Topographic Map of Library Lawn

Objective: The objective was to create a topographic map of Library Lawn using the total station equipment. The practice of gathering data and plotting out locations is necessary for surveying other plots of land.

Apparatus and Procedure:

Apparatus: Total station, assembly, tripod, prism, tape measurer

Procedure: The total station, handled with care, is taken out of the case and screwed onto the tripod. It is then leveled and balanced. To operate the total station and take angles and distance, find the power bottom and break the vertical and horizontal buttons by spinning through the axes. It should display angles. If the instrument reading goes out of focus, the leveling process may have to be repeated. The operation requires finding the target first using the commentator, the gun sight, on the top. The clamp screw mechanism is used to turn the fine tune adjustment in the horizontal and vertical direction. In the field of view, the target should be seen. The focus ring, the larger ring, can be used to focus on the cross hairs and the target. The button operation is used to turn and read the angle, a measurement button to shoot the display laser, and the zero-set button used to orient the instrument to create the zero angle. The measurement button will take several readings to display the distance. The location is then unclamped and used to read the distance on the next target. To determine the height of the instrument, use the tape measurer to measure the length from the cross hair on the side of the total station face to the ground where the pin is. For this lab, to create a topographic map of Library Lawn, one member of the group held the prism on the edge of the sidewalk or on the grass and that point is measured using the total station. The data is recorded by another member who also notes the information about the location, if it was grass or on sidewalk. This process is repeated around different areas of Library Lawn that will provide a sufficient map of the entire lawn.

Results

The included maps were created using Auto CAD Civil 3D. Figure 1 is a map of only the topographic lines and their labels. Figure 2 is a map of all the point information as recorded from the appendix. Included in both maps is the sidewalk lines and nearby buildings.

