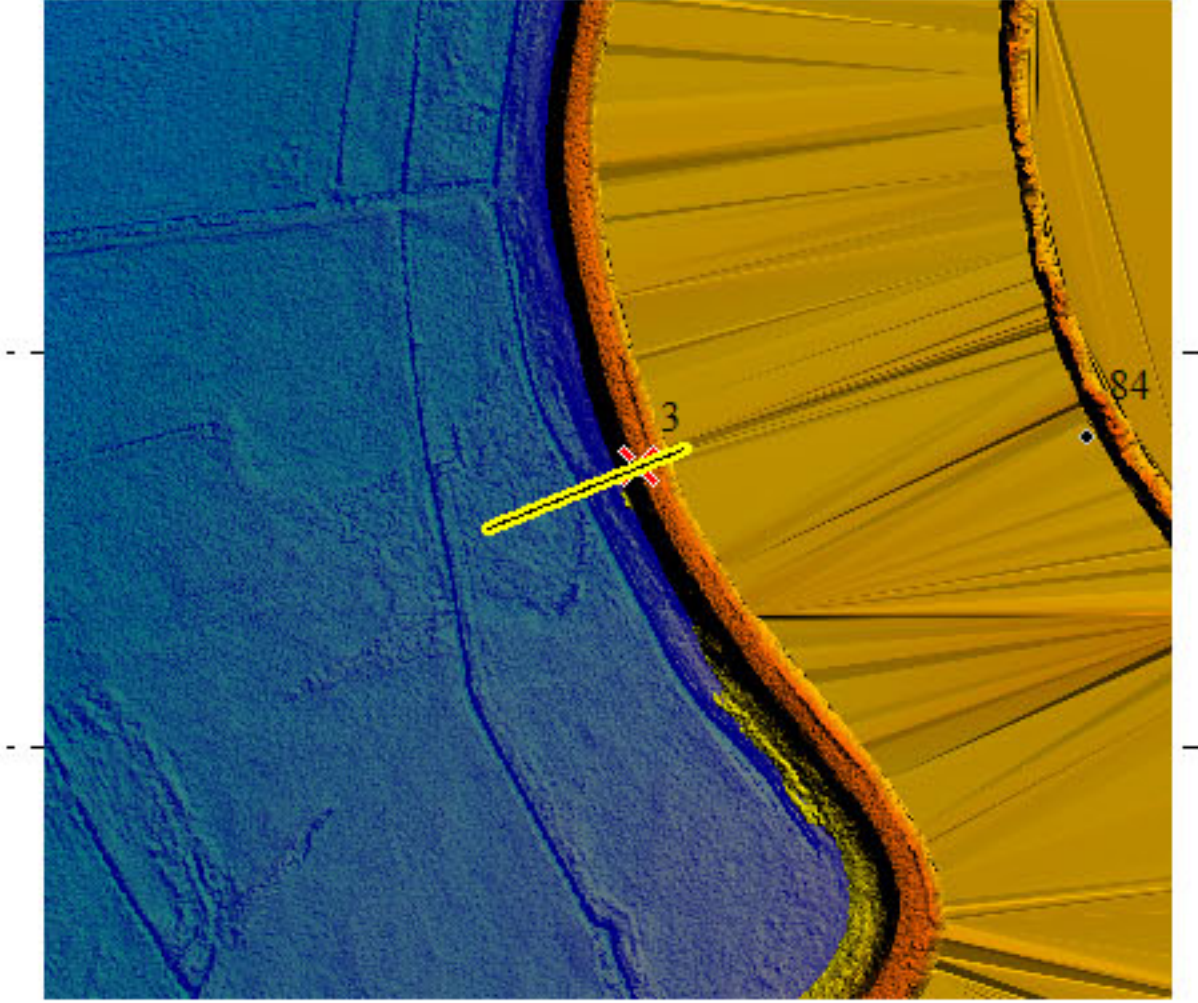
Vertical Difference (Start to Finish): 12.7 ft

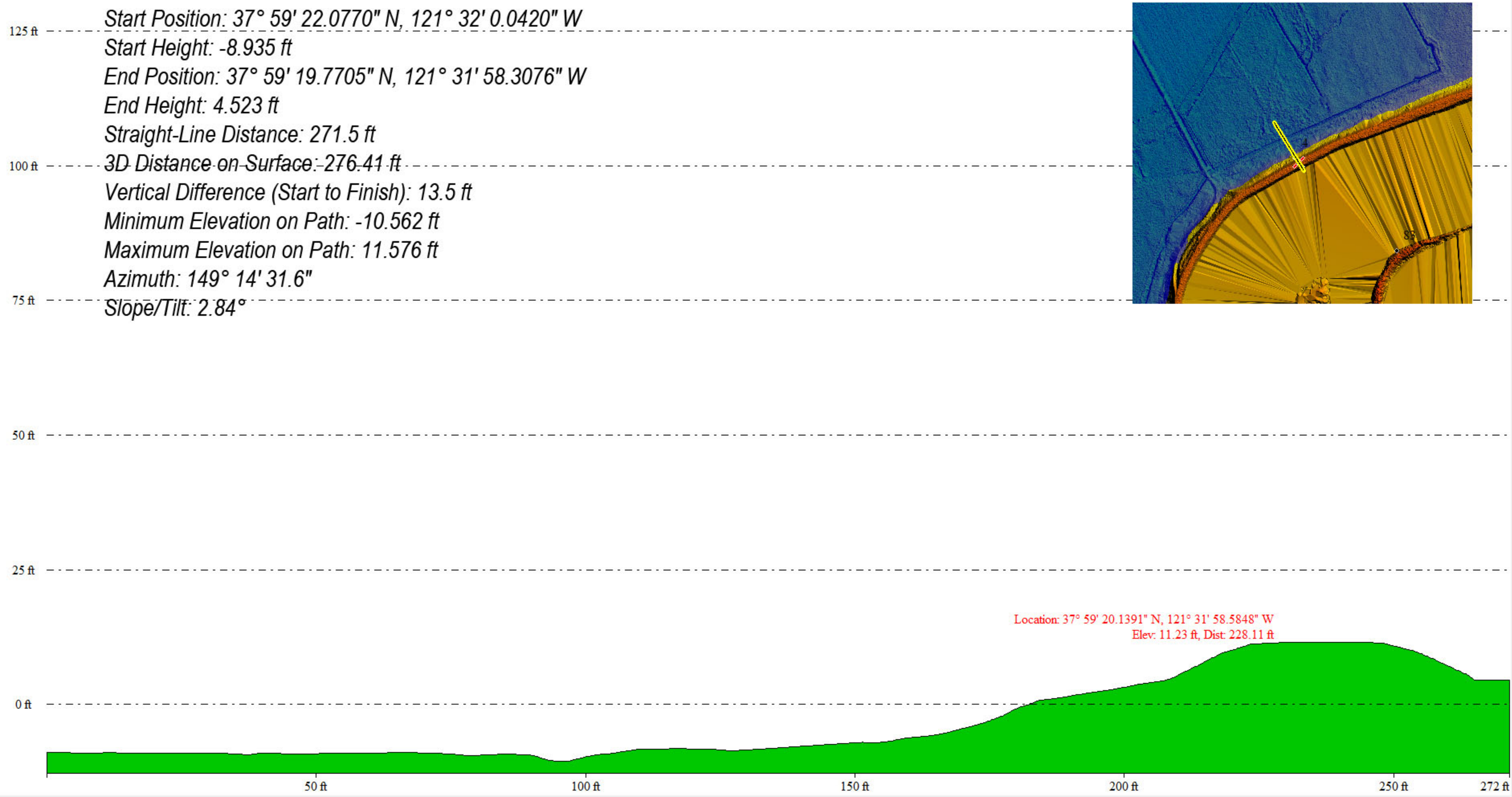
Minimum Elevation on Path: -12.122 ft

Maximum Elevation on Path: 11.796 ft

Azimuth: 68° 50' 10.7"

Slope/Tilt: 2.37°





Start Position: 37° 59' 3.4541" N, 121° 32' 6.0420" W

Start Height: -10.368 ft

End Position: 37° 59' 4.2914" N, 121° 32' 2.9461" W

End Height: 4.609 ft

Straight-Line Distance: 261.93 ft

3D Distance on Surface: 268.78 ft

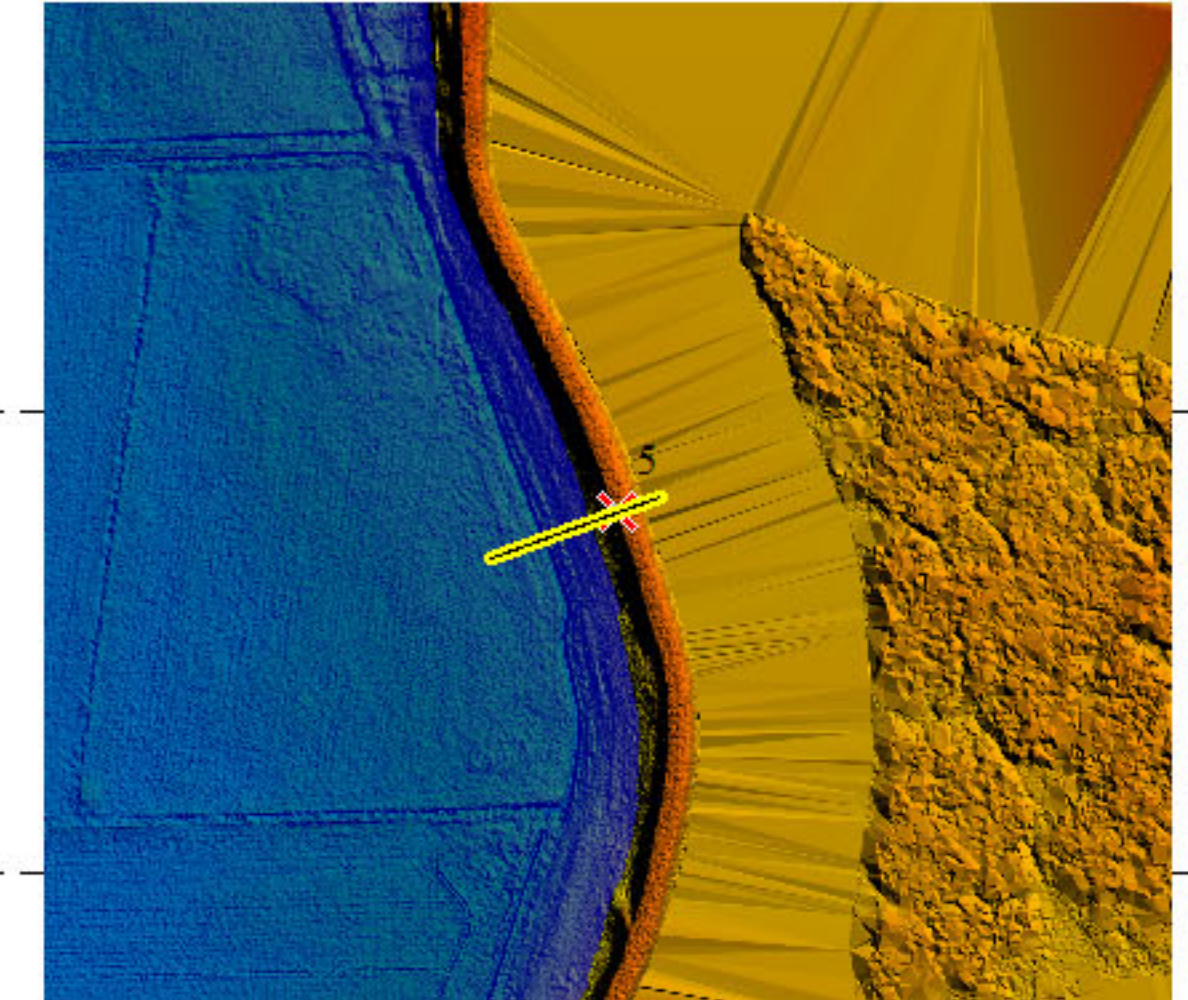
Vertical Difference (Start to Finish): 15.0 ft

Minimum Elevation on Path: -13.248 ft

Maximum Elevation on Path: 11.458 ft

Azimuth: 71° 08' 4.5"

Slope/Tilt: 3.27°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 59' 4.0794" N, 121° 32' 3.7299" W

Elev: 11.18 ft, Dist: 195.62 ft

50 ft

100 ft

150 ft

200 ft

250 ft

262 ft

Start Position: 37° 58' 46.0614" N, 121° 32' 12.9790" W

Start Height: -14.56 ft

End Position: 37° 58' 45.8648" N, 121° 32' 9.4227" W

End Height: 4.658 ft

Straight-Line Distance: 285.43 ft

3D Distance on Surface: 291.14 ft

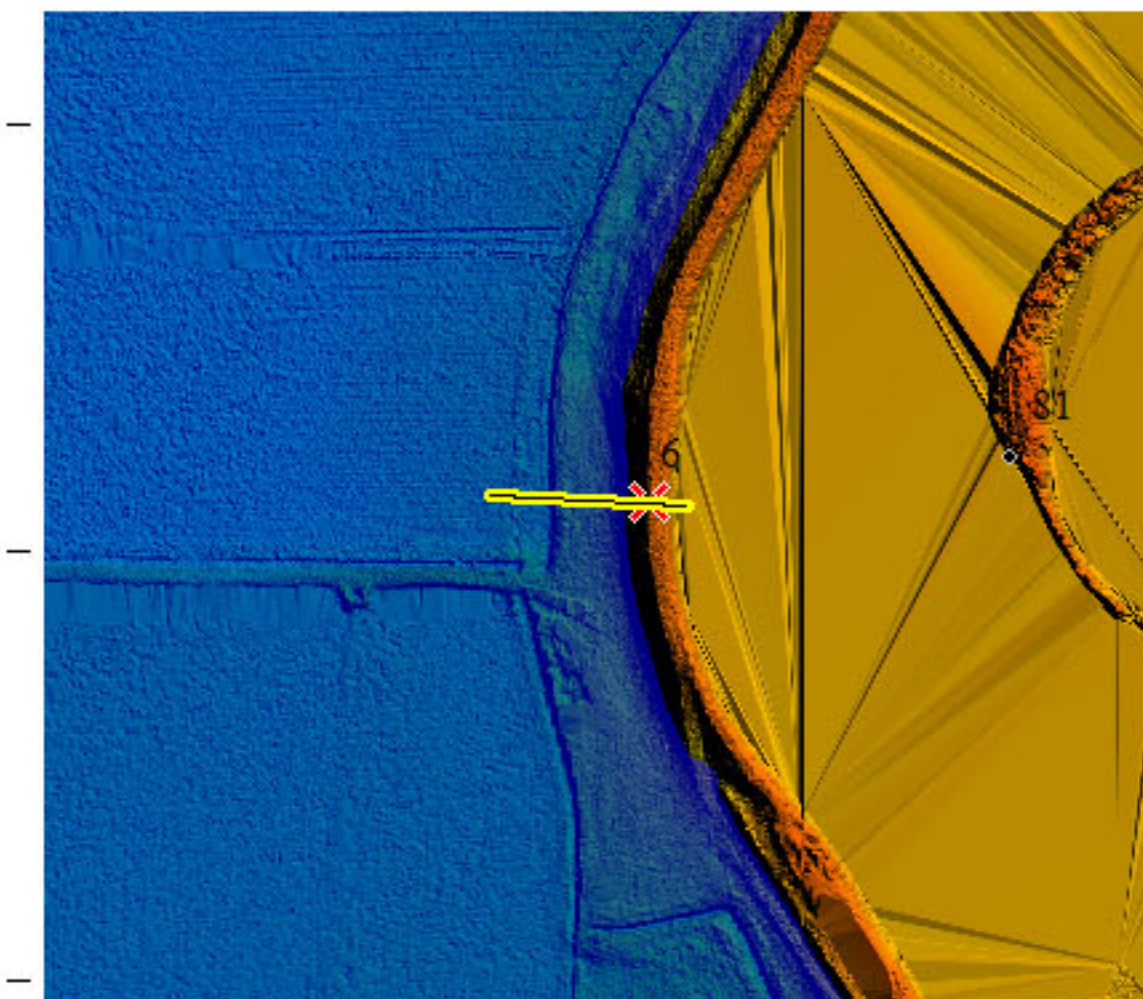
Vertical Difference (Start to Finish): 19.2 ft

Minimum Elevation on Path: -14.62 ft

Maximum Elevation on Path: 11.201 ft

Azimuth: 93° 59' 40.3"

Slope/Tilt: 3.85°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

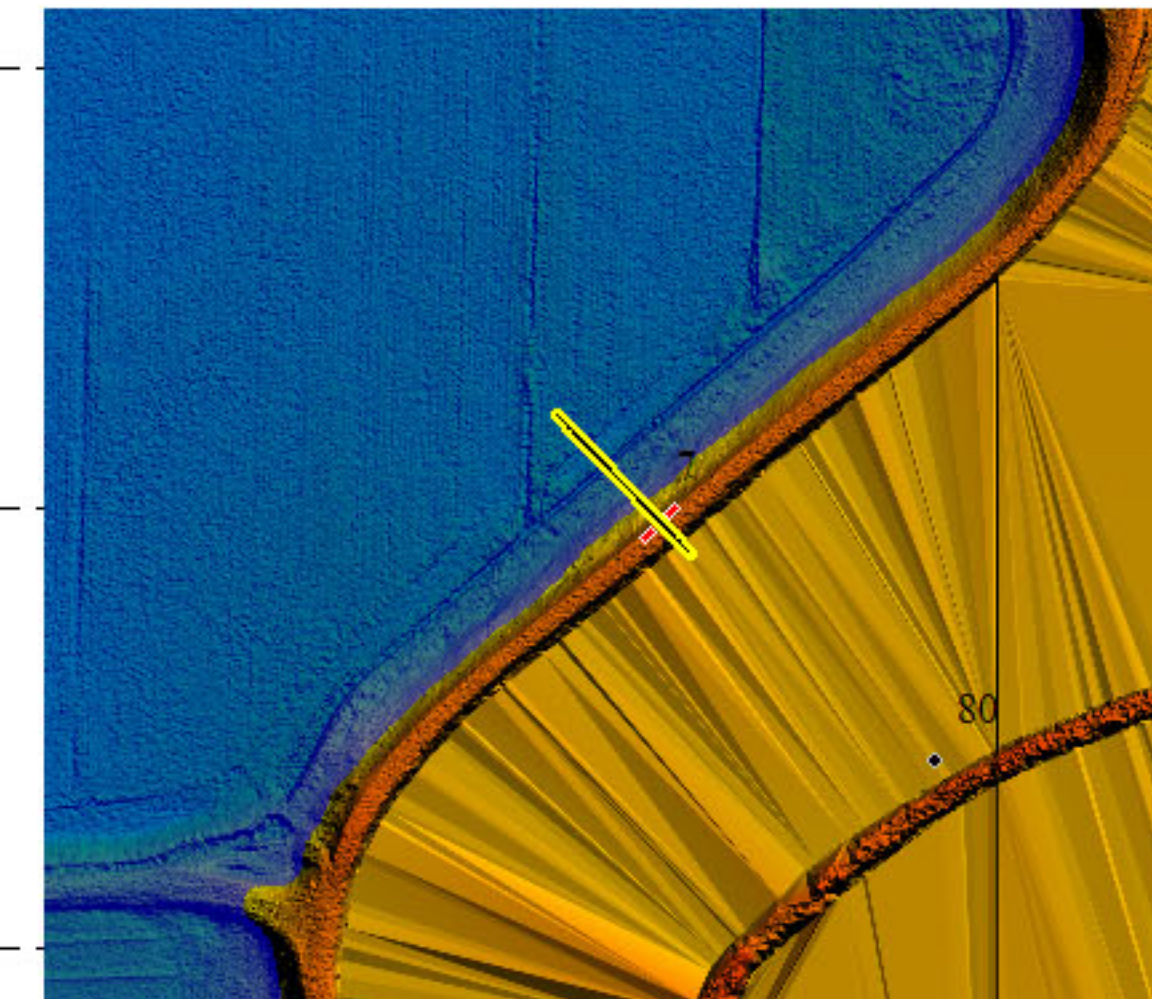
250 ft

285 ft

Location: 37° 58' 45.9032" N, 121° 32' 10.1173" W

Elev: 11.14 ft, Dist: 229.68 ft

125 ft --- Start Position: 37° 58' 31.4327" N, 121° 32' 15.5786" W
Start Height: -13.393 ft
End Position: 37° 58' 29.4230" N, 121° 32' 13.2131" W
End Height: 4.739 ft
Straight-Line Distance: 277.85 ft
3D Distance on Surface: 284.53 ft
Vertical Difference (Start to Finish): 18.1 ft
Minimum Elevation on Path: -14.06 ft
Maximum Elevation on Path: 11.596 ft
75 ft --- Azimuth: 137° 01' 23.6"
Slope/Tilt: 3.73°



50 ft ---

25 ft ---

0 ft ---

Location: 37° 58' 29.8462" N, 121° 32' 13.7112" W
Elev: 11.11 ft, Dist 219.34 ft

50 ft

100 ft

150 ft

200 ft

250 ft

278 ft

Start Position: 37° 58' 12.2068" N, 121° 32' 19.0387" W

Start Height: -12.109 ft

End Position: 37° 58' 13.2792" N, 121° 32' 16.4679" W

End Height: 4.569 ft

Straight-Line Distance: 232.69 ft

3D Distance on Surface: 239.5 ft

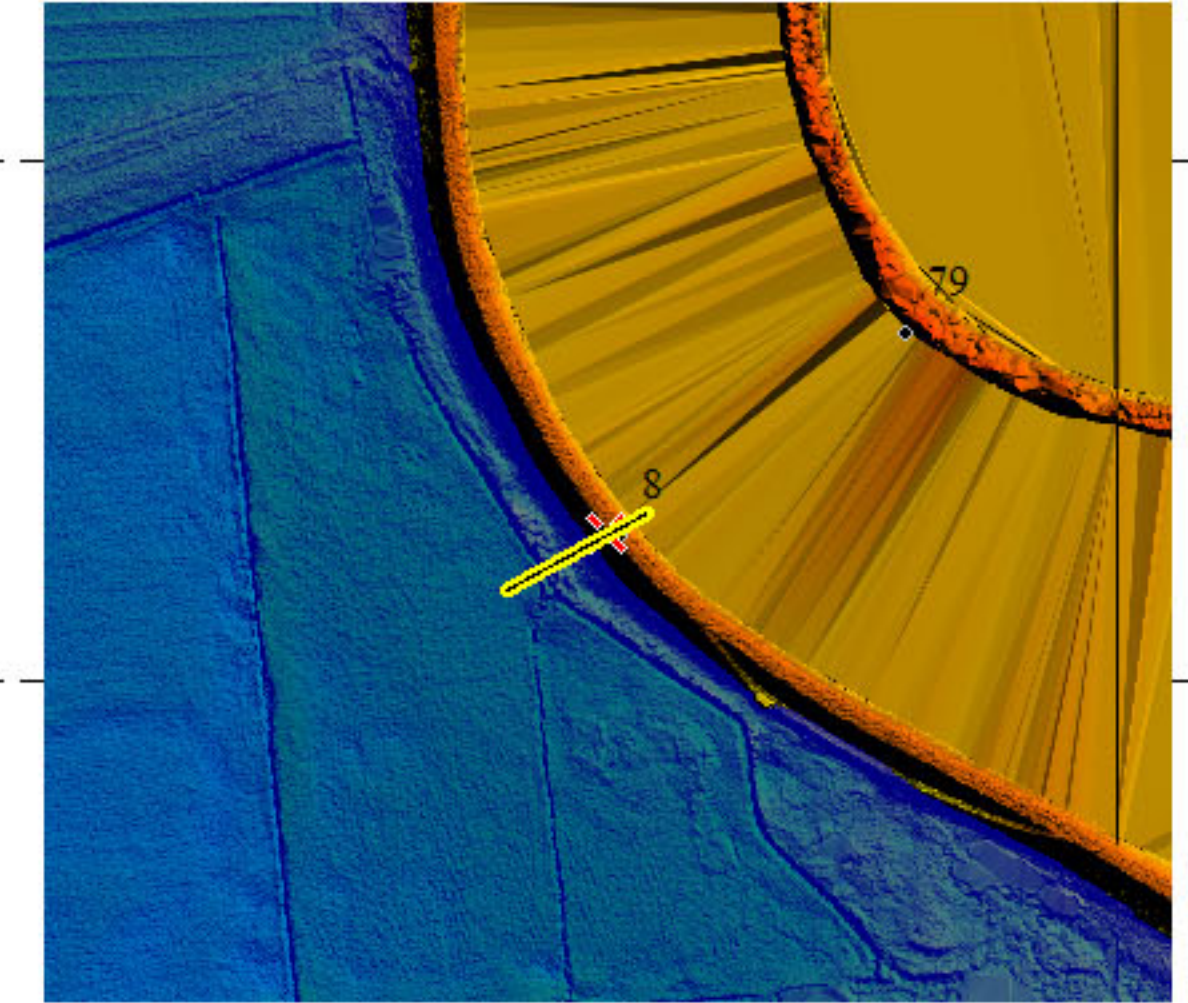
Vertical Difference (Start to Finish): 16.7 ft

Minimum Elevation on Path: -12.172 ft

Maximum Elevation on Path: 11.282 ft

Azimuth: 62° 12' 47.1"

Slope/Tilt: 4.10°



100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

233 ft

Location: 37° 58' 12.9824" N, 121° 32' 17.1794" W
Elev: 10.66 ft, Dist: 168.29 ft

Start Position: 37° 57' 58.2616" N, 121° 32' 6.1835" W

Start Height: -0.692 ft

End Position: 37° 57' 58.5230" N, 121° 32' 2.7149" W

End Height: 4.711 ft

Straight-Line Distance: 279.02 ft

3D Distance on Surface: 281.97 ft

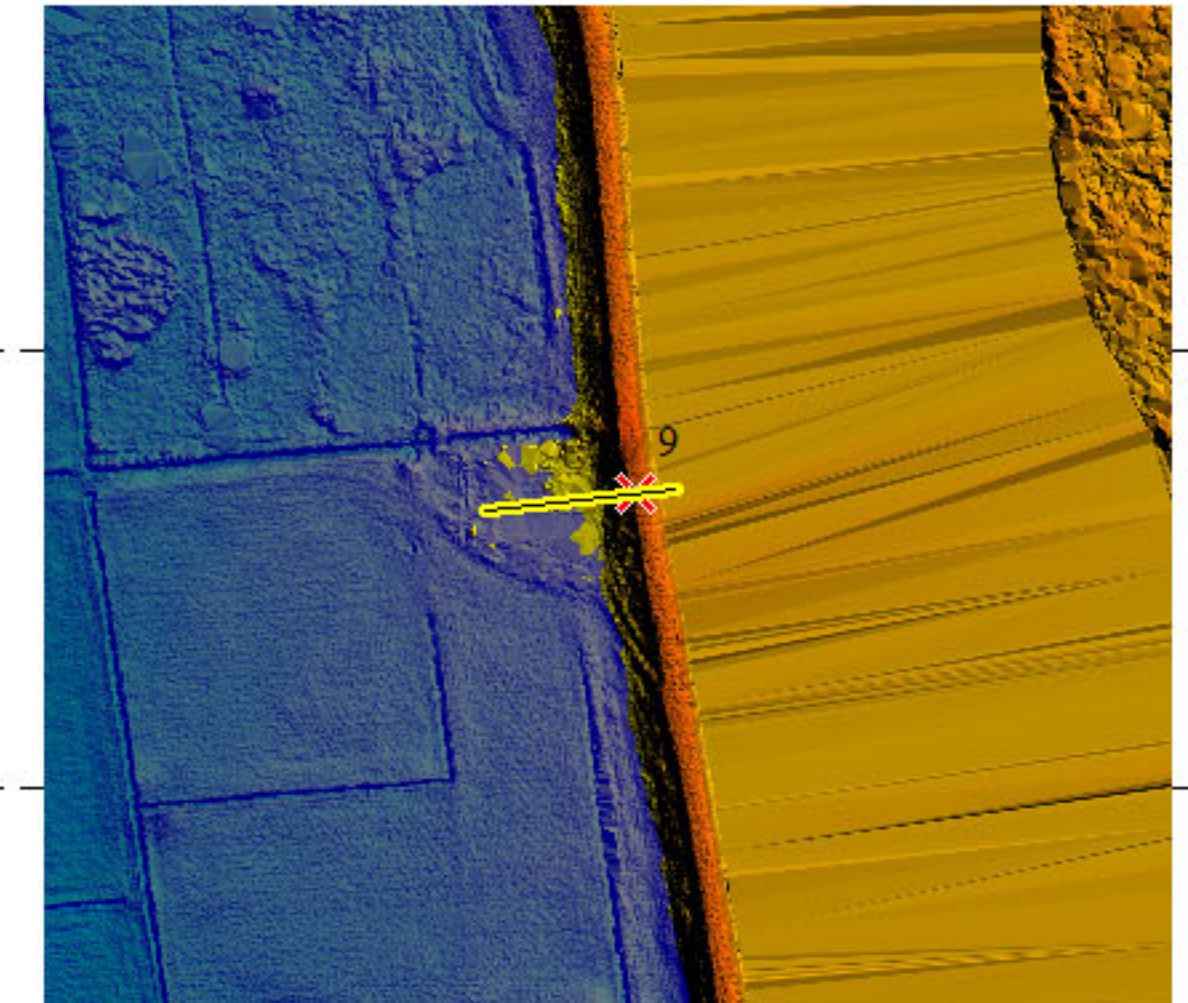
Vertical Difference (Start to Finish): 5.4 ft

Minimum Elevation on Path: -0.921 ft

Maximum Elevation on Path: 11.972 ft

Azimuth: 84° 33' 40.2"

Slope/Tilt: 1.11°



150 ft

125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 57' 58.4681" N, 121° 32' 3.4440" W
Elev: 11.84 ft, Dist: 220.37 ft

50 ft

100 ft

150 ft

200 ft

250 ft

279 ft

From Pos: 37° 57' 38.8329" N, 121° 32' 2.5293" W

Station 10

To Pos: 37° 57' 38.9783" N, 121° 31' 58.9190" W

Start Position: 37° 57' 38.8329" N, 121° 32' 2.5293" W

Start Height: -9.92 ft

End Position: 37° 57' 38.9783" N, 121° 31' 58.9190" W

End Height: 5.161 ft

Straight-Line Distance: 289.51 ft

3D Distance on Surface: 297.6 ft

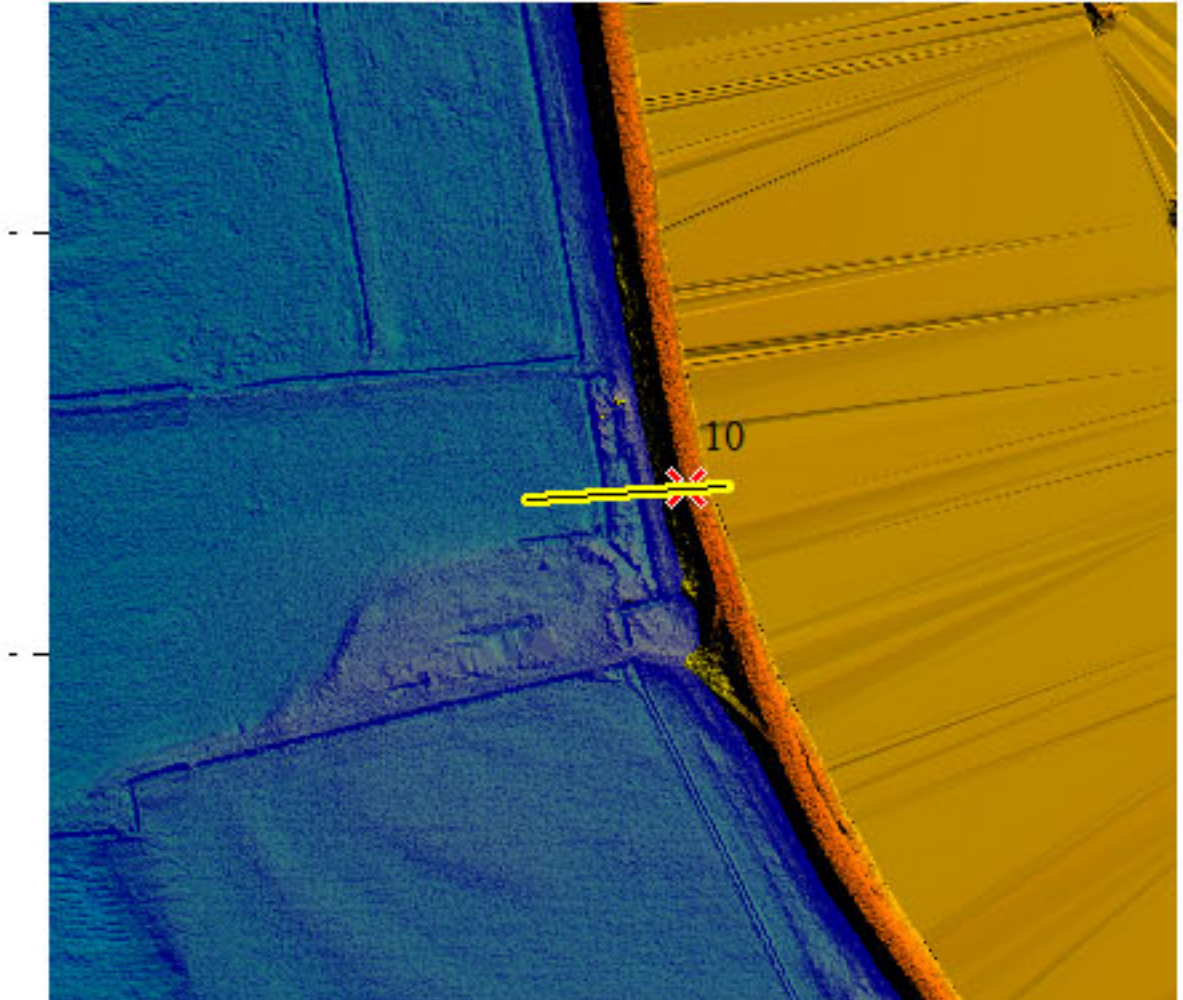
Vertical Difference (Start to Finish): -15.1 ft

Minimum Elevation on Path: -11.292 ft

Maximum Elevation on Path: 11.677 ft

Azimuth: 87° 05' 16.1"

Slope/Tilt: 2.98°



Location: 37° 57' 38.9496" N, 121° 31' 59.6308" W
Elev: 11.69 ft, Dist: 232.43 ft

150 ft

125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

250 ft

290 ft

Start Position: 37° 57' 22.6362" N, 121° 31' 49.3366" W

Start Height: -6.763 ft

End Position: 37° 57' 22.7422" N, 121° 31' 45.6311" W

End Height: 5.159 ft

Straight-Line Distance: 296.97 ft

3D Distance on Surface: 303.74 ft

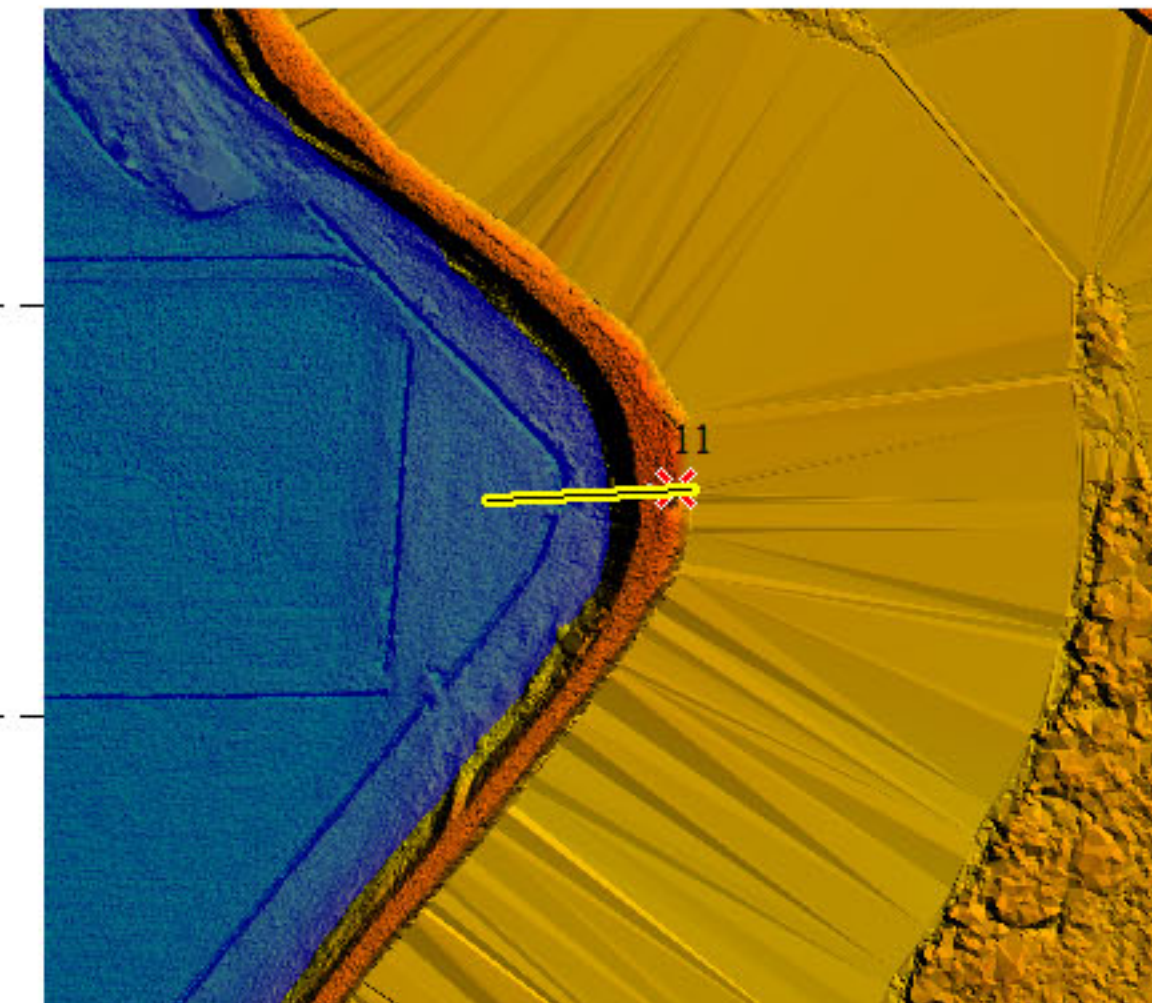
Vertical Difference (Start to Finish): 11.9 ft

Minimum Elevation on Path: -9.73 ft

Maximum Elevation on Path: 14.387 ft

Azimuth: 87° 55' 49.1"

Slope/Tilt: 2.30°



150 ft

125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 57' 22.7340" N, 121° 31' 45.9171" W
Elev: 14.52 ft, Dist: 274.05 ft

50 ft

100 ft

150 ft

200 ft

250 ft

297 ft

From Pos: 37° 57' 7.6137" N, 121° 32' 3.1018" W

Station 12

To Pos: 37° 57' 6.4671" N, 121° 31' 59.7100" W

Start Position: 37° 57' 7.6137" N, 121° 32' 3.1018" W

Start Height: -11.737 ft

End Position: 37° 57' 6.4671" N, 121° 31' 59.7100" W

End Height: 3.565 ft

Straight-Line Distance: 295.39 ft

3D Distance on Surface: 301.13 ft

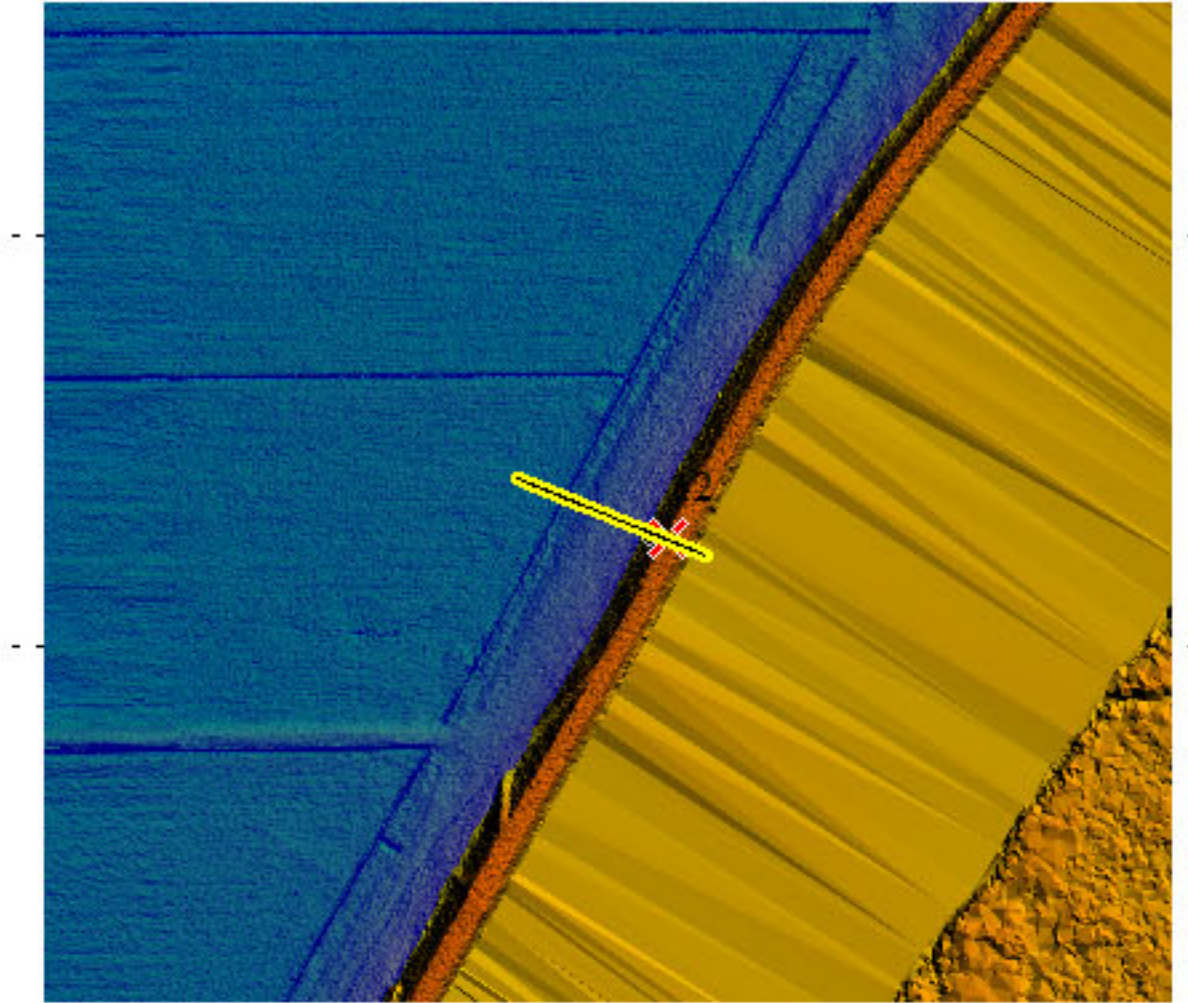
Vertical Difference (Start to Finish): 15.3 ft

Minimum Elevation on Path: -13.48 ft

Maximum Elevation on Path: 11.307 ft

Azimuth: 113° 07' 9.1"

Slope/Tilt: 2.97°



150 ft

125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 57' 6.6975" N, 121° 32' 0.3917" W
Elev: 10.97 ft, Dist: 236.02 ft

50 ft

100 ft

150 ft

200 ft

250 ft

295 ft

Start Position: 37° 56' 48.2906" N, 121° 32' 10.9876" W

Start Height: -10.513 ft

End Position: 37° 56' 49.1885" N, 121° 32' 6.6418" W

End Height: 9.493 ft

Straight-Line Distance: 359.77 ft

3D Distance on Surface: 367.8 ft

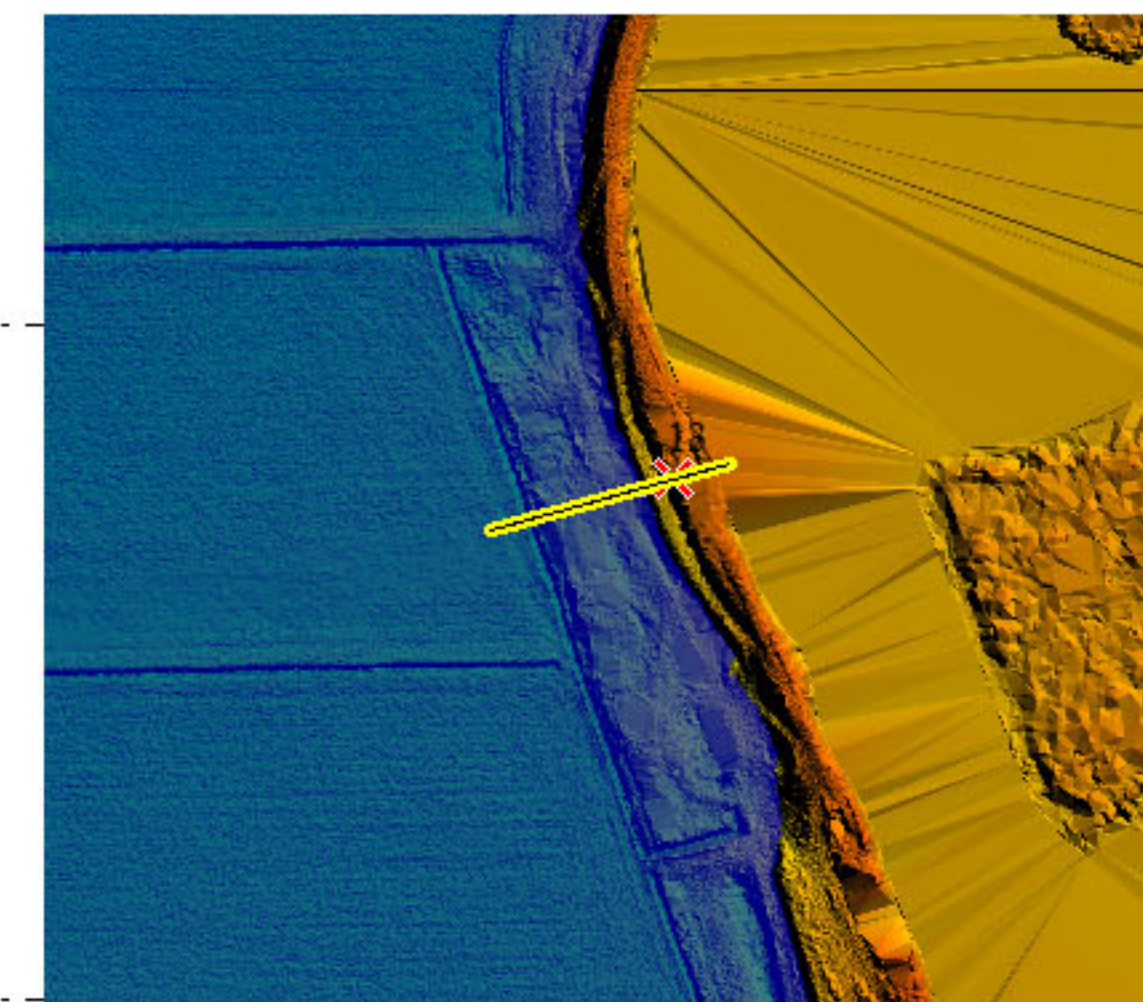
Vertical Difference (Start to Finish): 20.0 ft

Minimum Elevation on Path: -13.357 ft

Maximum Elevation on Path: 10.516 ft

Azimuth: 75° 22' 33.7"

Slope/Tilt: 3.18°



150 ft

100 ft

50 ft

0 ft

Location: 37° 56' 48.9800" N, 121° 32' 7.6513" W

Elev: 9.94 ft, Dist: 276.2 ft

50 ft

100 ft

150 ft

200 ft

250 ft

300 ft

360 ft

Start Position: 37° 56' 29.9112" N, 121° 32' 5.9667" W

Start Height: -9.109 ft

End Position: 37° 56' 29.9055" N, 121° 32' 2.4565" W

End Height: 4.319 ft

Straight-Line Distance: 281.19 ft

3D Distance on Surface: 287.3 ft

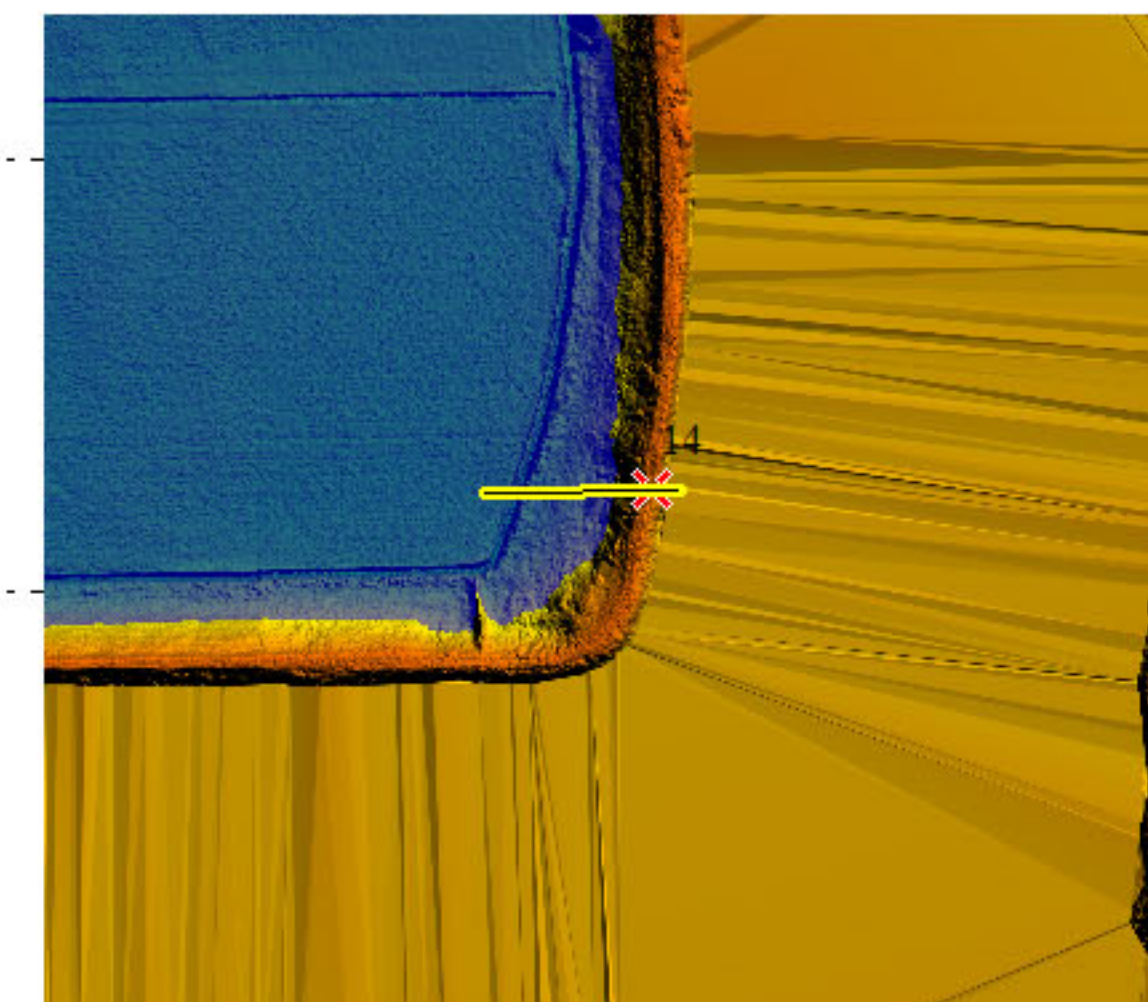
Vertical Difference (Start to Finish): 13.4 ft

