GCE AS/A LEVEL

WJEC GCE AS/A level in

BUILT ENVIRONMENT

PATHWAY B EXEMPLAR

Land Survey Report

Lavender Farm
Bull Hill
HL3 6FB

UNIT 4: CONSTRUCTION PRACTICES

For Teaching From September 2022

Contents

Project information

The purpose of this survey is to gather information on the topography of the site and to identify the land levels, with the production of a site plan and sectional drawings demonstrating the contour and other features of the site.

Survey location and extent of survey

Surveyor's name	Mrs Jones
Date of inspection	6th July 2022 at 2pm
Full address of property	Lavender Farm, Bull Hill, HL3 6FB
Weather conditions	The weather was dry and sunny at the time of inspection. This was following a period of exceptionally hot and dry weather.
Location details	The property is in a rural area and is part of a larger farm establishment. The survey area is adjacent to the farmhouse and to storage units used for both farm equipment and mechanical engineering works. The site has multiple large, detached properties and is close to good transport links, including a road and railway. The area is predominantly surrounded by farmland.

Satellite images of site

Fig 1: Satellite image of area for surveying

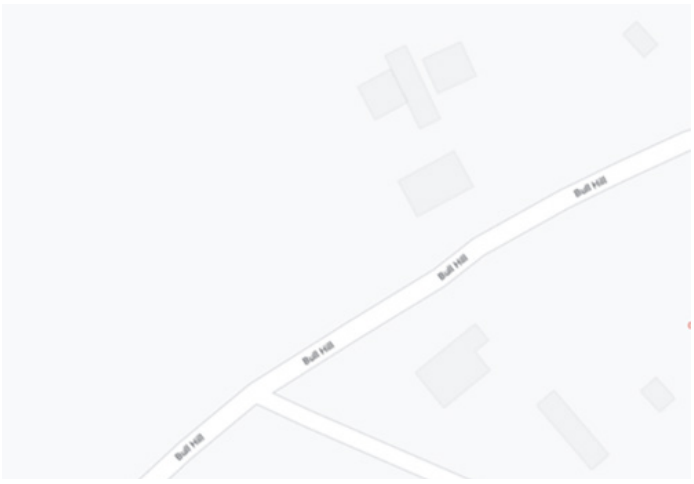


Fig 2: Road layout of area for surveying

Fig 3: Site viewed from south

Fig 4: Mid-point of site viewed from road

Fig 5: Site viewed from south-east on road

Survey type and methodology

The two types of surveying methods used for the purpose of this report were: triangulation for locating key features as shown on the site plans above, such as the large trees within the survey field, and a levelling survey which involved setting up a 5m x 5m grid and measuring changes in height at each point for contour lines to be plotted on the site.

The purpose of both surveys is to ascertain the site topography so that future developments on the site ensure that accurate information is provided to enable plans to be based on site data. The contour drawings demonstrate the changes in level on the site which can represent construction challenges if not appropriately planned for and incorporated into design drawings.

Triangulation survey methodology

Using fixed known points on the site, it is possible to acquire the component requiring locating via triangulation. On the Lavender Farm site, there is a tree in the survey field. Using two fixed points of K4 and K5 which are 5m apart, the distance from each of those points to the tree enabled the tree to be precisely located on the site plans.

The second item used for triangulation was the fence line running inside the grid lines. The fence length was measured, then the distance from each end to point G4 was used to locate the fence on the site plan.

Levelling survey methodology

A 5m-by-5m grid is set out over the field to a maximum of 50m on both sides, as shown in the *Google* image. This size grid was chosen as the site is visibly sloping with rough terrain. All points were accessible with some temporary moving of branches away from the staff to ensure that each grid point could be used. Appendix A shows the raw data for the survey with rise and fall calculations.

The levelling survey started at point A1 which is on the bottom left side of the image. This was chosen as the lowest point of the site. The survey required the use of a digital laser level device mounted on a 1m high table, which was moved after measuring the height of the adjacent points using a 2m staff. The results were recorded in a table and the actual height above A1 was calculated after the survey had finished. The laser was moved 42 times.