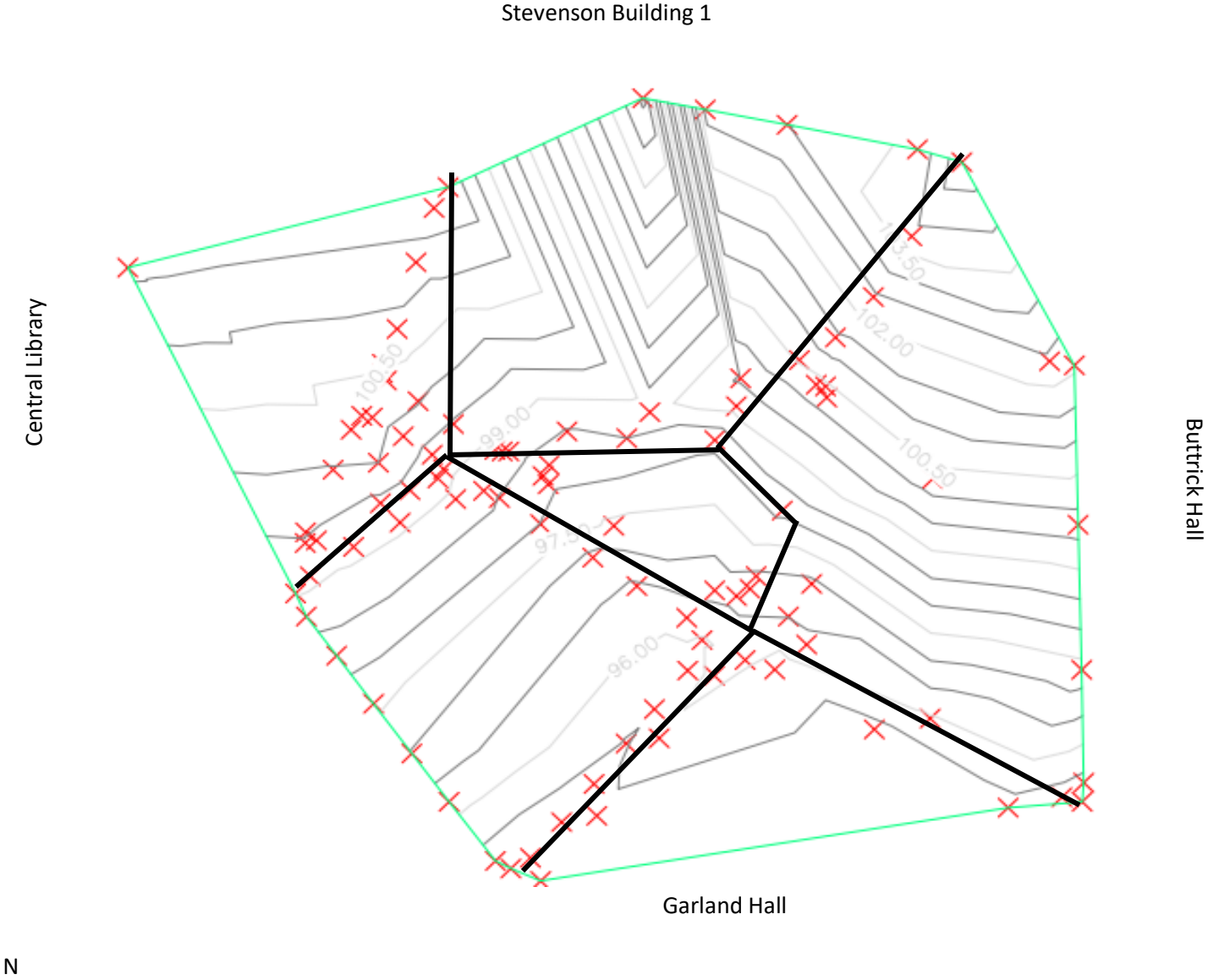


Figure 1. Topographic lines and labels

Scale
1” = 10’
Sidewalk line

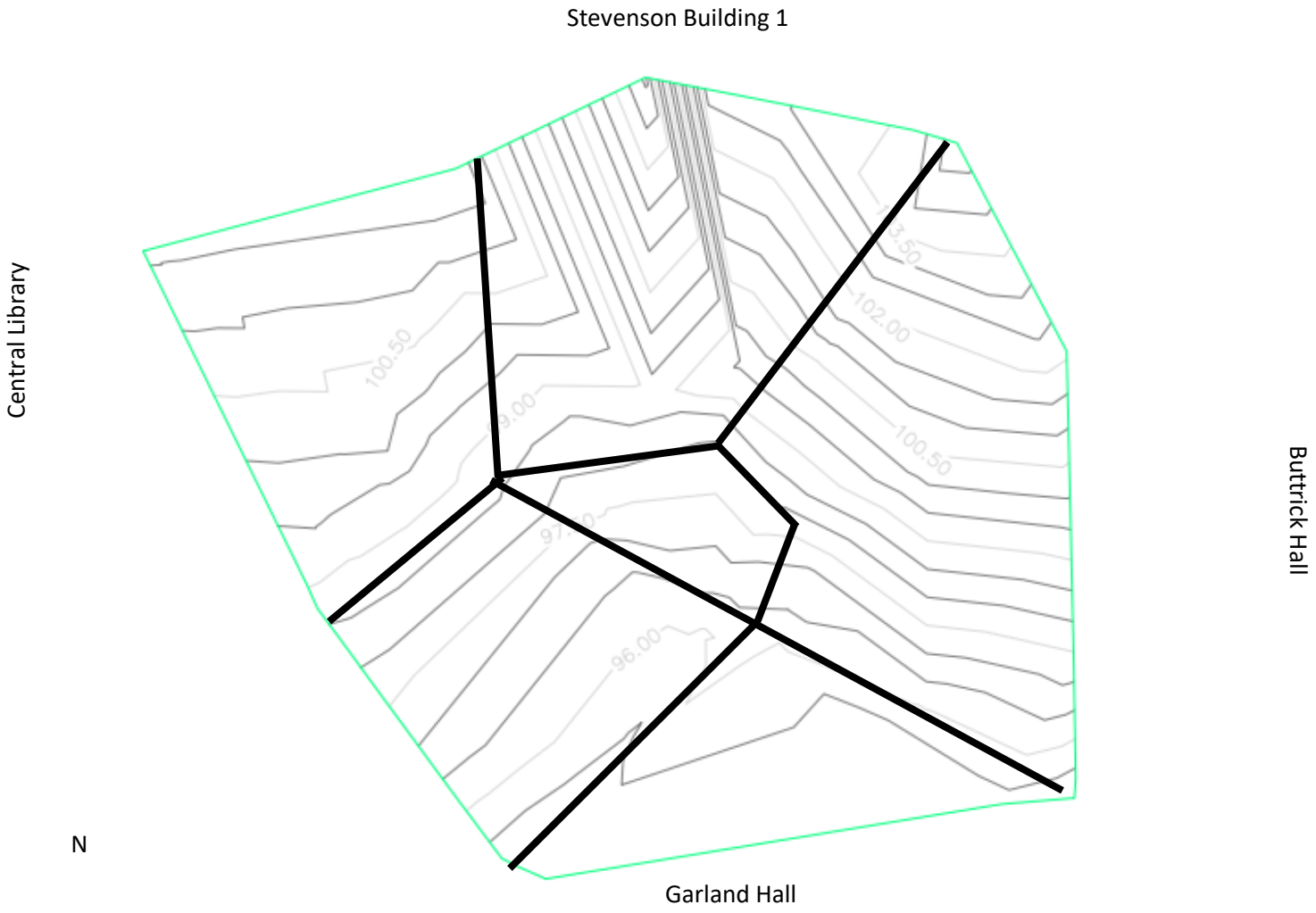


Figure 2. Topographic Map

Scale
1” = 10’
Sidewalk line

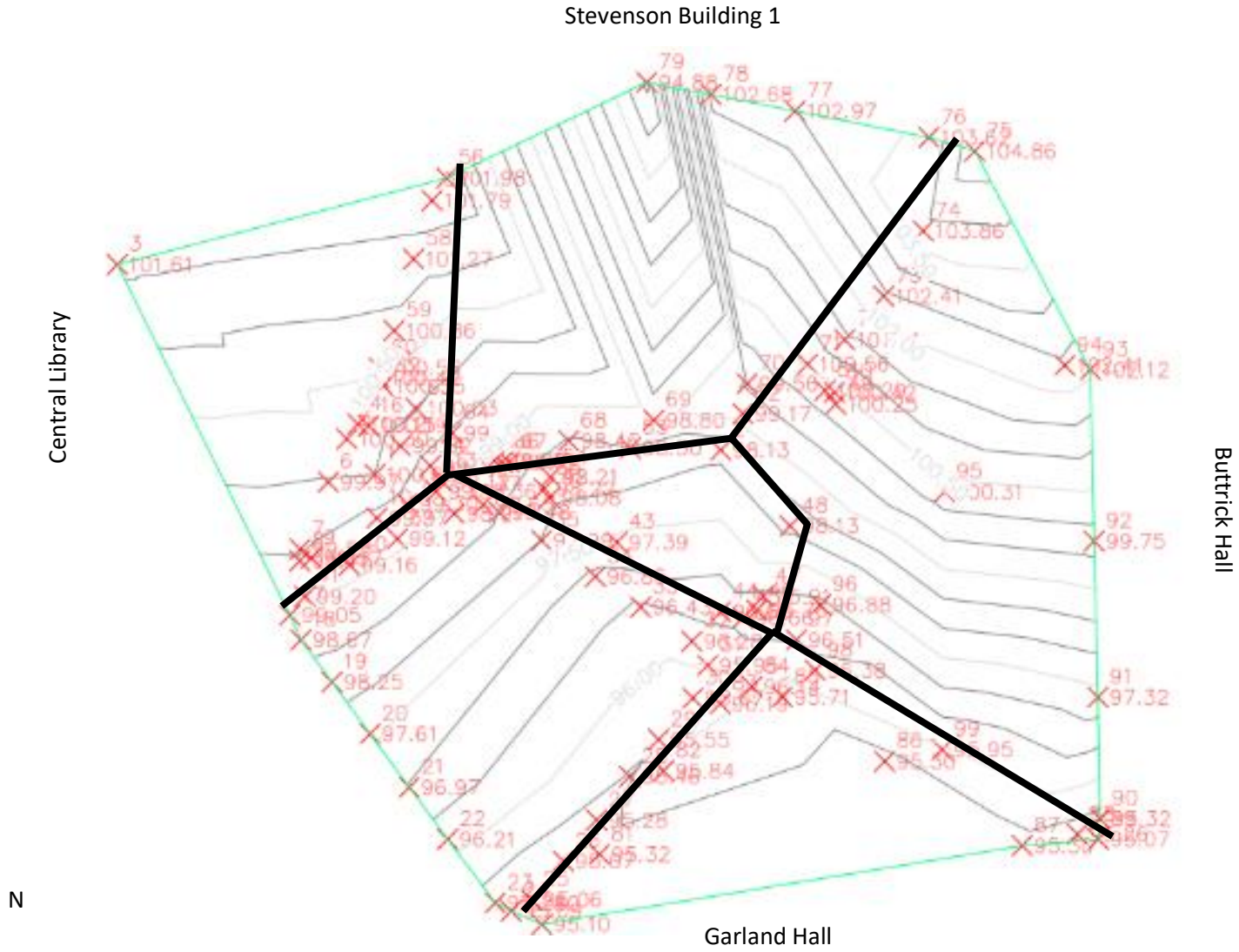


Figure 3. Topographic Map with all points

Scale
1” = 10’
Sidewalk line

Table 1. Data points from topographic information

Data Entry	Northing	Easting	Elevation
1	5000	5000	100
2	5085.25	5006	98.13
3	4936.49	5051.8	101.61
4	4995.77	5012.46	100.21
5	4993.08	5008.78	100.3
6	4988.5	4998.17	99.97
7	4981.56	4981.53	99.55
8	4981.48	4978.69	99.41
9	4984.31	4979.37	99.37
10	5000.55	4989.24	99.37
11	5007.99	4992.72	99.3
12	5015.06	4995.87	99.18
13	5016.52	4998.27	99.12
14	5013.61	5002.13	99.32
15	5006.28	5007.06	99.82