Minimum Elevation on Path: -11.994 ft

Maximum Elevation on Path: 10.91 ft

Azimuth: 90° 06' 57.9"

Slope/Tilt: 2.73°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 56' 29.9063" N, 121° 32' 2.9423" W

Elev: 11.04 ft, Dist: 242.28 ft

50 ft

100 ft

150 ft

200 ft

250 ft

281 ft

Start Position: 37° 56' 15.1460" N, 121° 32' 6.7887" W

Start Height: -11.47 ft

End Position: 37° 56' 16.5262" N, 121° 32' 1.4241" W

End Height: 4.636 ft

Straight-Line Distance: 451.88 ft

3D Distance on Surface: 462.16 ft

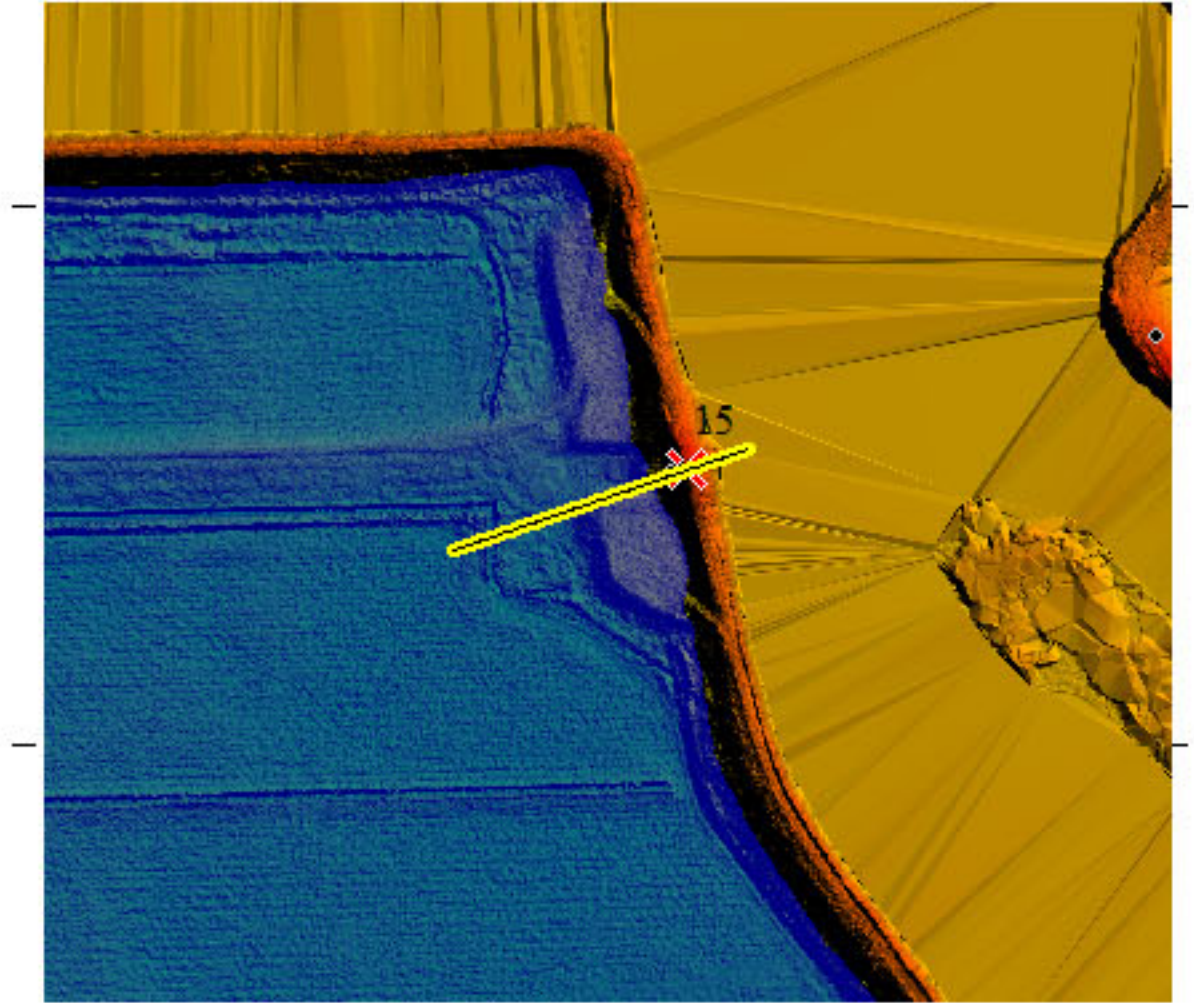
Vertical Difference (Start to Finish): 16.1 ft

Minimum Elevation on Path: -12.915 ft

Maximum Elevation on Path: 18.445 ft

Azimuth: 72° 00' 8.8"

Slope/Tilt: 2.04°



200 ft

150 ft

100 ft

50 ft

0 ft

Location: 37° 56' 16.2378" N, 121° 32' 2.5450" W
Elev: 18.46 ft, Dist: 357.46 ft

50 ft

100 ft

150 ft

200 ft

250 ft

300 ft

350 ft

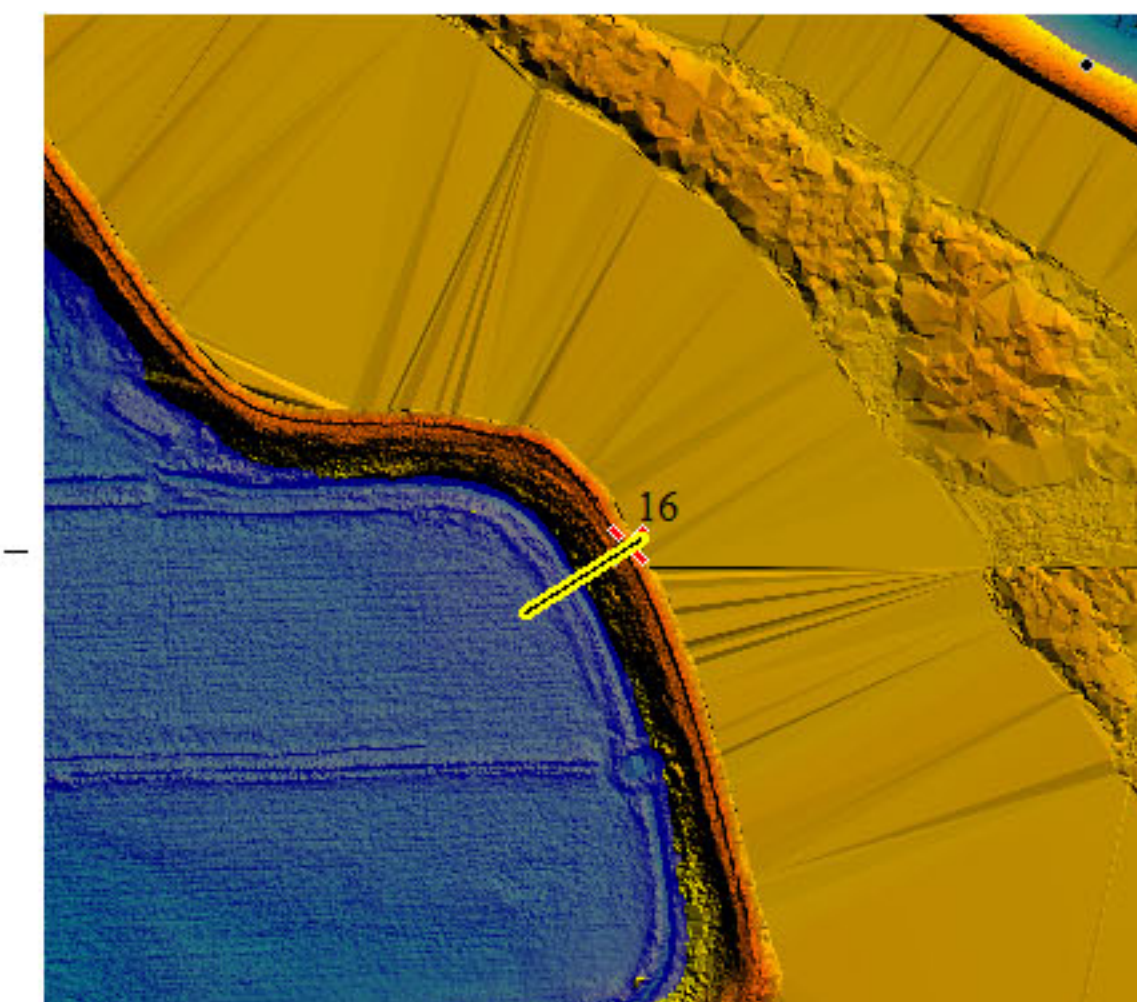
400 ft

452 ft

100 ft

*Start Position: 37° 56' 1.7556" N, 121° 31' 49.6013" W**Start Height: -3.301 ft**End Position: 37° 56' 2.7952" N, 121° 31' 47.4651" W**End Height: 4.438 ft**Straight-Line Distance: 200.87 ft*

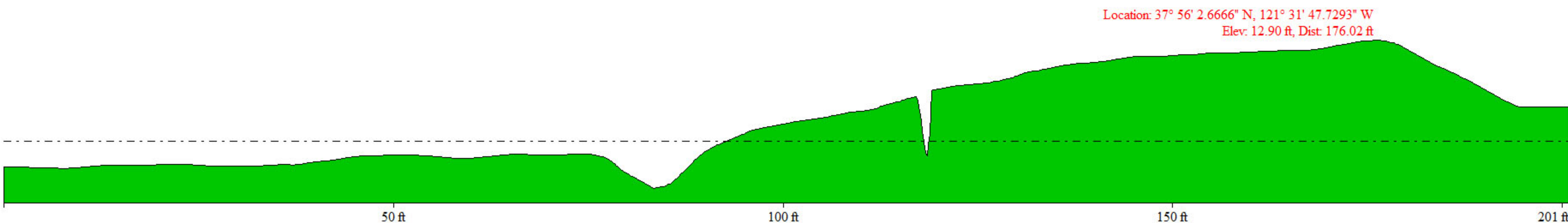
75 ft

*3D Distance on Surface: 221.91 ft**Vertical Difference (Start to Finish): 7.7 ft**Minimum Elevation on Path: -5.985 ft**Maximum Elevation on Path: 13.002 ft**Azimuth: 58° 25' 56.4"**Slope/Tilt: 2.21°*

50 ft

25 ft

0 ft



Start Position: 37° 55' 52.5870" N, 121° 32' 2.5247" W

Start Height: -11.114 ft

End Position: 37° 55' 51.3792" N, 121° 32' 0.3371" W

End Height: 4.992 ft

Straight-Line Distance: 213.65 ft

3D Distance on Surface: 220.8 ft

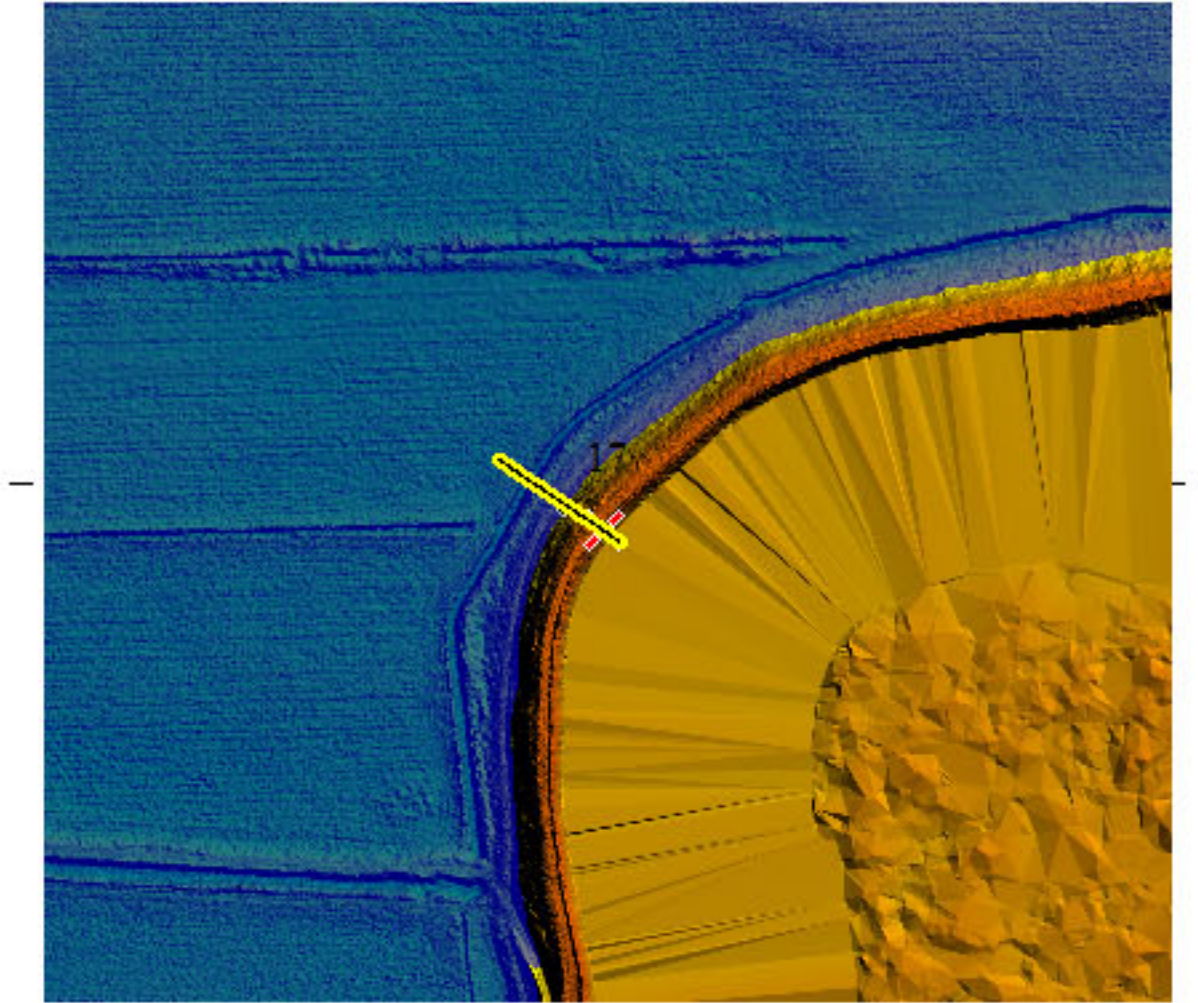
Vertical Difference (Start to Finish): 16.1 ft

Minimum Elevation on Path: -13.039 ft

Maximum Elevation on Path: 12.727 ft

Azimuth: 124° 52' 40.1"

Slope/Tilt: 4.31°



25 ft

Location: 37° 55' 51.5446" N, 121° 32' 0.6367" W
Elev: 12.59 ft, Dist: 184.39 ft

0 ft

50 ft

100 ft

150 ft

200 ft

214 ft

Start Position: 37° 55' 32.4054" N, 121° 32' 2.6371" W

Start Height: -10.713 ft

End Position: 37° 55' 32.3242" N, 121° 31' 59.1773" W

End Height: 5.051 ft

Straight-Line Distance: 277.34 ft

3D Distance on Surface: 282.58 ft

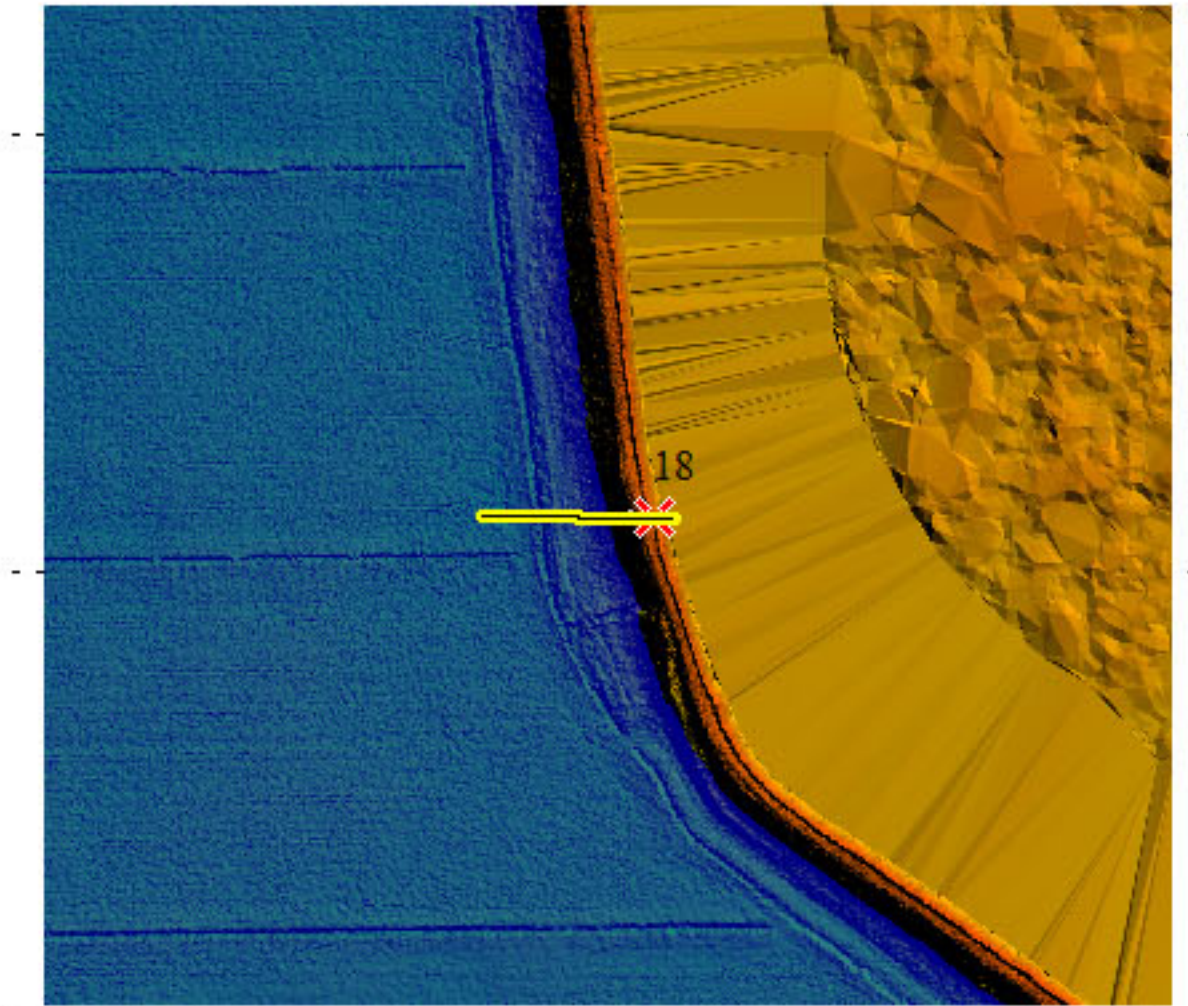
Vertical Difference (Start to Finish): 15.8 ft

Minimum Elevation on Path: -10.831 ft

Maximum Elevation on Path: 12.407 ft

Azimuth: 91° 41' 48.7"

Slope/Tilt: 3.25°



50 ft

25 ft

0 ft

Location: 37° 55' 32.3319" N, 121° 31' 59.5041" W
Elev: 12.58 ft, Dist: 251.14 ft

50 ft

100 ft

150 ft

200 ft

250 ft

277 ft

Start Position: 37° 55' 18.2969" N, 121° 31' 45.8995" W

Start Height: -7.481 ft

End Position: 37° 55' 18.9534" N, 121° 31' 43.5790" W

End Height: 4.787 ft

Straight-Line Distance: 197.45 ft

3D Distance on Surface: 202.58 ft

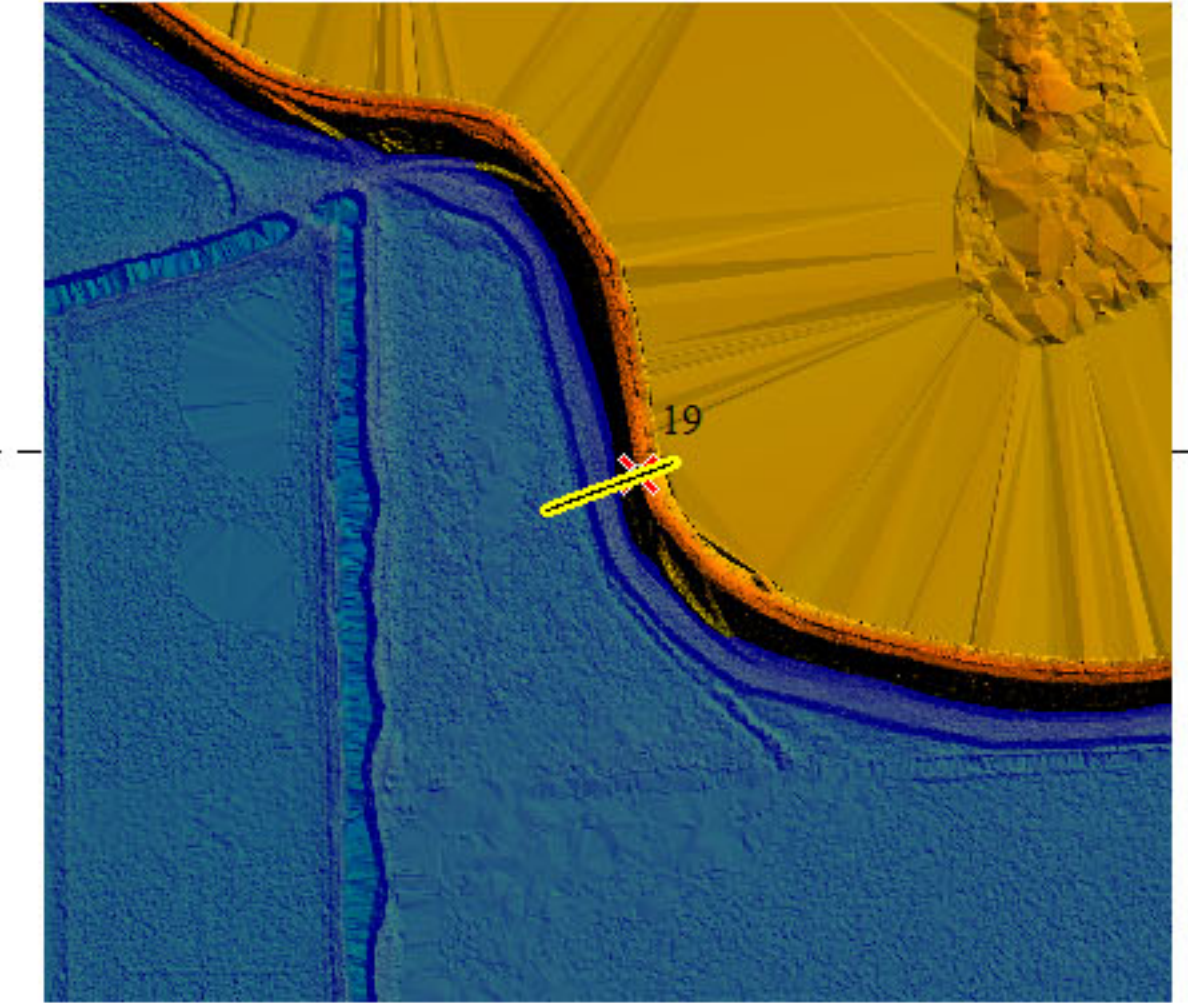
Vertical Difference (Start to Finish): 12.3 ft

Minimum Elevation on Path: -8.286 ft

Maximum Elevation on Path: 11.645 ft

Azimuth: 70° 20' 52.4"

Slope/Tilt: 3.56°



Location: 37° 55' 18.7734" N, 121° 31' 44.2153" W
Elev: 11.66 ft, Dist: 143.3 ft

100 ft

75 ft

50 ft

25 ft

0 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

175 ft

197 ft

Start Position: 37° 55' 11.9340" N, 121° 31' 24.3461" W

Start Height: -8.11 ft

End Position: 37° 55' 13.5077" N, 121° 31' 22.2956" W

End Height: 4.832 ft

Straight-Line Distance: 228.77 ft

3D Distance on Surface: 233.06 ft

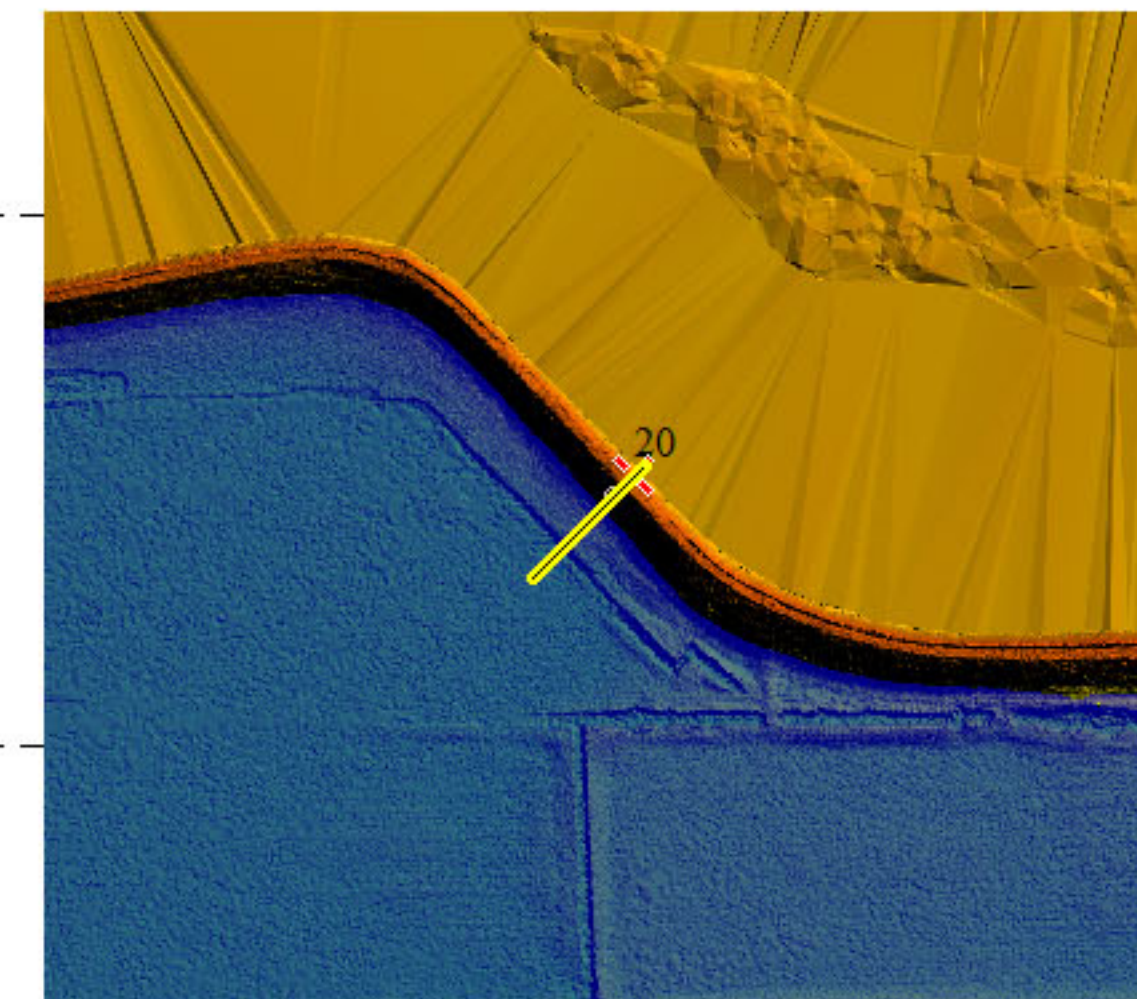
Vertical Difference (Start to Finish): 12.9 ft

Minimum Elevation on Path: -8.44 ft

Maximum Elevation on Path: 12.015 ft

Azimuth: 45° 54' 27.3"

Slope/Tilt: 3.24°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 55' 13.3475" N, 121° 31' 22.5043" W

Elev: 12.05 ft, Dist: 205.48 ft

50 ft

100 ft

150 ft

200 ft

229 ft

Start Position: 37° 55' 5.8523" N, 121° 31' 4.0378" W

Start Height: -5.708 ft

End Position: 37° 55' 5.7779" N, 121° 31' 1.1551" W

End Height: 5.378 ft

Straight-Line Distance: 231.12 ft

3D Distance on Surface: 236.68 ft

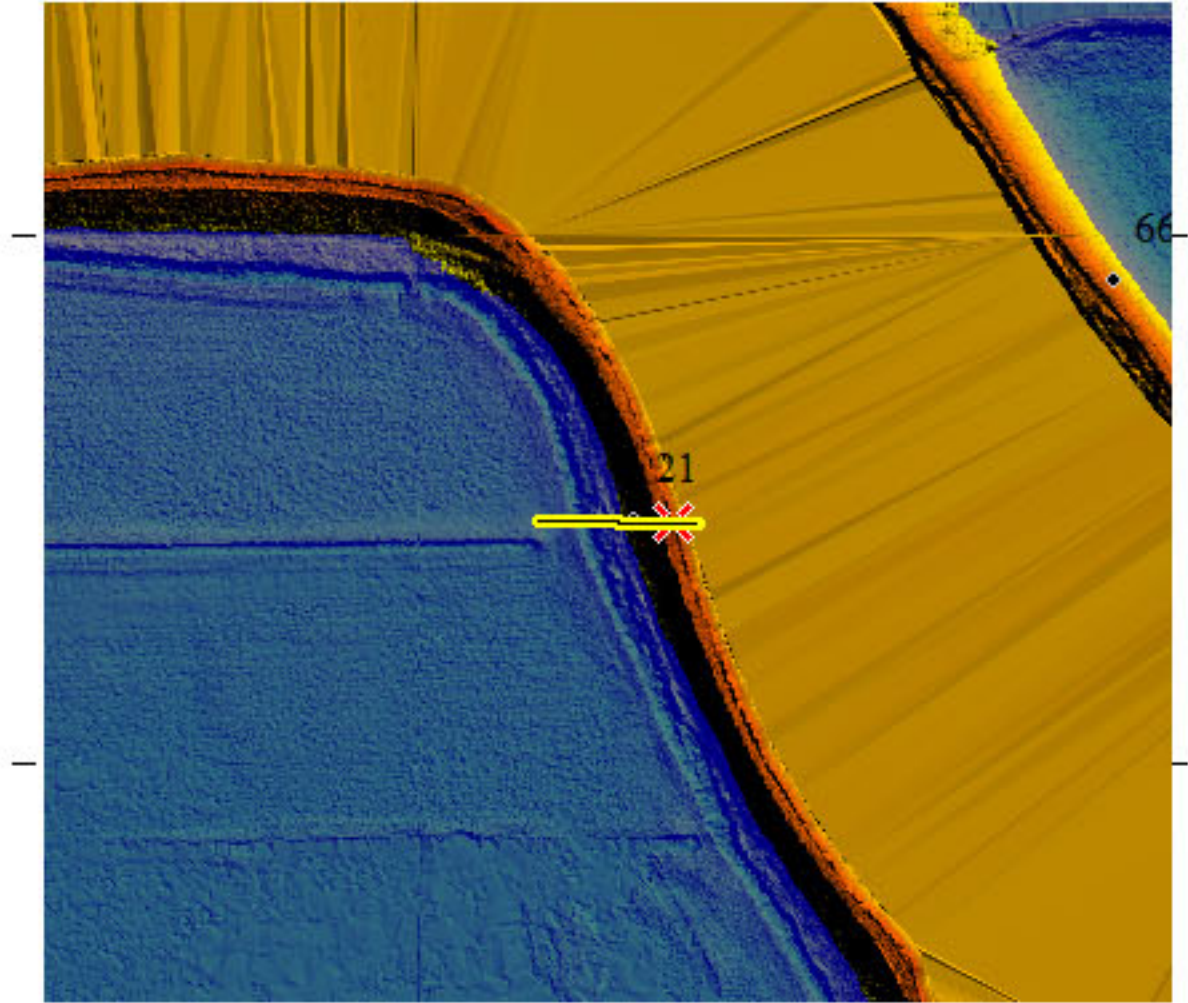
Vertical Difference (Start to Finish): 11.1 ft

Minimum Elevation on Path: -7.748 ft

Maximum Elevation on Path: 13.664 ft

Azimuth: 91° 51' 57.0"

Slope/Tilt: 2.75°



100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

231 ft

Location: 37° 55' 5.7891" N, 121° 31' 1.5890" W

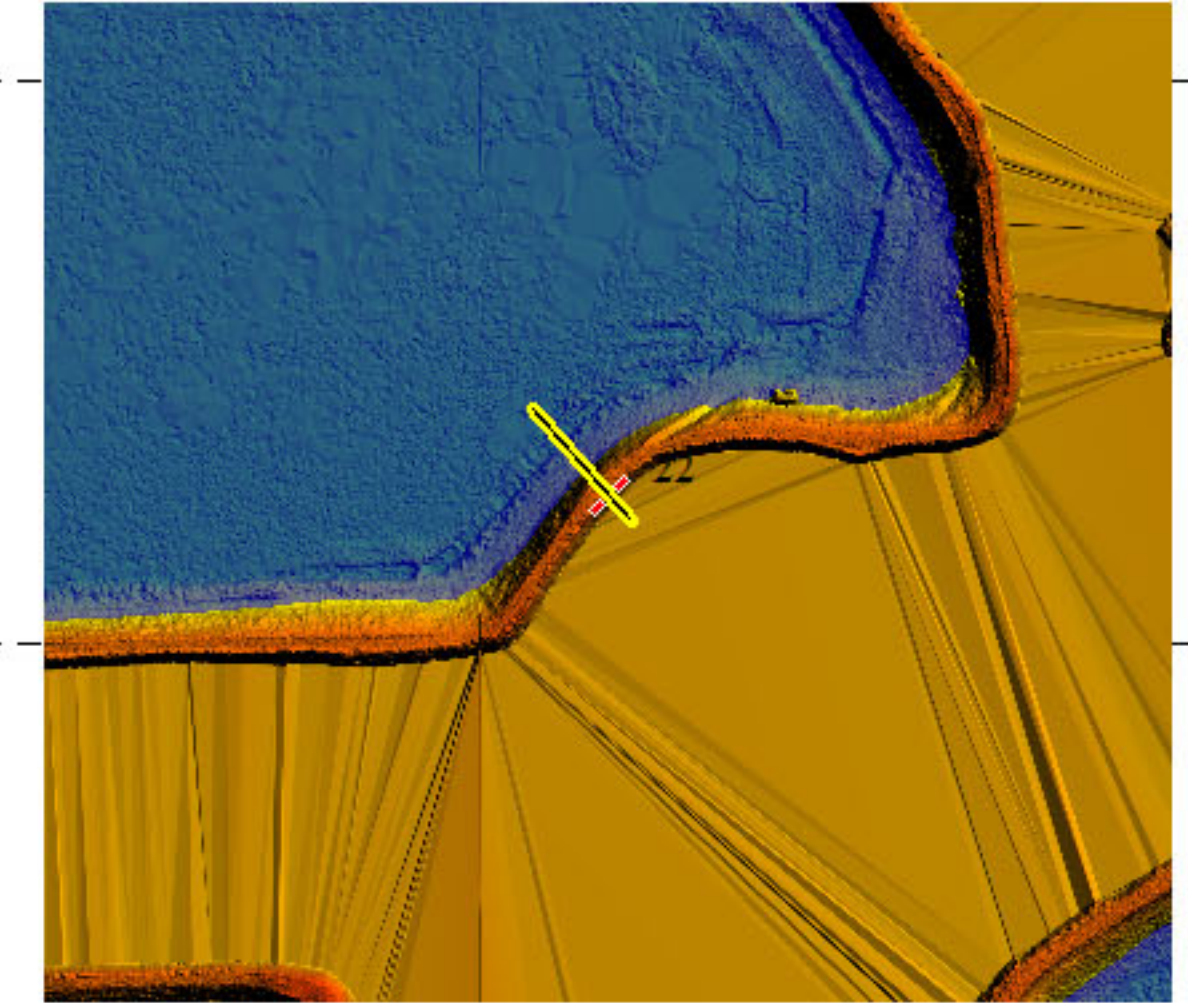
Elev: 13.77 ft, Dist: 196.34 ft

From Pos: 37° 54' 55.3597" N, 121° 31' 5.4501" W

Station 22

To Pos: 37° 54' 53.7281" N, 121° 31' 3.6943" W

100 ft ——— *Start Position: 37° 54' 55.3597" N, 121° 31' 5.4501" W*
Start Height: -7.793 ft
End Position: 37° 54' 53.7281" N, 121° 31' 3.6943" W
End Height: 4.899 ft
Straight-Line Distance: 216.88 ft
3D Distance on Surface: 222.62 ft
75 ft ——— *Vertical Difference (Start to Finish): -12.7 ft*
Minimum Elevation on Path: -8.09 ft
Maximum Elevation on Path: 12.478 ft
Azimuth: 139° 33' 3.5"
Slope/Tilt: 3.35°



50 ft ———

25 ft ———

0 ft ———

Location: 37° 54' 54.0951" N, 121° 31' 4.0893" W
Elev: 12.29 ft, Dist: 168.09 ft

50 ft

100 ft

150 ft

200 ft

217 ft

Start Position: 37° 54' 44.5849" N, 121° 31' 11.6746" W

Start Height: -7.965 ft

End Position: 37° 54' 45.3865" N, 121° 31' 8.5711" W

End Height: 5.318 ft

Straight-Line Distance: 261.6 ft

3D Distance on Surface: 270.58 ft

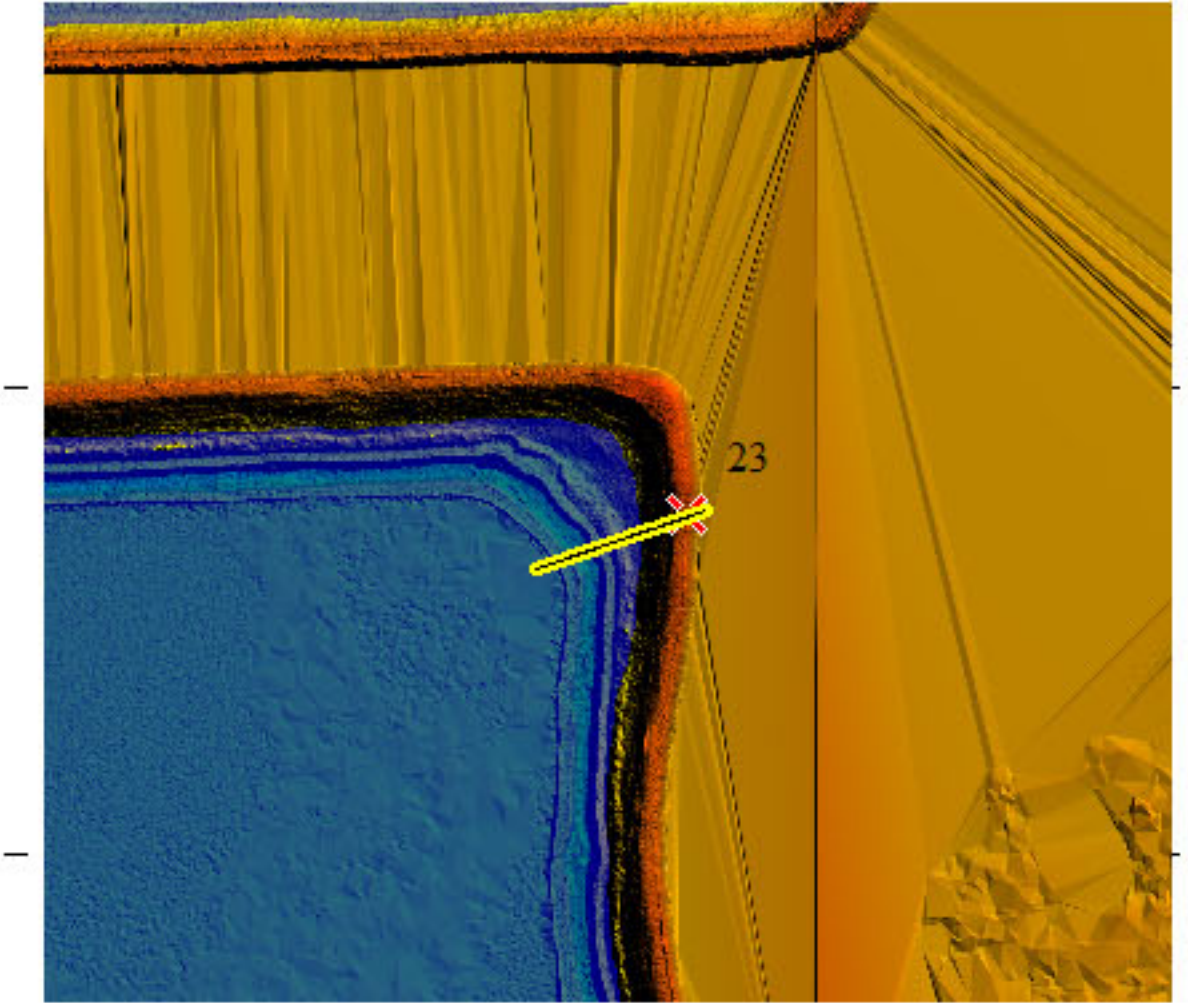
Vertical Difference (Start to Finish): 13.3 ft

Minimum Elevation on Path: -13.23 ft

Maximum Elevation on Path: 13.561 ft

Azimuth: 71° 56' 37.7"

Slope/Tilt: 2.91°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 54' 45.2973" N, 121° 31' 8.9165" W

Elev: 13.49 ft, Dist: 232.48 ft

50 ft

100 ft

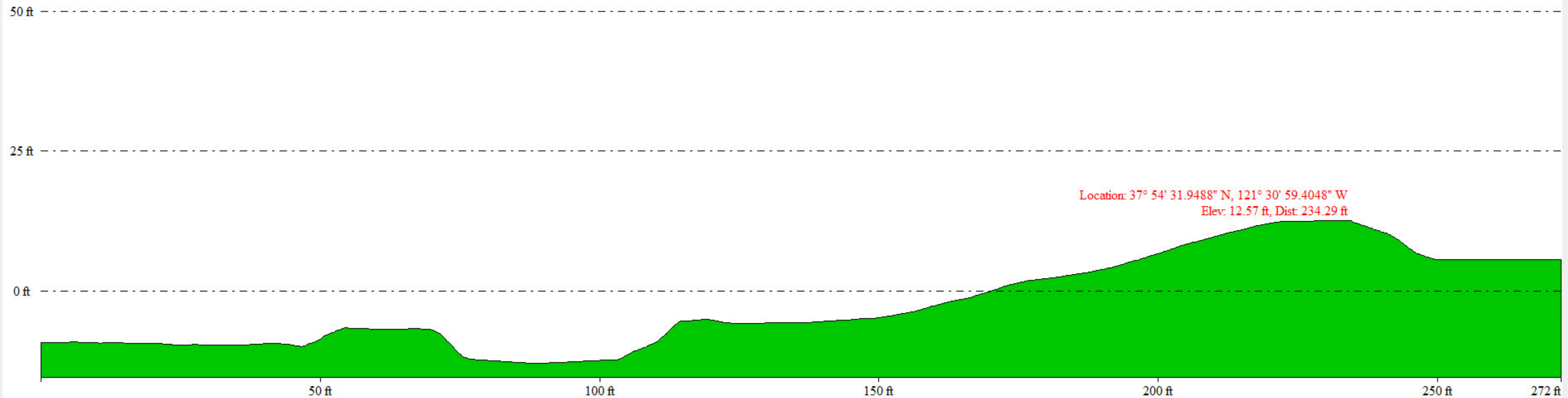
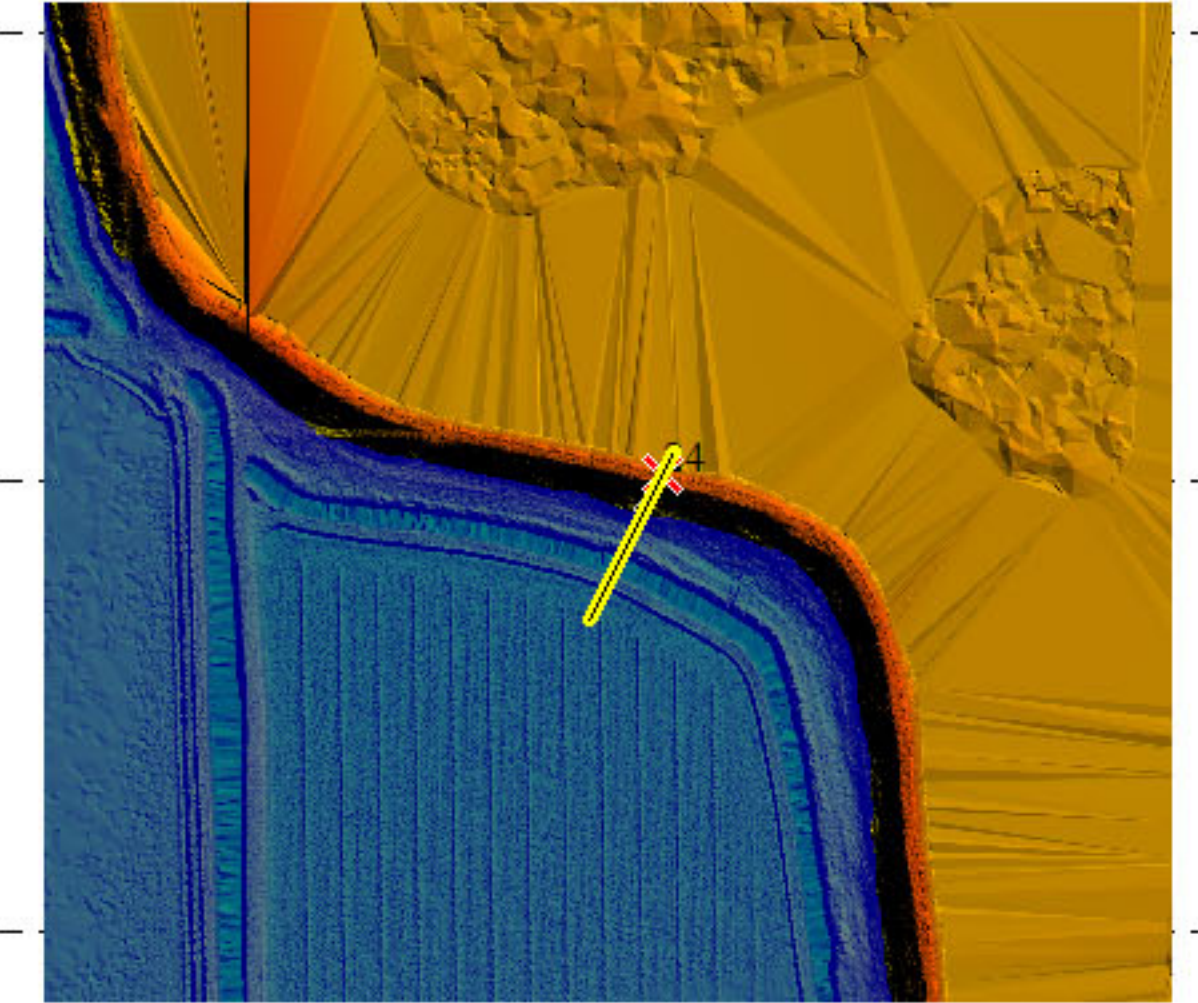
150 ft

200 ft

250 ft

262 ft

125 ft ————
Start Position: 37° 54' 29.9006" N, 121° 31' 0.7700" W
Start Height: -9.198 ft
End Position: 37° 54' 32.2798" N, 121° 30' 59.1842" W
End Height: 5.577 ft
Straight-Line Distance: 272.15 ft
3D Distance on Surface: 280.99 ft
Vertical Difference (Start to Finish): 14.8 ft
Minimum Elevation on Path: -12.941 ft
Maximum Elevation on Path: 12.61 ft
75 ft ————
Azimuth: 27° 50' 20.5"
Slope/Tilt: 3.11°