Errors calculated showed that a -1.8mm error at each station move could have occurred, and that was taken into account as demonstrated in Appendix A (height calculations). This error is quite high for this type of survey; however it is within the tolerance limit for the type of manual equipment that was used. To gain results with higher accuracy, a theodolite should be used.

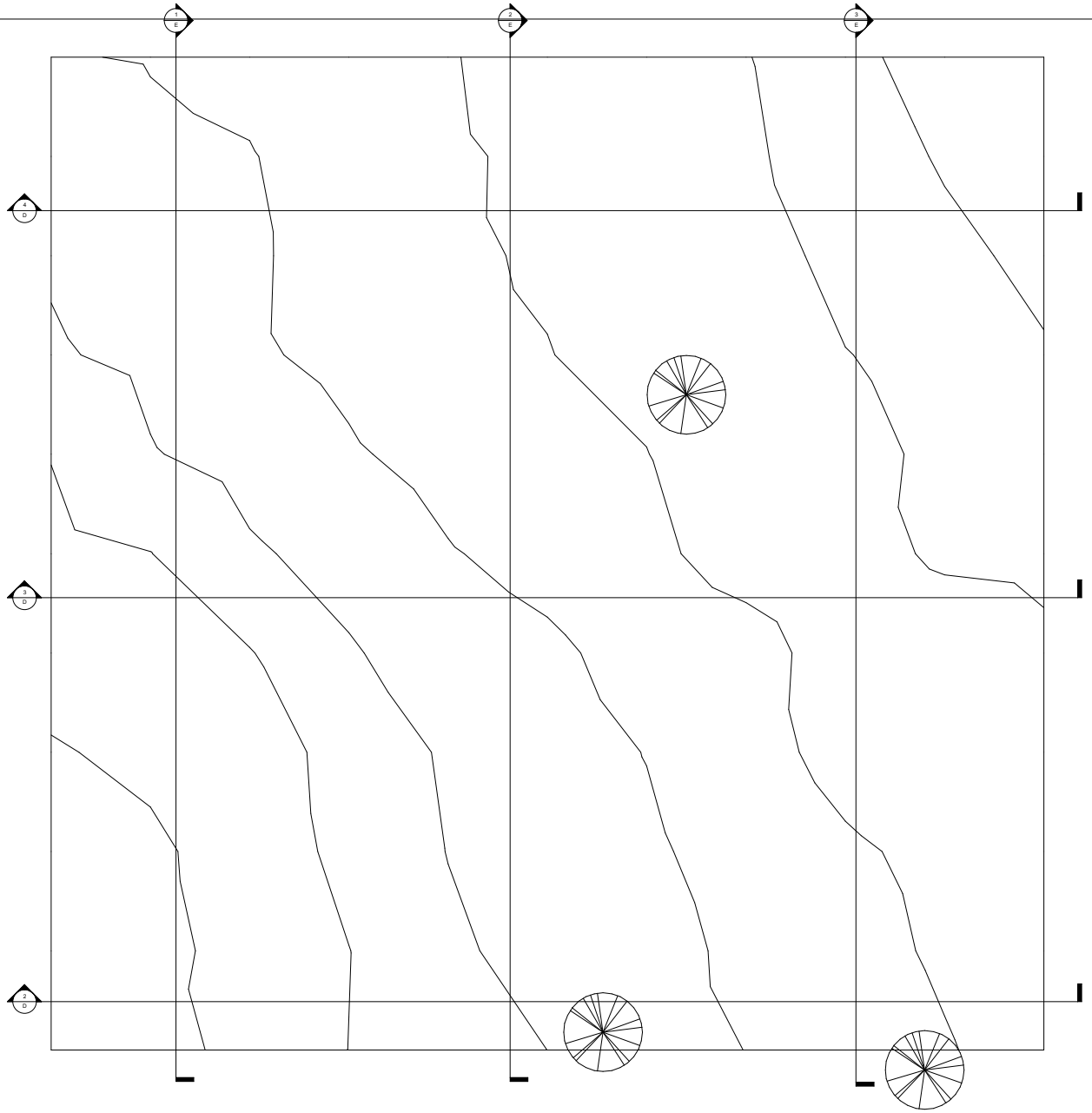
Table of appendices

Appendix A: Survey Raw Data with Rise and Fall Calculations

	Back Sight	Intermediate Sight	Front Sight	Height of Staff Measurement	Reduced Height	Correction	Final Height
A1	1000			1000	0		0
A2		600			400	-1.8	398.2
B1		800			200	-1.8	198.2
B2	1000		650	1350	350	-3.6	346.4
A3		1000			350	-3.6	346.4
B3		925			425	-3.6	421.4
C3		640			710	-3.6	706.4
C1		600			750	-3.6	746.4
C2	1000		660	1690	690	-5.4	684.6
D1		680			1010	-5.4	1004.6
D3		550			1140	-5.4	1134.6
D2	1000		690	2000	1000	-7.2	992.8
E1		650			1350	-7.2	1342.8
E3		480			1520	-7.2	1512.8
E2	1000		575	2425	1425	-9	1416
F1		915			1510	-9	1501
F3		675			1750	-9	1741
F2	1000		735	2690	1690	-10.8	1679.2
G1		900			1790	-10.8	1779.2
G3		760			1930	-10.8	1919.2
G2	1000		880	2810	1810	-12.6	1797.4
H1		790			2020	-12.6	2007.4
H3		580			2230	-12.6	2217.4
H2	1000		670	3140	2140	-14.4	2125.6
I1		840			2300	-14.4	2285.6
I3		680			2460	-14.4	2445.6
I2	1000		750	3390	2390	-16.2	2373.8
J1		900			2490	-16.2	2473.8
J3		780			2610	-16.2	2593.8
J2	1000		820	3570	2570	-18	2552
K1		890			2680	-18	2662
K2		820			2750	-18	2732
K3	1000		780	3790	2790	-19.8	2770.2
J4	1000		980	3810	2810	-21.6	2788.4
K4		980			2830	-21.6	2808.4
K5		860			2950	-21.6	2928.4
J5	1000		990	3820	2820	-23.4	2796.6