16	4998.43	5012.03	100.19
17	4979.02	4965.32	99.05
18	4981.73	4959.2	98.67
19	4989.41	4948.81	98.25
20	4998.78	4936.02	97.61
21	5008.47	4922.83	96.97
22	5017.92	4909.97	96.21
23	5029.66	4894.3	95.24
24	5033.58	4892.28	95.09
25	5038.53	4895.1	95.06
26	5046.45	4904.59	95.07
27	5054.65	4914.7	95.28
28	5062.78	4925.45	95.46
29	5069.93	4934.57	95.55
30	5078.38	4944.83	95.67
31	5081.99	4952.92	95.95
32	5078.11	4958.85	96.28
33	5065.47	4967.29	96.43
34	5054.32	4974.84	96.85
35	5041.09	4983.7	97.99
36	5030.67	4990.65	98.48
37	5026.71	4992.56	98.65
38	5019.57	4990.36	98.91
39	5005.51	4984.15	99.12
40	4993.72	4977.66	99.16
41	4982.73	4969.88	99.2
42	5043.05	4994.26	98.08
43	5059.67	4983.26	97.39
44	5085.21	4966.11	96.66
45	5090.7	4964.61	96.66
46	5094.16	4966.5	96.76
47	5095.72	4969.92	96.91
48	5102.34	4987.31	98.13
49	5113.58	5017.34	100.25
50	5113.3	5020.25	100.42
51	5110.92	5020.74	100.29
52	5090.69	5015	99.17
53	5062.97	5006.55	98.5
54	5043.25	4999.37	98.21
55	5041.69	4996.51	98.22
56	5017.68	5073.18	101.98
57	5014.08	5067.64	101.79
58	5009.55	5053.21	101.27
59	5004.74	5035.53	100.86
60	5001.05	5026.29	100.56
61	5000.98	5023.81	100.42
62	5002.06	5021.81	100.35
63	5010.03	5016.33	100.03
64	5018.99	5010.26	99.45
65	5029.5	5003.41	98.85
66	5031.35	5003.01	98.76
67	5033.06	5003	98.72
68	5047.79	5008.32	98.46
69	5068.77	5013.43	98.8
70	5091.75	5022.41	99.56
71	5106.66	5027.25	100.56
72	5115.81	5033.28	101.41
73	5125.42	5044	102.41
74	5135.13	5060.13	103.86
75	5147.85	5079.82	104.86
76	5136.57	5083.19	103.62
77	5103.55	5089.75	102.97
78	5082.81	5093.78	102.68