Start Position: 37° 54' 14.6141" N, 121° 30' 47.4276" W

Start Height: -7.906 ft

End Position: 37° 54' 17.2428" N, 121° 30' 47.5189" W

End Height: 6.029 ft

Straight-Line Distance: 266.01 ft

3D Distance on Surface: 276.97 ft

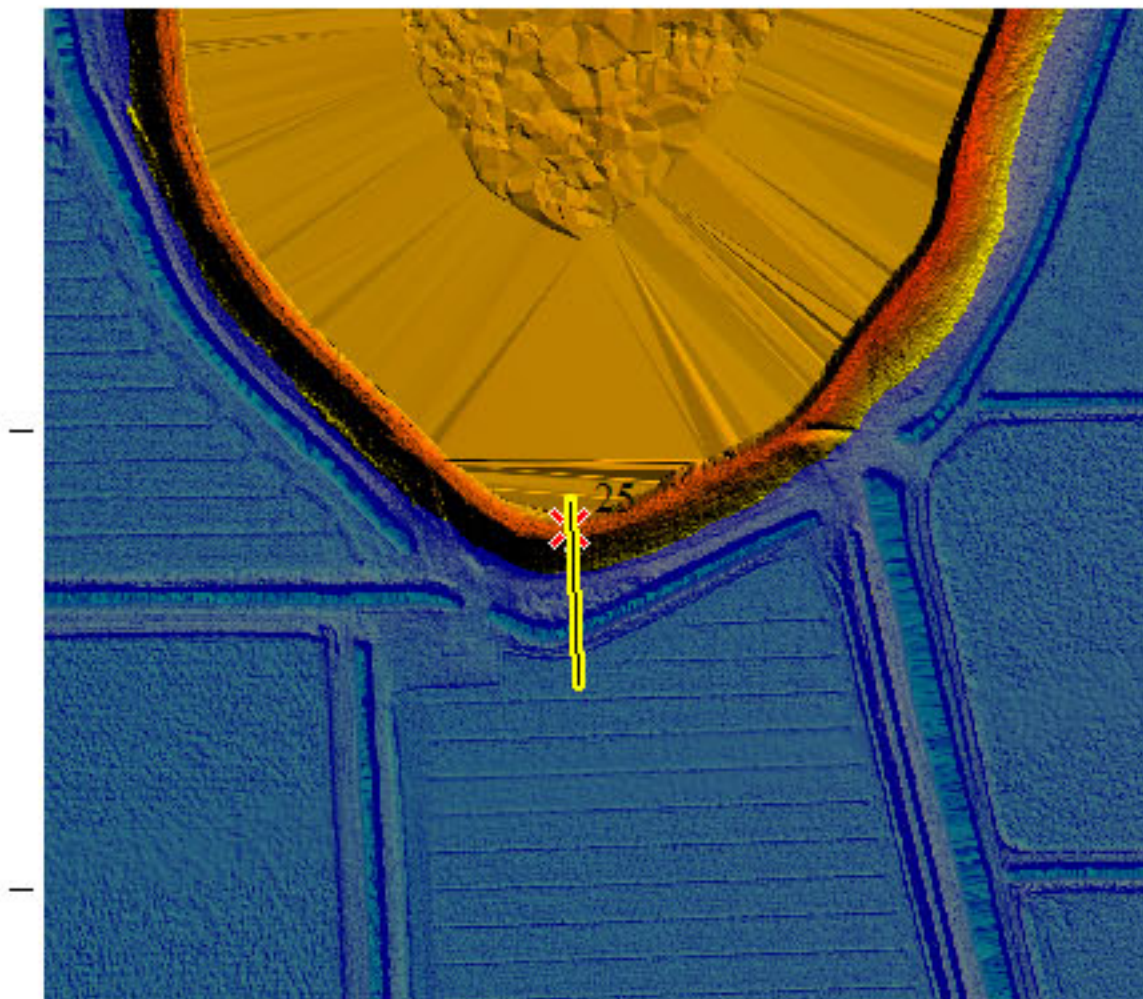
Vertical Difference (Start to Finish): 13.9 ft

Minimum Elevation on Path: -13.083 ft

Maximum Elevation on Path: 12.721 ft

Azimuth: 358° 25' 26.4"

Slope/Tilt: 3.00°



Location: 37° 54' 16.8169" N, 121° 30' 47.5041" W

Elev: 12.64 ft, Dist: 222.91 ft

125 ft
100 ft
75 ft
50 ft
25 ft
0 ft

50 ft

100 ft

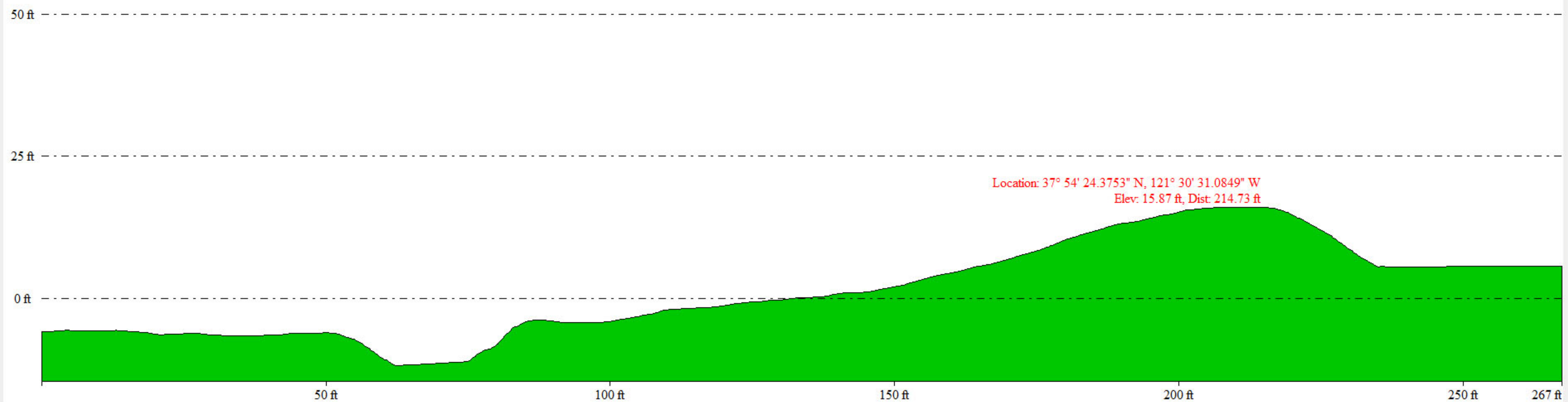
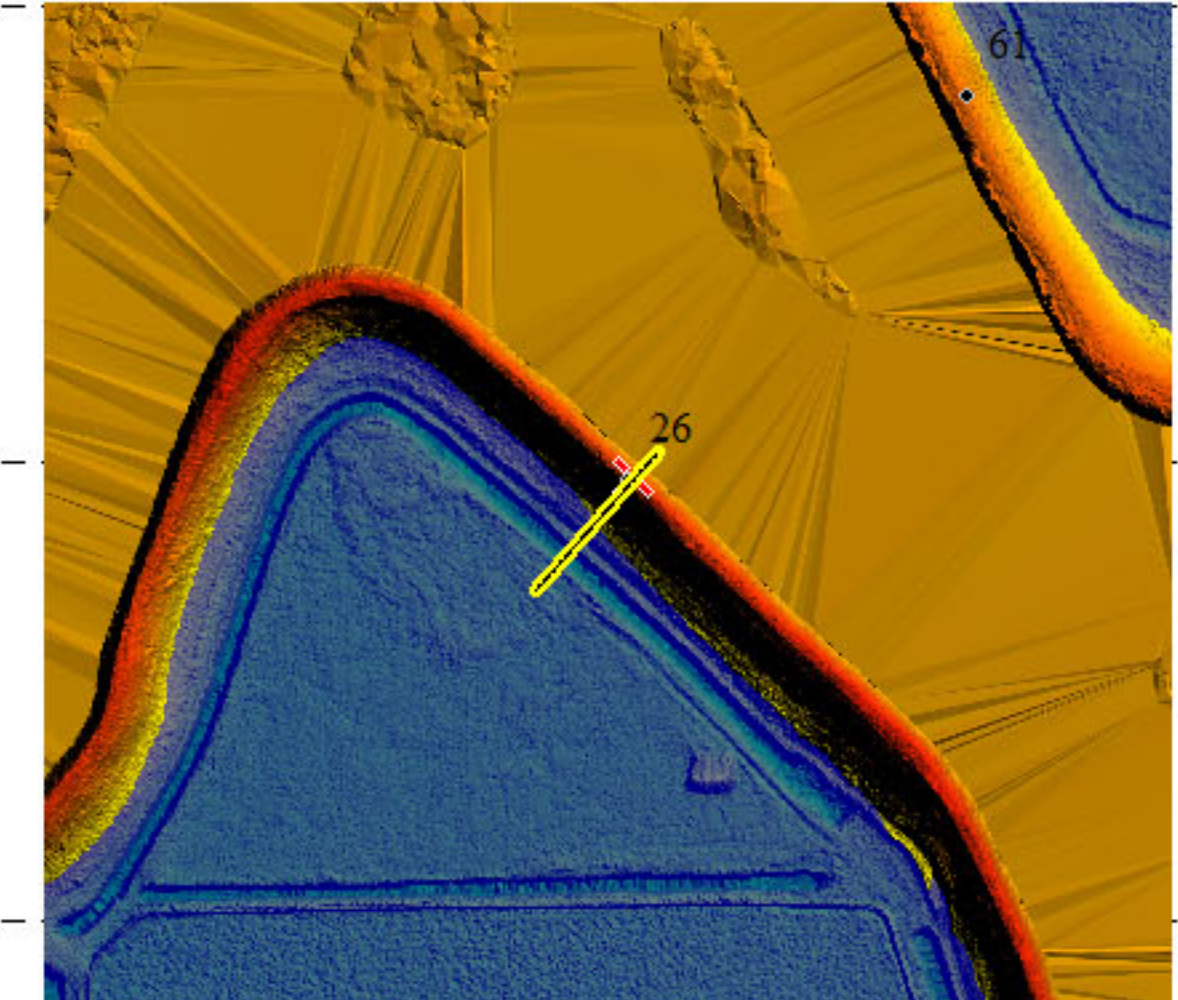
150 ft

200 ft

250 ft

266 ft

125 ft ——— Start Position: 37° 54' 22.8080" N, 121° 30' 32.8920" W
Start Height: -5.872 ft
End Position: 37° 54' 24.7597" N, 121° 30' 30.6417" W
End Height: 5.64 ft
100 ft ——— Straight-Line Distance: 267.4 ft
3D Distance on Surface: 276.67 ft
Vertical Difference (Start to Finish): 11.5 ft
Minimum Elevation on Path: -11.826 ft
Maximum Elevation on Path: 16.085 ft
75 ft ——— Azimuth: 42° 24' 45.2"
Slope/Tilt: 2.47°



Start Position: 37° 54' 8.7269" N, 121° 30' 15.5863" W

Start Height: -6.813 ft

End Position: 37° 54' 11.1997" N, 121° 30' 15.3920" W

End Height: 4.749 ft

Straight-Line Distance: 250.62 ft

3D Distance on Surface: 260.98 ft

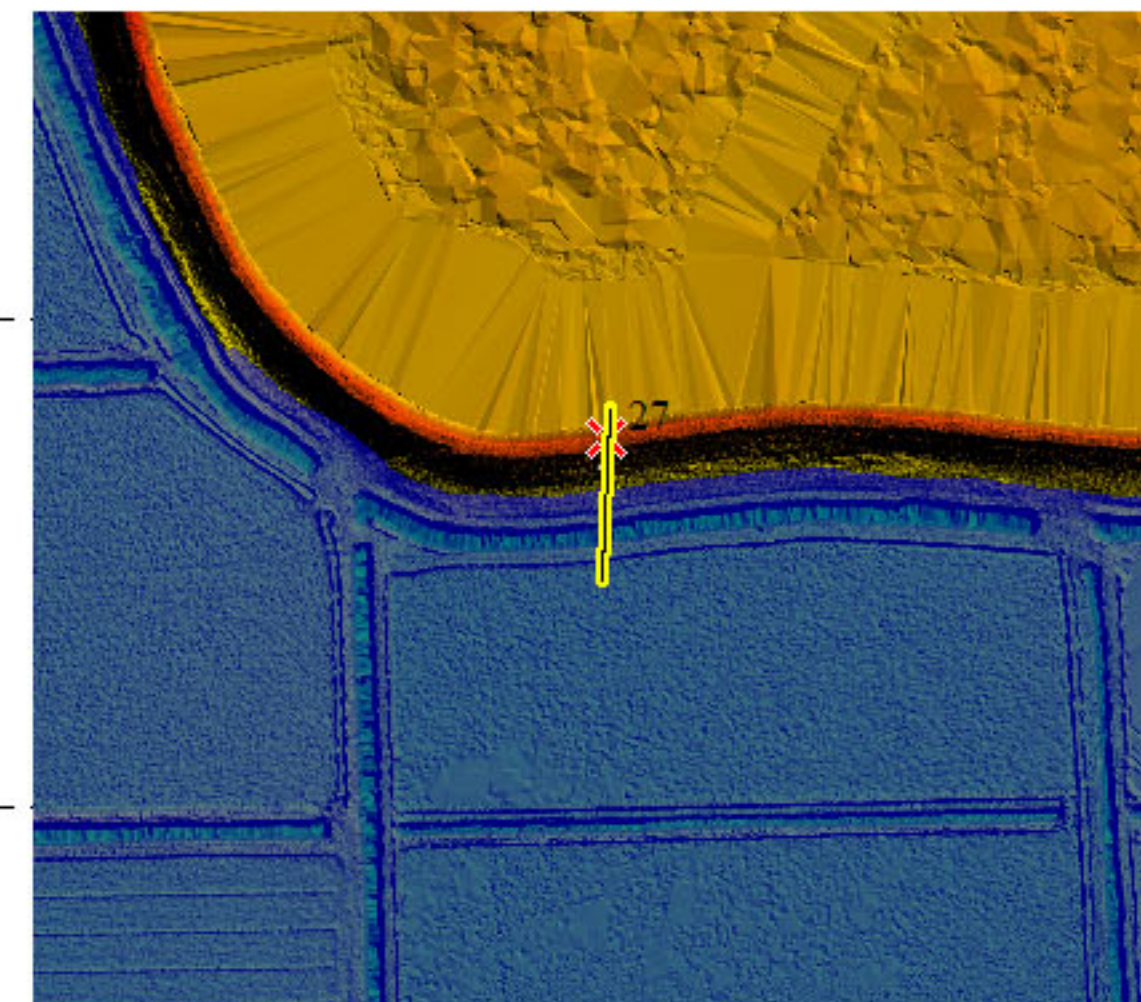
Vertical Difference (Start to Finish): 11.6 ft

Minimum Elevation on Path: -12.062 ft

Maximum Elevation on Path: 14.379 ft

Azimuth: 3° 33' 41.4"

Slope/Tilt: 2.64°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 54' 10.7545" N, 121° 30' 15.4270" W
Elev: 14.42 ft, Dist: 205.5 ft

50 ft

100 ft

150 ft

200 ft

251 ft

From Pos: 37° 54' 7.8147" N, 121° 29' 54.7949" W

Station 28

To Pos: 37° 54' 11.7742" N, 121° 29' 51.7347" W

Start Position: 37° 54' 7.8147" N, 121° 29' 54.7949" W

Start Height: -5.348 ft

End Position: 37° 54' 11.7742" N, 121° 29' 51.7347" W

End Height: 4.873 ft

Straight-Line Distance: 469.65 ft

3D Distance on Surface: 478.2 ft

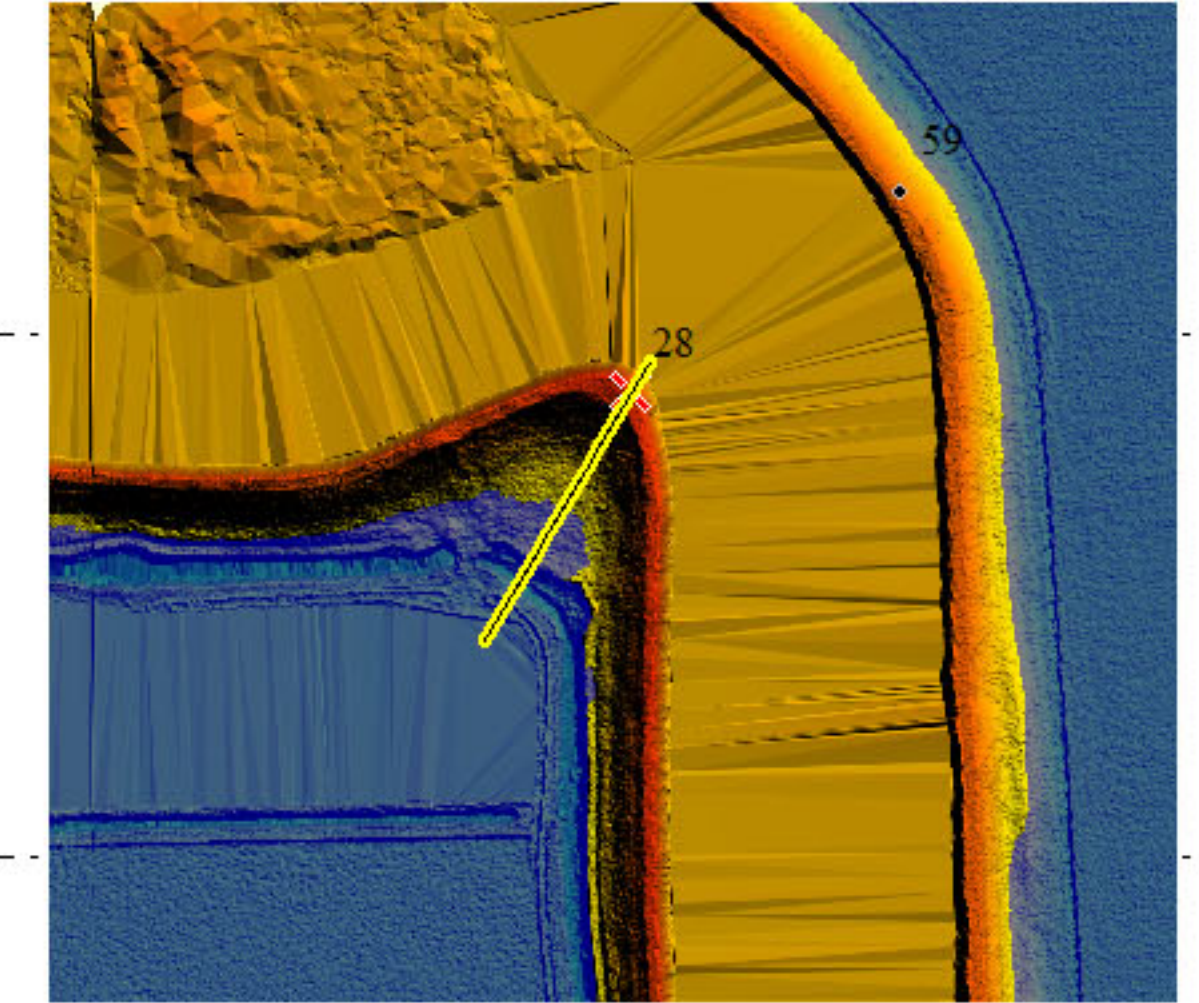
Vertical Difference (Start to Finish): 10.2 ft

Minimum Elevation on Path: -9.431 ft

Maximum Elevation on Path: 17.418 ft

Azimuth: 31° 29' 0.0"

Slope/Tilt: 1.25°



250 ft

200 ft

150 ft

100 ft

50 ft

0 ft

Location: 37° 54' 11.3350" N, 121° 29' 52.0742" W

Elev: 17.25 ft, Dist: 417.55 ft

50 ft

100 ft

150 ft

200 ft

250 ft

300 ft

350 ft

400 ft

450 ft

470 ft

From Pos: 37° 53' 50.1130" N, 121° 29' 49.2917" W

Station 29

To Pos: 37° 53' 52.8639" N, 121° 29' 47.0251" W

Start Position: 37° 53' 50.1130" N, 121° 29' 49.2917" W

Start Height: -7.055 ft

End Position: 37° 53' 52.8639" N, 121° 29' 47.0251" W

End Height: 4.302 ft

Straight-Line Distance: 332.33 ft

3D Distance on Surface: 338.99 ft

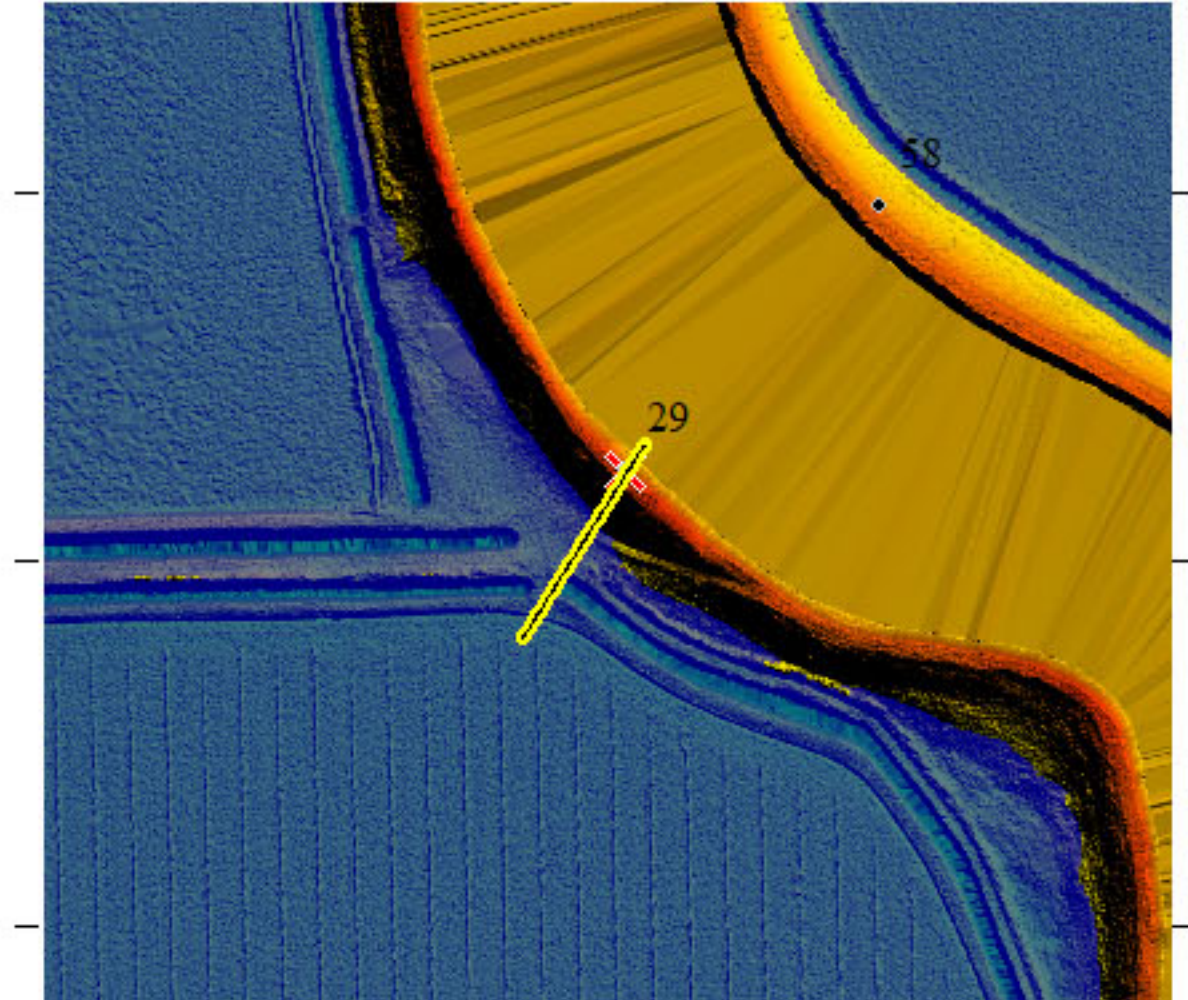
Vertical Difference (Start to Finish): 11.4 ft

Minimum Elevation on Path: -8.493 ft

Maximum Elevation on Path: 15.686 ft

Azimuth: 33°-08' 23.6"

Slope/Tilt: 1.96°



75 ft

50 ft

25 ft

0 ft

Location: 37° 53' 52.4408" N, 121° 29' 47.3738" W
Elev: 15.83 ft, Dist: 281.21 ft

50 ft

100 ft

150 ft

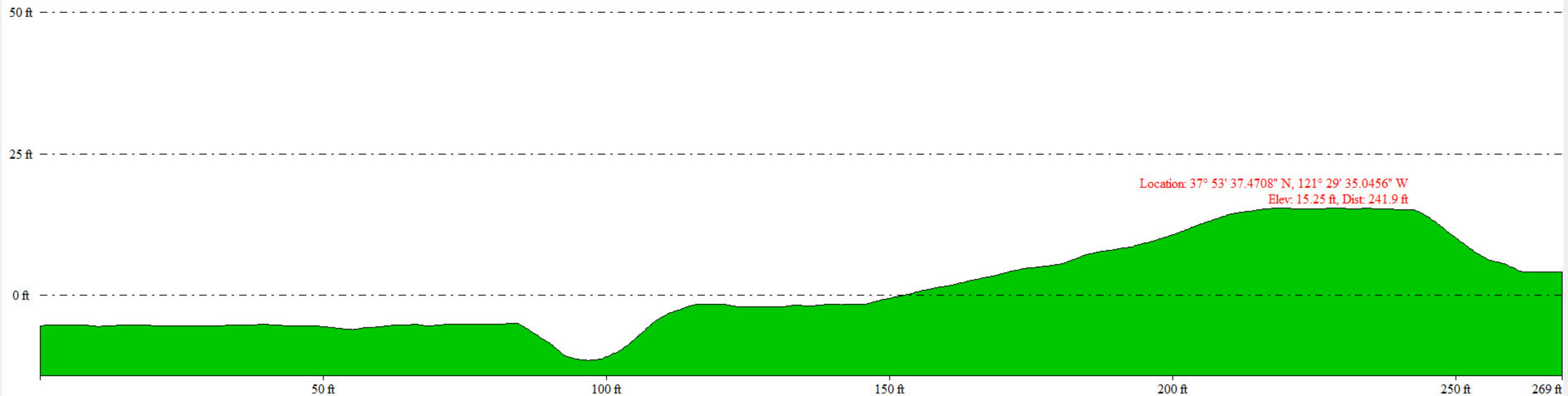
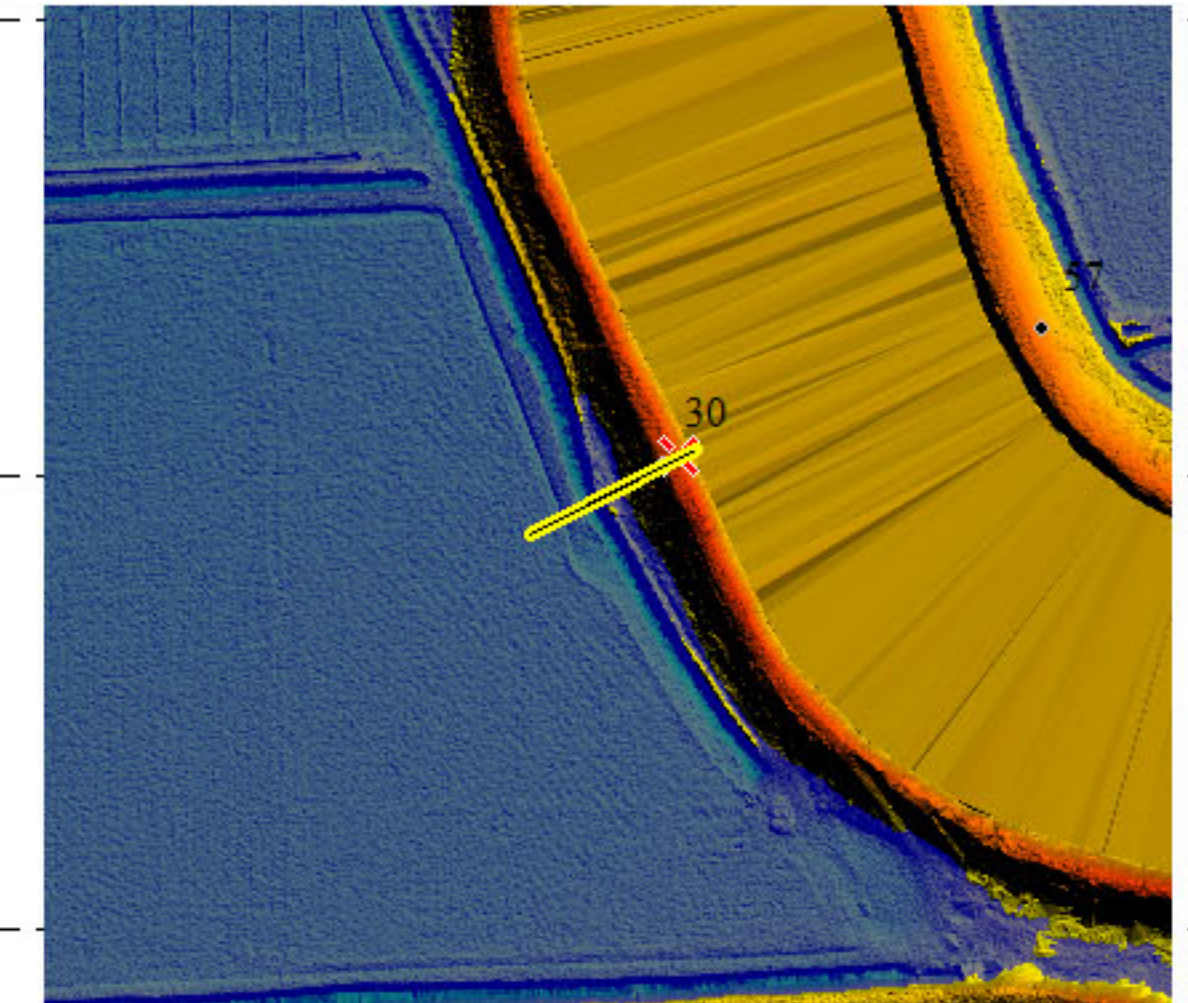
200 ft

250 ft

300 ft

332 ft

125 ft ————
Start Position: 37° 53' 36.4085" N, 121° 29' 37.7492" W
Start Height: -5.353 ft
End Position: 37° 53' 37.5887" N, 121° 29' 34.7457" W
End Height: 4.094 ft
Straight-Line Distance: 268.72 ft
3D Distance on Surface: 279.08 ft
Vertical Difference (Start to Finish): 9.4 ft
Minimum Elevation on Path: -11.519 ft
Maximum Elevation on Path: 15.421 ft
75 ft ————
Azimuth: 63° 37' 32.4"
Slope/Tilt: 2.01°



Start Position: 37° 53' 24.4152" N, 121° 29' 29.0079" W

Start Height: -4.709 ft

End Position: 37° 53' 24.1431" N, 121° 29' 25.6018" W

End Height: 4.091 ft

Straight-Line Distance: 274.43 ft

3D Distance on Surface: 283.53 ft

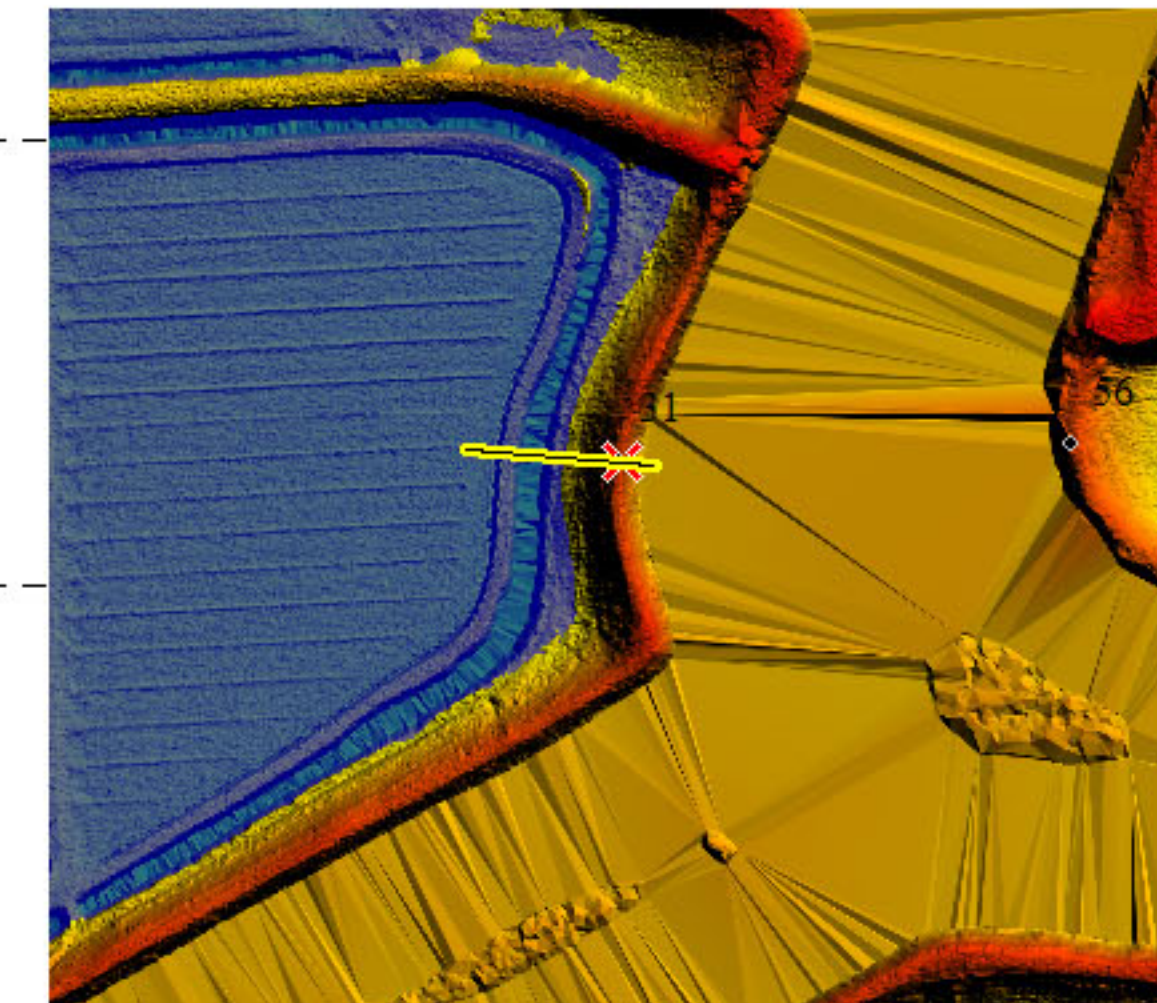
Vertical Difference (Start to Finish): 8.8 ft

Minimum Elevation on Path: -9.106 ft

Maximum Elevation on Path: 14.94 ft

Azimuth: 95° 45' 25.4"

Slope/Tilt: 1.84°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 53' 24.1890" N, 121° 29' 26.1760" W
Elev: 14.78 ft, Dist: 228.17 ft

50 ft

100 ft

150 ft

200 ft

250 ft

274 ft

From Pos: 37° 53' 14.1283" N, 121° 29' 49.4468" W

Station 32

To Pos: 37° 53' 11.5530" N, 121° 29' 47.5772" W

Start Position: 37° 53' 14.1283" N, 121° 29' 49.4468" W

Start Height: -4.286 ft

End Position: 37° 53' 11.5530" N, 121° 29' 47.5772" W

End Height: 4.443 ft

Straight-Line Distance: 300.54 ft

3D Distance on Surface: 313.3 ft

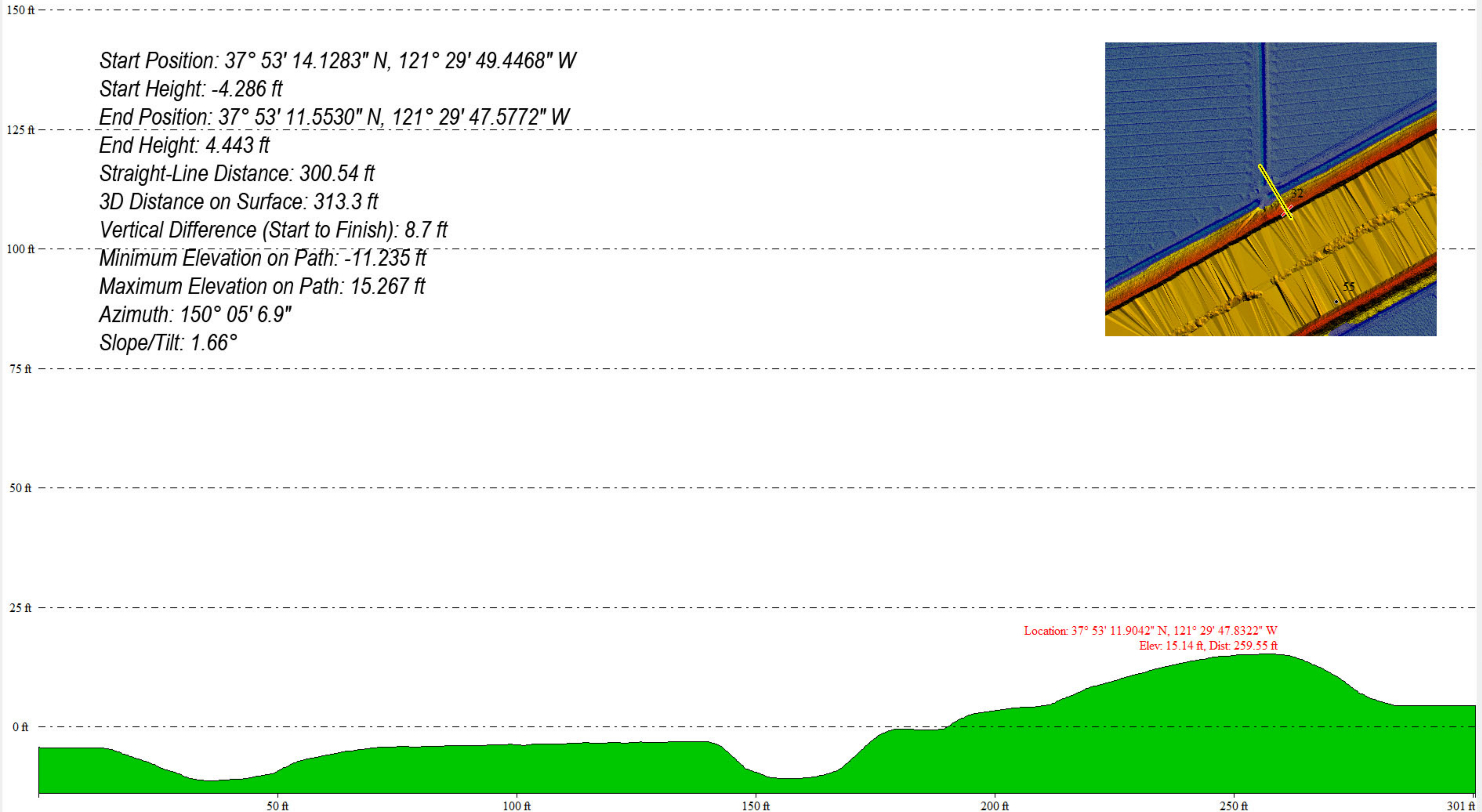
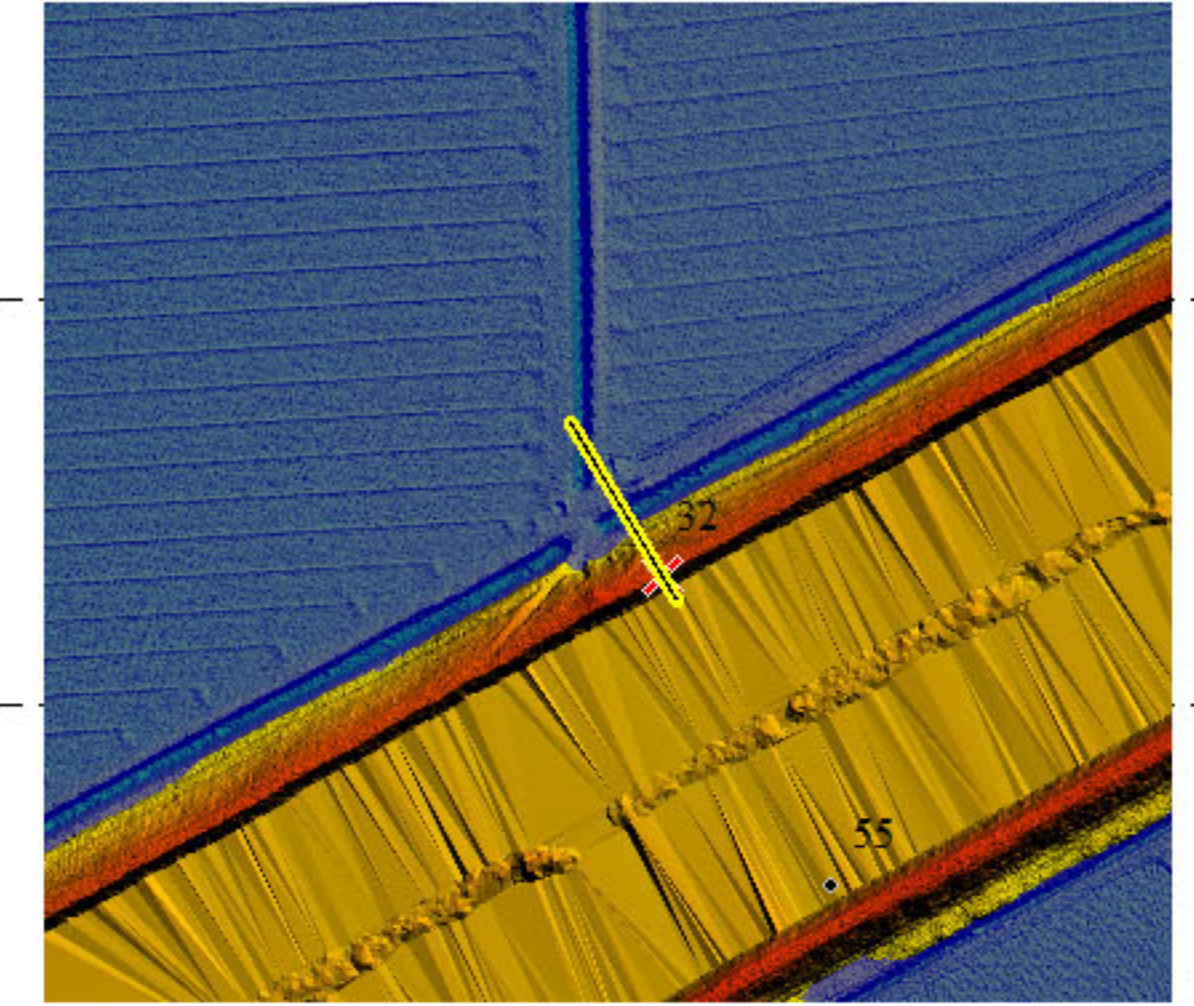
Vertical Difference (Start to Finish): 8.7 ft

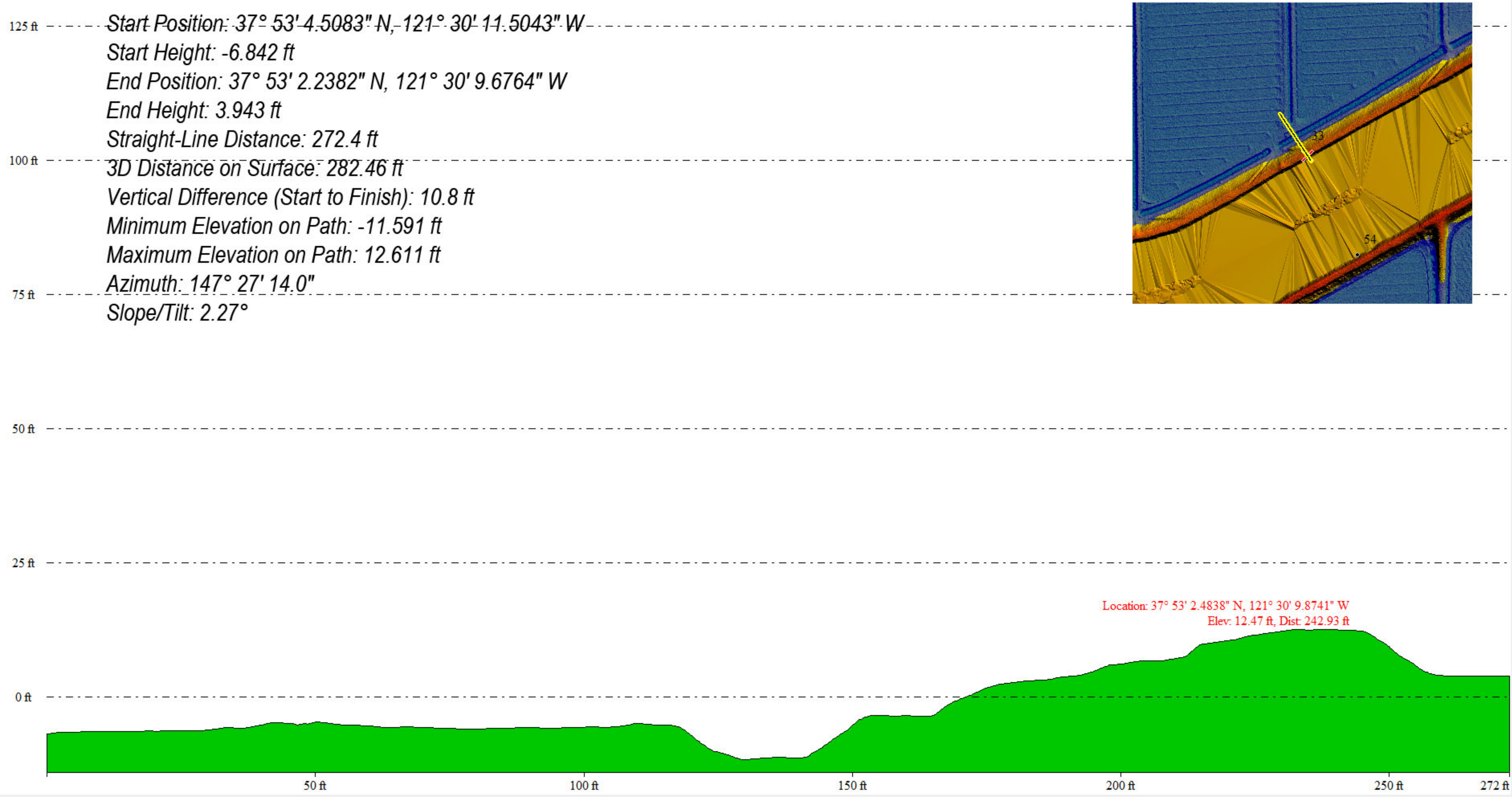
Minimum Elevation on Path: -11.235 ft

Maximum Elevation on Path: 15.267 ft

Azimuth: 150° 05' 6.9"

Slope/Tilt: 1.66°





Start Position: 37° 52' 58.3226" N, 121° 30' 34.2116" W

Start Height: -6.425 ft

End Position: 37° 52' 56.7410" N, 121° 30' 32.6099" W

End Height: 3.675 ft

Straight-Line Distance: 205.15 ft

3D Distance on Surface: 215.01 ft

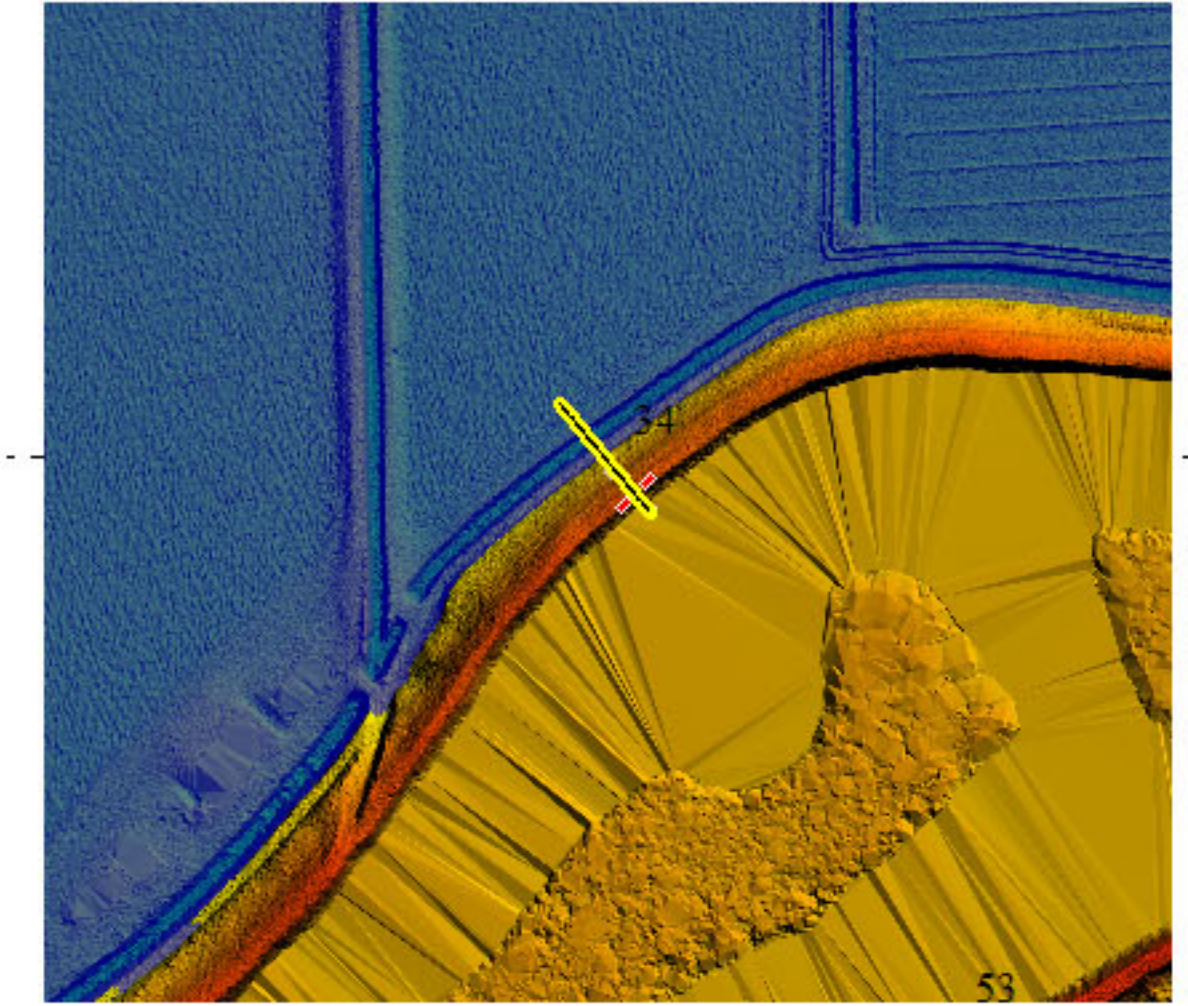
Vertical Difference (Start to Finish): 10.1 ft