K6		710			3110	-23.4	3086.6
J6		740			3080	-23.4	3056.6
I6		930			2890	-23.4	2866.6
I4		1170			2650	-23.4	2626.6
I5	1000		1100	3720	2720	-25.2	2694.8
H6		1030			2690	-25.2	2664.8
H4		1150			2570	-25.2	2544.8
H5	1000		1360	3360	2360	-27	2333

	Back Sight	Intermediate Sight	Front Sight	Height of Staff Measurement	Reduced Height	Correction	Final Height
G6		920			2440	-27	2413
G4		1320			2040	-27	2013
G5	1000		1150	3210	2210	-28.8	2181.2
F6		1020			2190	-28.8	2161.2
F4		1385			1825	-28.8	1796.2
F5	1000		1270	2940	1940	-30.6	1909.4
E6		940			2000	-30.6	1969.4
E4		1340			1600	-30.6	1569.4
E5	1000		1160	2780	1780	-32.4	1747.6
D6		1070			1710	-32.4	1677.6
D4		1590			1190	-32.4	1157.6
D5	1000		1290	2490	1490	-34.2	1455.8
C6		1020			1470	-34.2	1435.8
C4		1670			820	-34.2	785.8
C5	1000		1480	2010	1010	-36	974
B4		1380			630	-36	594
B5	1000		1170	1840	840	-37.8	802.2
A4		1340			500	-37.8	462.2
A5		1120			720	-37.8	682.2
A6		950			890	-37.8	852.2
B6	1000		810	2030	1030	-39.6	990.4
B7	1000		520	2510	1510	-41.4	1468.6
A7		1450			1060	-41.4	1018.6
B8	1000		840	2670	1670	-43.2	1626.8
A8		1180			1490	-43.2	1446.8
A9		1080			1590	-43.2	1546.8
B9		860			1810	-43.2	1766.8
C8	1000		530	2980	1980	-45	1935
C7		1240			1740	-45	1695
C9		1010			1970	-45	1925
D7		990			1990	-45	1945
D9		700			2280	-45	2235
D8	1000		810	3170	2170	-46.8	2123.2
E7		950			2220	-46.8	2173.2
E9		680			2490	-46.8	2443.2
E8	1000		700	3470	2470	-48.6	2421.4
F7		980			2490	-48.6	2441.4
F9		880			2590	-48.6	2541.4
F8	1000		930	3540	2540	-50.4	2489.6
G7		1000			2540	-50.4	2489.6
G9		860			2680	-50.4	2629.6
G8	1000		850	3690	2690	-52.2	2637.8
H7		730			2960	-52.2	2907.8
H9		910			2780	-52.2	2727.8
H8	1000		880	3810	2810	-54	2756