Data Entry	Northing	Easting	Elevation
79	5066.99	5096.78	94.88
80	5041.12	4888.99	95.1
81	5055.32	4906.26	95.32
82	5071.15	4926.86	95.84
83	5085.1	4943.46	96.19
84	5092.92	4947.65	96.14
85	5100.43	4945.07	95.71
86	5125.65	4929.22	95.3
87	5159.54	4908.41	95.3
88	5173.2	4911.2	95.26
89	5178.33	4909.98	95.07

Data Entry	Northing	Easting	Elevation
90	5178.7	4915.07	95.32
91	5178.18	4945.06	97.32
92	5177.3	4983.54	99.75
93	5176.34	5025.86	102.12
94	5170.08	5026.94	102.41
95	5140.46	4995.74	100.31
96	5109.78	4967.86	96.88
97	5103.87	4959.2	96.51
98	5108.51	4951.71	96.38
99	5139.8	4932.12	95.95

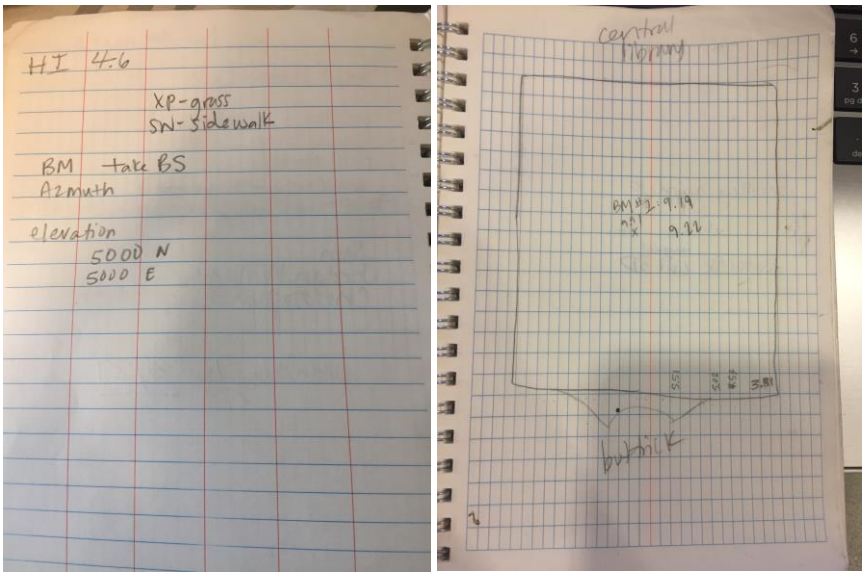
Discussion

The topographic map of Library Lawn was created using tracked data points from the total station. The lab was delayed because the group had to set the total station and practice first taking the data points. As the points were being collected, it was discovered that some of the data had not been individually saved so the process was started over again, and a group member manually recorded all of the data points, in case of the incident reoccurring, which it did. Each group member held the prism for one of the plots of land on the lawn. In the beginning of the lab, the data points that were collected were about 10 feet apart and very detailed. As time ran out, some of the remaining plots had distances that were farther apart in order to make up for lost time. There is one data point that is completely off of the pre-allotted course, but was still marked as part of the plotting to complete the lab. While the group was still setting up the total station, the prism had been set up and left standing, which is not good surveying practice and was corrected upon realization.

Conclusion

Creating the topographic map helped reinforce the ability to use the total station setup and collect data. Having the patience to complete the lab while staying outside the entire time in the heat tested our focus and ability to complete the assignment. The group was able to communicate the necessary procedures to complete the assignment and practice setting up and taking data points. It was imperative that the lab be done correctly and efficiently.

Appendix



Figures 4 and 5. Field book