Minimum Elevation on Path: -11.149 ft

Maximum Elevation on Path: 13.138 ft

Azimuth: 141° 14' 51.1"

Slope/Tilt: 2.82°



Location: 37° 52' 56.9920" N, 121° 30' 32.8641" W
Elev: 13.23 ft, Dist: 172.59 ft

100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

205 ft

From Pos: 37° 52' 46.7204" N, 121° 30' 53.2792" W

Station 35

To Pos: 37° 52' 44.4934" N, 121° 30' 51.8345" W

Start Position: 37° 52' 46.7204" N, 121° 30' 53.2792" W

Start Height: -7.591 ft

End Position: 37° 52' 44.4934" N, 121° 30' 51.8345" W

End Height: 3.737 ft

Straight-Line Distance: 253.3 ft

3D Distance on Surface: 263.3 ft

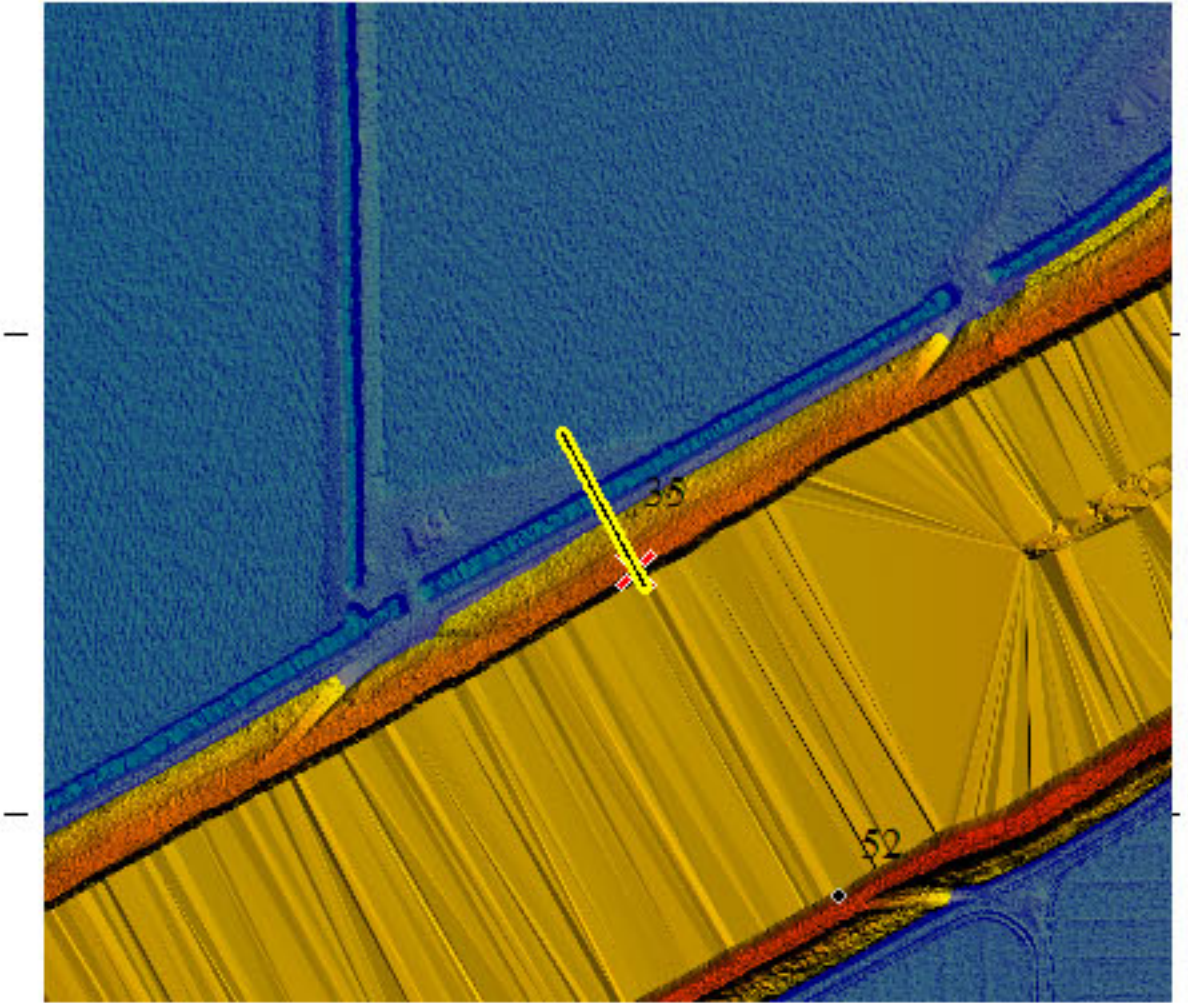
Vertical Difference (Start to Finish): 11.3 ft

Minimum Elevation on Path: -12.526 ft

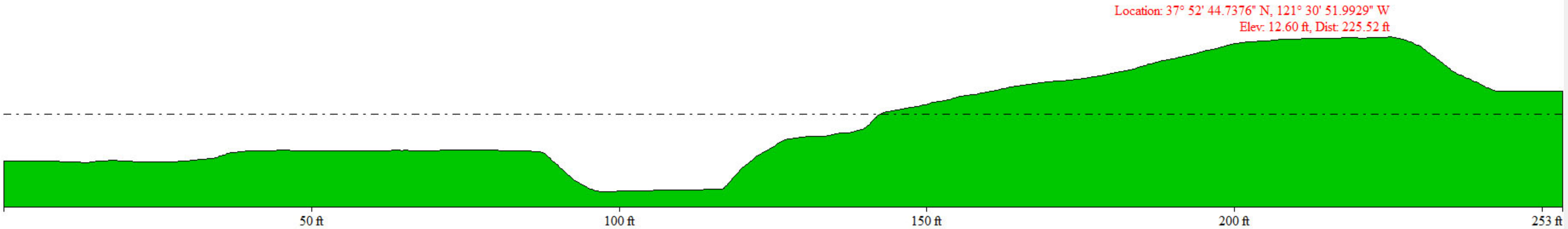
Maximum Elevation on Path: 12.555 ft

Azimuth: 152° 47' 17.9"

Slope/Tilt: 2.56°



125 ft
100 ft
75 ft
50 ft
25 ft
0 ft



From Pos: 37° 52' 37.3610" N, 121° 31' 15.1347" W

Station 36

To Pos: 37° 52' 35.2097" N, 121° 31' 13.6403" W

Start Position: 37° 52' 37.3610" N, 121° 31' 15.1347" W

Start Height: -8.727 ft

End Position: 37° 52' 35.2097" N, 121° 31' 13.6403" W

End Height: 0 ft

Straight-Line Distance: 248.42 ft

3D Distance on Surface: 261.24 ft

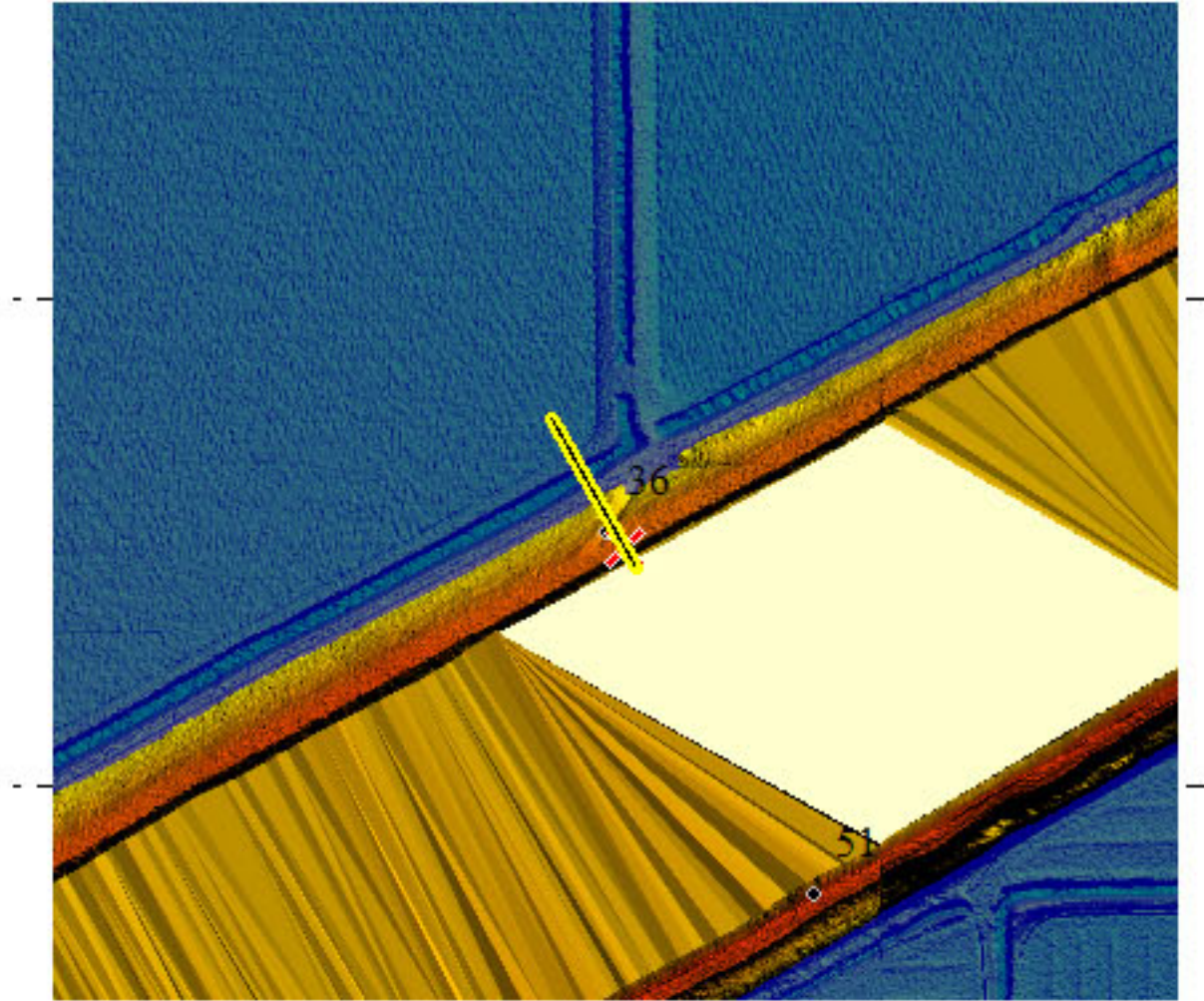
Vertical Difference (Start to Finish): 8.7 ft

Minimum Elevation on Path: -12.869 ft

Maximum Elevation on Path: 11.867 ft

Azimuth: 151° 09' 48.2"

Slope/Tilt: 2.01°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

248 ft

Location: 37° 52' 35.4708" N, 121° 31' 13.8217" W

Elev: 11.53 ft, Dist: 218.27 ft

From Pos: 37° 52' 28.3111" N, 121° 31' 37.4629" W

Station 37

To Pos: 37° 52' 25.7386" N, 121° 31' 35.7847" W

Start Position: 37° 52' 28.3111" N, 121° 31' 37.4629" W

Start Height: -7.851 ft

End Position: 37° 52' 25.7386" N, 121° 31' 35.7847" W

End Height: 4.258 ft

Straight-Line Distance: 292.95 ft

3D Distance on Surface: 301.83 ft

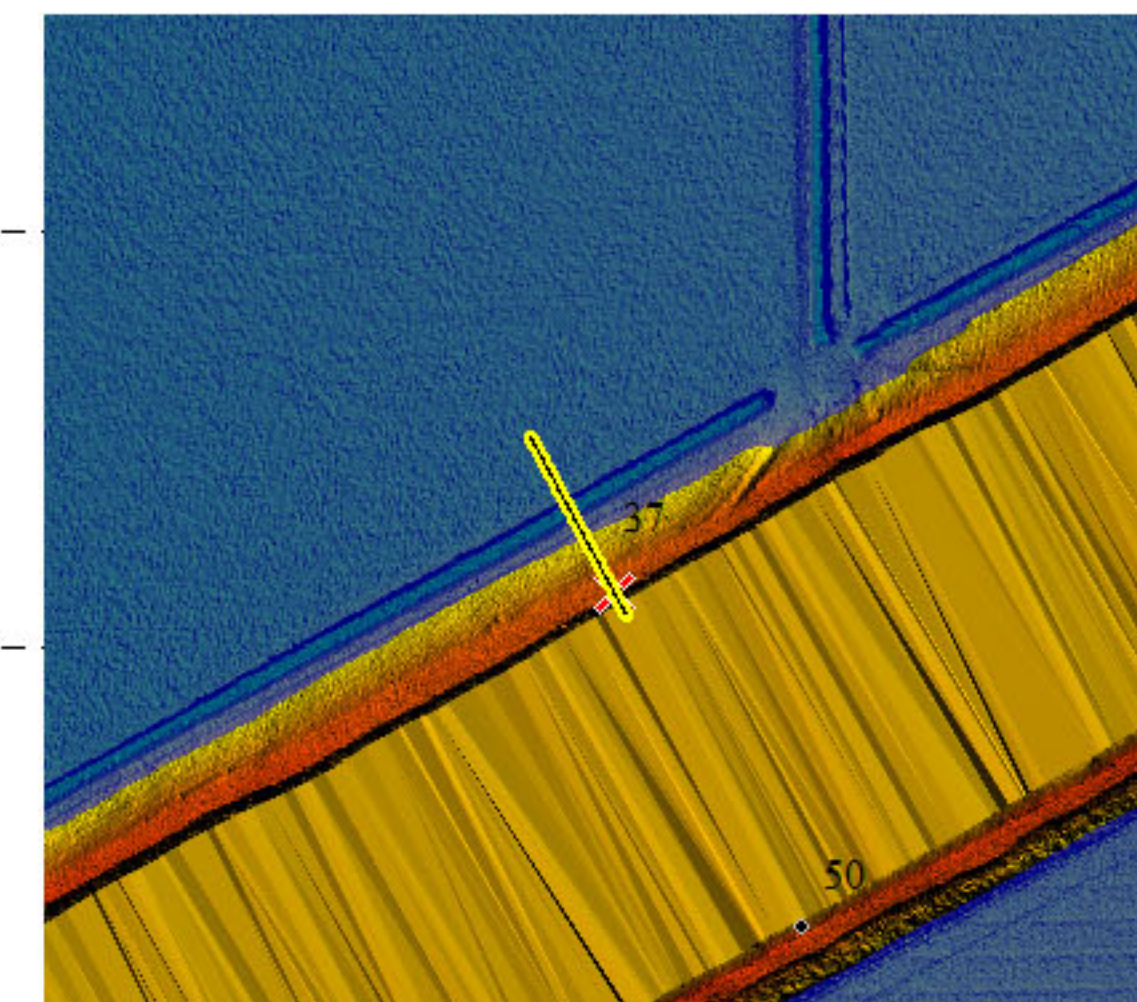
Vertical Difference (Start to Finish): 12.1 ft

Minimum Elevation on Path: -12.387 ft

Maximum Elevation on Path: 12.695 ft

Azimuth: 152° 39' 16.8"

Slope/Tilt: 2.37°



150 ft

125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 52' 26.0600" N, 121° 31' 35.9943" W

Elev: 12.59 ft, Dist: 256.35 ft

50 ft

100 ft

150 ft

200 ft

250 ft

293 ft

Start Position: 37° 52' 18.7185" N, 121° 31' 59.1279" W

Start Height: -5.977 ft

End Position: 37° 52' 16.5697" N, 121° 31' 57.8254" W

End Height: 4.562 ft

Straight-Line Distance: 241.15 ft

3D Distance on Surface: 253.49 ft

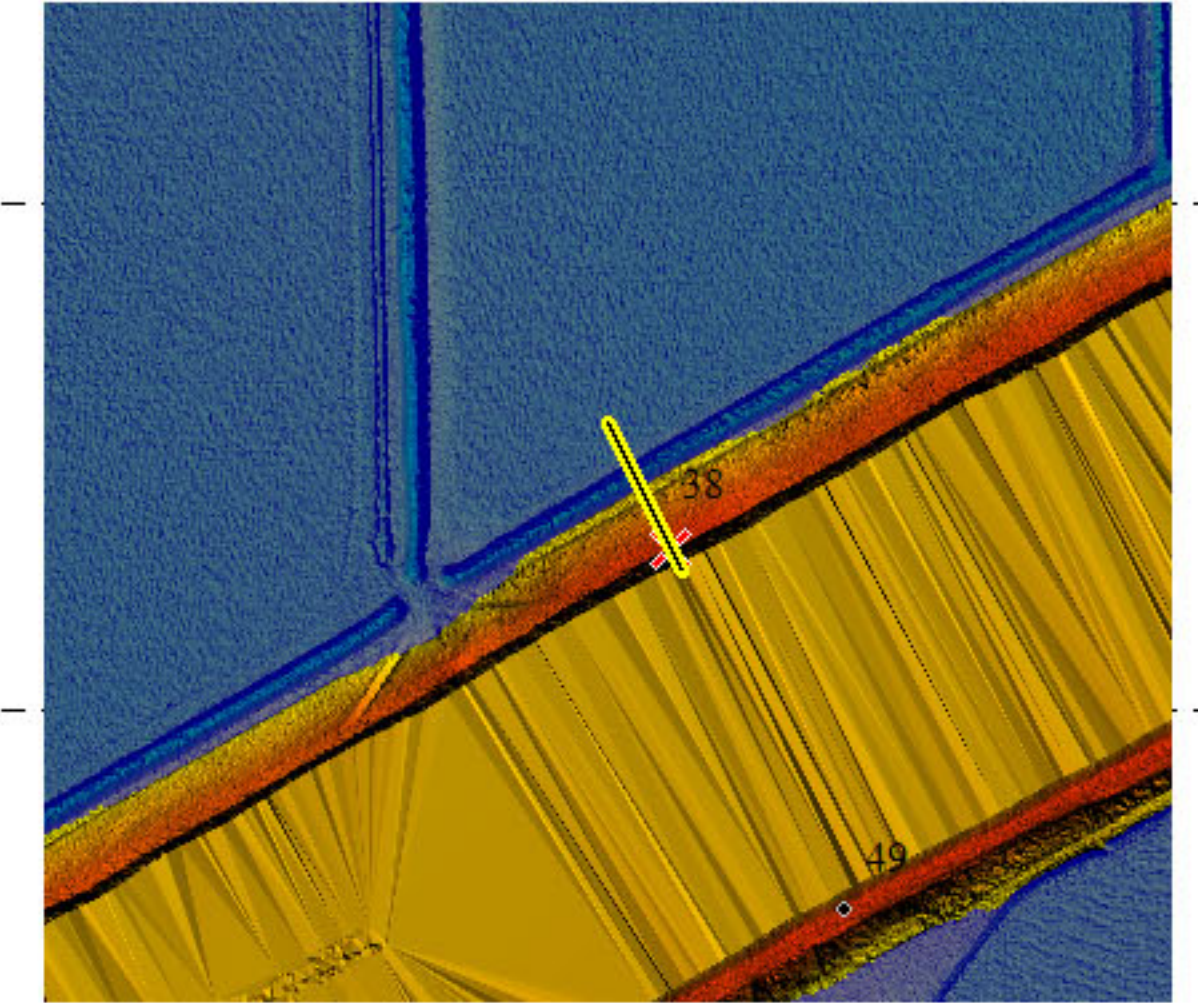
Vertical Difference (Start to Finish): 10.5 ft

Minimum Elevation on Path: -13.065 ft

Maximum Elevation on Path: 16.616 ft

Azimuth: 154° 20' 8.2"

Slope/Tilt: 2.50°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 52' 16.8675" N, 121° 31' 58.0059" W
Elev: 16.73 ft, Dist: 207.73 ft

50 ft

100 ft

150 ft

200 ft

241 ft

Start Position: 37° 52' 9.0553" N, 121° 32' 21.3211" W

Start Height: -6.144 ft

End Position: 37° 52' 7.1695" N, 121° 32' 19.7250" W

End Height: 4.7 ft

Straight-Line Distance: 229.71 ft

3D Distance on Surface: 240.21 ft

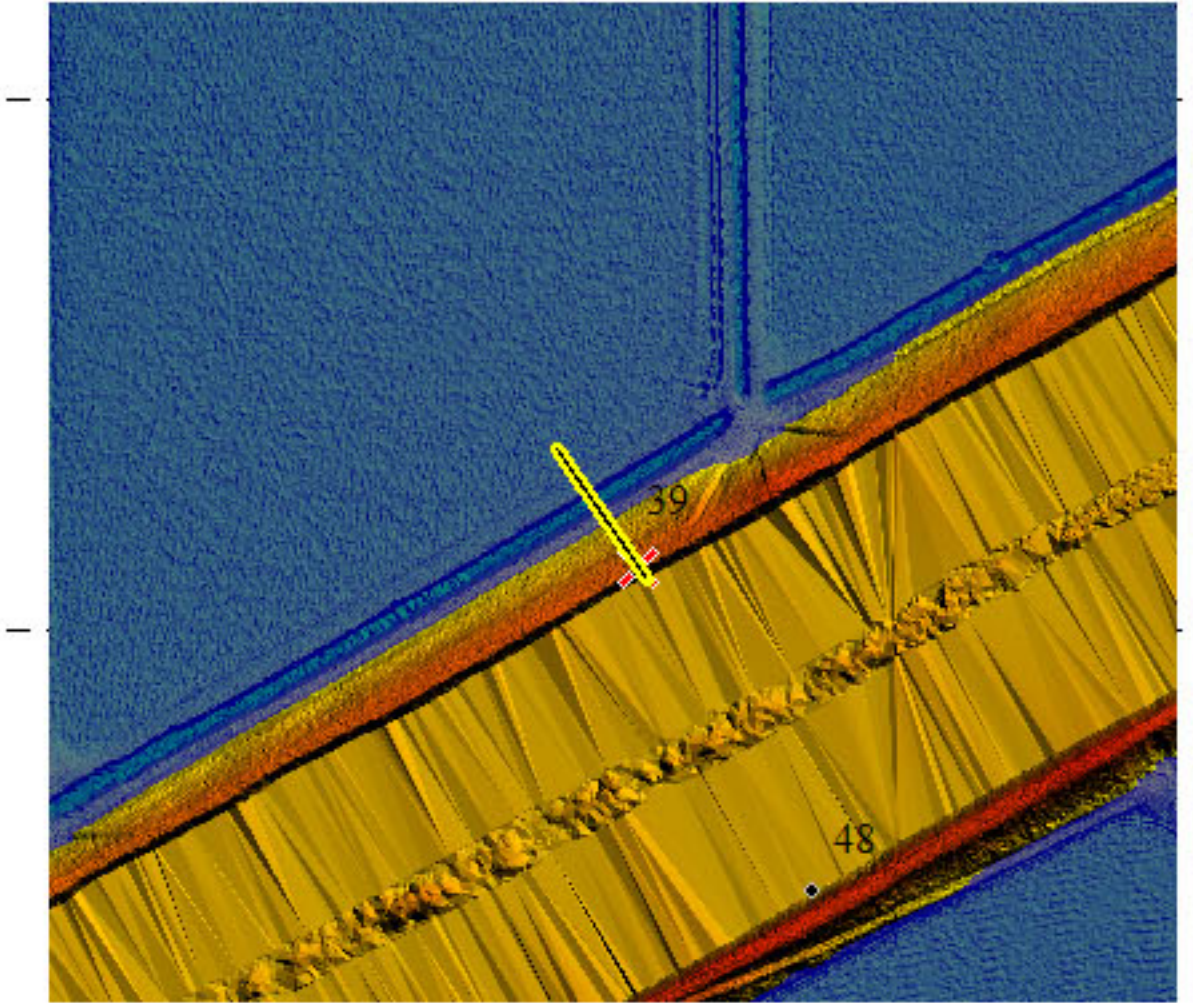
Vertical Difference (Start to Finish): 10.8 ft

Minimum Elevation on Path: -12.711 ft

Maximum Elevation on Path: 12.411 ft

Azimuth: 146° 08' 27.2"

Slope/Tilt: 2.70°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 52' 7.3083" N, 121° 32' 19.8426" W

Elev: 12.22 ft, Dist: 212.79 ft

50 ft

100 ft

150 ft

200 ft

230 ft

Start Position: 37° 51' 59.8851" N, 121° 32' 43.4549" W

Start Height: -8.535 ft

End Position: 37° 51' 57.6919" N, 121° 32' 41.6246" W

End Height: 4.775 ft

Straight-Line Distance: 266.01 ft

3D Distance on Surface: 274.63 ft

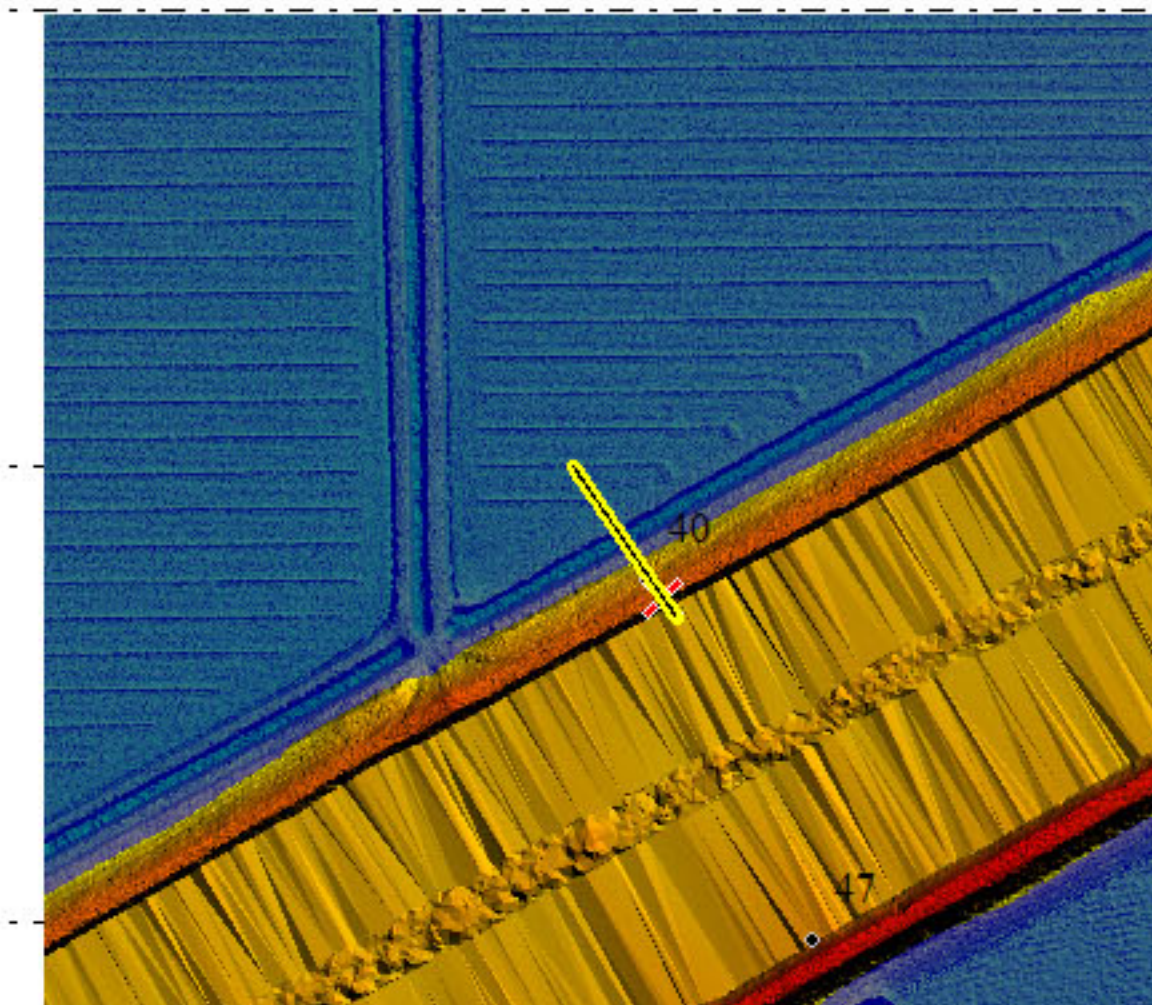
Vertical Difference (Start to Finish): 13.3 ft

Minimum Elevation on Path: -12.617 ft

Maximum Elevation on Path: 12.141 ft

Azimuth: 146° 30' 45.5"

Slope/Tilt: 2.86°



Location: 37° 51' 57.9689" N, 121° 32' 41.8558" W

Elev: 12.08 ft, Dist: 232.41 ft

125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

250 ft

266 ft

Start Position: 37° 51' 50.1719" N, 121° 33' 4.8774" W

Start Height: -6.814 ft

End Position: 37° 51' 48.2541" N, 121° 33' 3.7621" W

End Height: 4.419 ft

Straight-Line Distance: 213.61 ft

3D Distance on Surface: 221.23 ft

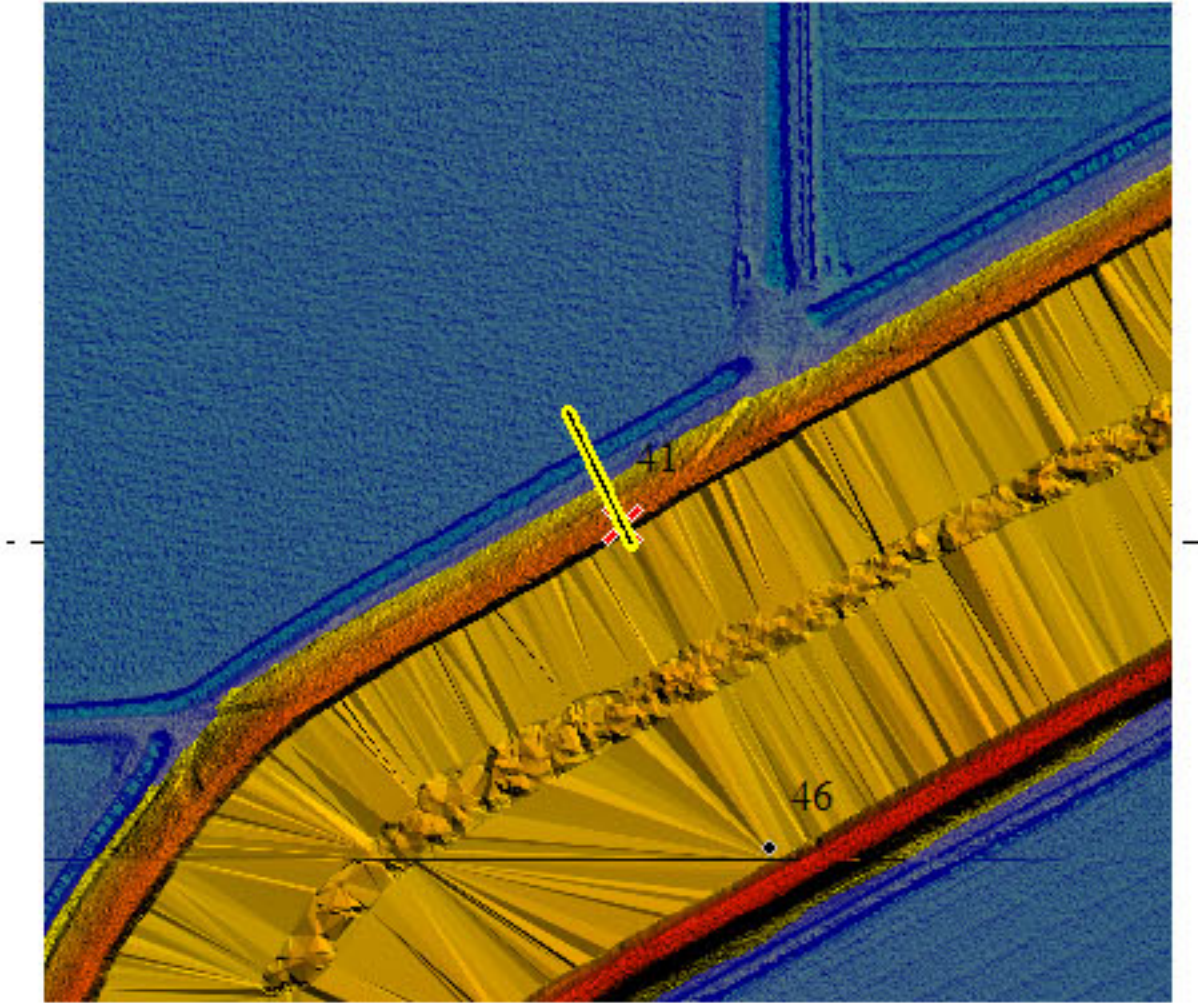
Vertical Difference (Start to Finish): 11.2 ft

Minimum Elevation on Path: -11.161 ft

Maximum Elevation on Path: 11.884 ft

Azimuth: 155° 14' 53.8"

Slope/Tilt: 3.01°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 51' 48.5301" N, 121° 33' 3.9225" W
Elev: 11.76 ft, Dist: 182.88 ft

50 ft

100 ft

150 ft

200 ft

214 ft

From Pos: 37° 51' 33.4601" N, 121° 33' 20.8630" W
125 ft

Station 42

To Pos: 37° 51' 31.1640" N, 121° 33' 19.9471" W

Start Position: 37° 51' 33.4601" N, 121° 33' 20.8630" W

Start Height: -3.972 ft

End Position: 37° 51' 31.1640" N, 121° 33' 19.9471" W

End Height: 3.331 ft

Straight-Line Distance: 243.6 ft

3D Distance on Surface: 256.63 ft

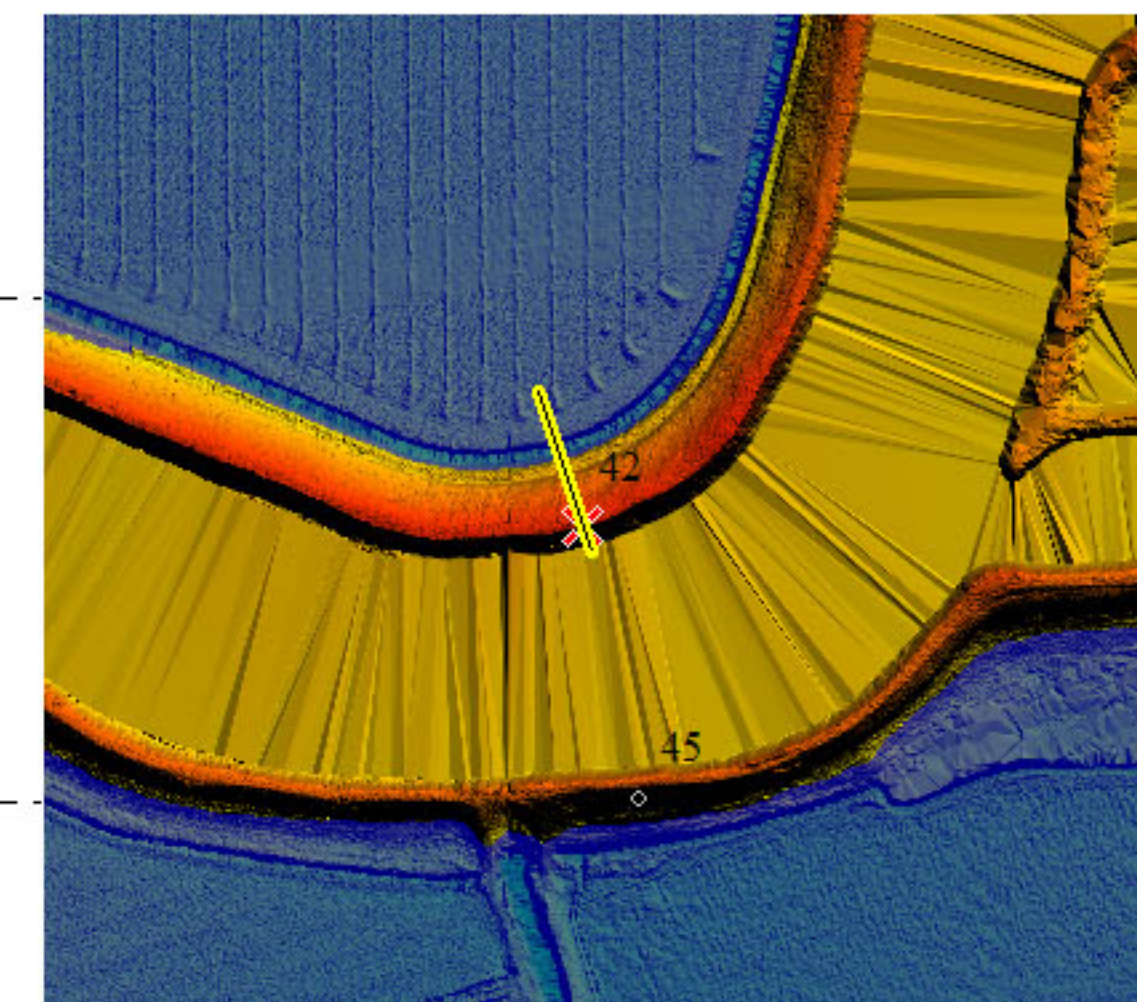
Vertical Difference (Start to Finish): 7.3 ft

Minimum Elevation on Path: -9.76 ft

Maximum Elevation on Path: 17.412 ft

Azimuth: 162° 27' 5.4"

Slope/Tilt: 1.72°



50 ft

25 ft

Location: 37° 51' 31.4986" N, 121° 33' 20.0806" W
Elev: 17.46 ft, Dist: 208.1 ft

0 ft

50 ft

100 ft

150 ft

200 ft

244 ft

Start Position: 37° 51' 30.2320" N, 121° 33' 43.3567" W

Start Height: -7.221 ft

End Position: 37° 51' 28.8689" N, 121° 33' 40.8855" W

End Height: 2.479 ft

Straight-Line Distance: 241.42 ft

3D Distance on Surface: 251.64 ft

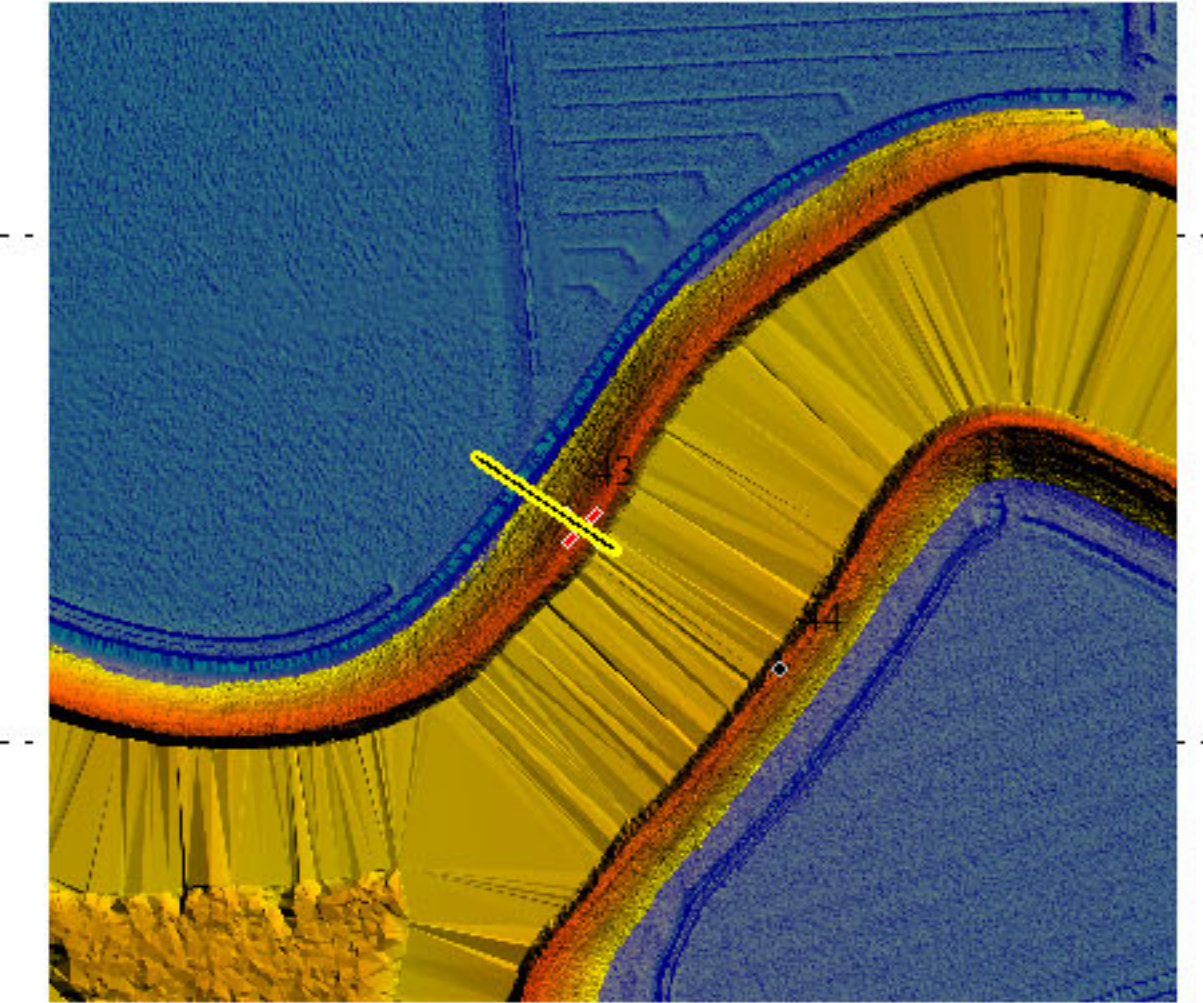
Vertical Difference (Start to Finish): 9.7 ft

Minimum Elevation on Path: -11.931 ft

Maximum Elevation on Path: 14.548 ft

Azimuth: 124° 49' 34.3"

Slope/Tilt: 2.30°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 51' 29.1879" N, 121° 33' 41.4639" W
Elev: 14.66 ft, Dist: 184.92 ft

50 ft

100 ft

150 ft

200 ft

241 ft

Start Position: 37° 51' 26.1844" N, 121° 33' 36.2307" W

Start Height: -3.609 ft

End Position: 37° 51' 27.4297" N, 121° 33' 38.4159" W

End Height: 4.639 ft

Straight-Line Distance: 215.83 ft

3D Distance on Surface: 224.21 ft

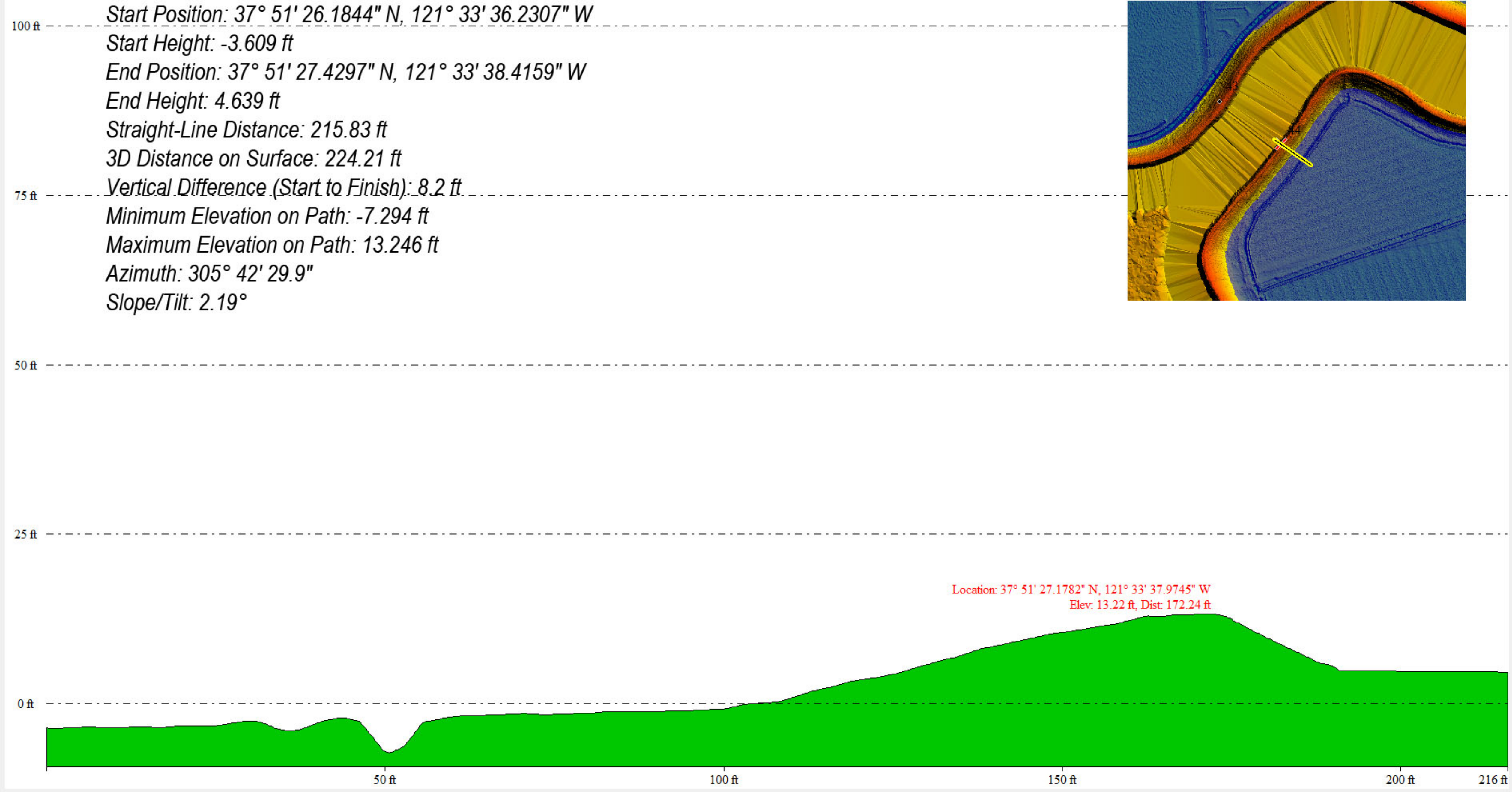
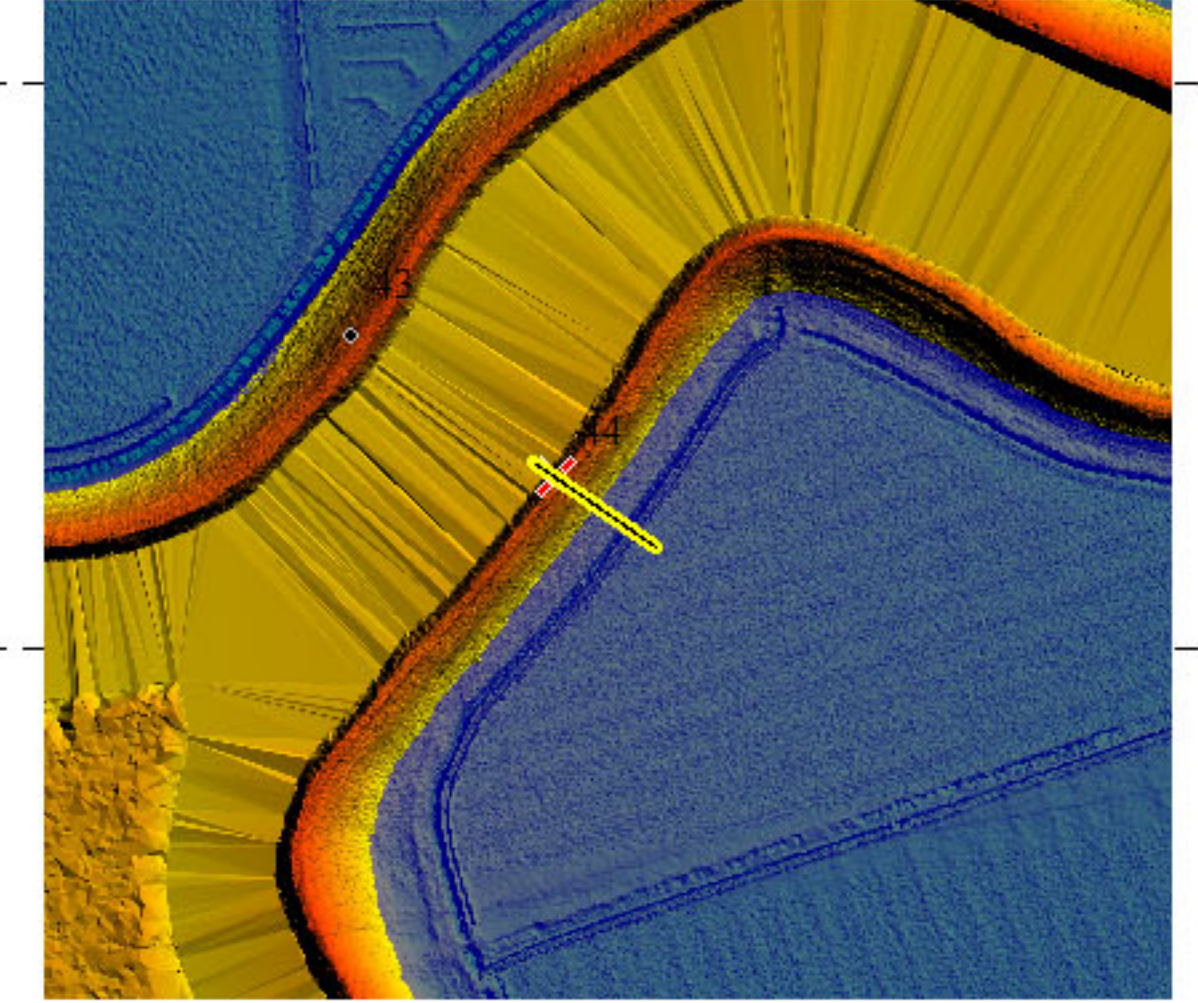
Vertical Difference (Start to Finish): 8.2 ft