	Back Sight	Intermediate Sight	Front Sight	Height of Staff Measurement	Reduced Height	Correction	Final Height
I7		820			2990	-54	2936
I9		570			3240	-54	3186
I8	1000		770	4040	3040	-55.8	2984.2
J7		940			3100	-55.8	3044.2
J8	1000		800	4240	3240	-57.6	3182.4
K7		940			3300	-57.6	3242.4
K8		720			3520	-57.6	3462.4
K9		570			3670	-57.6	3612.4
J9	1000		790	4450	3450	-59.4	3390.6
J10	1000		840	4610	3610	-61.2	3548.8
K10		730			3880	-61.2	3818.8
K11		700			3910	-61.2	3848.8
J11		860			3750	-61.2	3688.8
I10	1000		1300	4310	3310	-63	3247
I11		860			3450	-63	3387
H10	1000		1320	3990	2990	-64.8	2925.2
H11		950			3040	-64.8	2975.2
G10	1000		210	4780	3780	-66.6	3713.4
G11		1870			2910	-66.6	2843.4
F10	1000		2120	3660	2660	-68.4	2591.6
F11		880			2780	-68.4	2711.6
E10	1000		1150	3510	2510	-70.2	2439.8
E11		970			2540	-70.2	2469.8
D10	1000		1200	3310	2310	-72	2238
D11		820			2490	-72	2418
C10	1000		1260	3050	2050	-73.8	1976.2
C11		850			2200	-73.8	2126.2
B10	1000		1070	2980	1980	-75.6	1904.4
B11		880			2100	-75.6	2024.4
A10		1220			1760	-75.6	1684.4
A11			880		2050	-75.6	1974