Minimum Elevation on Path: -7.294 ft

Maximum Elevation on Path: 13.246 ft

Azimuth: 305° 42' 29.9"

Slope/Tilt: 2.19°



Start Position: 37° 51' 26.2409" N, 121° 33' 19.0826" W

Start Height: -7.306 ft

End Position: 37° 51' 28.3378" N, 121° 33' 19.2818" W

End Height: 3.265 ft

Straight-Line Distance: 212.71 ft

3D Distance on Surface: 220.23 ft

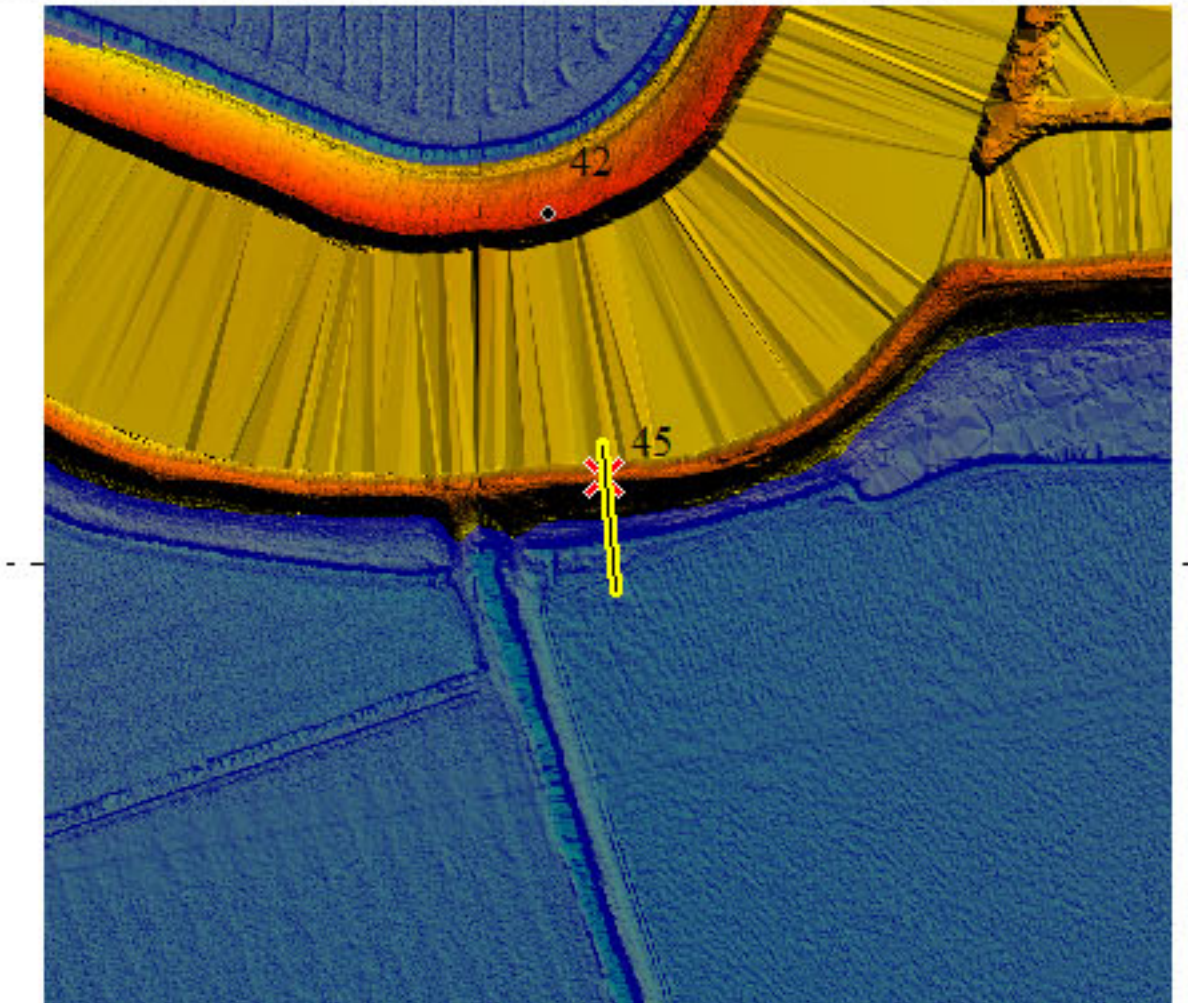
Vertical Difference (Start to Finish): 10.6 ft

Minimum Elevation on Path: -10.088 ft

Maximum Elevation on Path: 12.526 ft

Azimuth: 355° 41' 32.3"

Slope/Tilt: 2.85°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 51' 27.8461" N, 121° 33' 19.2351" W
Elev: 12.53 ft, Dist: 162.83 ft

50 ft

100 ft

150 ft

200 ft

213 ft

Start Position: 37° 51' 42.2336" N, 121° 33' 0.3735" W

Start Height: -5.932 ft

End Position: 37° 51' 43.8918" N, 121° 33' 1.3280" W

End Height: 4.642 ft

Straight-Line Distance: 184.37 ft

3D Distance on Surface: 219.51 ft

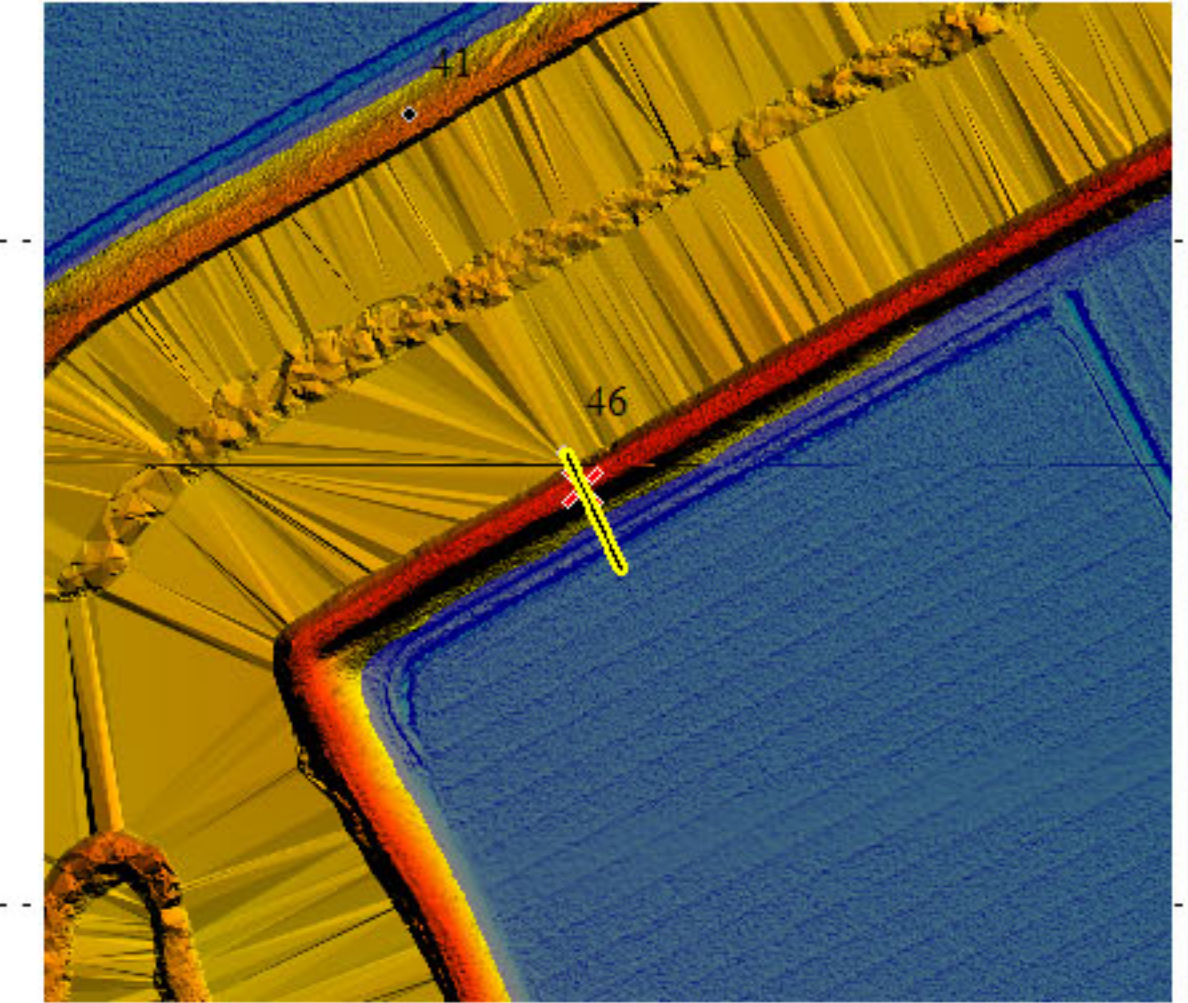
Vertical Difference (Start to Finish): 10.6 ft

Minimum Elevation on Path: -8.967 ft

Maximum Elevation on Path: 18.9 ft

Azimuth: 335° 28' 12.3"

Slope/Tilt: 3.28°



75 ft

50 ft

25 ft

0 ft

Location: 37° 51' 43.3878" N, 121° 33' 1.0379" W
Elev: 19.02 ft, Dist: 128.33 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

175 ft

184 ft

From Pos: 37° 51' 51.5213" N, 121° 32' 38.4316" W

Station 47

To Pos: 37° 51' 53.0712" N, 121° 32' 39.2683" W

80 ft

70 ft

60 ft

50 ft

40 ft

30 ft

20 ft

10 ft

0 ft

-10 ft

Start Position: 37° 51' 51.5213" N, 121° 32' 38.4316" W

Start Height: -6.061 ft

End Position: 37° 51' 53.0712" N, 121° 32' 39.2683" W

End Height: 7.918 ft

Straight-Line Distance: 170.53 ft

3D Distance on Surface: 186.87 ft

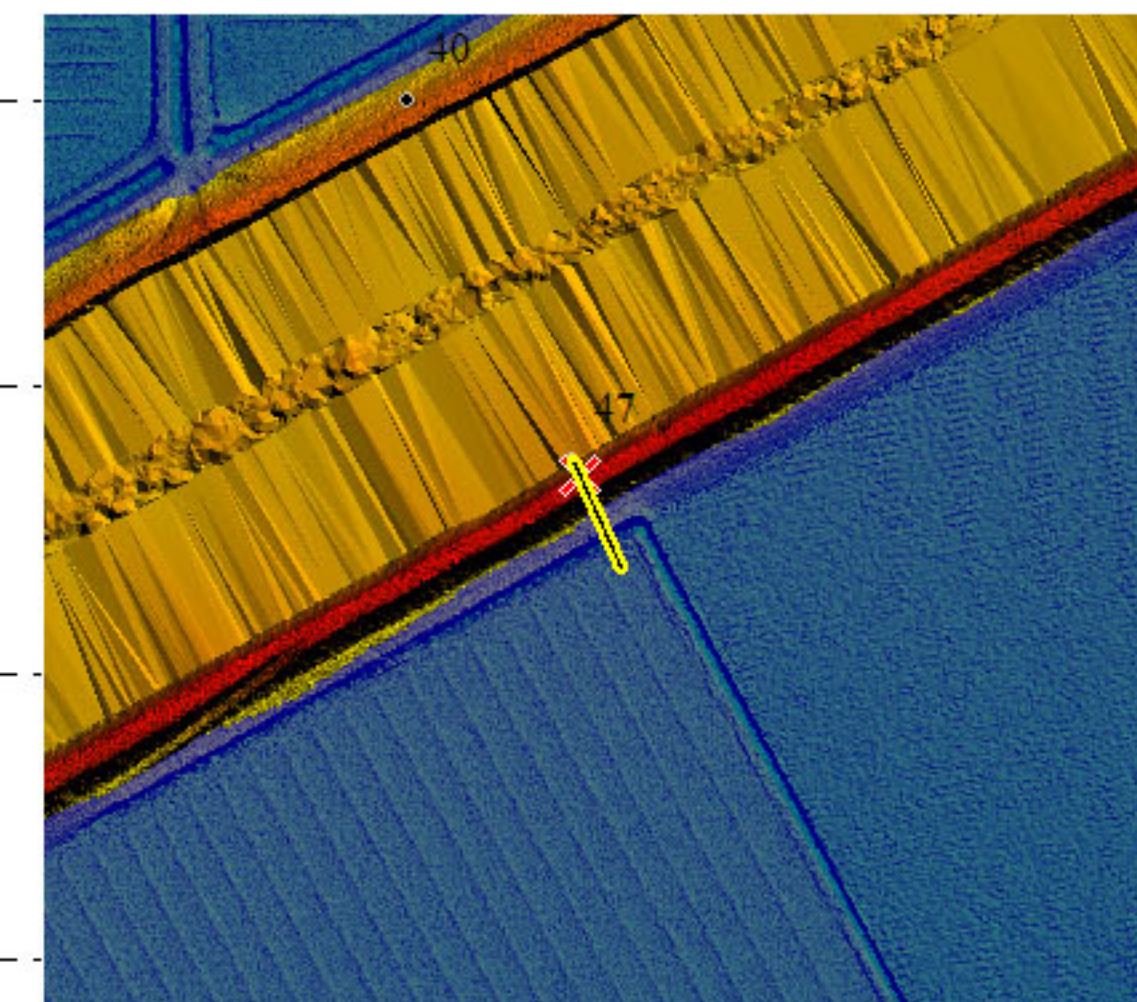
Vertical Difference (Start to Finish): 14.0 ft

Minimum Elevation on Path: -12.684 ft

Maximum Elevation on Path: 20.524 ft

Azimuth: 336° 49' 48.2"

Slope/Tilt: 4.69°



Location: 37° 51' 52.8192" N, 121° 32' 39.1322" W

Elev: 20.65 ft, Dist: 142.81 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

171 ft

Start Position: 37° 52' 1.2194" N, 121° 32' 15.9035" W

Start Height: -6.462 ft

End Position: 37° 52' 2.6657" N, 121° 32' 16.8252" W

End Height: 3.877 ft

Straight-Line Distance: 163.91 ft

3D Distance on Surface: 174 ft

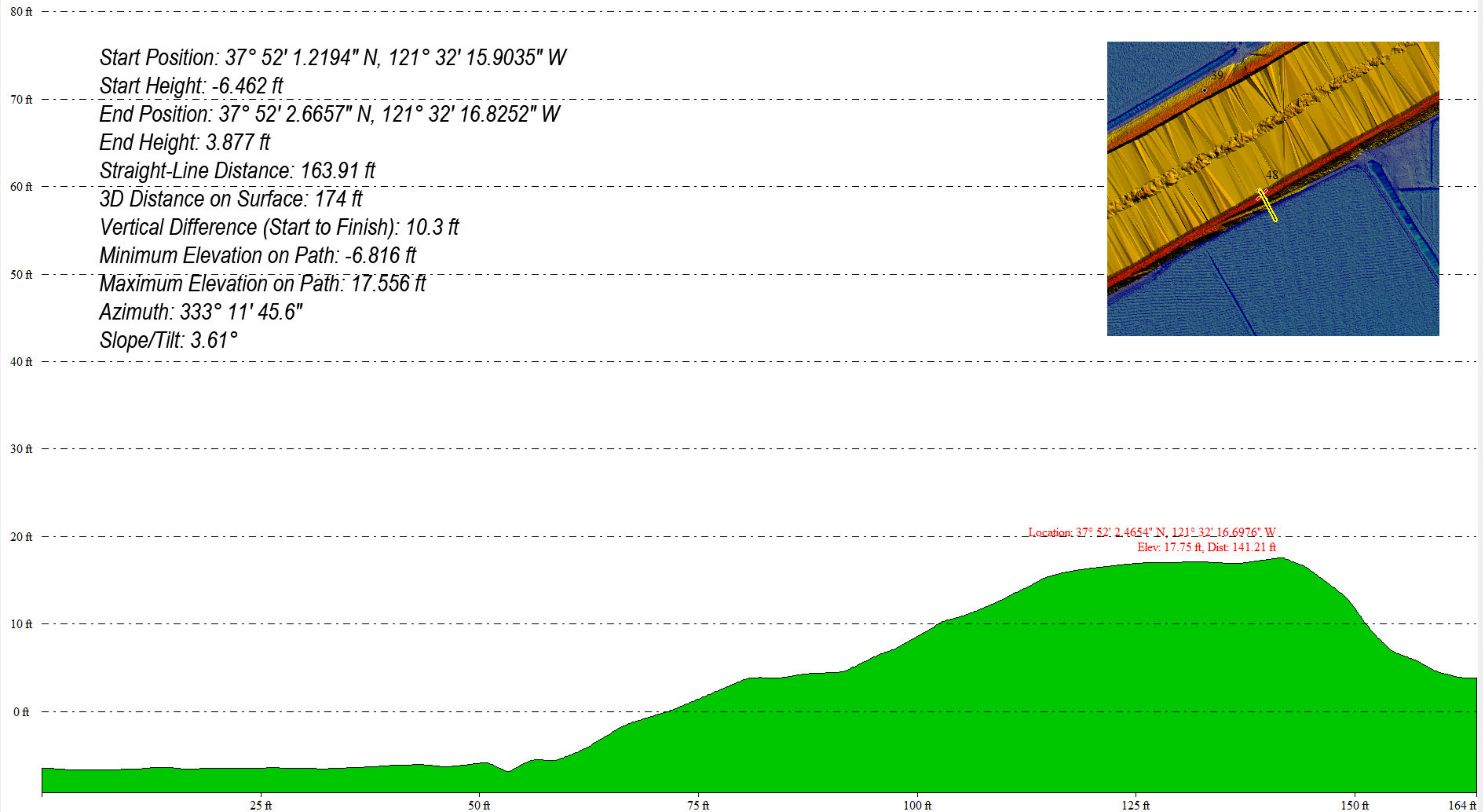
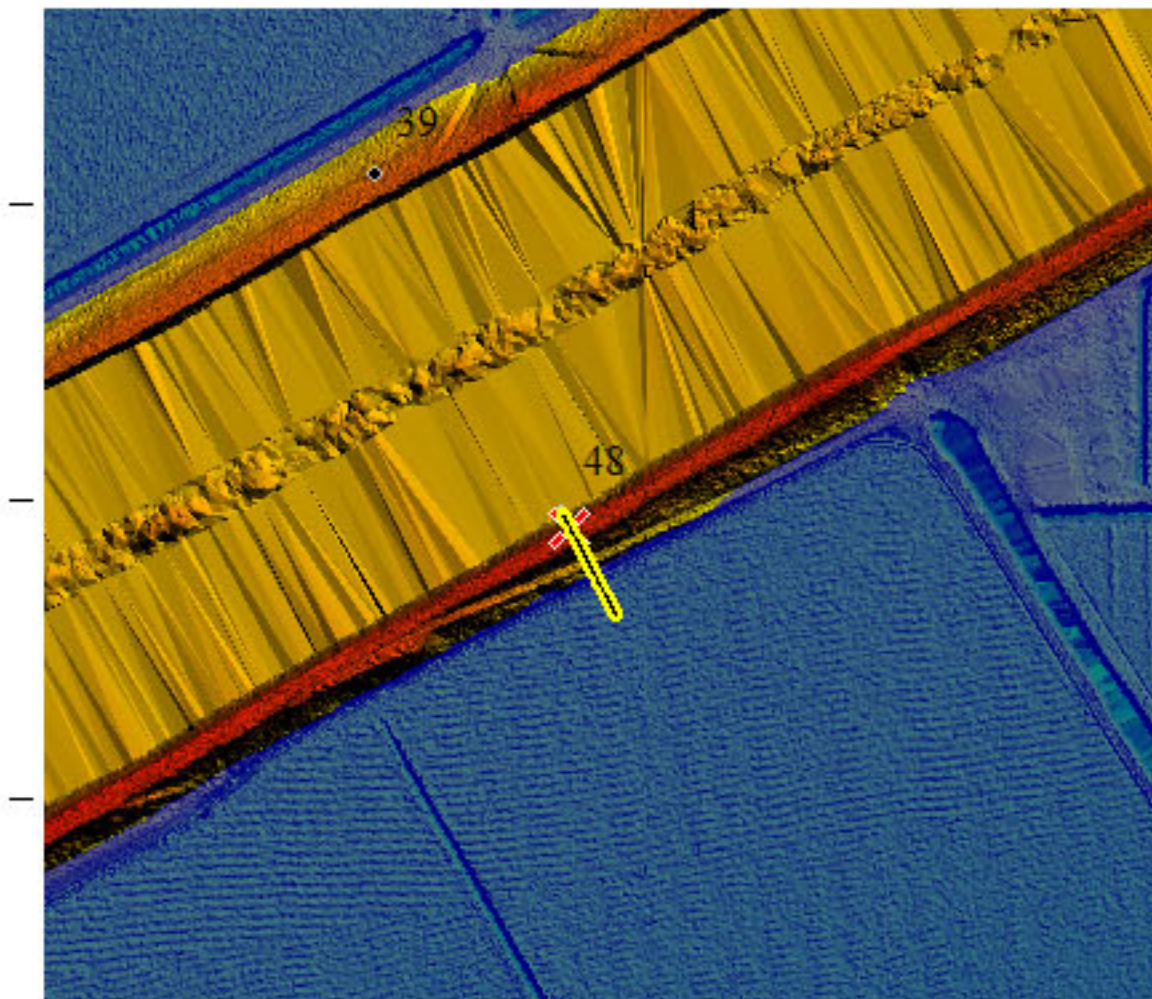
Vertical Difference (Start to Finish): 10.3 ft

Minimum Elevation on Path: -6.816 ft

Maximum Elevation on Path: 17.556 ft

Azimuth: 333° 11' 45.6"

Slope/Tilt: 3.61°



Start Position: 37° 52' 9.8877" N, 121° 31' 53.3462" W

Start Height: -4.743 ft

End Position: 37° 52' 12.0830" N, 121° 31' 55.3203" W

End Height: 4.097 ft

Straight-Line Distance: 272.7 ft

3D Distance on Surface: 280.37 ft

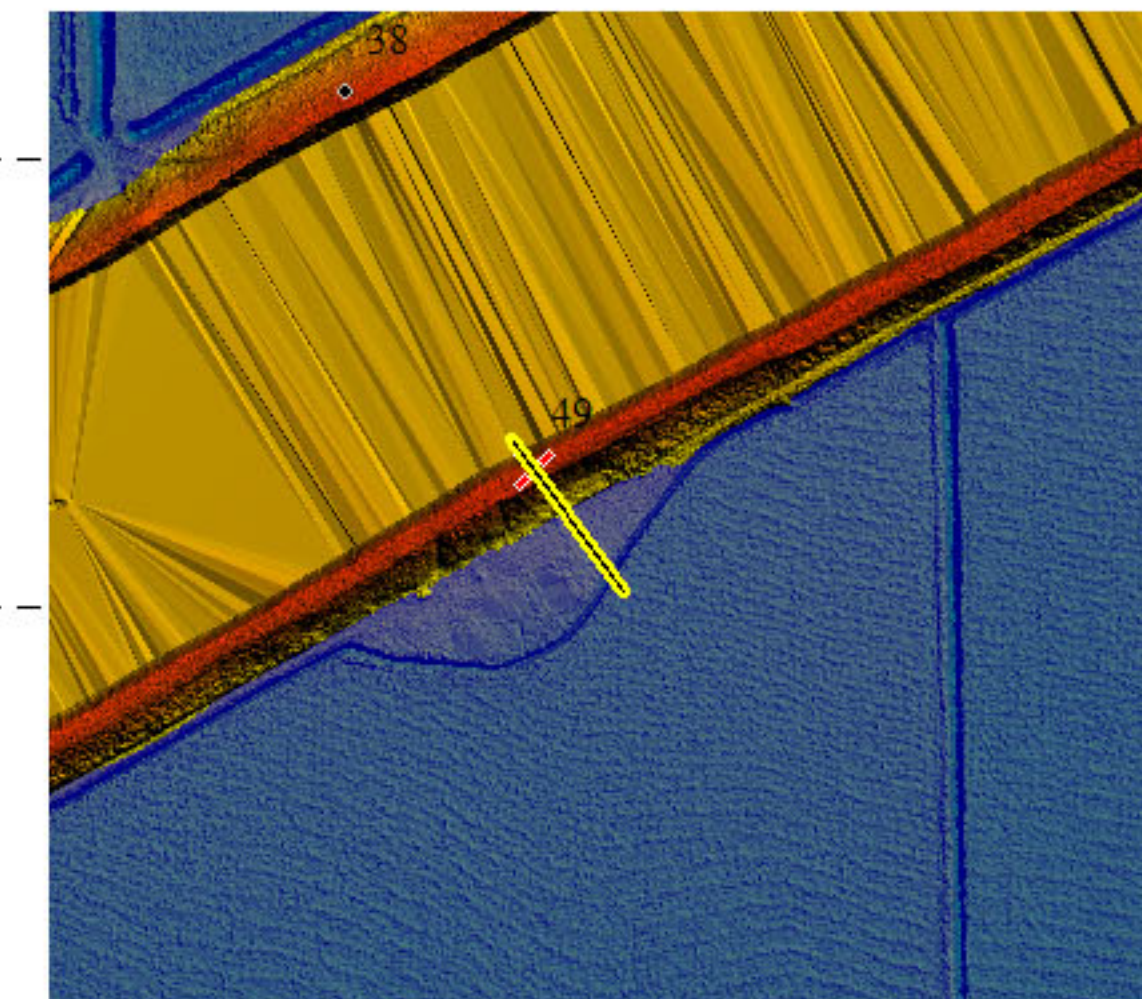
Vertical Difference (Start to Finish): 8.8 ft

Minimum Elevation on Path: -7.312 ft

Maximum Elevation on Path: 16.773 ft

Azimuth: 324° 31' 2.1"

Slope/Tilt: 1.86°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 52' 11.6360" N, 121° 31' 54.9183" W
Elev: 16.85 ft, Dist: 217.17 ft

50 ft

100 ft

150 ft

200 ft

250 ft

273 ft

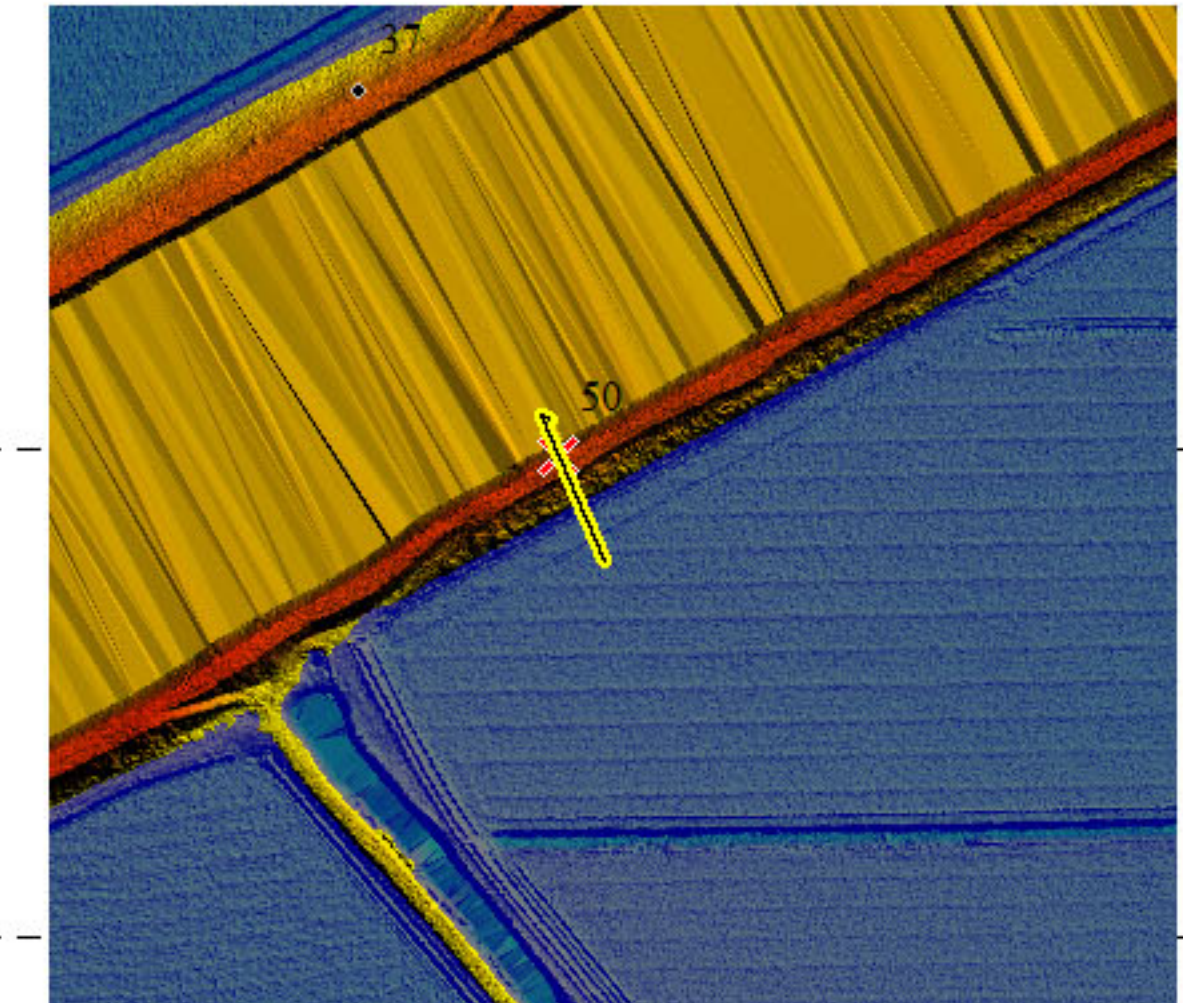
125 ft

*Start Position: 37° 52' 19.6353" N, 121° 31' 31.9189" W**Start Height: -4.758 ft**End Position: 37° 52' 21.6651" N, 121° 31' 32.8393" W**End Height: 3.595 ft*

100 ft

*Straight-Line Distance: 218.18 ft**3D Distance on Surface: 256.03 ft**Vertical Difference (Start to Finish): 8.4 ft**Minimum Elevation on Path: -5.527 ft**Maximum Elevation on Path: 15.071 ft*

75 ft

*Azimuth: 340° 13' 51.2"**Slope/Tilt: 2.19°*

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

248 ft

Location: 37° 52' 21.1332" N, 121° 31' 32.7082" W
Elev: 15.11 ft, Dist: 164.21 ft

Start Position: 37° 52' 29.1811" N, 121° 31' 9.6774" W

Start Height: -7.096 ft

End Position: 37° 52' 31.0242" N, 121° 31' 10.8896" W

End Height: 5.576 ft

Straight-Line Distance: 210.25 ft

3D Distance on Surface: 220.5 ft

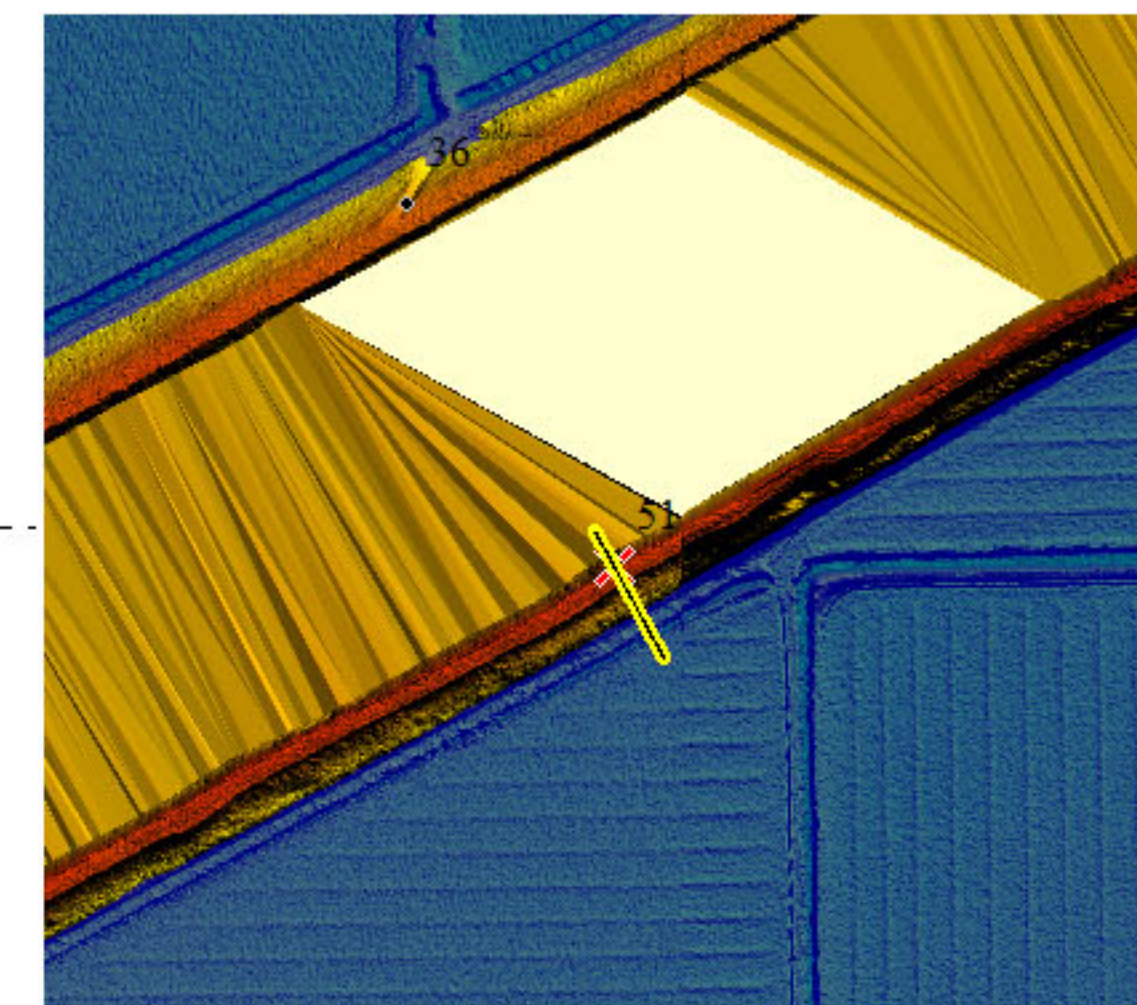
Vertical Difference (Start to Finish): 12.7 ft

Minimum Elevation on Path: -10.396 ft

Maximum Elevation on Path: 17.082 ft

Azimuth: 332° 27' 58.4"

Slope/Tilt: 3.45°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 52' 30.4762" N, 121° 31' 10.5292" W
Elev: 17.14 ft, Dist: 147.74 ft

50 ft

100 ft

150 ft

200 ft

210 ft

Start Position: 37° 52' 38.6900" N, 121° 30' 47.6272" W

Start Height: -6.739 ft

End Position: 37° 52' 40.4933" N, 121° 30' 48.6959" W

End Height: 3.802 ft

Straight-Line Distance: 201.54 ft

3D Distance on Surface: 211.64 ft

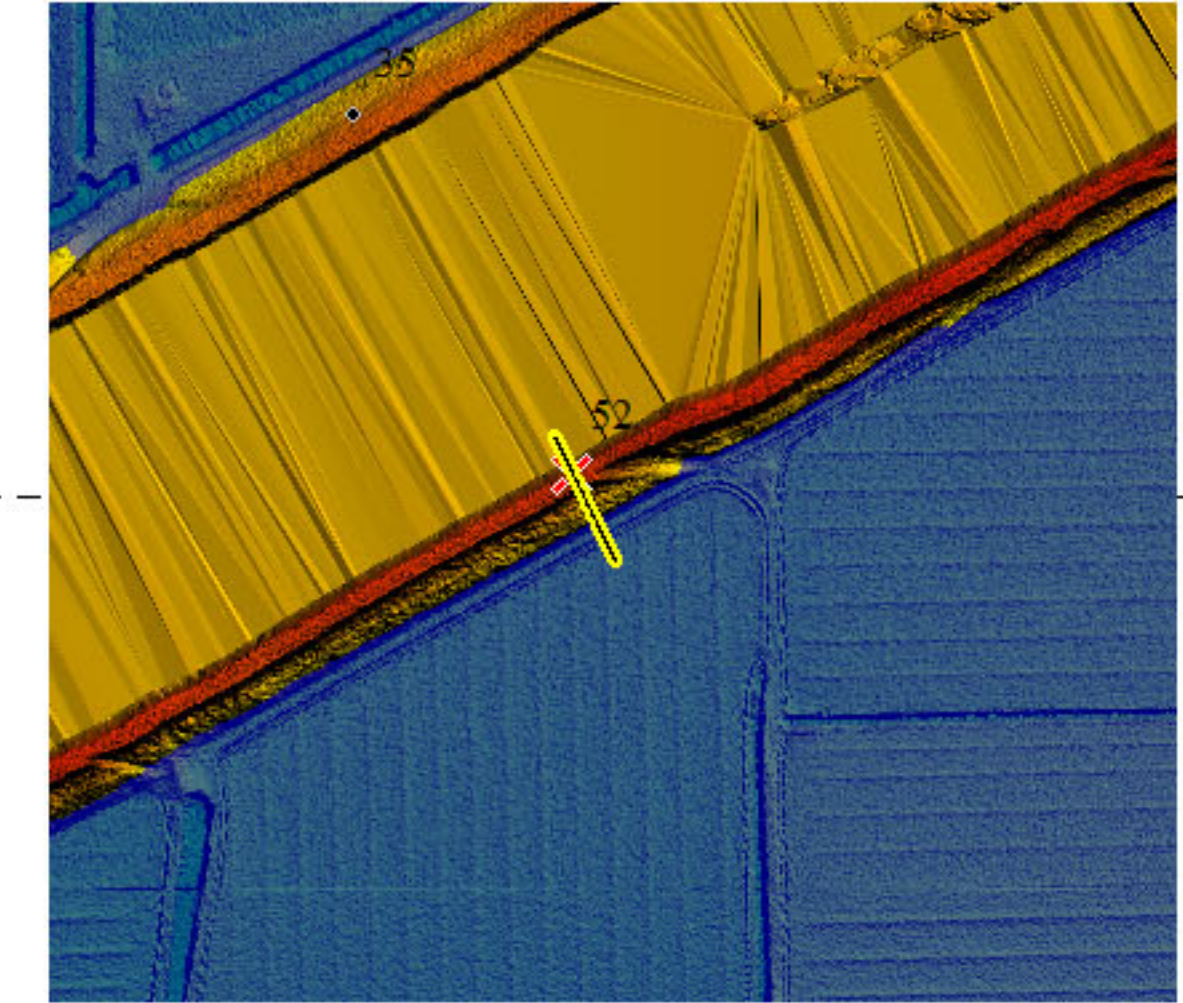
Vertical Difference (Start to Finish): 10.5 ft

Minimum Elevation on Path: -7.51 ft

Maximum Elevation on Path: 16.296 ft

Azimuth: 334° 50' 15.4"

Slope/Tilt: 2.99°



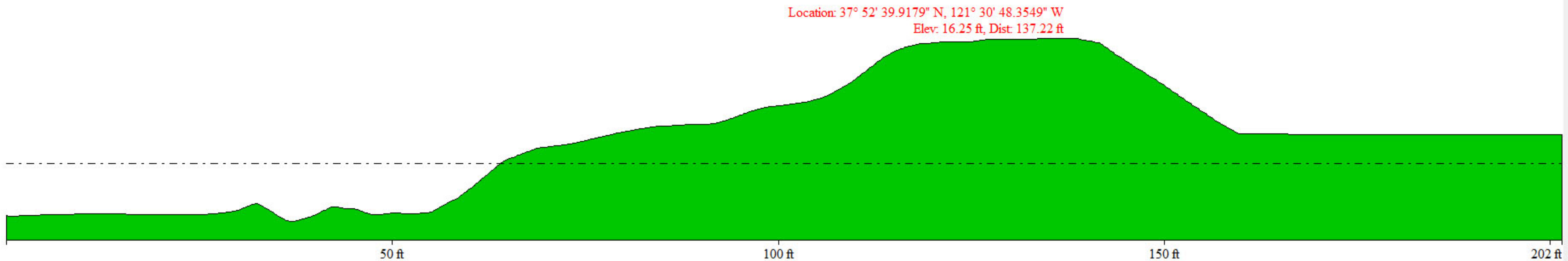
100 ft

75 ft

50 ft

25 ft

0 ft



Start Position: 37° 52' 47.4449" N, 121° 30' 26.2632" W

Start Height: -5.572 ft

End Position: 37° 52' 49.1473" N, 121° 30' 27.2679" W

End Height: 3.851 ft

Straight-Line Distance: 190.11 ft

3D Distance on Surface: 202.08 ft

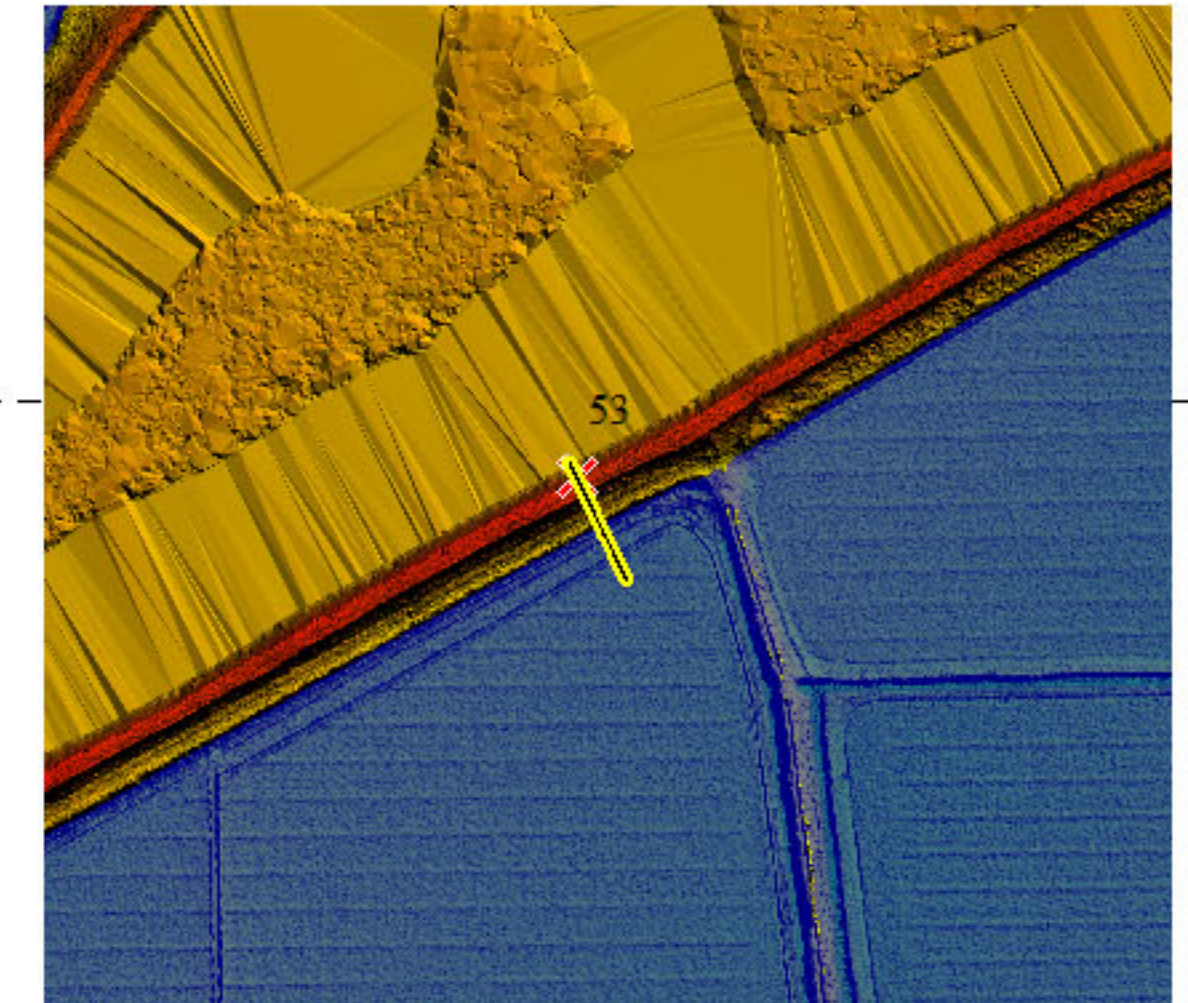
Vertical Difference (Start to Finish): 9.4 ft

Minimum Elevation on Path: -6.66 ft

Maximum Elevation on Path: 17.211 ft

Azimuth: 334° 56' 0.3"

Slope/Tilt: 2.84°



75 ft

50 ft

25 ft

0 ft

Location: 37° 52' 48.8883" N, 121° 30' 27.1150" W
Elev: 17.07 ft, Dist: 161.19 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

175 ft

190 ft

Start Position: 37° 52' 56.5971" N, 121° 30' 6.2832" W

Start Height: -6.629 ft

End Position: 37° 52' 58.1316" N, 121° 30' 7.1650" W

End Height: 3.94 ft

Straight-Line Distance: 170.56 ft

3D Distance on Surface: 178.2 ft

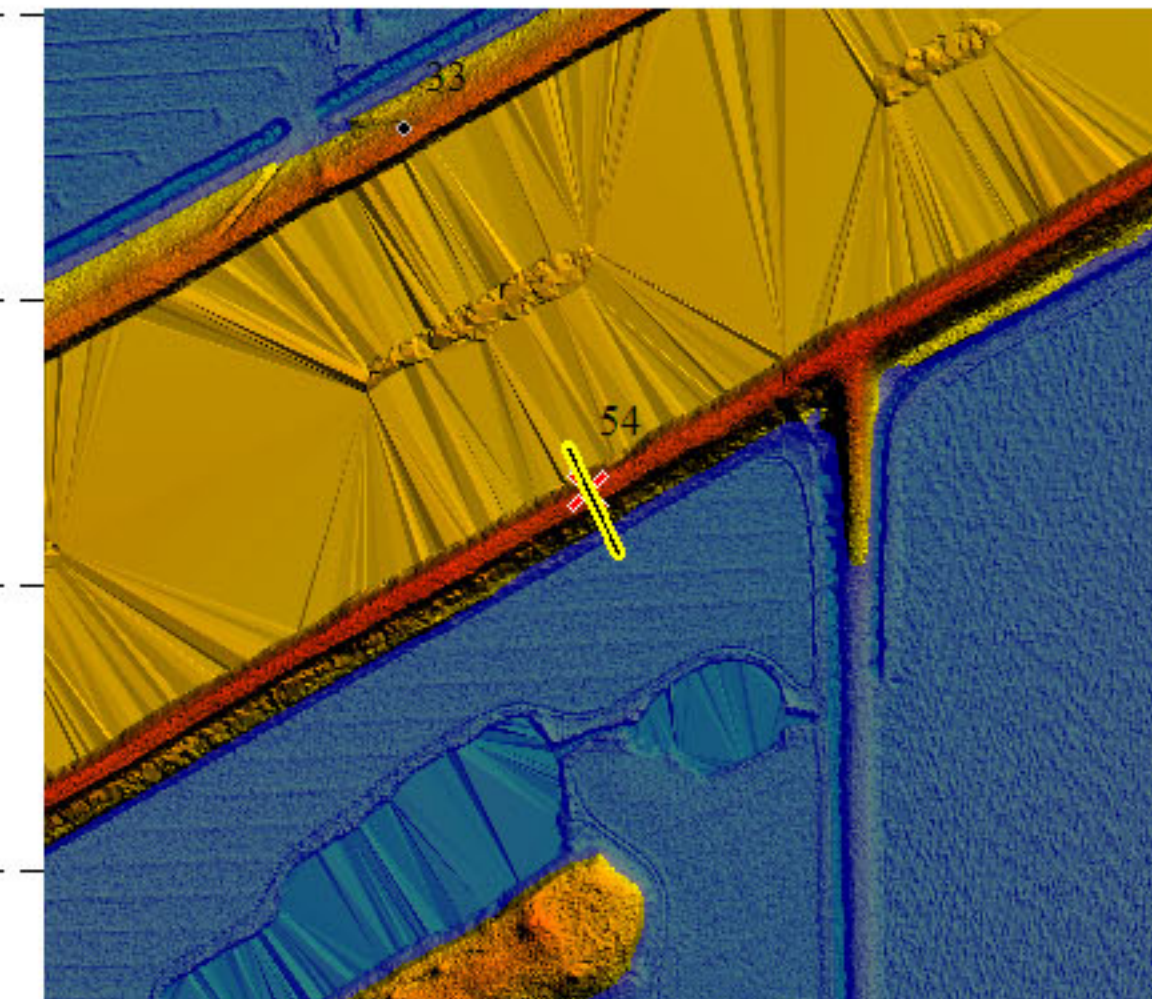
Vertical Difference (Start to Finish): 10.6 ft

Minimum Elevation on Path: -6.634 ft

Maximum Elevation on Path: 16.075 ft

Azimuth: 335° 30' 44.7"

Slope/Tilt: 3.55°



80 ft
70 ft
60 ft
50 ft
40 ft
30 ft
20 ft
10 ft
0 ft

Location: 37° 52' 57.4714" N, 121° 30' 6.7856" W
Elev: 16.21 ft, Dist: 97.181 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

171 ft

Start Position: 37° 53' 5.7551" N, 121° 29' 43.8512" W

Start Height: -4.134 ft

End Position: 37° 53' 7.4333" N, 121° 29' 44.8600" W

End Height: 4.311 ft

Straight-Line Distance: 188.04 ft

3D Distance on Surface: 196.55 ft

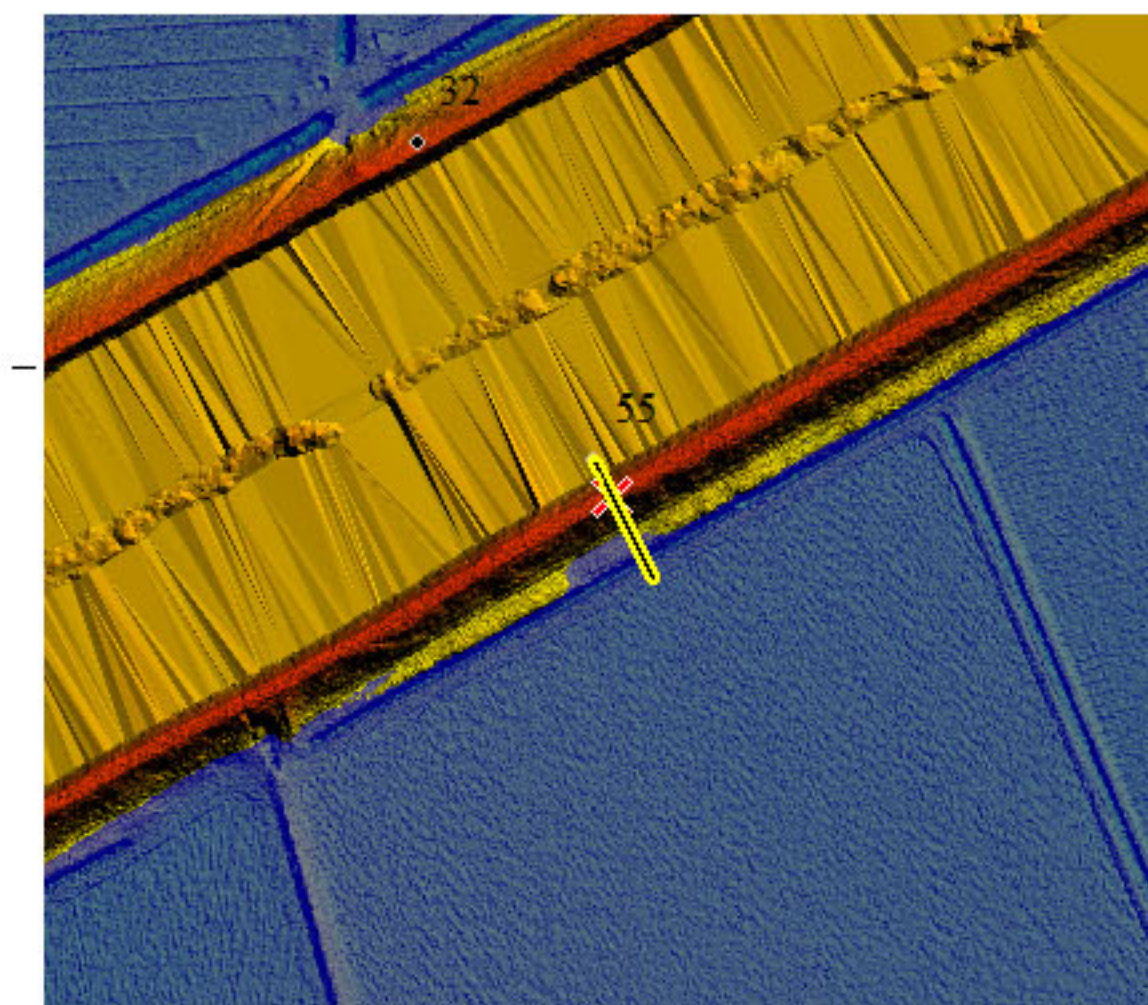
Vertical Difference (Start to Finish): 8.4 ft

Minimum Elevation on Path: -7.533 ft

Maximum Elevation on Path: 15.931 ft

Azimuth: 334° 31' 36.9"

Slope/Tilt: 2.57°



75 ft

50 ft

25 ft

0 ft

Location: 37° 53' 6.9226" N, 121° 29' 44.5530" W

Elev: 15.85 ft, Dist: 130.81 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

175 ft

188 ft

Start Position: 37° 53' 24.5330" N, 121° 29' 14.4458" W

Start Height: -5.296 ft

End Position: 37° 53' 24.3589" N, 121° 29' 18.6779" W

End Height: 5.089 ft

Straight-Line Distance: 339.72 ft

3D Distance on Surface: 344.96 ft

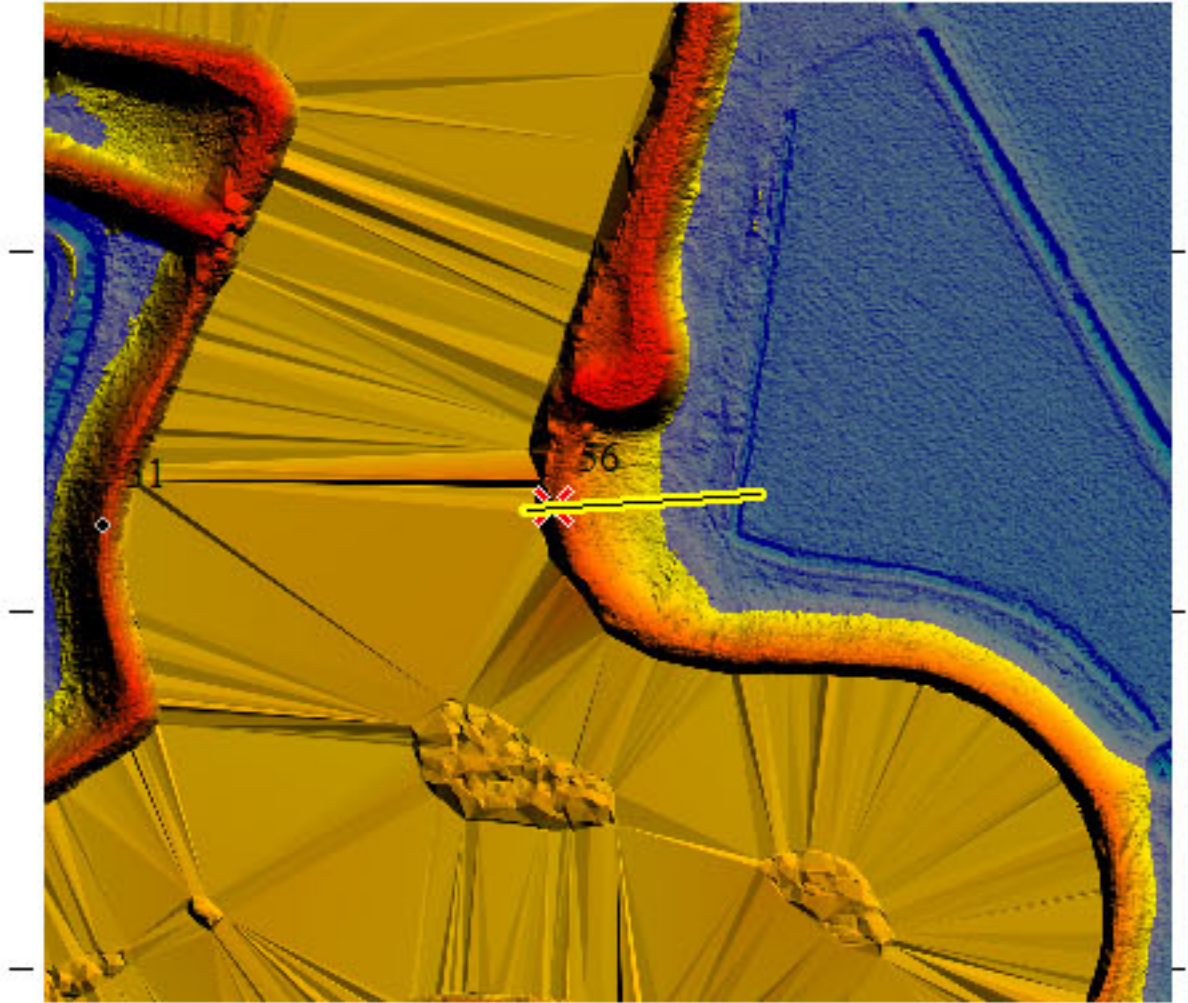
Vertical Difference (Start to Finish): 10.4 ft

Minimum Elevation on Path: -8.118 ft

Maximum Elevation on Path: 14.598 ft

Azimuth: 267° 01' 43.1"

Slope/Tilt: 1.75°



Location: 37° 53' 24.3811" N, 121° 29' 18.1382" W
Elev: 14.53 ft, Dist: 296.39 ft

175 ft
150 ft
125 ft
100 ft
75 ft
50 ft
25 ft
0 ft

50 ft

100 ft

150 ft

200 ft

250 ft

300 ft

340 ft

Start Position: 37° 53' 39.9249" N, 121° 29' 26.8652" W

Start Height: -3.295 ft

End Position: 37° 53' 38.8903" N, 121° 29' 29.3371" W

End Height: 4.203 ft

Straight-Line Distance: 224.08 ft

3D Distance on Surface: 232.84 ft

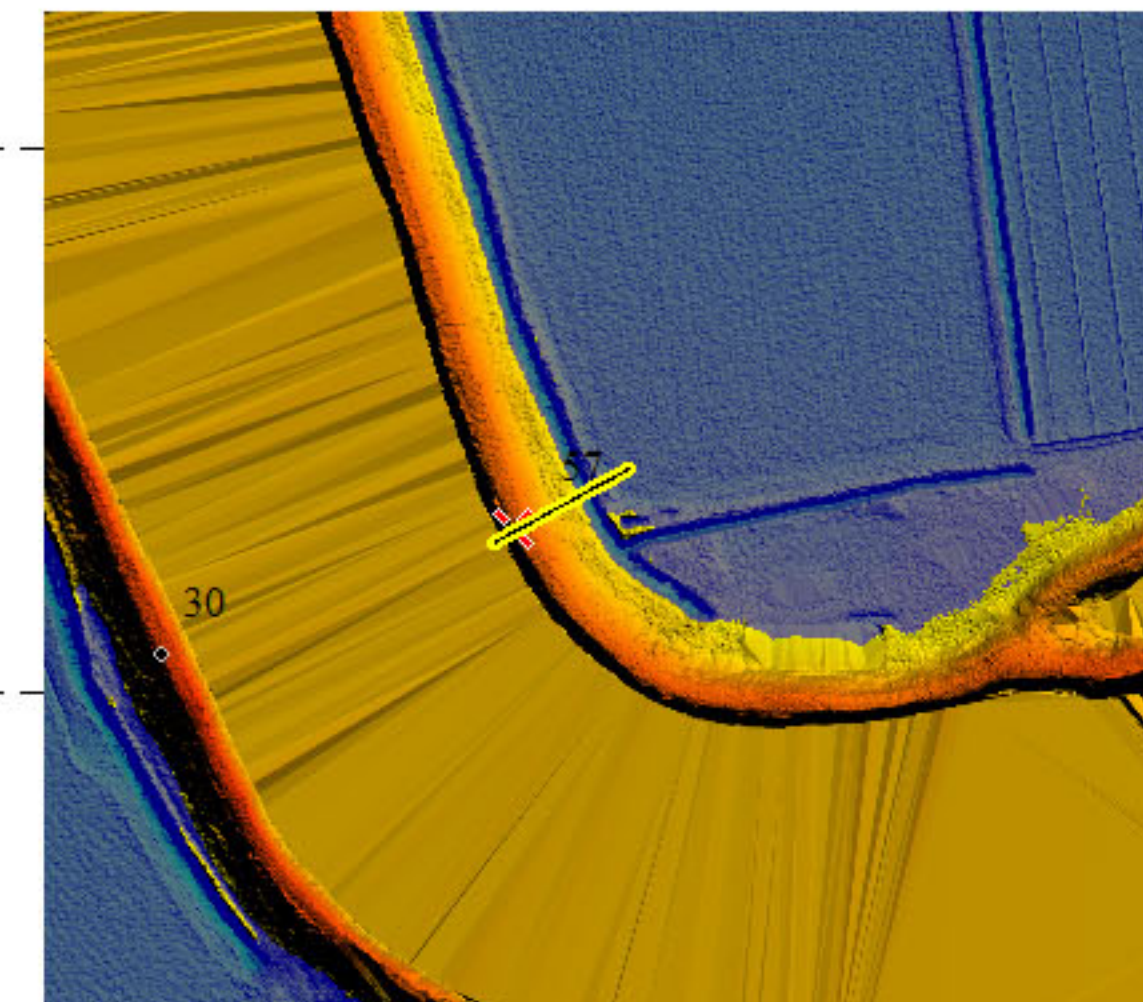
Vertical Difference (Start to Finish): 7.5 ft

Minimum Elevation on Path: -8.826 ft

Maximum Elevation on Path: 12.49 ft

Azimuth: 242° 09' 34.0"

Slope/Tilt: 1.92°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 53' 39.0573" N, 121° 29' 28.9380" W
Elev: 12.71 ft, Dist: 187.9 ft

50 ft

100 ft

150 ft

200 ft

224 ft

Start Position: 37° 53' 57.4030" N, 121° 29' 41.6464" W

Start Height: -5.884 ft

End Position: 37° 53' 55.6732" N, 121° 29' 43.3637" W

End Height: 4.657 ft

Straight-Line Distance: 222.62 ft

3D Distance on Surface: 230.95 ft

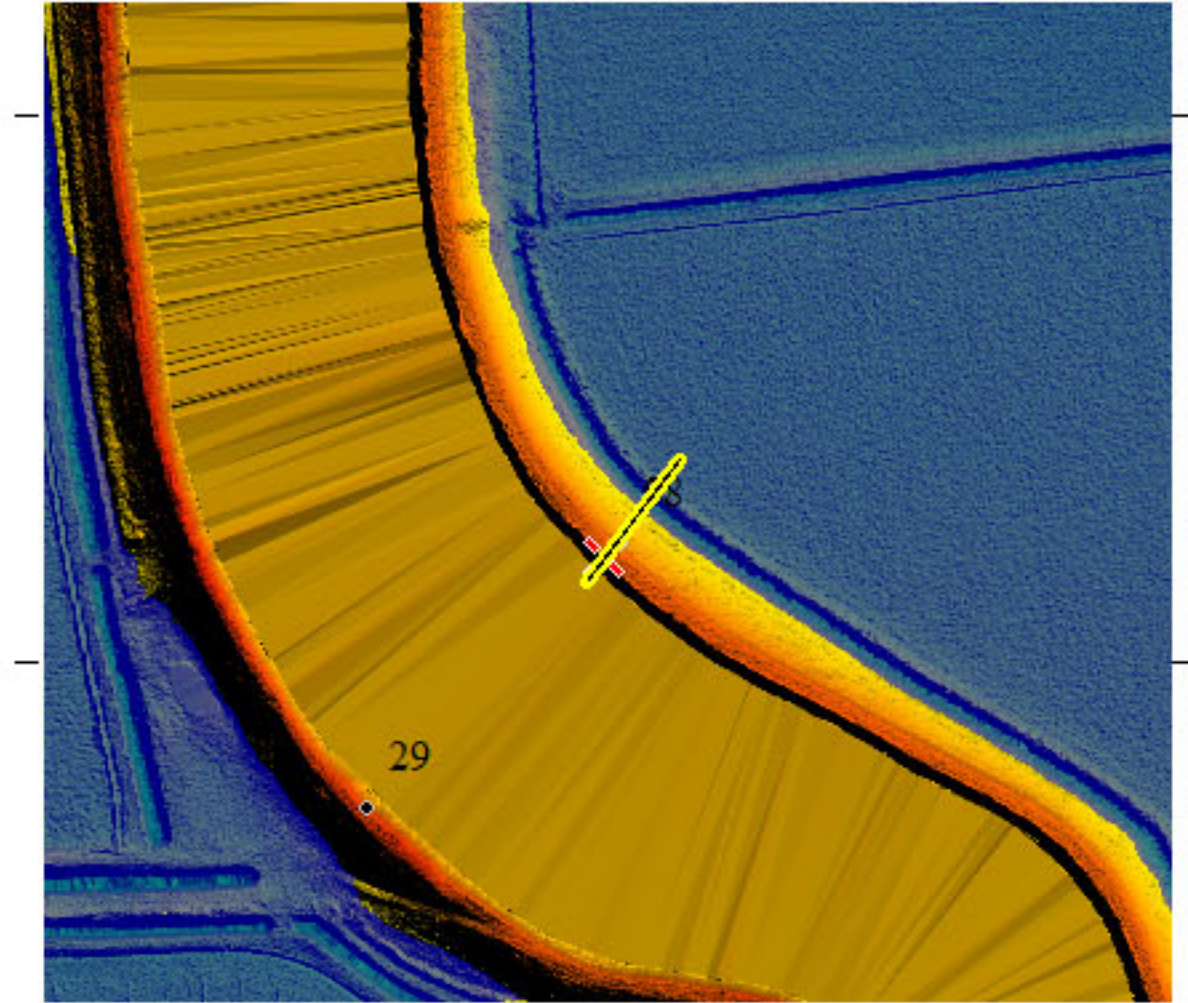
Vertical Difference (Start to Finish): 10.5 ft

Minimum Elevation on Path: -9.256 ft

Maximum Elevation on Path: 13.252 ft

Azimuth: 218° 11' 27.9"

Slope/Tilt: 2.71°



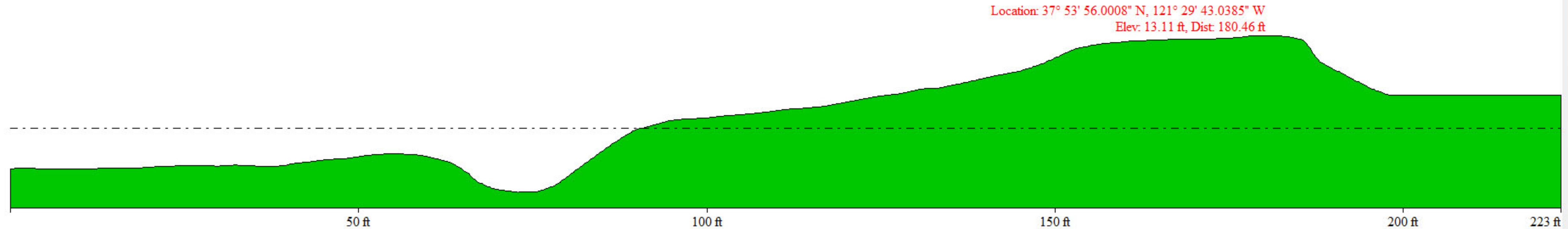
100 ft

75 ft

50 ft

25 ft

0 ft



Location: 37° 53' 56.0008" N, 121° 29' 43.0385" W

Elev: 13.11 ft, Dist: 180.46 ft

50 ft

100 ft

150 ft

200 ft

223 ft

Start Position: 37° 54' 15.2025" N, 121° 29' 45.8496" W

Start Height: -6.622 ft

End Position: 37° 54' 13.7042" N, 121° 29' 47.8026" W

End Height: 4.528 ft

Straight-Line Distance: 217.87 ft

3D Distance on Surface: 221.84 ft

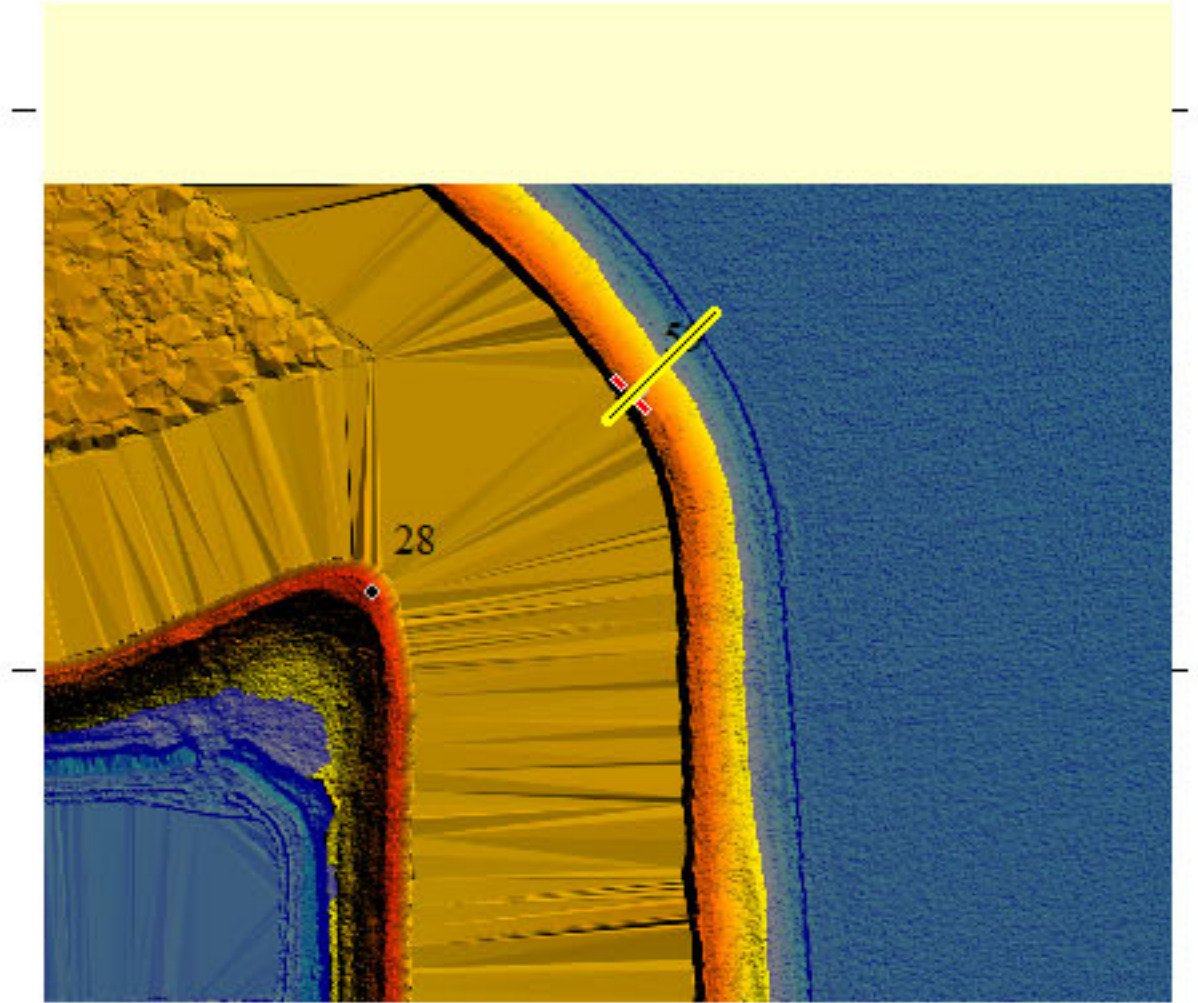
Vertical Difference (Start to Finish): 11.2 ft

Minimum Elevation on Path: -7.31 ft

Maximum Elevation on Path: 11.886 ft

Azimuth: 225° 55' 26.6"

Slope/Tilt: 2.93°



100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

218 ft

Location: 37° 54' 14.0331" N, 121° 29' 47.3739" W

Elev: 11.76 ft, Dist: 170.05 ft

From Pos: 37° 54' 30.0756" N, 121° 30' 5.4452" W

Station 60

To Pos: 37° 54' 28.4151" N, 121° 30' 6.6324" W

Start Position: 37° 54' 30.0756" N, 121° 30' 5.4452" W

Start Height: -4.408 ft

End Position: 37° 54' 28.4151" N, 121° 30' 6.6324" W

End Height: 5.637 ft

Straight-Line Distance: 193.04 ft

3D Distance on Surface: 196.95 ft

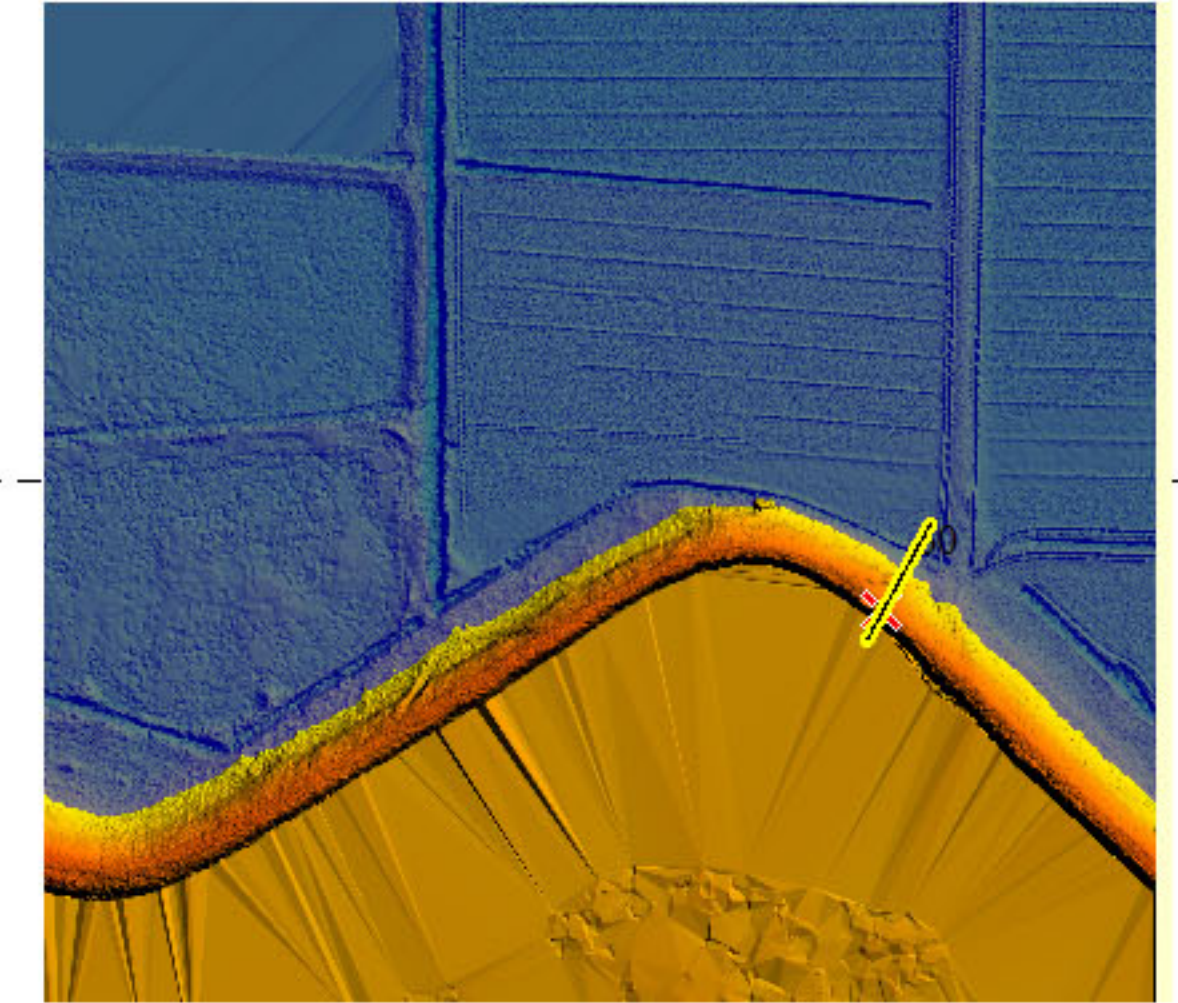
Vertical Difference (Start to Finish): 10.0 ft

Minimum Elevation on Path: -5.422 ft

Maximum Elevation on Path: 11.426 ft

Azimuth: 209° 31' 52.5"

Slope/Tilt: 2.98°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 54' 28.8323" N, 121° 30' 6.3341" W
Elev: 11.49 ft, Dist: 144.54 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

175 ft

193 ft

Start Position: 37° 54' 31.0341" N, 121° 30' 23.9303" W

Start Height: -4.351 ft

End Position: 37° 54' 29.2274" N, 121° 30' 25.6010" W

End Height: 5.869 ft

Straight-Line Distance: 226.55 ft

3D Distance on Surface: 230.53 ft

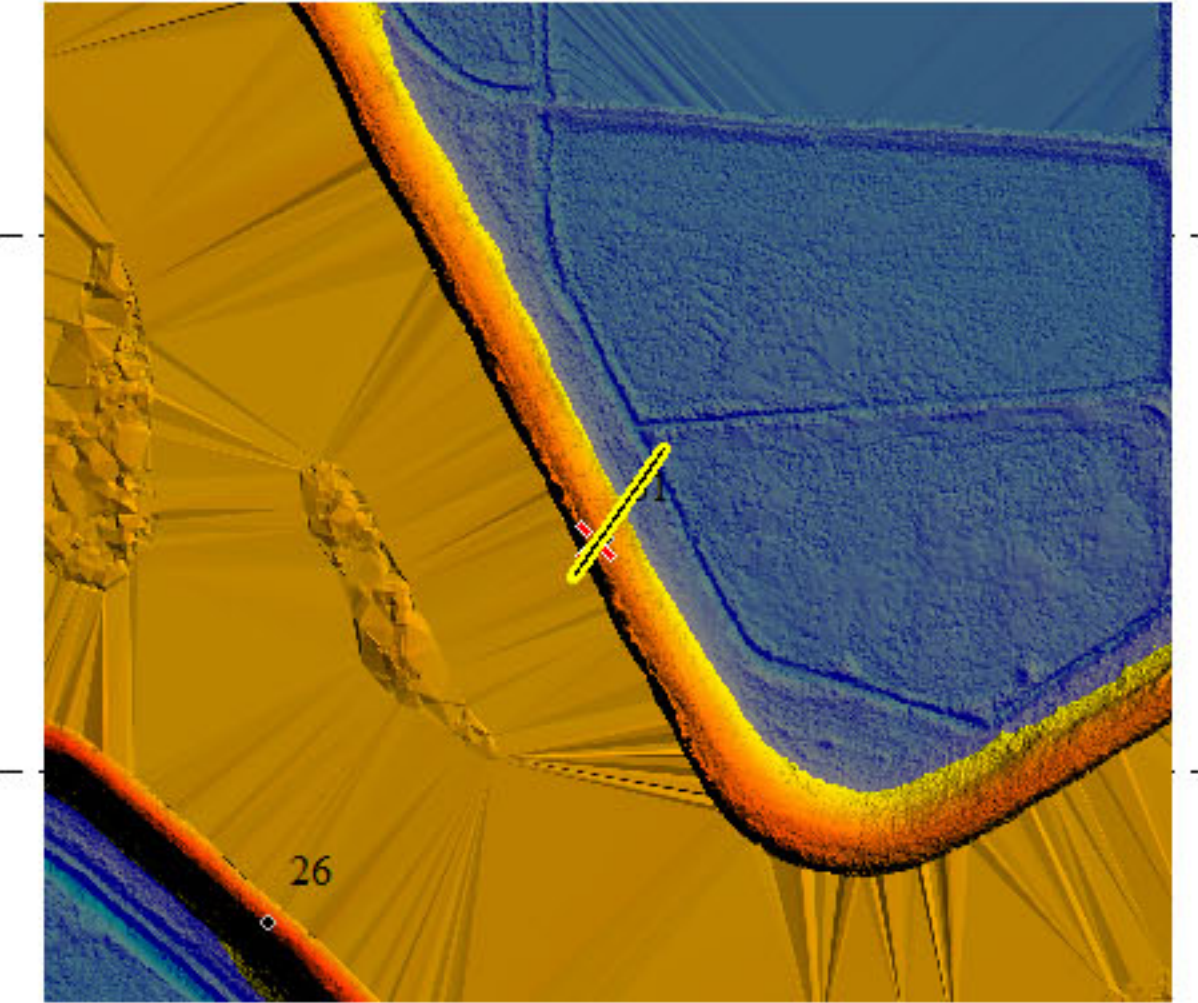
Vertical Difference (Start to Finish): 10.2 ft

Minimum Elevation on Path: -6.125 ft

Maximum Elevation on Path: 11.61 ft

Azimuth: 216° 13' 43.9"

Slope/Tilt: 2.58°



100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

227 ft

Location: 37° 54' 29.7209" N, 121° 30' 25.1447" W
Elev: 11.57 ft, Dist: 164.68 ft

Start Position: 37° 54' 42.0638" N, 121° 30' 40.8668" W

Start Height: -5.853 ft

End Position: 37° 54' 39.8973" N, 121° 30' 41.1989" W

End Height: 5.319 ft

Straight-Line Distance: 220.75 ft

3D Distance on Surface: 225.06 ft

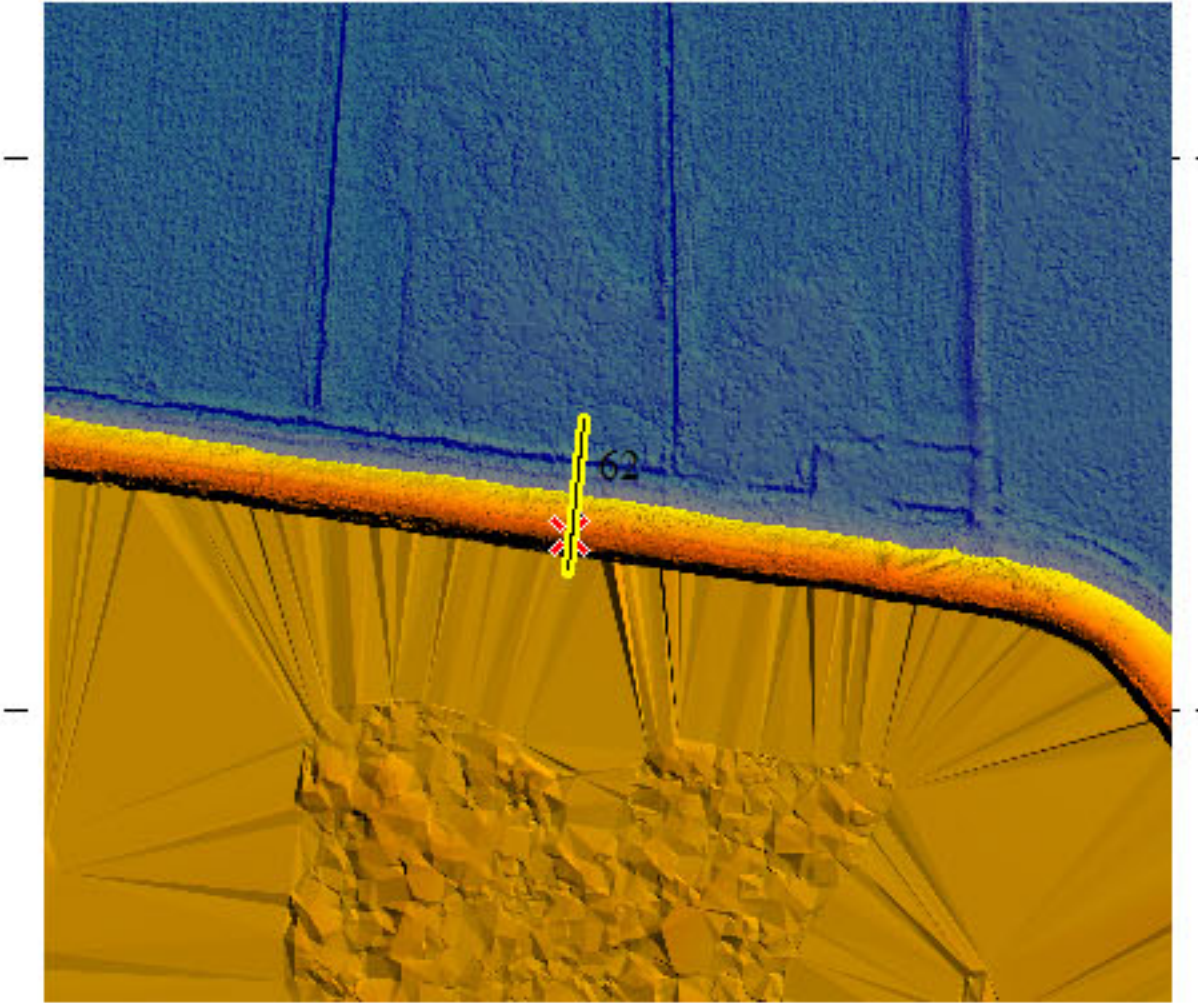
Vertical Difference (Start to Finish): 11.2 ft

Minimum Elevation on Path: -6.606 ft

Maximum Elevation on Path: 12.332 ft

Azimuth: 186° 55' 25.8"

Slope/Tilt: 2.90°



100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

221 ft

Location: 37° 54' 40.3811" N, 121° 30' 41.1247" W

Elev: 12.40 ft, Dist: 171.45 ft

Start Position: 37° 54' 43.6653" N, 121° 30' 53.0914" W

Start Height: -8.081 ft

End Position: 37° 54' 41.6131" N, 121° 30' 53.4211" W

End Height: 5.372 ft

Straight-Line Distance: 209.26 ft

3D Distance on Surface: 213.14 ft

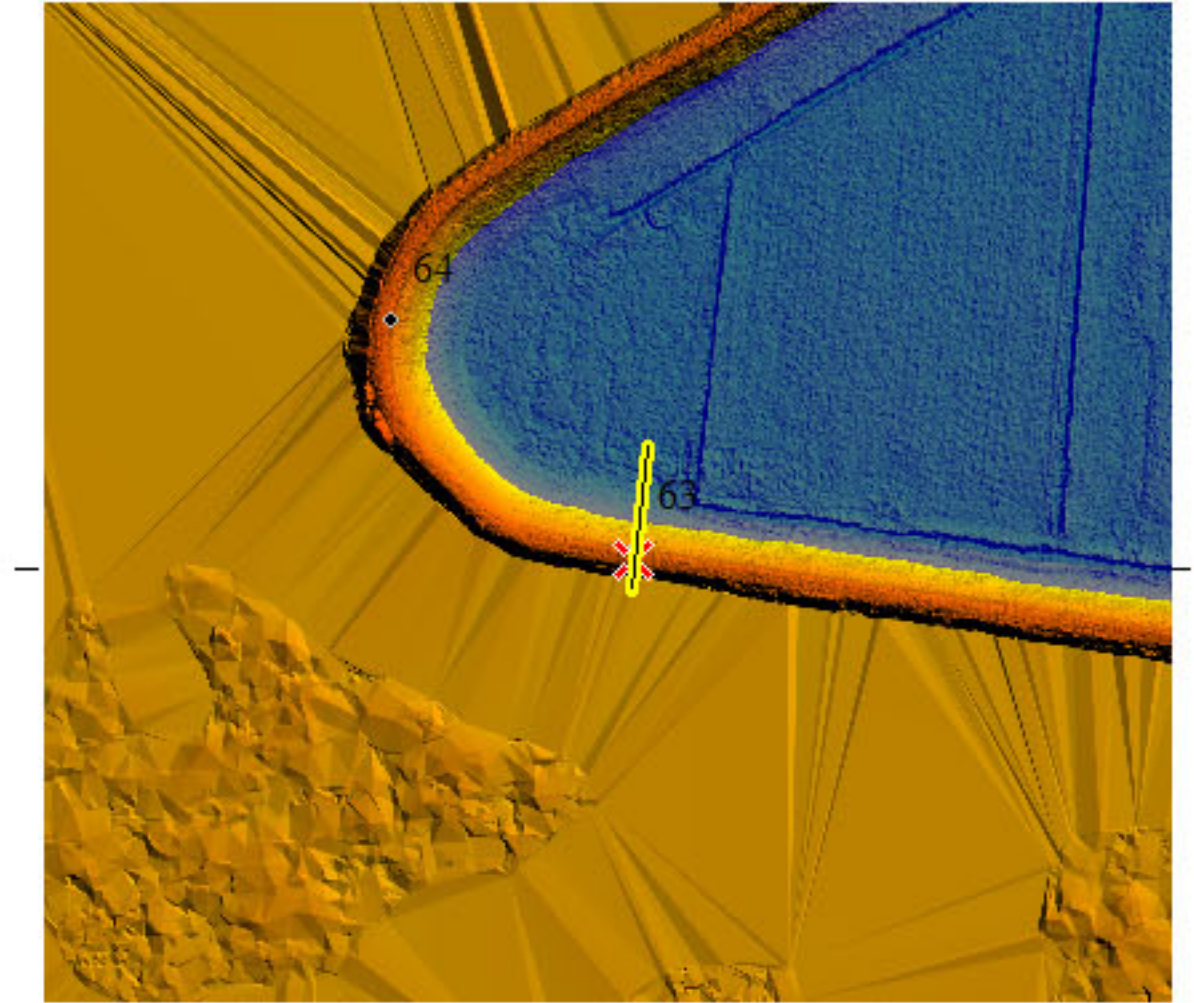
Vertical Difference (Start to Finish): 13.5 ft

Minimum Elevation on Path: -8.155 ft

Maximum Elevation on Path: 12.196 ft

Azimuth: 187° 15' 10.6"

Slope/Tilt: 3.68°



Location: 37° 54' 42.0399" N, 121° 30' 53.3525" W
Elev: 12.15 ft, Dist: 165.74 ft

50 ft

100 ft

150 ft

200 ft

209 ft

Start Position: 37° 54' 45.4518" N, 121° 30' 55.8434" W

Start Height: -7.178 ft

End Position: 37° 54' 45.4869" N, 121° 30' 58.6305" W

End Height: 5.216 ft

Straight-Line Distance: 223.39 ft

3D Distance on Surface: 226.66 ft

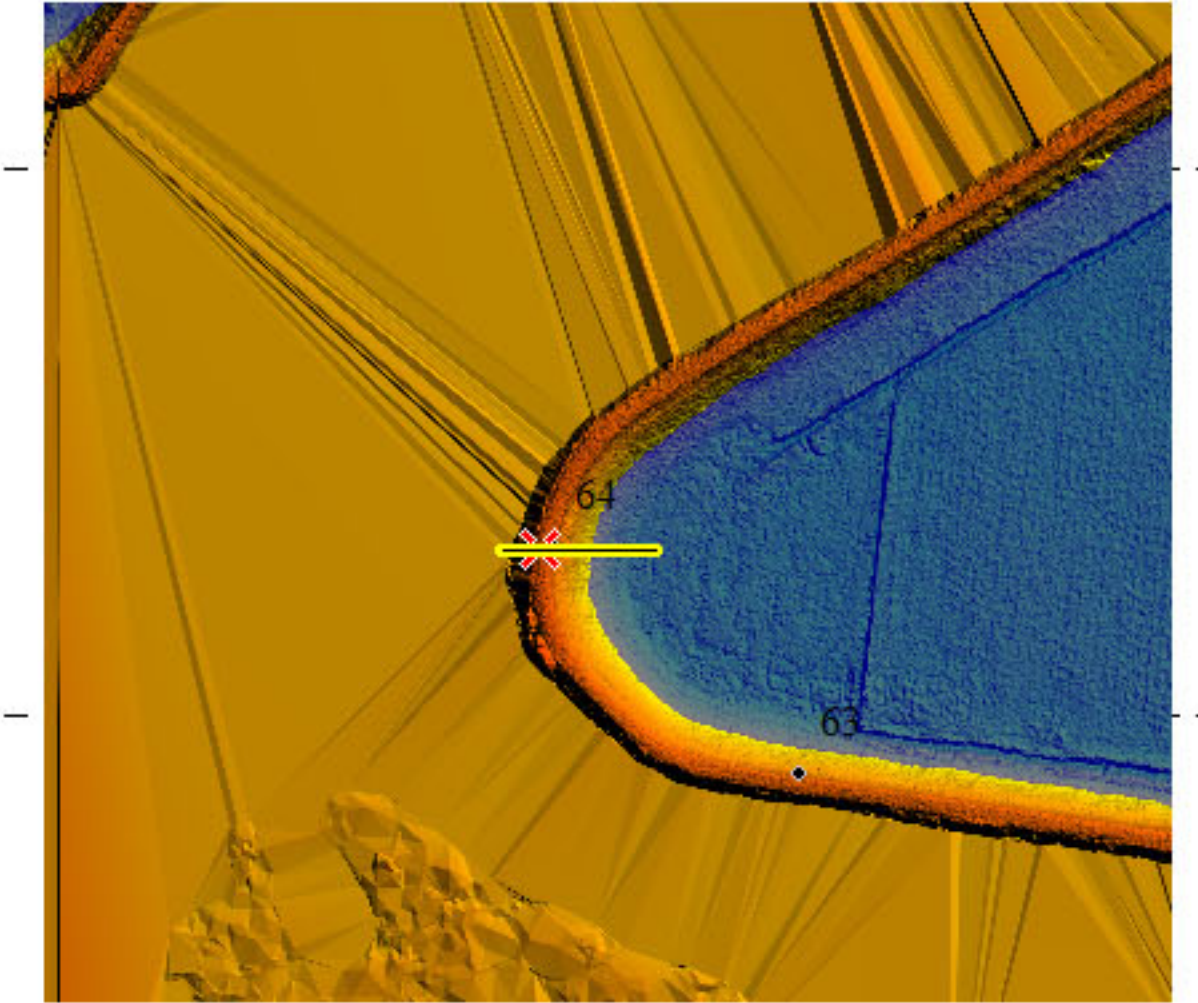
Vertical Difference (Start to Finish): 12.4 ft

Minimum Elevation on Path: -7.233 ft

Maximum Elevation on Path: 13.202 ft

Azimuth: 270° 54' 44.2"

Slope/Tilt: 3.18°



100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

223 ft

Location: 37° 54' 45.4778" N, 121° 30' 57.9059" W

Elev: 13.47 ft, Dist: 165.31 ft

From Pos: 37° 54' 53.4090" N, 121° 30' 40.6381" W

Station 65

To Pos: 37° 54' 53.5380" N, 121° 30' 44.8175" W

175 ft

Start Position: 37° 54' 53.4090" N, 121° 30' 40.6381" W

Start Height: -8.438 ft

150 ft

End Position: 37° 54' 53.5380" N, 121° 30' 44.8175" W

End Height: 5.406 ft

Straight-Line Distance: 335.17 ft

125 ft

3D Distance on Surface: 340.25 ft

Vertical Difference (Start to Finish): 13.8 ft

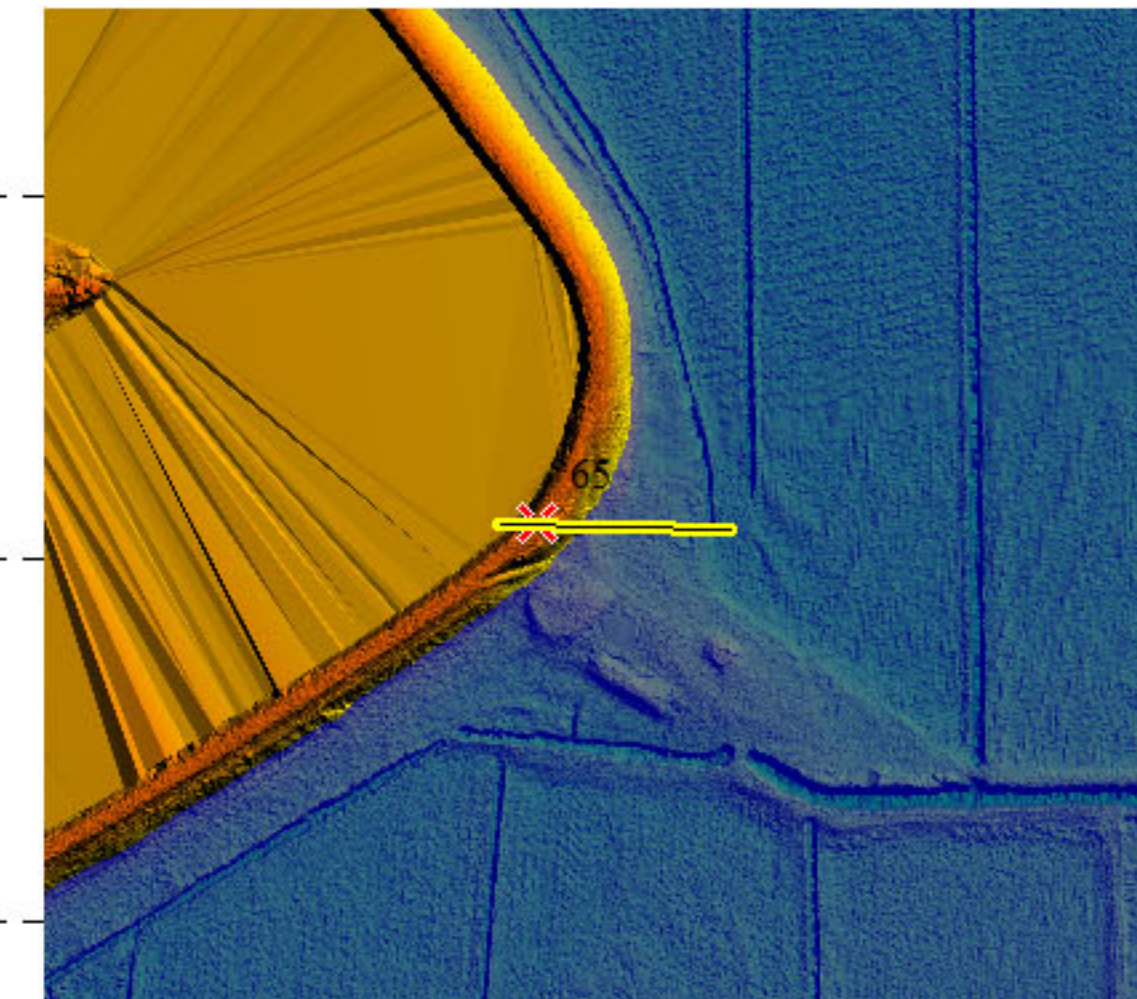
Minimum Elevation on Path: -10.582 ft

Maximum Elevation on Path: 12.123 ft

100 ft

Azimuth: 272° 13' 54.6"

Slope/Tilt: 2.37°



75 ft

50 ft

25 ft

0 ft

Location: 37° 54' 53.5156" N, 121° 30' 44.0899" W
Elev: 12.36 ft, Dist: 276.83 ft