Rev	Description	Date

Lavender Farm

Appendix B Site Plan wtih Trees

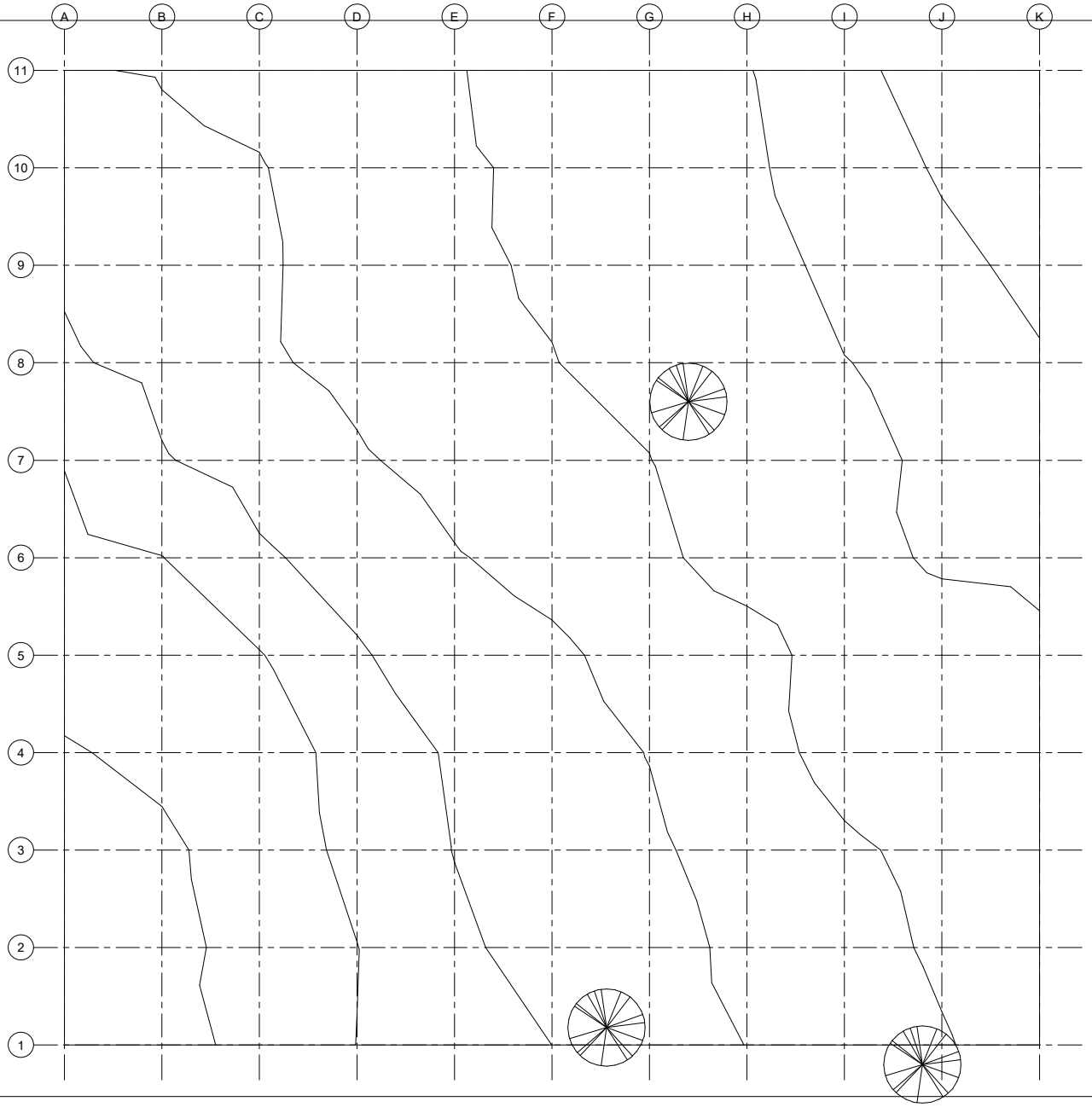
Mrs Jones

DRAWN BY	CHECKED BY	DATE
Author	Checker	10/04/22

SCALE (@ A1)	PROJECT NUMBER
1 : 100	Project Number

DRAWING NUMBER	REV
B	

04/10/2022 16:33:07