50 ft

100 ft

150 ft

200 ft

250 ft

300 ft

335 ft

Start Position: 37° 55' 9.6638" N, 121° 30' 52.2320" W

Start Height: -8.652 ft

End Position: 37° 55' 8.7055" N, 121° 30' 54.7510" W

End Height: 4.792 ft

Straight-Line Distance: 223.92 ft

3D Distance on Surface: 227.93 ft

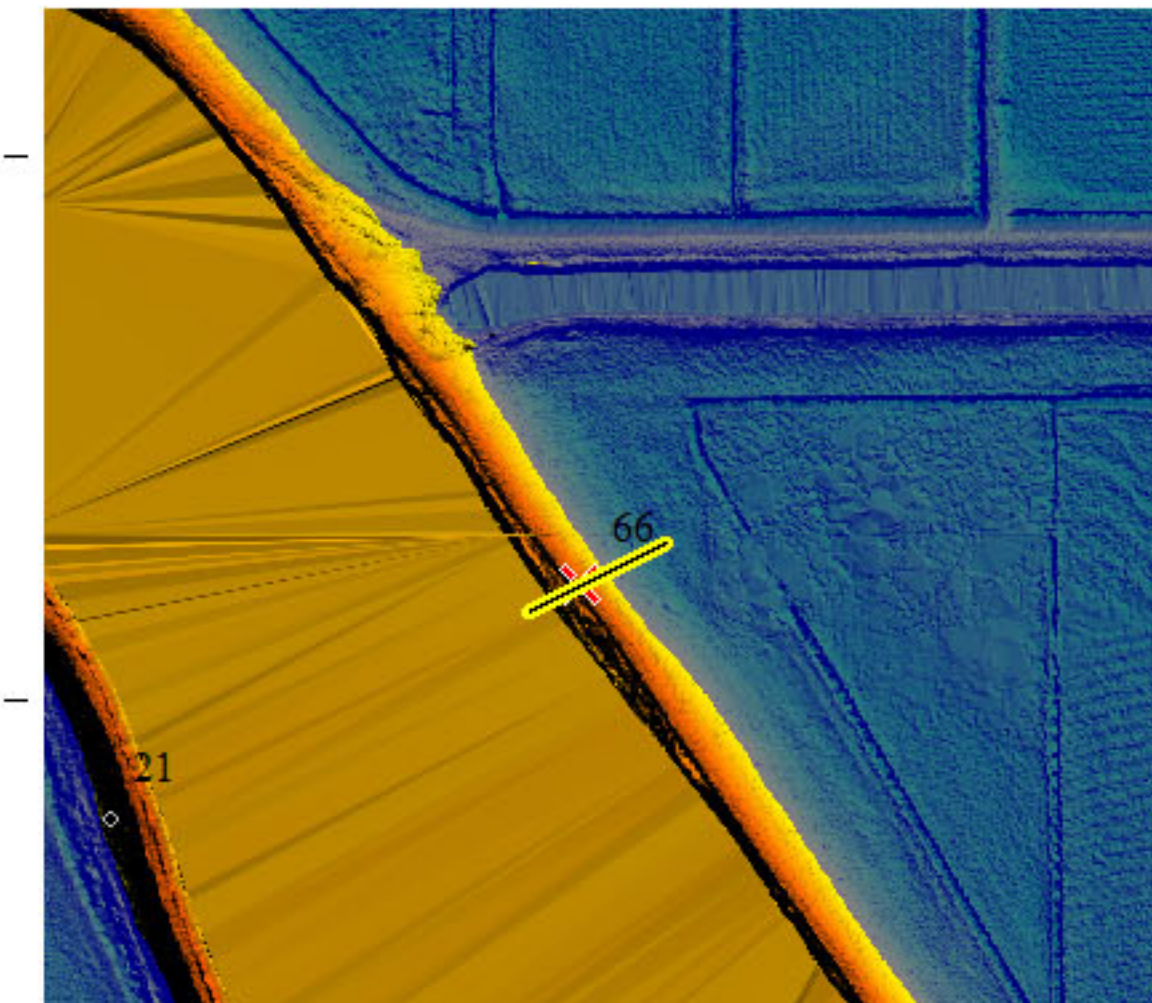
Vertical Difference (Start to Finish): 13.4 ft

Minimum Elevation on Path: -8.794 ft

Maximum Elevation on Path: 11.895 ft

Azimuth: 244° 20' 52.7"

Slope/Tilt: 3.44°



100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

224 ft

Location: 37° 55' 9.0690" N, 121° 30' 53.7955" W

Elev: 11.93 ft, Dist: 138.98 ft

Start Position: 37° 55' 22.9821" N, 121° 31' 18.6448" W

Start Height: -9.817 ft

End Position: 37° 55' 21.2000" N, 121° 31' 19.2573" W

End Height: 5.637 ft

Straight-Line Distance: 186.83 ft

3D Distance on Surface: 191.82 ft

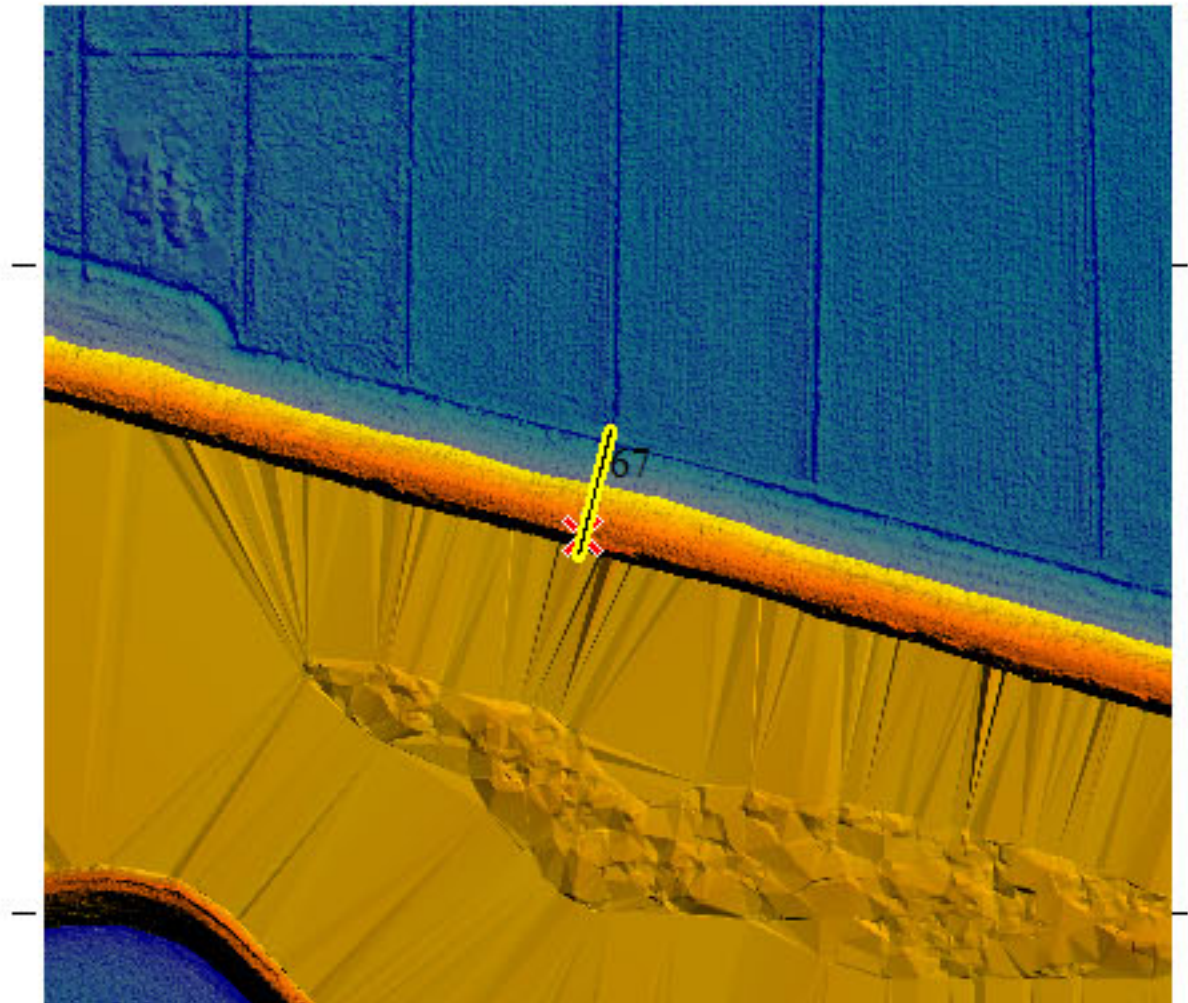
Vertical Difference (Start to Finish): 15.5 ft

Minimum Elevation on Path: -11.071 ft

Maximum Elevation on Path: 11.813 ft

Azimuth: 195° 13' 52.7"

Slope/Tilt: 4.73°



75 ft

50 ft

25 ft

0 ft

Location: 37° 55' 21.4613" N, 121° 31' 19.1675" W
Elev: 11.68 ft, Dist: 159.44 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

175 ft

187 ft

Start Position: 37° 55' 26.6941" N, 121° 31' 29.1948" W

Start Height: -7.609 ft

End Position: 37° 55' 24.8654" N, 121° 31' 32.1638" W

End Height: 4.69 ft

Straight-Line Distance: 301.36 ft

3D Distance on Surface: 305.05 ft

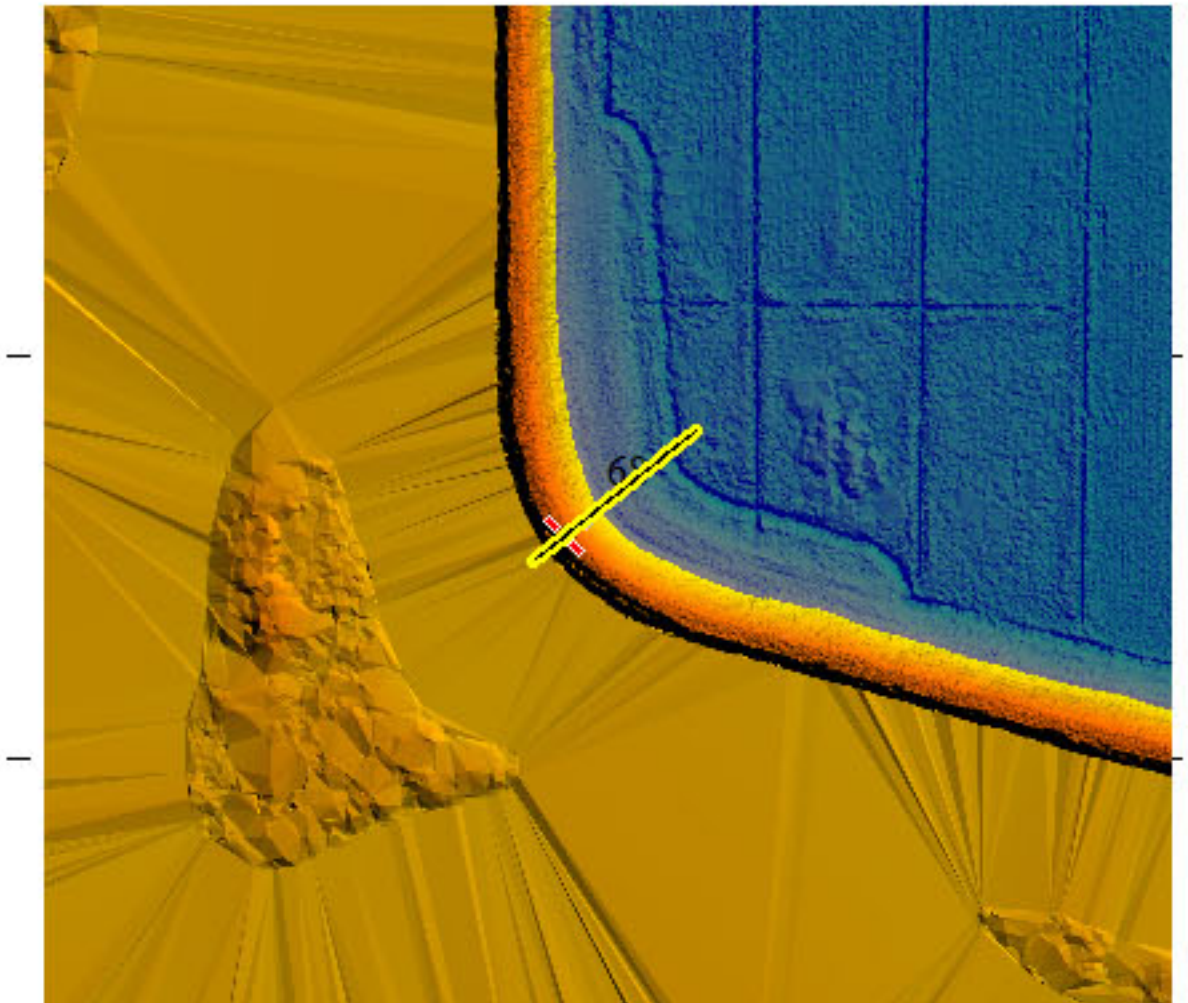
Vertical Difference (Start to Finish): 12.3 ft

Minimum Elevation on Path: -9.295 ft

Maximum Elevation on Path: 12.234 ft

Azimuth: 232° 07' 57.5"

Slope/Tilt: 2.34°



75 ft

50 ft

25 ft

0 ft

Location: 37° 55' 25.2157" N, 121° 31' 31.5950" W

Elev: 12.30 ft, Dist: 243.63 ft

50 ft

100 ft

150 ft

200 ft

250 ft

301 ft

Start Position: 37° 55' 38.4364" N, 121° 31' 30.2582" W

Start Height: -11.535 ft

End Position: 37° 55' 38.3572" N, 121° 31' 33.0482" W

End Height: 4.661 ft

Straight-Line Distance: 223.69 ft

3D Distance on Surface: 228.89 ft

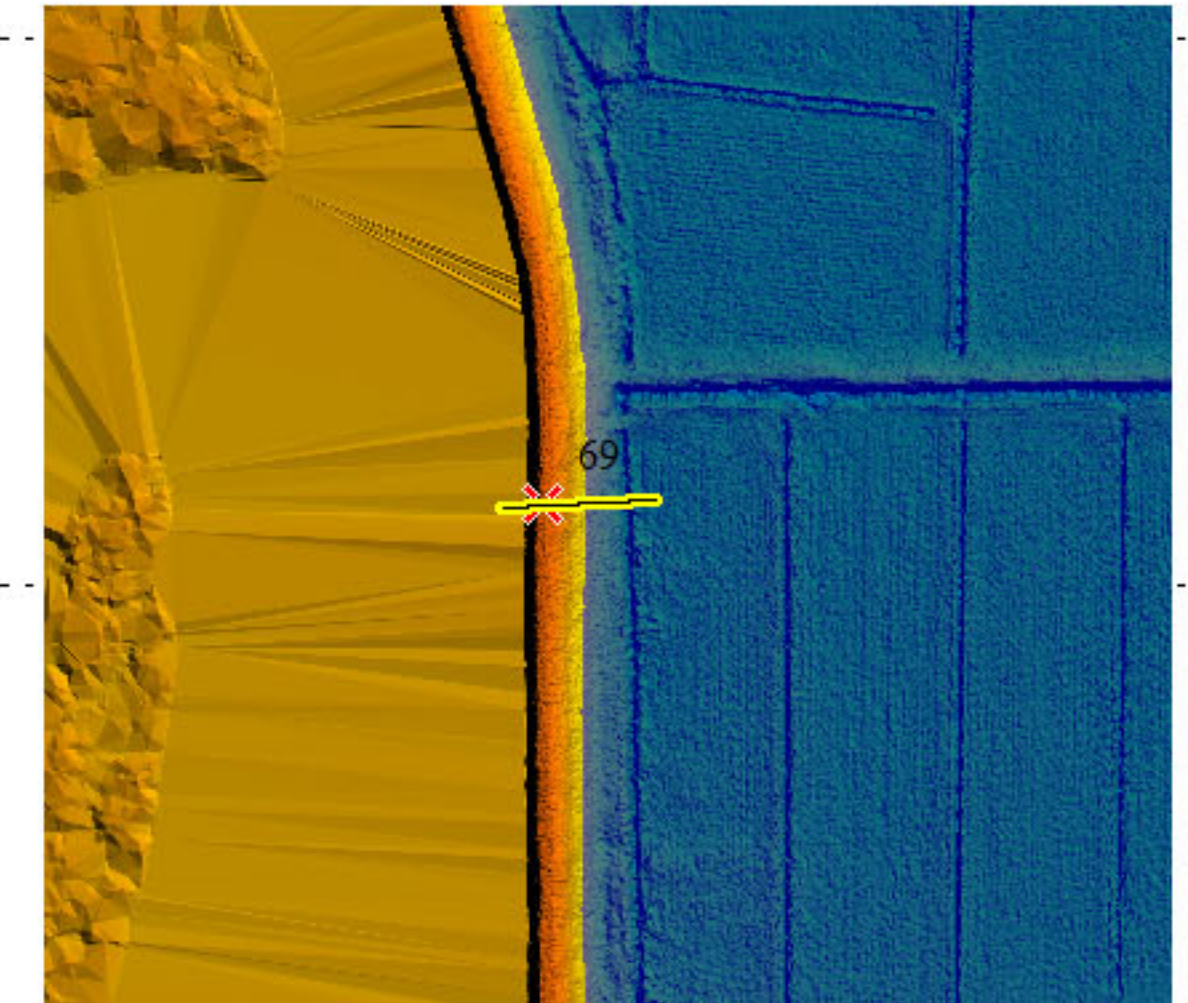
Vertical Difference (Start to Finish): 16.2 ft

Minimum Elevation on Path: -13.039 ft

Maximum Elevation on Path: 12.205 ft

Azimuth: 267° 56' 44.8"

Slope/Tilt: 4.14°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 55' 38.3791" N, 121° 31' 32.2750" W
Elev: 12.26 ft, Dist: 161.7 ft

50 ft

100 ft

150 ft

200 ft

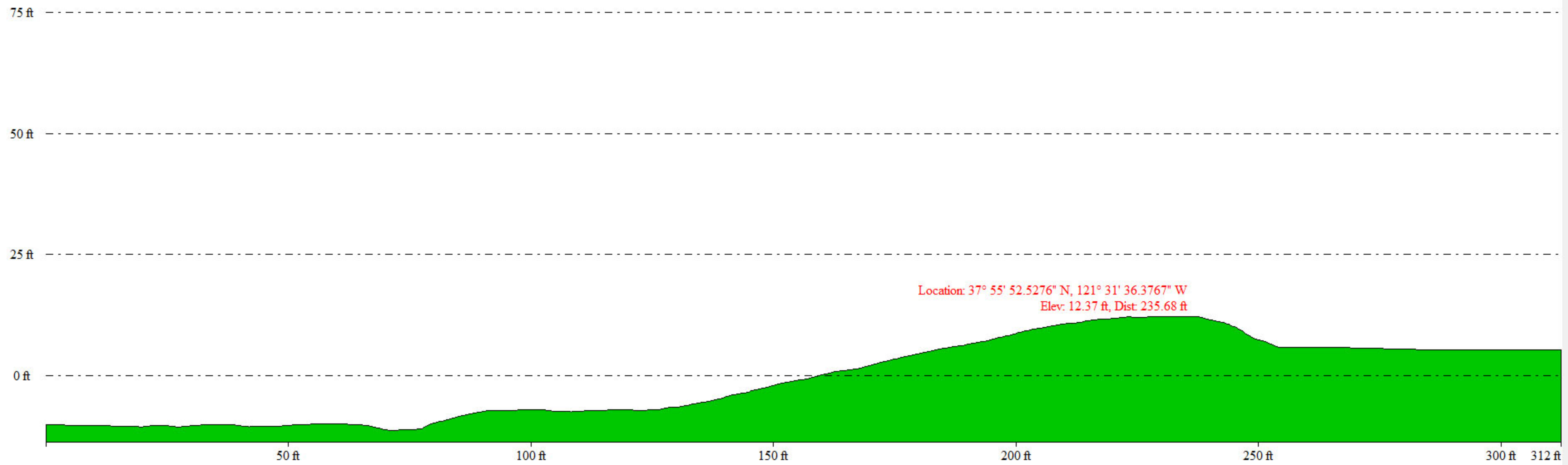
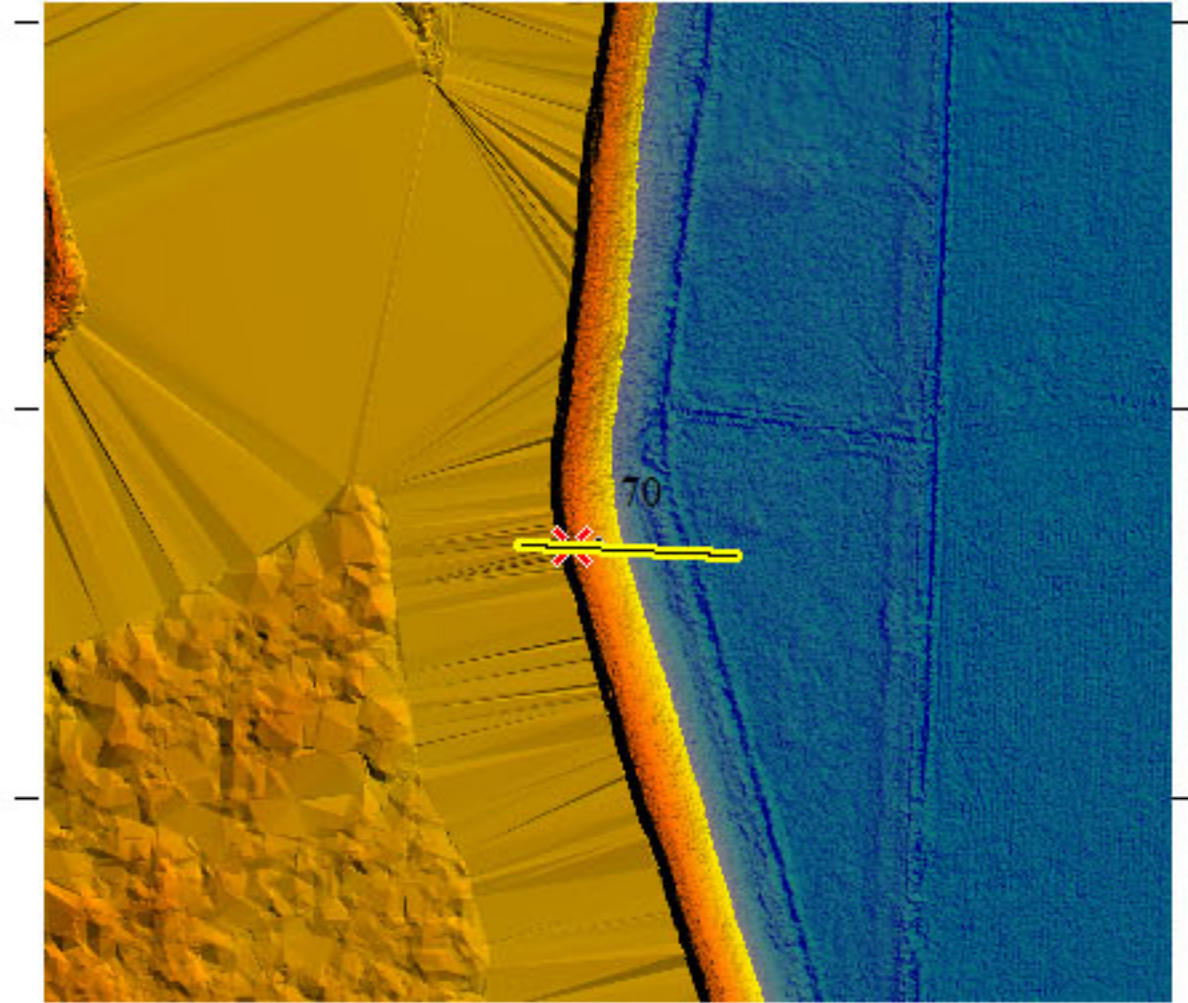
224 ft

From Pos: 37° 55' 52.3759" N, 121° 31' 33.4413" W

Station 70

To Pos: 37° 55' 52.5769" N, 121° 31' 37.3317" W

150 ft ----- *Start Position: 37° 55' 52.3759" N, 121° 31' 33.4413" W*
Start Height: -10.169 ft
End Position: 37° 55' 52.5769" N, 121° 31' 37.3317" W
End Height: 5.388 ft
125 ft ----- *Straight-Line Distance: 312.36 ft*
3D Distance on Surface: 316.64 ft
Vertical Difference (Start to Finish): 15.6 ft
Minimum Elevation on Path: -11.337 ft
100 ft ----- *Maximum Elevation on Path: 12.271 ft*
Azimuth: 273° 44' 0.1"
Slope/Tilt: 2.85°



Start Position: 37° 56' 10.2608" N, 121° 31' 38.4693" W

Start Height: -12.039 ft

End Position: 37° 56' 8.8696" N, 121° 31' 39.8914" W

End Height: 5.031 ft

Straight-Line Distance: 181.06 ft

3D Distance on Surface: 185.55 ft

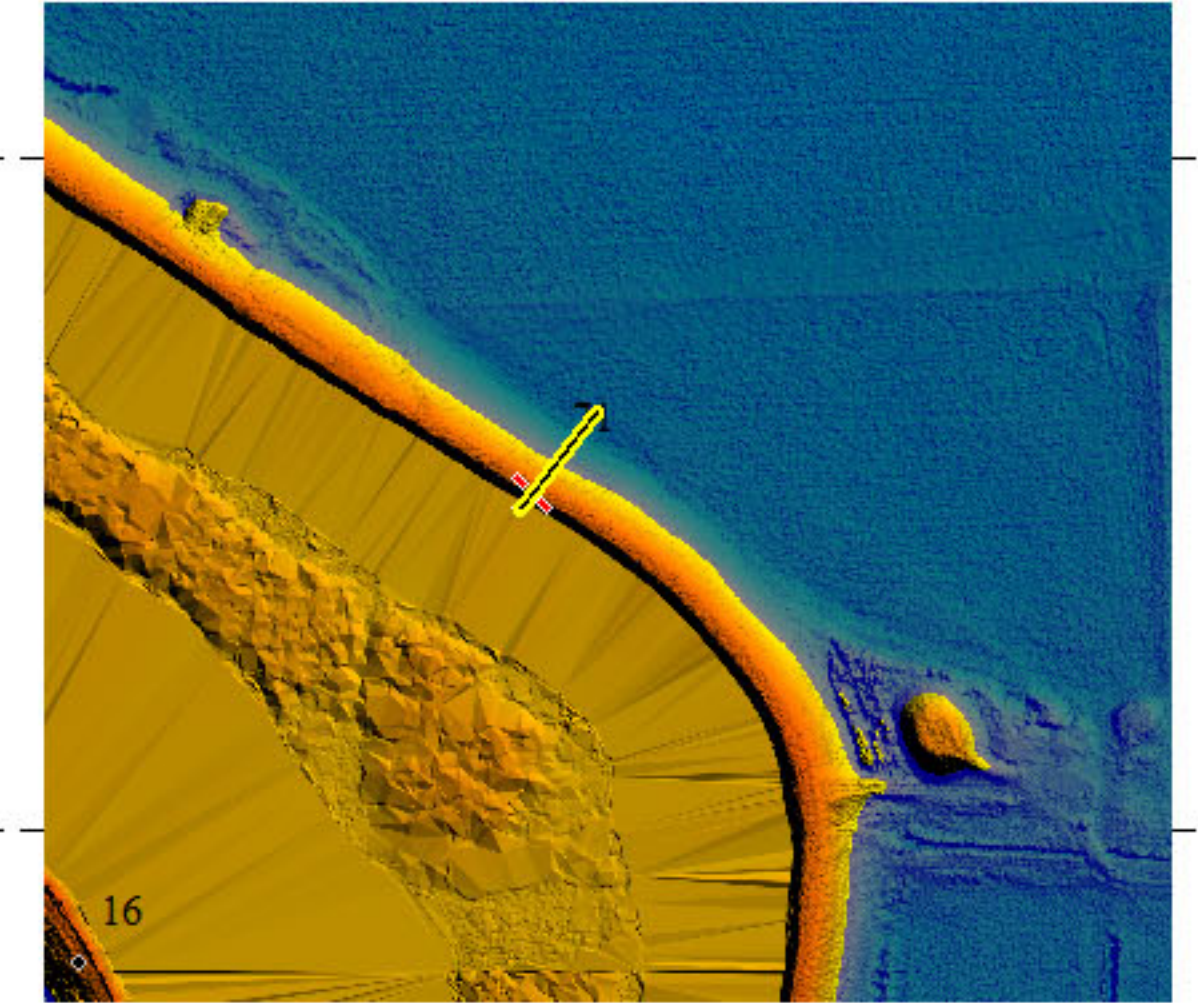
Vertical Difference (Start to Finish): 17.1 ft

Minimum Elevation on Path: -12.278 ft

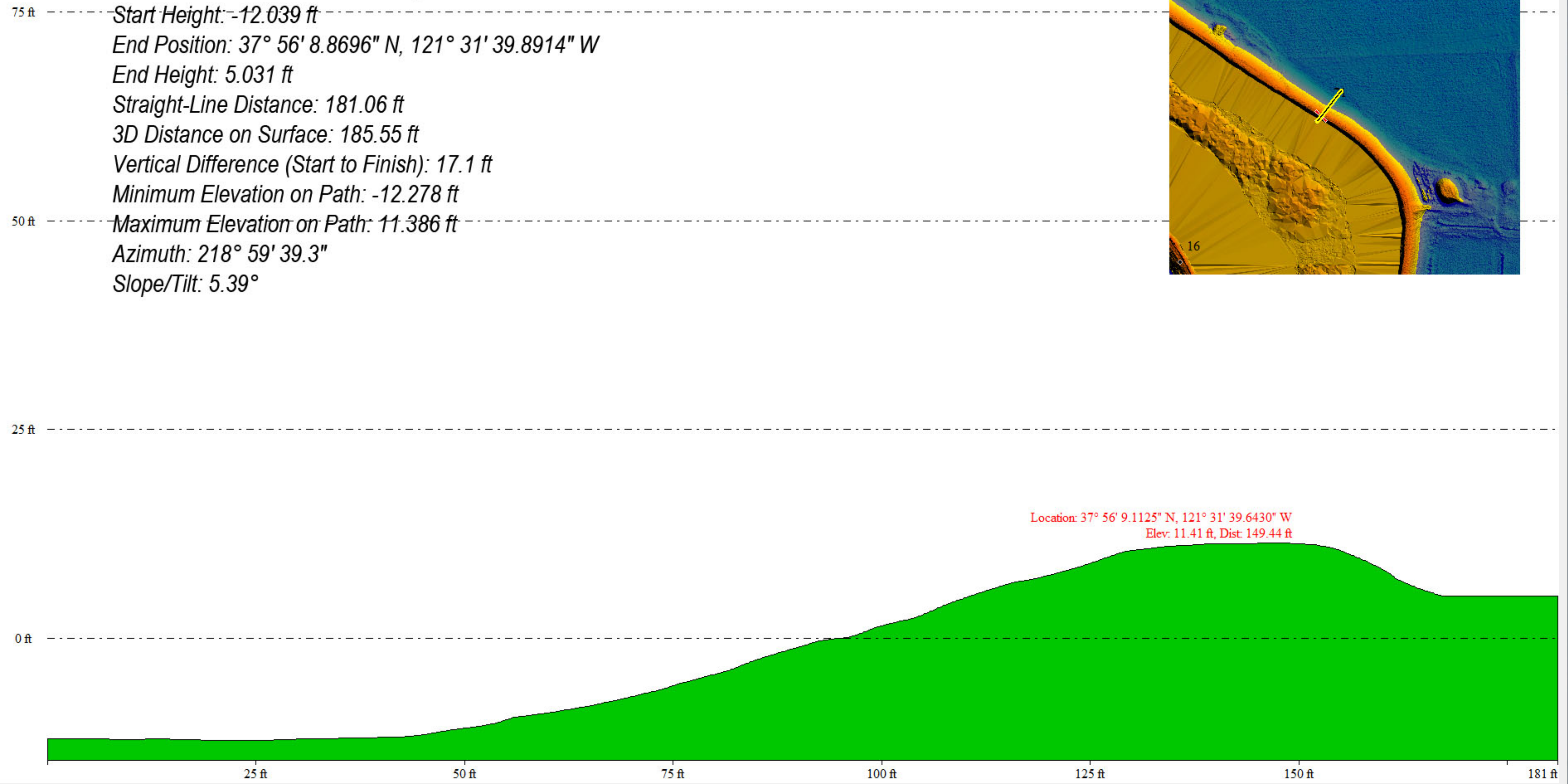
Maximum Elevation on Path: 11.386 ft

Azimuth: 218° 59' 39.3"

Slope/Tilt: 5.39°



Location: 37° 56' 9.1125" N, 121° 31' 39.6430" W
Elev: 11.41 ft, Dist: 149.44 ft



Start Position: 37° 56' 18.5812" N, 121° 31' 52.1512" W

Start Height: -3.675 ft

End Position: 37° 56' 17.7784" N, 121° 31' 54.9561" W

End Height: 4.492 ft

Straight-Line Distance: 238.92 ft

3D Distance on Surface: 243.41 ft

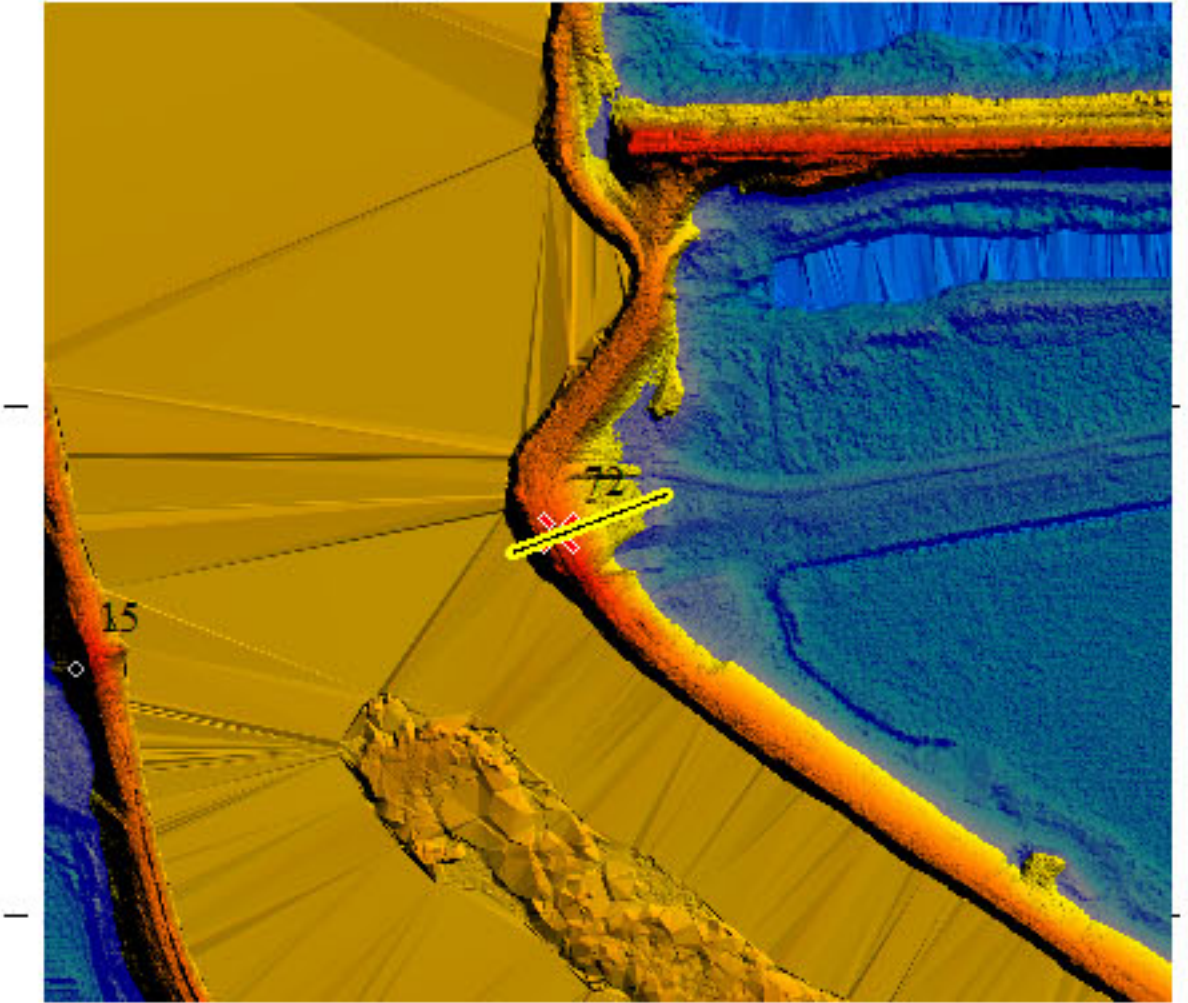
Vertical Difference (Start to Finish): 8.2 ft

Minimum Elevation on Path: -3.675 ft

Maximum Elevation on Path: 16.189 ft

Azimuth: 250° 07' 51.4"

Slope/Tilt: 1.96°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 56' 18.0302" N, 121° 31' 54.0764" W

Elev: 16.18 ft, Dist: 163.99 ft

50 ft

100 ft

150 ft

200 ft

239 ft

100 ft

Start Position: 37° 56' 29.8461" N, 121° 31' 51.5904" W

Start Height: -6.612 ft

End Position: 37° 56' 30.0665" N, 121° 31' 53.9903" W

End Height: 4.118 ft

75 ft

Straight-Line Distance: 193.54 ft

3D Distance on Surface: 197.14 ft

Vertical Difference (Start to Finish): 10.7 ft

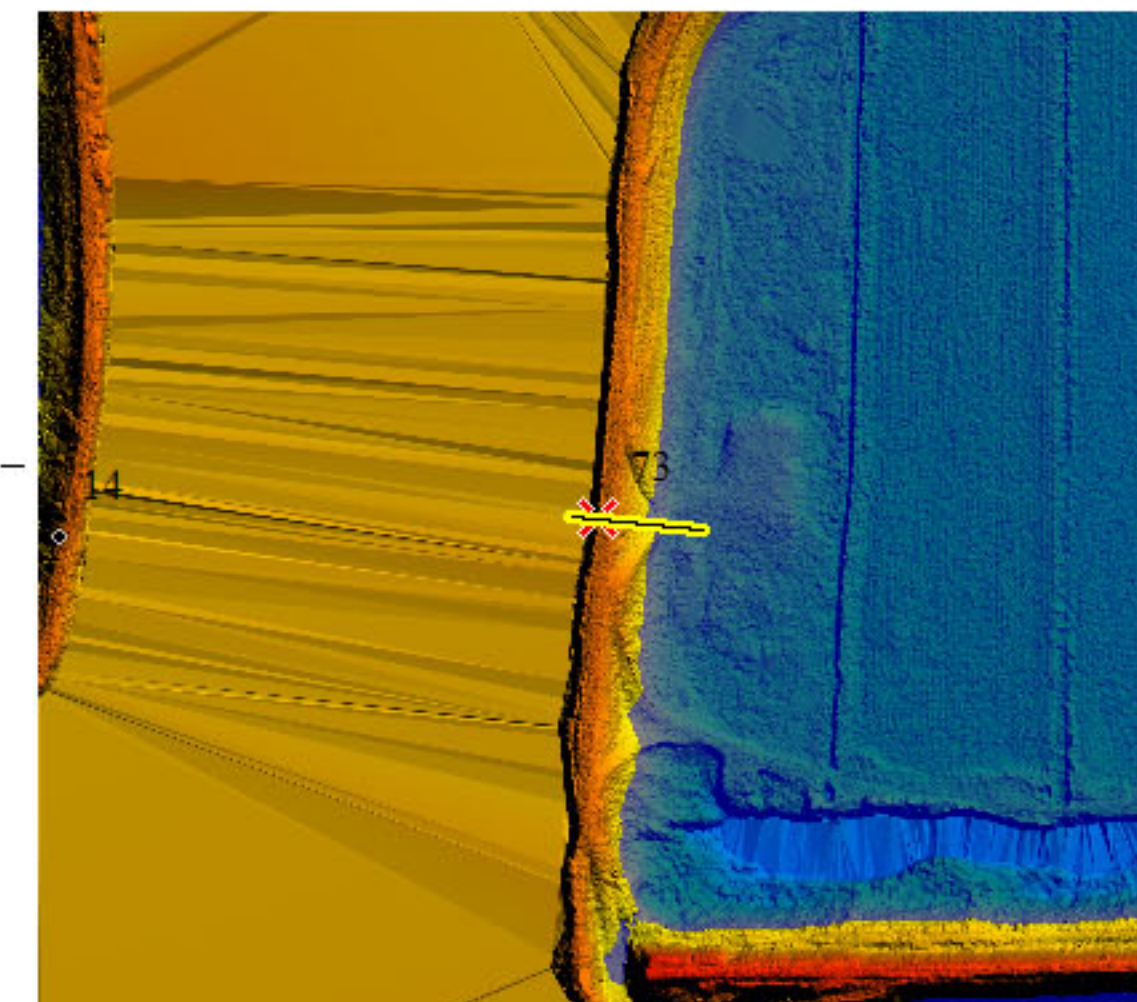
Minimum Elevation on Path: -6.612 ft

Maximum Elevation on Path: 11.19 ft

Azimuth: 276° 36' 50.2"

Slope/Tilt: 3.17°

50 ft



25 ft

Location: 37° 56' 30.0162" N, 121° 31' 53.4425" W

Elev: 11.42 ft, Dist: 149.36 ft

0 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

175 ft

194 ft

Start Position: 37° 56' 49.1079" N, 121° 31' 26.6815" W

Start Height: -10.744 ft

End Position: 37° 56' 50.5878" N, 121° 31' 29.2968" W

End Height: 4.502 ft

Straight-Line Distance: 257.48 ft

3D Distance on Surface: 260.77 ft

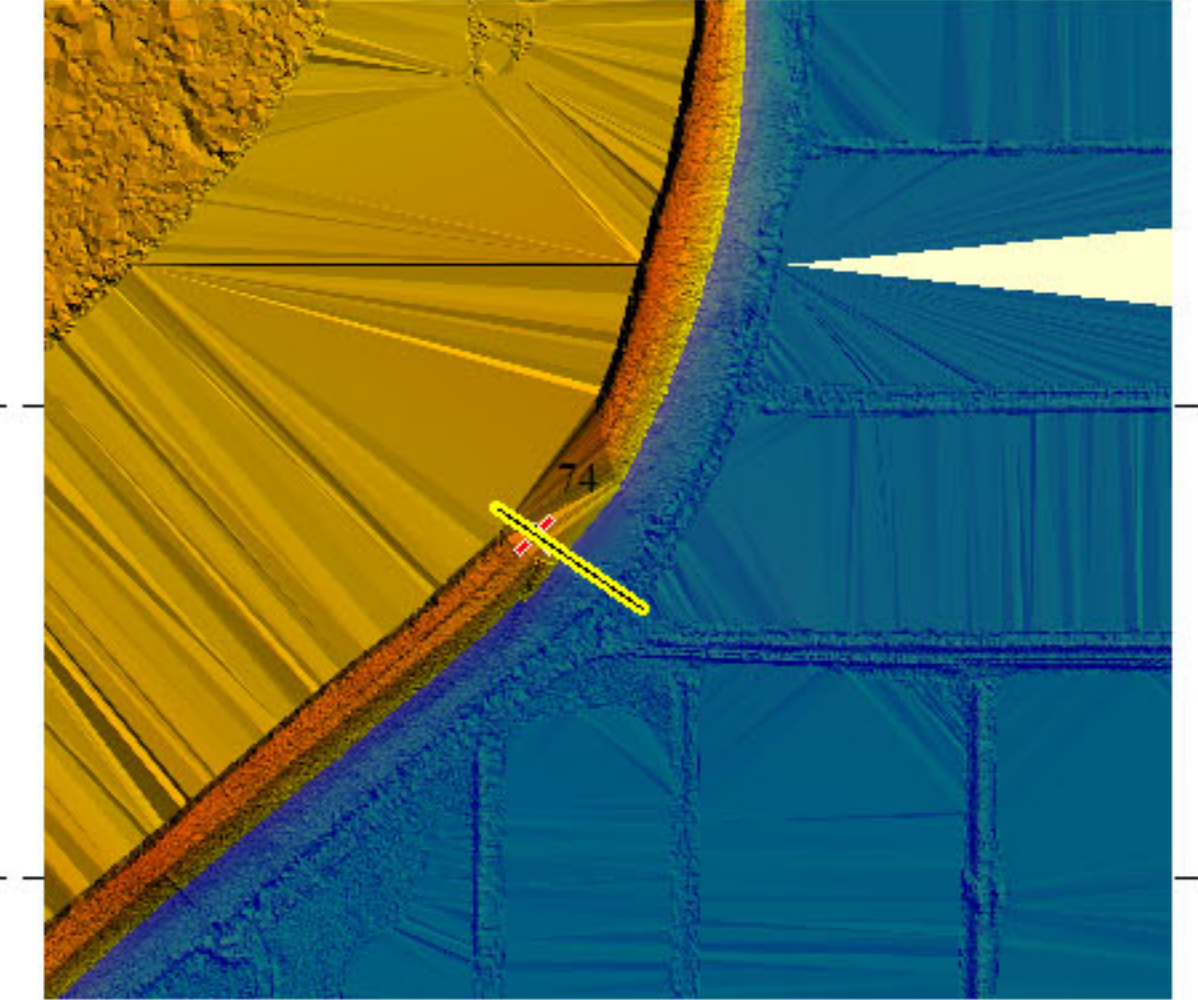
Vertical Difference (Start to Finish): 15.2 ft

Minimum Elevation on Path: -12.014 ft

Maximum Elevation on Path: 9.303 ft

Azimuth: 305° 32' 55.2"

Slope/Tilt: 3.39°



125 ft

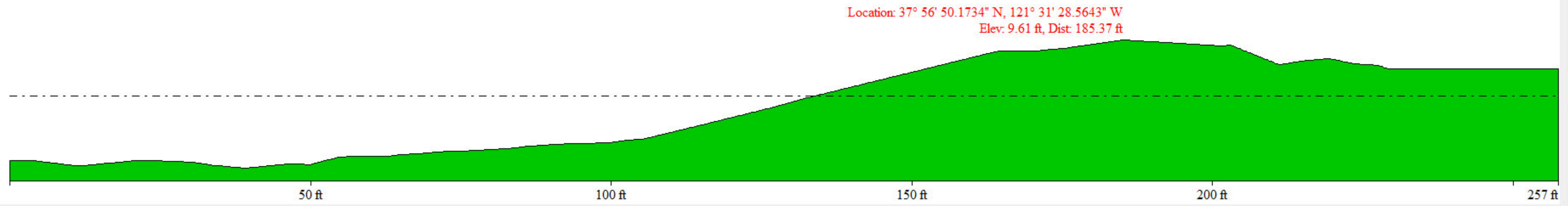
100 ft

75 ft

50 ft

25 ft

0 ft



50 ft

100 ft

150 ft

200 ft

257 ft

Start Position: 37° 57' 9.1558" N, 121° 31' 28.0597" W

Start Height: -10.045 ft

End Position: 37° 57' 8.6958" N, 121° 31' 30.8583" W

End Height: 5.408 ft

Straight-Line Distance: 228.93 ft

3D Distance on Surface: 233.03 ft

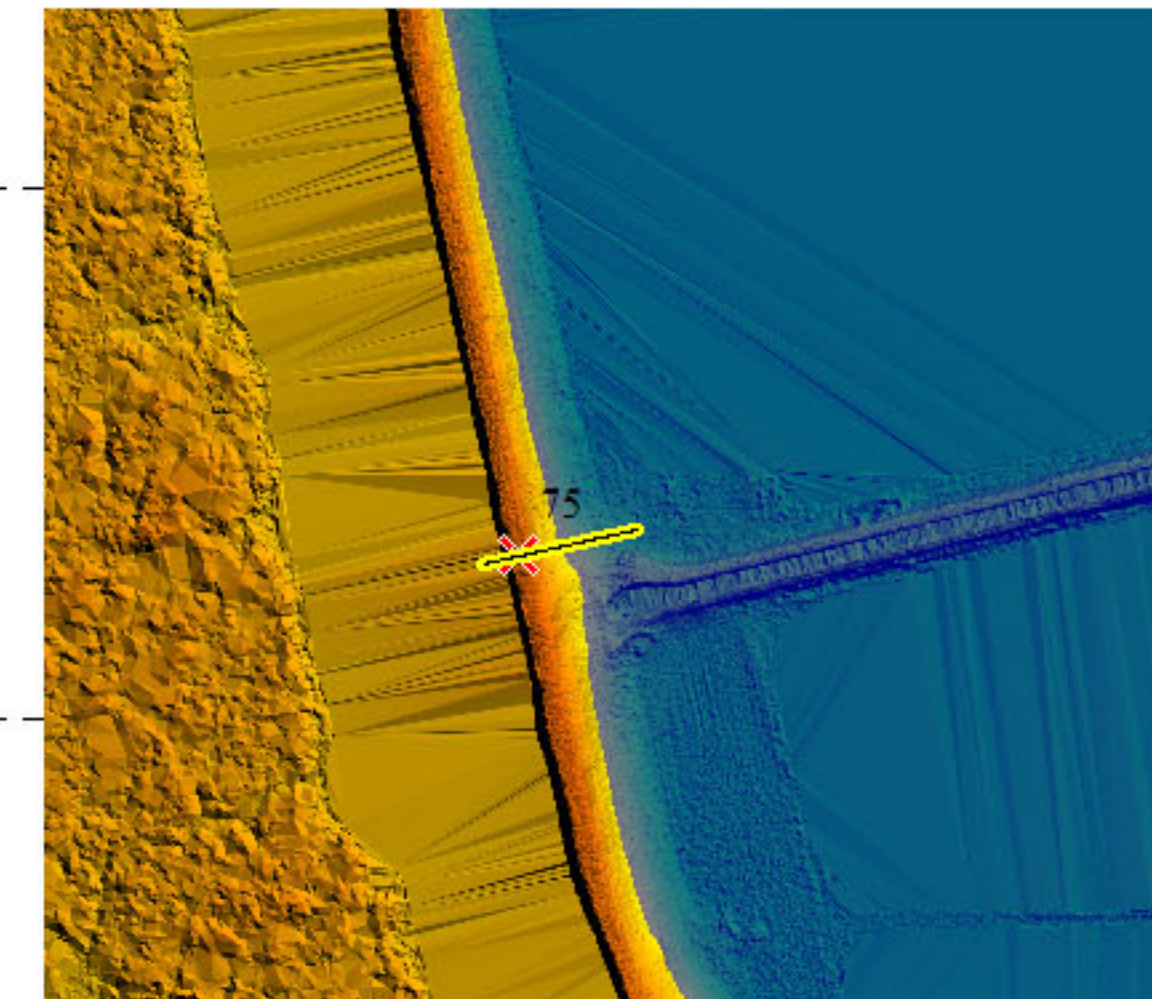
Vertical Difference (Start to Finish): 15.5 ft

Minimum Elevation on Path: -10.045 ft

Maximum Elevation on Path: 11.568 ft

Azimuth: 258° 16' 27.2"

Slope/Tilt: 3.86°



100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

229 ft

Location: 37° 57' 8.8085" N, 121° 31' 30.1729" W

Elev: 11.56 ft, Dist: 172.86 ft

Start Position: 37° 57' 23.0952" N, 121° 31' 31.2437" W

Start Height: -12.103 ft

End Position: 37° 57' 23.0220" N, 121° 31' 34.5156" W

End Height: 5.134 ft

Straight-Line Distance: 262.16 ft

3D Distance on Surface: 267 ft

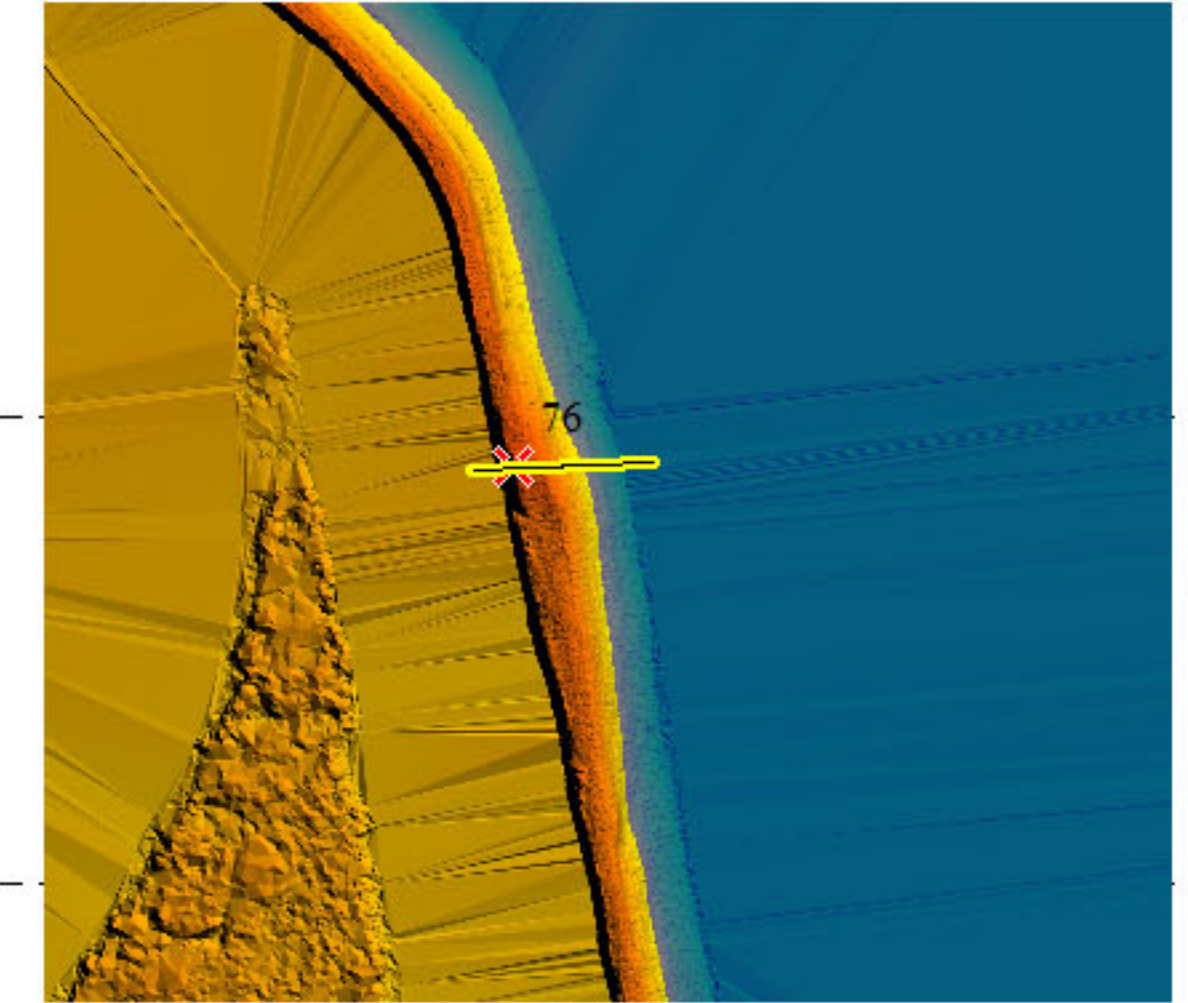
Vertical Difference (Start to Finish): 17.2 ft

Minimum Elevation on Path: -12.164 ft

Maximum Elevation on Path: 15.036 ft

Azimuth: 268° 22' 51.6"

Slope/Tilt: 3.76°



50 ft

25 ft

0 ft

Location: 37° 57' 23.0396" N, 121° 31' 33.7284" W

Elev: 15.29 ft, Dist: 199.09 ft

50 ft

100 ft

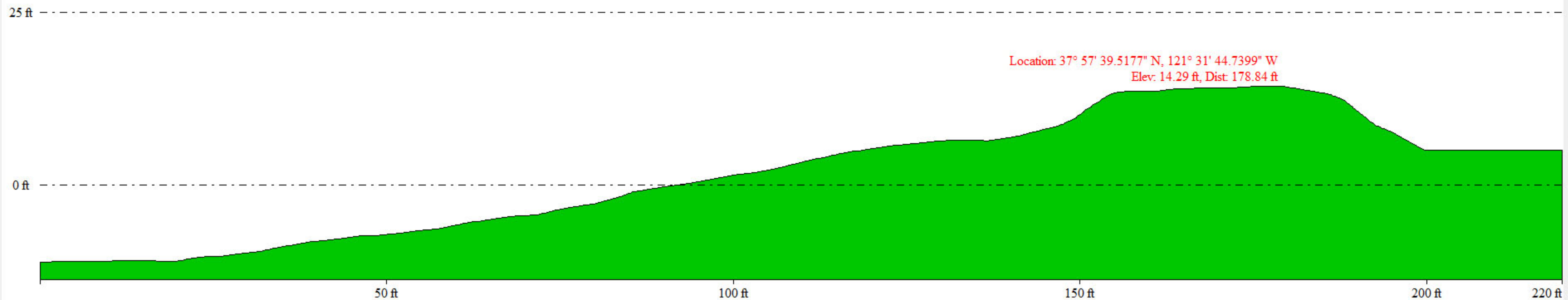
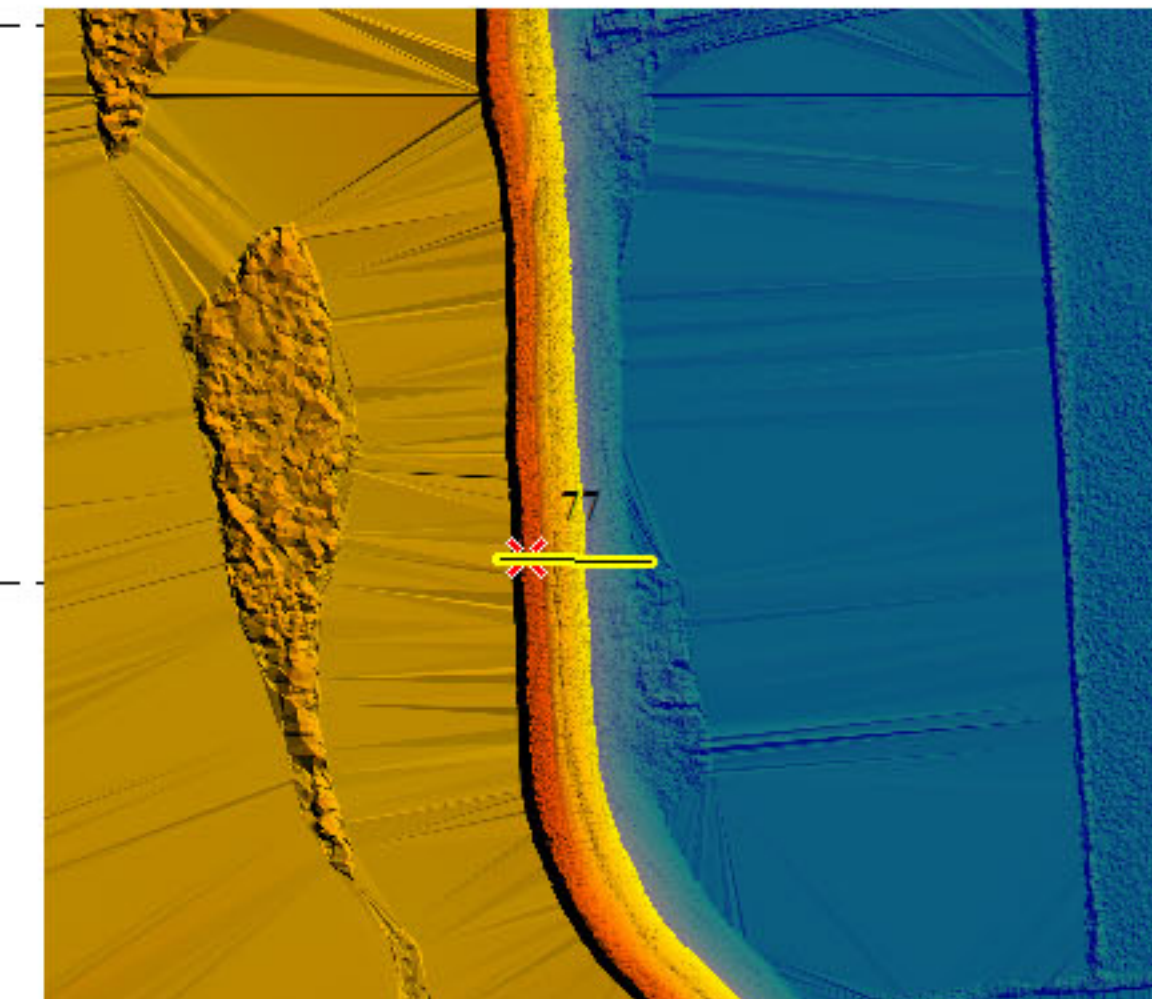
150 ft

200 ft

250 ft

262 ft

100 ft ----- Start Position: 37° 57' 39.4587" N, 121° 31' 42.5080" W
Start Height: -11.085 ft
End Position: 37° 57' 39.5311" N, 121° 31' 45.2482" W
End Height: 5.03 ft
Straight-Line Distance: 219.57 ft
3D Distance on Surface: 225.2 ft
75 ft ----- Vertical Difference (Start to Finish): 16.1 ft
Minimum Elevation on Path: -11.087 ft
Maximum Elevation on Path: 14.272 ft
Azimuth: 271° 54' 37.4"
Slope/Tilt: 4.20°
50 ft -----



Start Position: 37° 57' 59.6544" N, 121° 31' 46.5784" W

Start Height: -10.082 ft

End Position: 37° 57' 59.4627" N, 121° 31' 49.5164" W

End Height: 4.804 ft

Straight-Line Distance: 236.08 ft

3D Distance on Surface: 241.92 ft

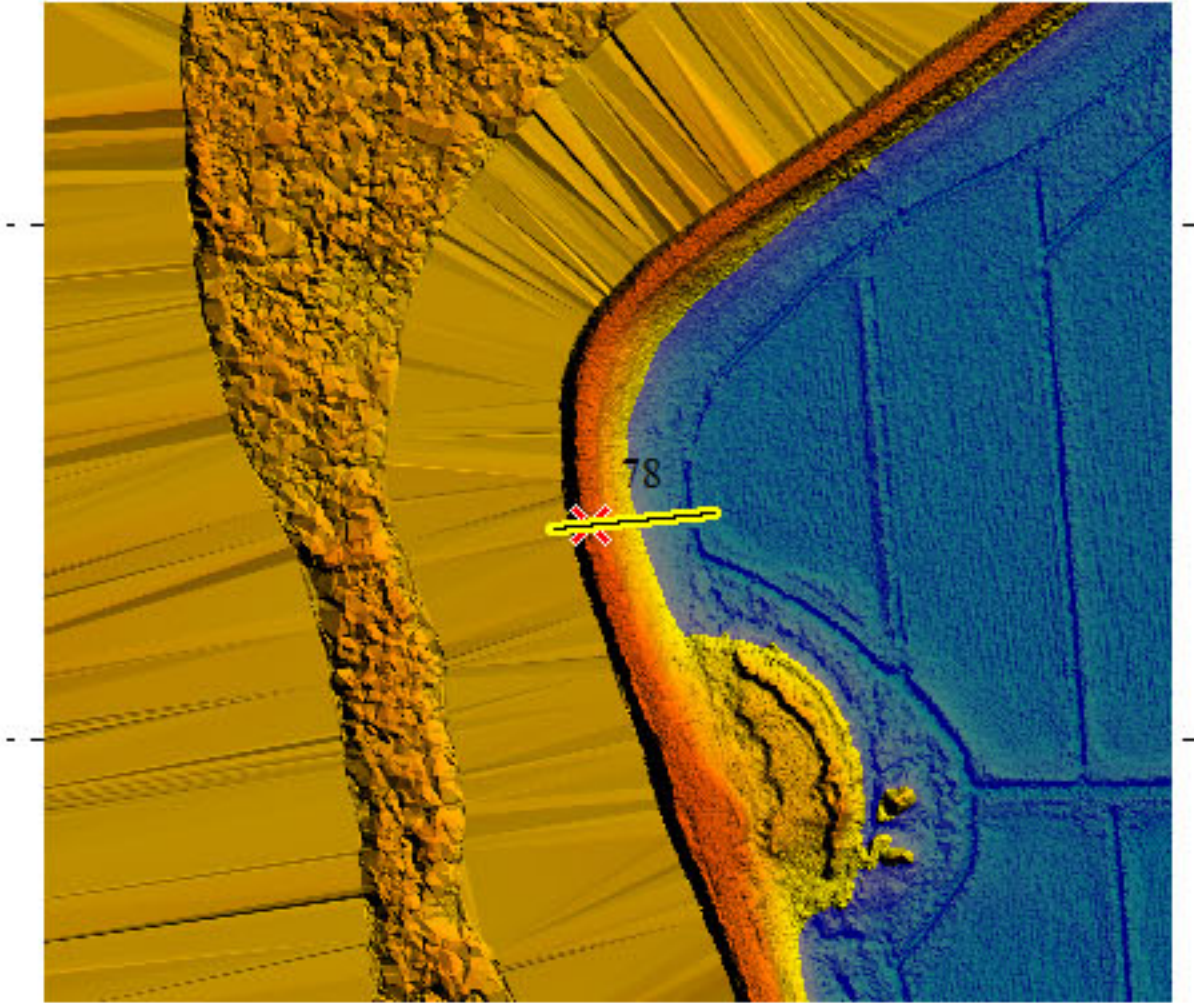
Vertical Difference (Start to Finish): 14.9 ft

Minimum Elevation on Path: -11.028 ft

Maximum Elevation on Path: 13.365 ft

Azimuth: 265° 17' 13.7"

Slope/Tilt: 3.61°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 57' 59.5090" N, 121° 31' 48.8065" W

Elev: 13.50 ft, Dist: 179.04 ft

50 ft

100 ft

150 ft

200 ft

236 ft

Start Position: 37° 58' 16.8224" N, 121° 32' 10.4807" W

Start Height: 4.494 ft

End Position: 37° 58' 15.5138" N, 121° 32' 12.4309" W

End Height: 4.417 ft

Straight-Line Distance: 204.71 ft

3D Distance on Surface: 211.78 ft

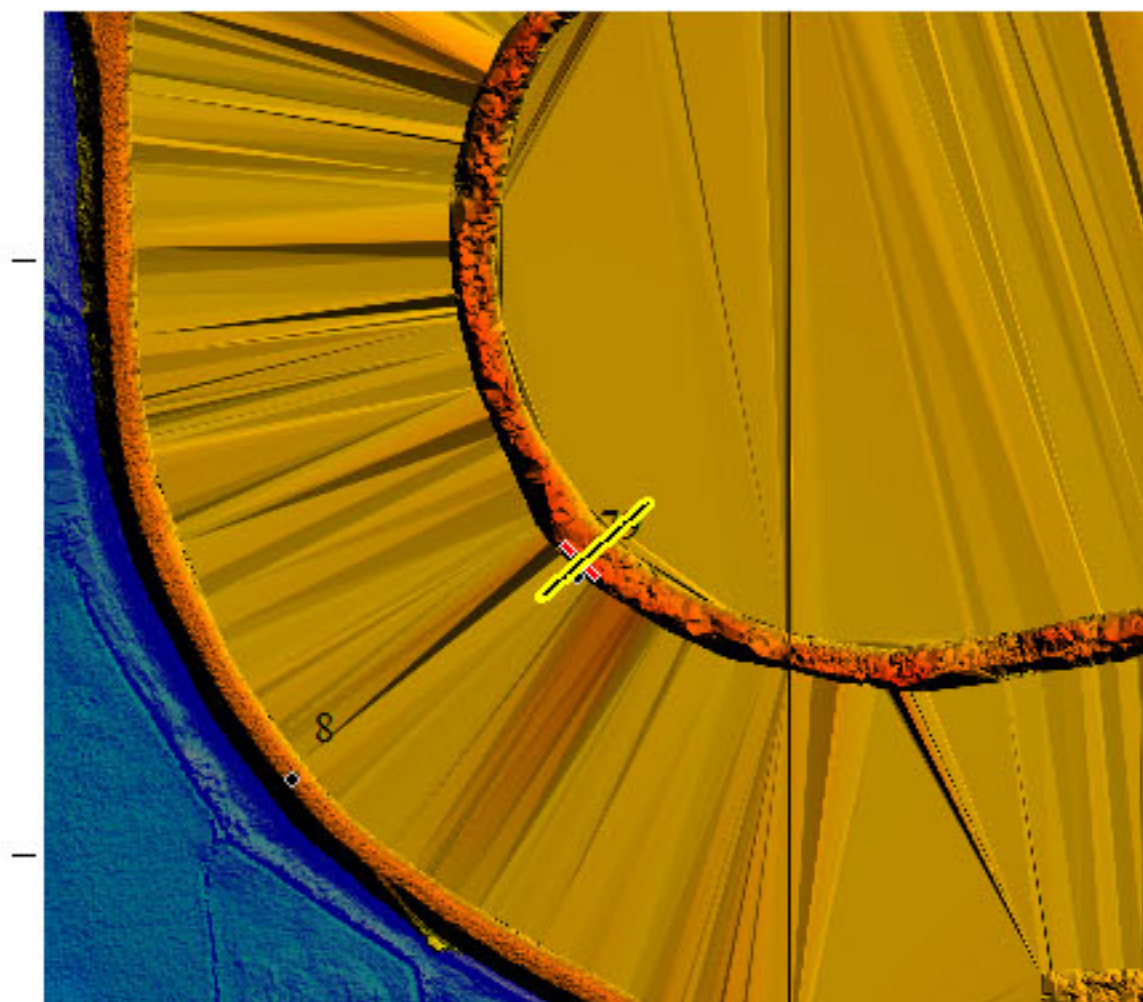
Vertical Difference (Start to Finish): -0.1 ft

Minimum Elevation on Path: 4.31 ft

Maximum Elevation on Path: 15.479 ft

Azimuth: 229° 42' 53.3"

Slope/Tilt: -0.02°



100 ft

75 ft

50 ft

25 ft

Location: 37° 58' 15.9987" N, 121° 32' 11.7083" W
Elev: 15.63 ft, Dist: 128.86 ft

50 ft

100 ft

150 ft

205 ft

Start Position: 37° 58' 9.9295" N, 121° 31' 30.8359" W

Start Height: -10.876 ft

End Position: 37° 58' 11.7104" N, 121° 31' 33.1574" W

End Height: 5.197 ft

Straight-Line Distance: 258.86 ft

3D Distance on Surface: 264.15 ft

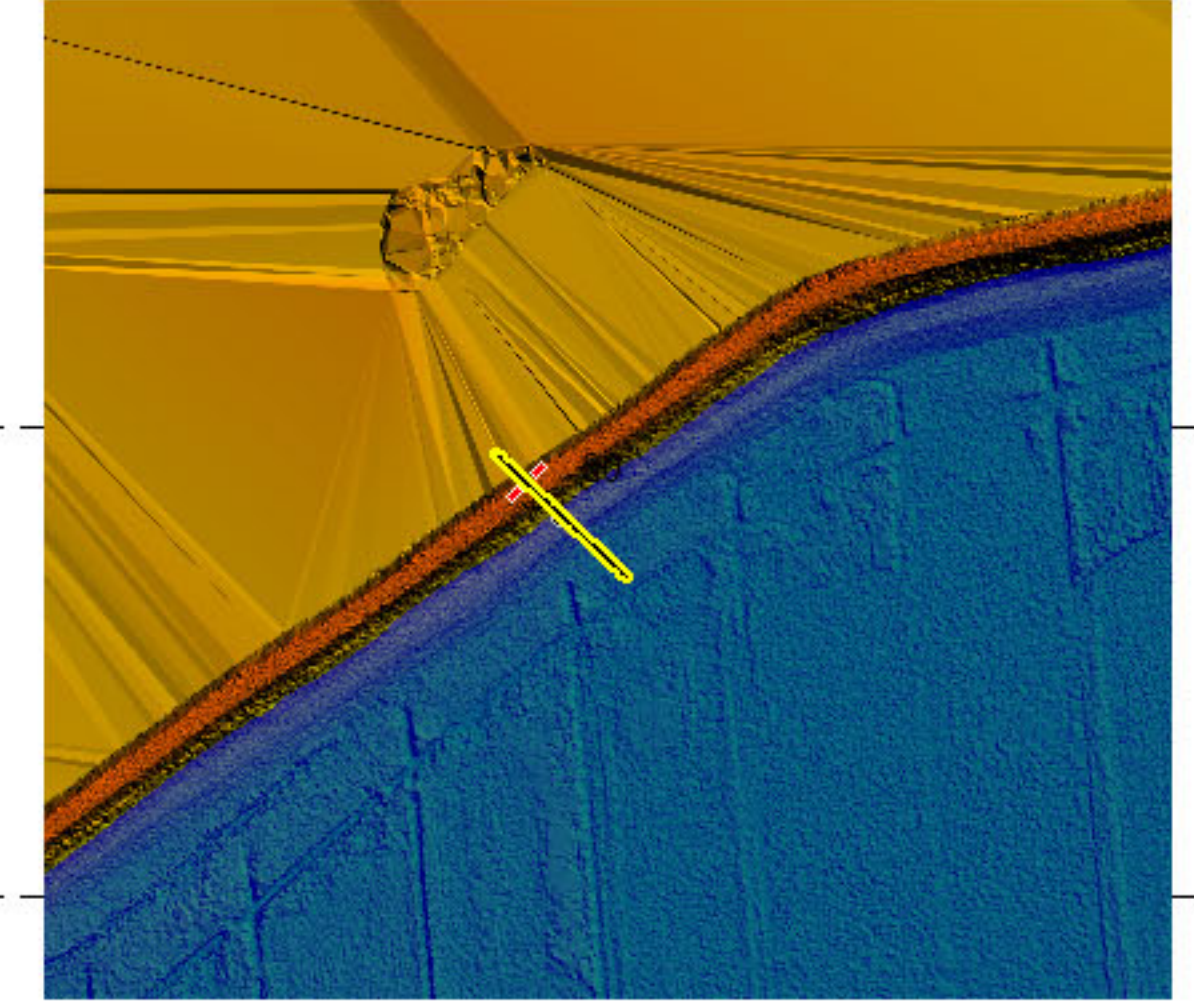
Vertical Difference (Start to Finish): 16.1 ft

Minimum Elevation on Path: -11.205 ft

Maximum Elevation on Path: 12.847 ft

Azimuth: 314° 05' 55.4"

Slope/Tilt: 3.55°



125 ft
100 ft
75 ft
50 ft
25 ft
0 ft

Location: 37° 58' 11.2918" N, 121° 31' 32.6117" W
Elev: 12.97 ft, Dist: 198.02 ft

50 ft 100 ft 150 ft 200 ft 259 ft

Start Position: 37° 58' 37.8986" N, 121° 30' 40.8686" W

Start Height: -13.428 ft

End Position: 37° 58' 38.3655" N, 121° 30' 44.6598" W

End Height: 4.457 ft

Straight-Line Distance: 307.21 ft

3D Distance on Surface: 313.66 ft

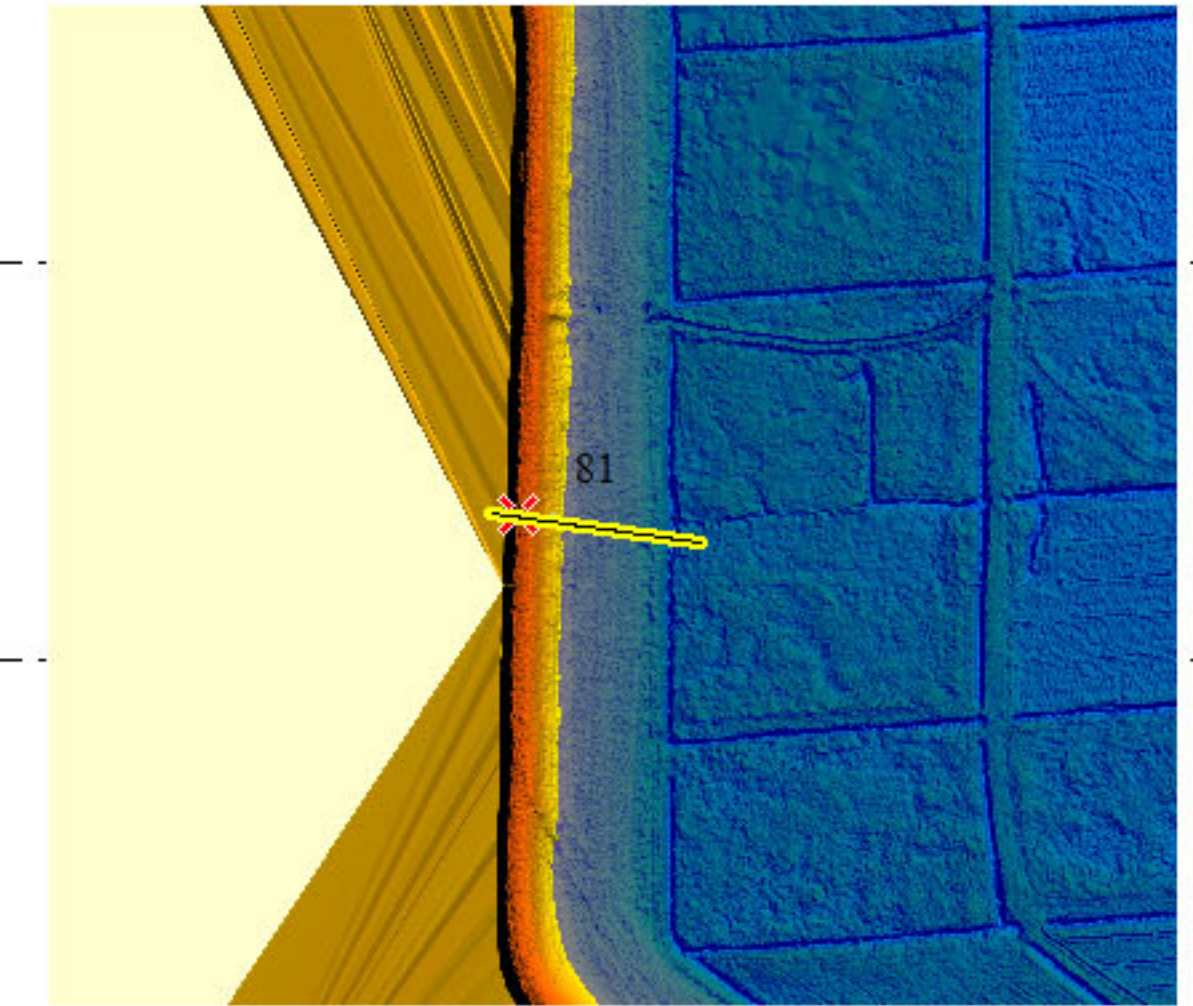
Vertical Difference (Start to Finish): 17.9 ft

Minimum Elevation on Path: -16.453 ft

Maximum Elevation on Path: 13.252 ft

Azimuth: 278° 50' 35.1"

Slope/Tilt: 3.33°



150 ft

125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 58' 38.3023" N, 121° 30' 44.1468" W
Elev: 13.26 ft, Dist: 265.64 ft

50 ft

100 ft

150 ft

200 ft

250 ft

307 ft

Start Position: 37° 58' 58.5517" N, 121° 30' 53.9709" W

Start Height: -9.394 ft

End Position: 37° 58' 58.7471" N, 121° 30' 57.3829" W

End Height: 0 ft

Straight-Line Distance: 273.89 ft

3D Distance on Surface: 282.15 ft

Vertical Difference (Start to Finish): 9.4 ft

Minimum Elevation on Path: -10.322 ft

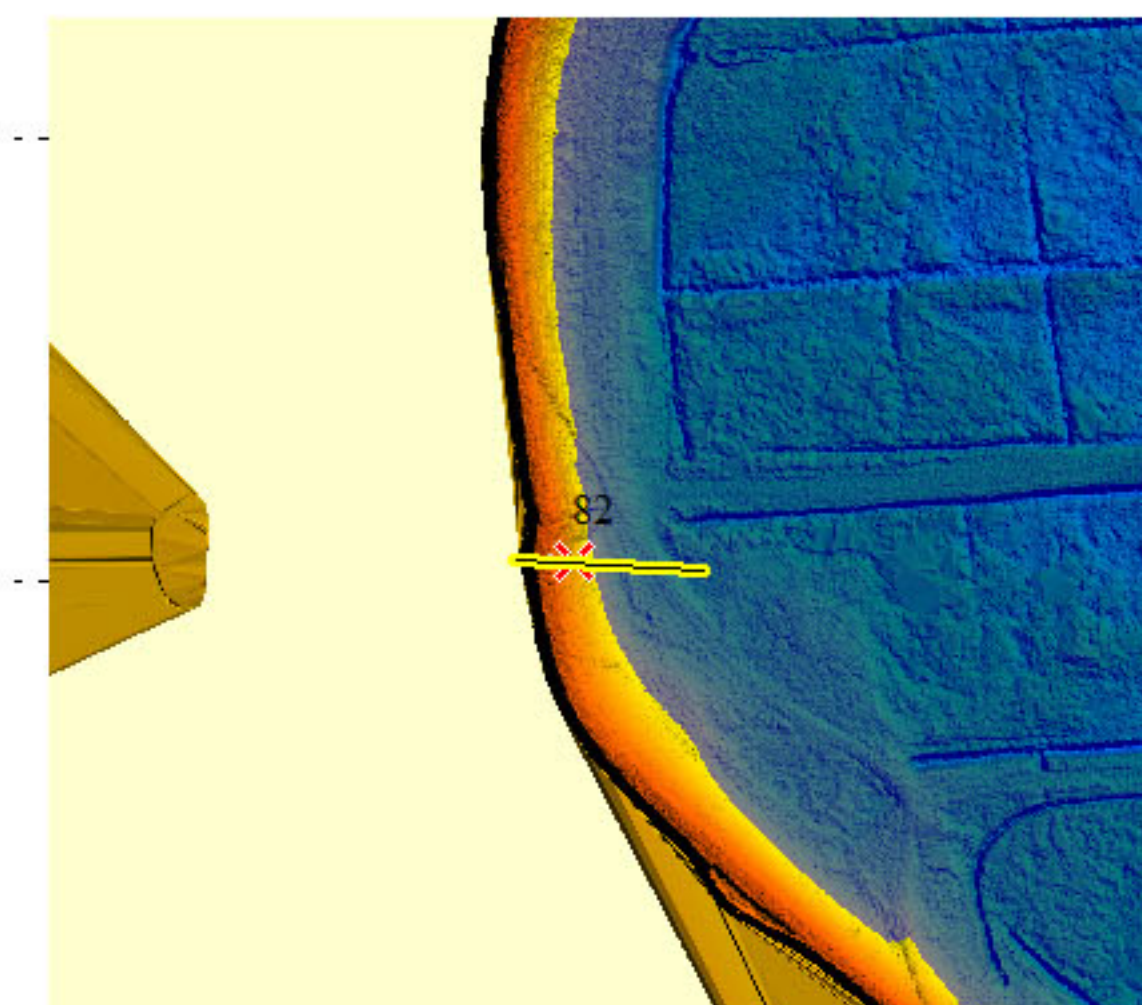
Maximum Elevation on Path: 13.173 ft

Azimuth: 274° 08' 18.8"

Slope/Tilt: 1.96°

Location: 37° 58' 58.6844" N, 121° 30' 56.2887" W

Elev: 121.19 ft, Dist: 186.05 ft



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

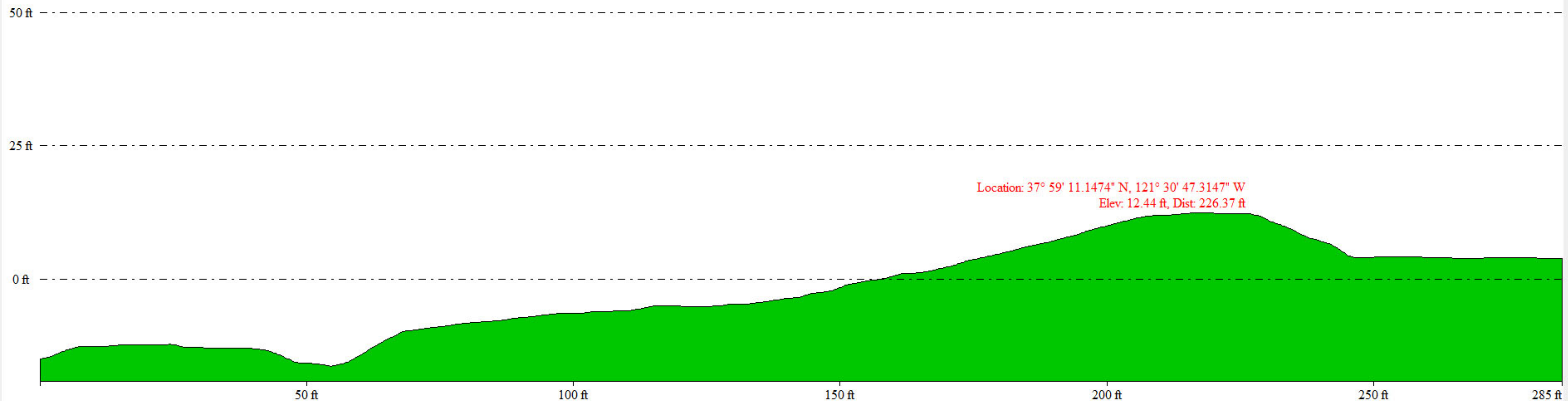
100 ft

150 ft

200 ft

250 ft

274 ft



From Pos: 37° 59' 25.4138" N, 121° 30' 31.1029" W

Station 84

To Pos: 37° 59' 28.0270" N, 121° 30' 32.9747" W

Start Position: 37° 59' 25.4138" N, 121° 30' 31.1029" W

Start Height: -12.584 ft

End Position: 37° 59' 28.0270" N, 121° 30' 32.9747" W

End Height: 0 ft

Straight-Line Distance: 303.86 ft

3D Distance on Surface: 313.77 ft

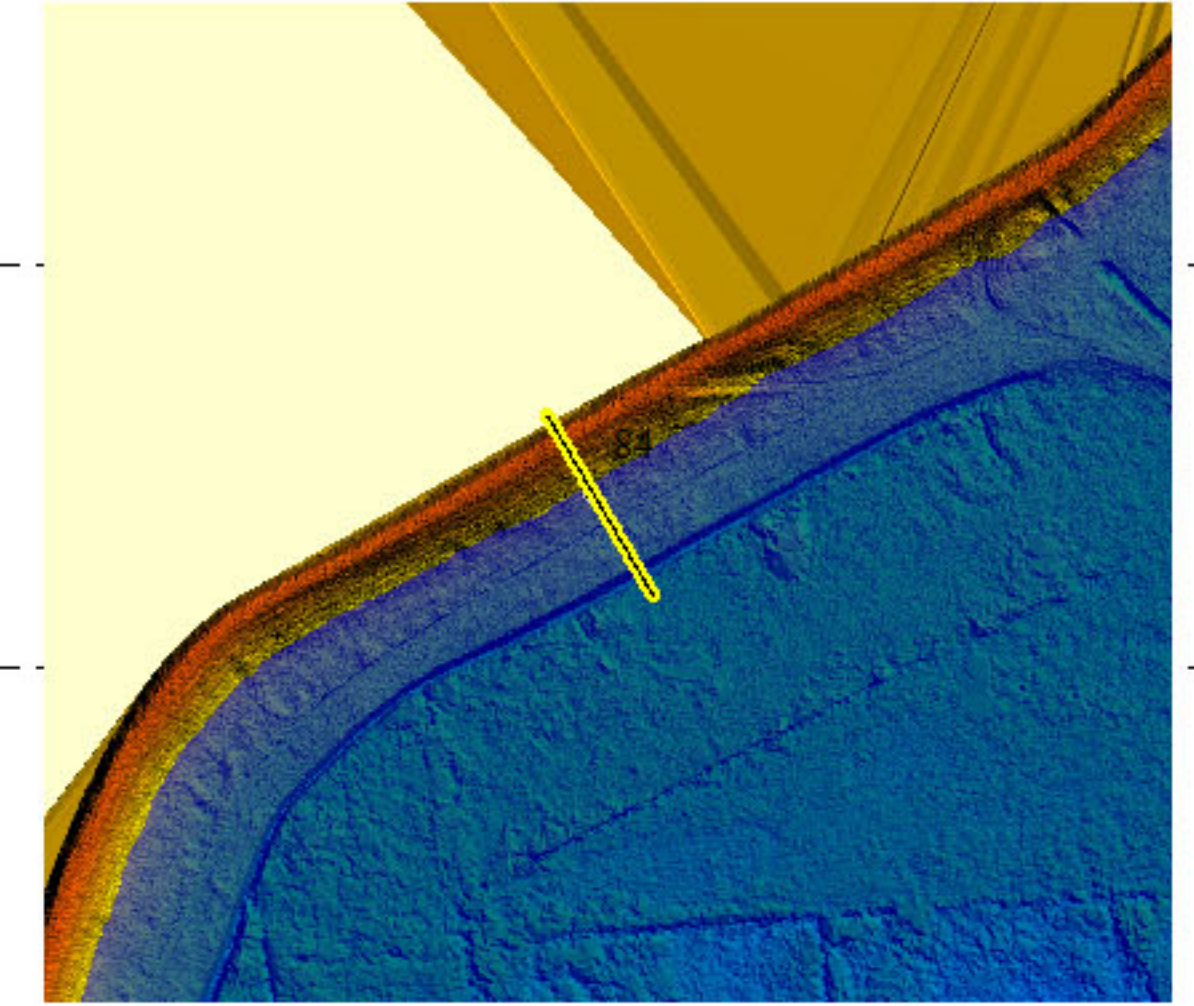
Vertical Difference (Start to Finish): 12.6 ft

Minimum Elevation on Path: -14.913 ft

Maximum Elevation on Path: 13.316 ft

Azimuth: 330° 27' 9.2"

Slope/Tilt: 2.37°



150 ft
125 ft
100 ft
75 ft
50 ft
25 ft
0 ft

50 ft

100 ft

150 ft

200 ft

250 ft

304 ft

Start Position: 37° 59' 42.6018" N, 121° 30' 17.1849" W

Start Height: -12.706 ft

End Position: 37° 59' 43.1867" N, 121° 30' 21.2633" W

End Height: 4.174 ft

Straight-Line Distance: 331.79 ft

3D Distance on Surface: 336.8 ft

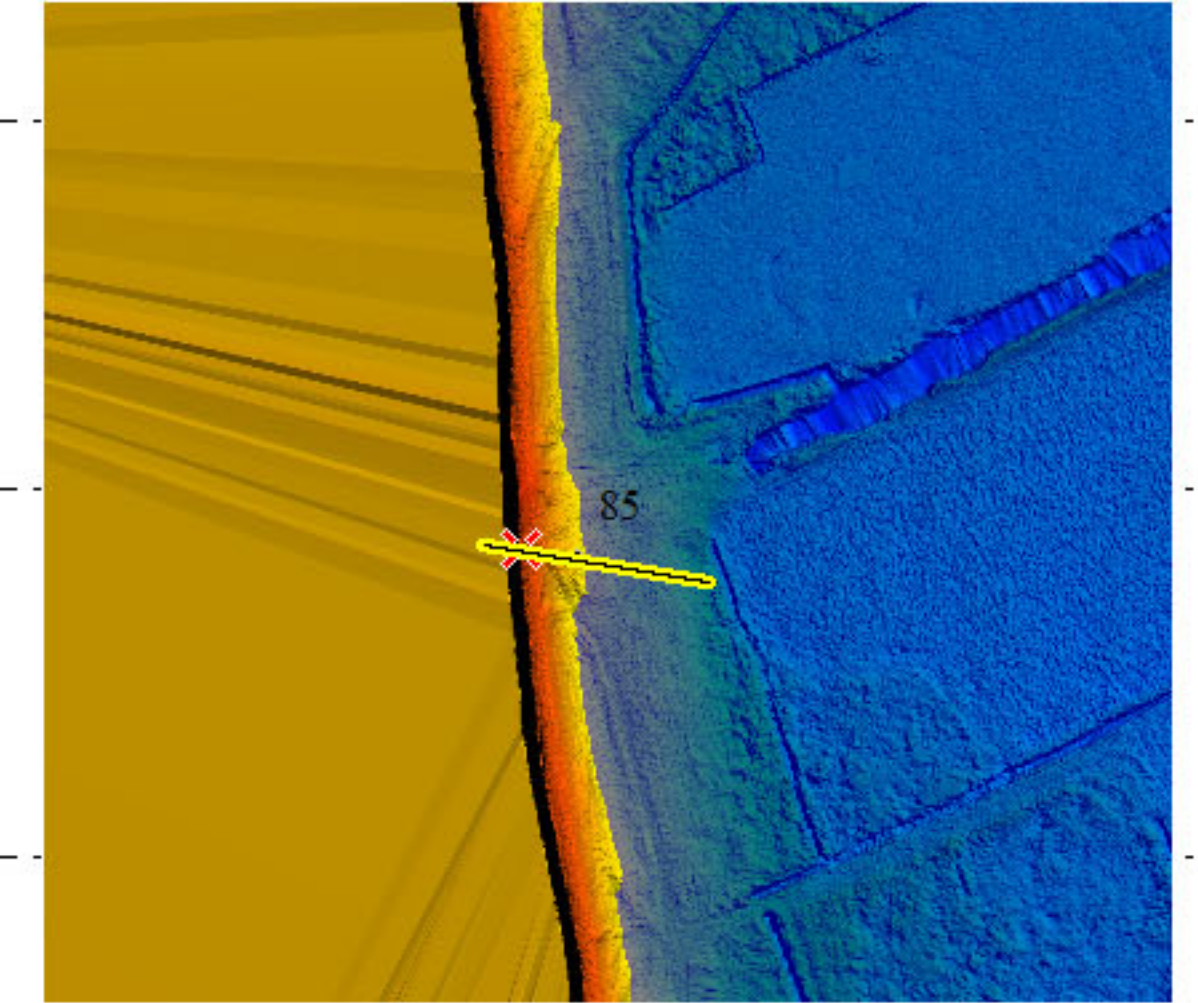
Vertical Difference (Start to Finish): 16.9 ft

Minimum Elevation on Path: -12.8 ft

Maximum Elevation on Path: 14.237 ft

Azimuth: 280° 16' 24.8"

Slope/Tilt: 2.91°



150 ft

125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 59' 43.0840" N, 121° 30' 20.5468" W
Elev: 14.00 ft, Dist: 273.51 ft

50 ft

100 ft

150 ft

200 ft

250 ft

300 ft

332 ft

Start Position: 38° 00' 3.3648" N, 121° 30' 29.9011" W

Start Height: -9.286 ft

End Position: 38° 00' 1.3869" N, 121° 30' 32.2461" W

End Height: 3.998 ft

Straight-Line Distance: 274.34 ft

3D Distance on Surface: 279.86 ft

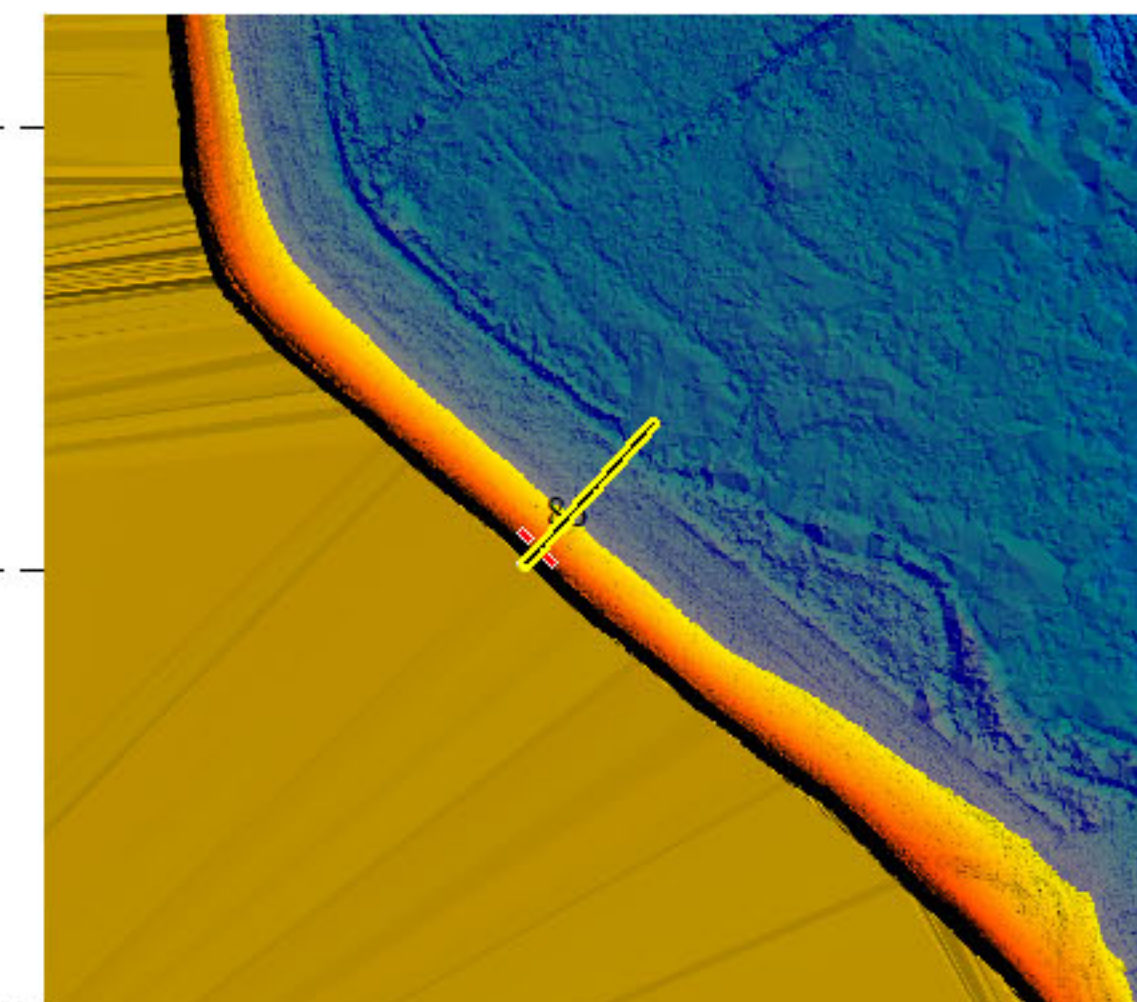
Vertical Difference (Start to Finish): 13.3 ft

Minimum Elevation on Path: -10.697 ft

Maximum Elevation on Path: 13.495 ft

Azimuth: 223° 10' 18.3"

Slope/Tilt: 2.77°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 38° 00' 1.5867" N, 121° 30' 32.0092" W

Elev: 13.40 ft, Dist: 246.62 ft

50 ft

100 ft

150 ft

200 ft

250 ft

274 ft

Appendix A

Delta LIDAR data READ ME

Author date: 11.6.2007

This is a general description of the data contained on this hard drive and the status of the project.

These data are from LIDAR flights of the Sacramento-San Joaquin Delta conducted during late January and February of 2007. The work was conducted under contract issued by California Department of Water Resources to URS Corporation. The prime LIDAR creation subcontractor was EarthData International, (later Fugro EarthData), also known as EDI. The principal aerial survey firm under subcontract to EDI was Airborne 1 Corporation. In effect, Airborne 1 performed the aerial survey, and EDI did the processing and deliverables preparation. Also involved in the contract to URS was an independent QA/QC firm, Spectrum Mapping LLC.

For this release, the survey includes:

- a) raw data, in folders titled "point cloud"
- b) bare earth elevations
- c) canopy/first return points
- d) LIDAR intensity return images
- e) flightlines and project tiles

The data are in a variety of formats, including ASCII, native LIDAR .las formats, ESRI v. 9.2 geodatabase points, and ESRI raster export format. The intensity images are geotiffs.

All data are registered to UTM Zone 10, NAD83, vertical datum NAVD88. The elevation units in the point files are in meters. The elevations for the ESRI grids are in decimeters (done to allow integer type grids to save file size).

The bare earth grid is of one meter resolution.

The accuracy specifications are as follows:

Vertical accuracy:	95% at 0.6' (<18.5cm) and 90% at 0.5' (15cm)
Horizontal accuracy:	1.0' (30cm), 1 sigma.

The final QA/QC reports, final metadata, and the 1 foot contours (with breakline development) are not yet available and will be delivered later, probably around early January.

Included with the delivery is an indication of where reflights are planned for winter (probably January) of 2007-08. Data are provided in the reflight area, but end users should be aware that these are provisional data which will be revised with update data once processing of the reflight areas is complete, probably around March or April of 2008.

If problems, corrections, or issues arise with any portion of this dataset, please contact Joel Dudas at California Department of Water Resources, 916-651-7002, jdudas@water.ca.gov.

These data are considered public domain data and are not subject to distribution restrictions.

By using these data, users indicate that they understand that they shall not hold the California Department of Water Resources liable from any consequence from the use or misuse of these data.