Rev	Description	Date

Lavender Farm

Appendix C Site Plan showing Contour

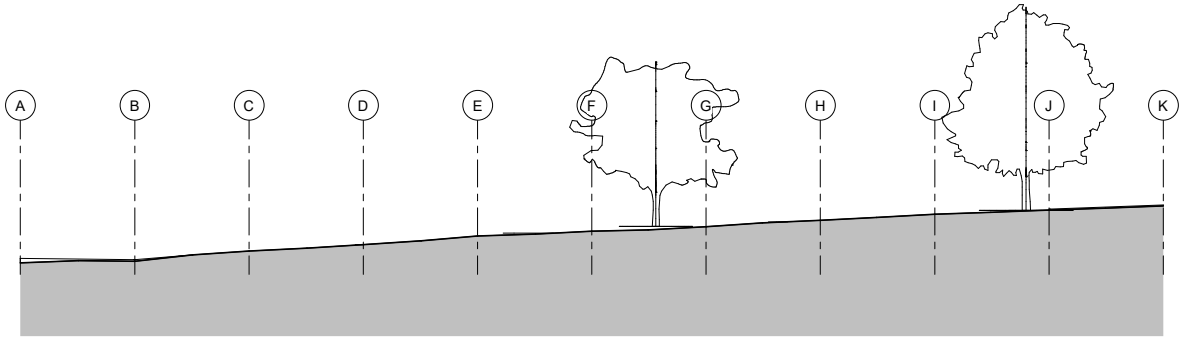
Mrs Jones

DRAWN BY	CHECKED BY	DATE
Author	Checker	10/04/22

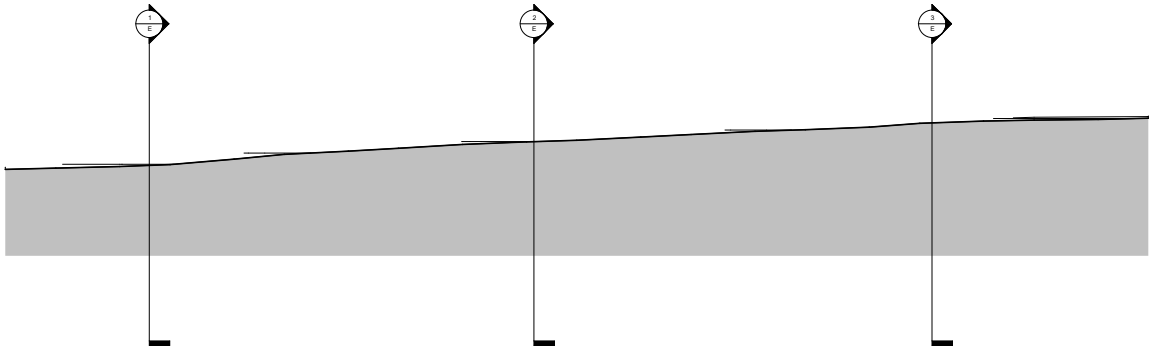
SCALE (@ A1)	PROJECT NUMBER
1 : 100	Project Number

DRAWING NUMBER	REV
C	

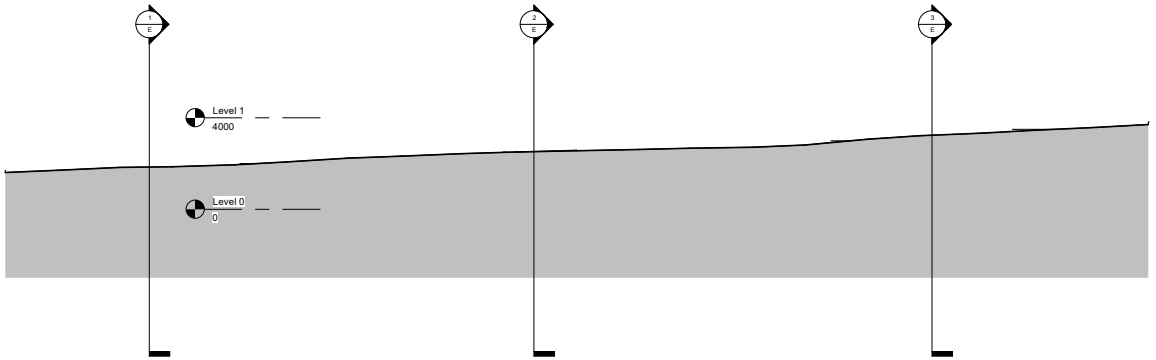
04/10/2022 16:33:34



2 Section 1
1 : 100



3 Section 2
1 : 100



4 Section 3
1 : 100

Rev	Description	Date

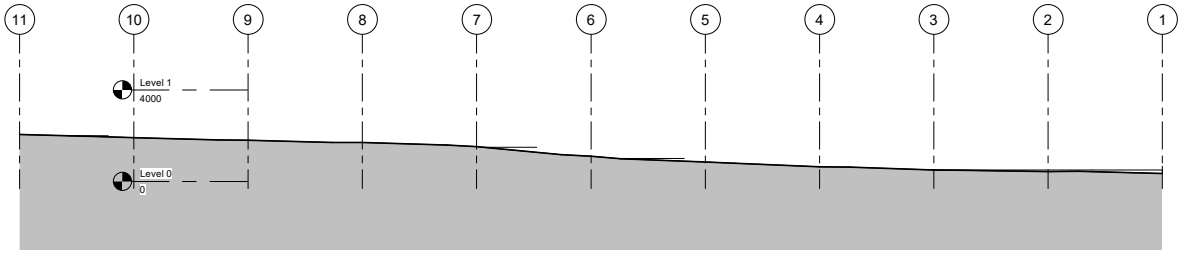
Lavender Farm

Appendix D Section Drawings Page 1

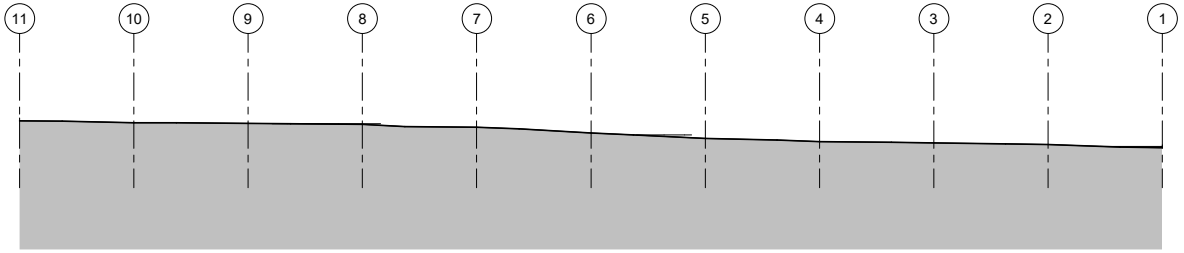
Mrs Jones

DRAWN BY	CHECKED BY	DATE
Author	Checker	10/04/22
SCALE (@ A1)	PROJECT NUMBER	
1 : 100	Project Number	
DRAWING NUMBER		REV
D		

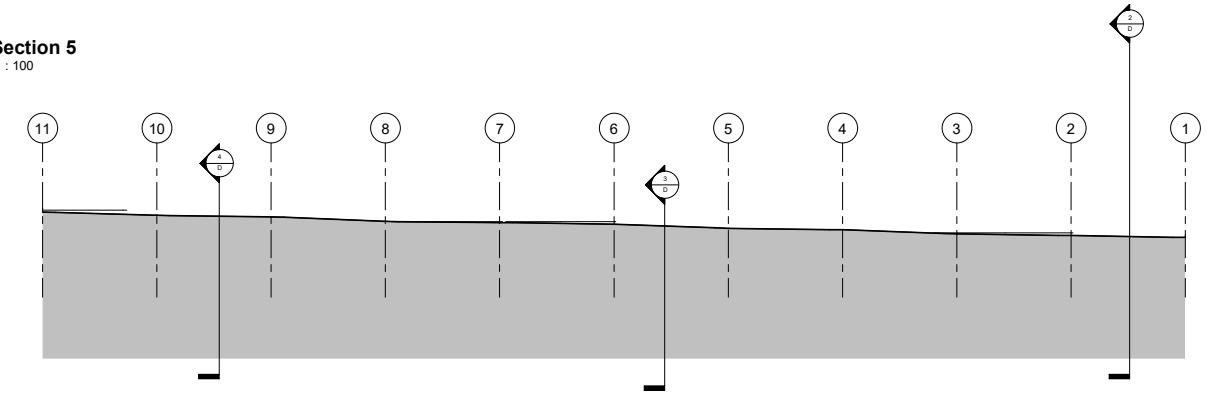
04/10/2022 16:34:04



1 **Section 4**
1 : 100



2 **Section 5**
1 : 100



3 **Section 6**
1 : 100

Rev	Description	Date

Lavender Farm

Appendix E Sectional Drawings Page 2

Mrs Jones

DRAWN BY	CHECKED BY	DATE
Author	Checker	10/04/22

SCALE (@ A1)	PROJECT NUMBER
1 : 100	Project Number

DRAWING NUMBER	REV
E	

04/10/2022 16:34:25