

Specific Building Damage Results - Detail

Ref.	Building Name	Sub-building Name	Vertical Offset from Line for Movement Calculations [m]	Segment	Start [m]	Length [m]	Curvature Ratio	Deflection Ratio	Average Horizontal Strain [%]	Max Tensile Strain [%]	Max Gradient of Horizontal Displacement Curve	Max Gradient of Vertical Displacement Curve	Min Radius of Curvature [m]	Damage Category
0	Base Model	28	Ferncroft Avenue	28A	0.0	0.0	13.950	None	0.0048080	0.019265	0.026569	-500.20E-6	-397.03E-6	11294.0 (Negligible)
1					0.0	0.0	1.4600	None	7.7265E-6	0.0	7.6175E-6	0.0	11.890E-6	2.3382E+6 (Negligible)
2					0.0	0.0	0.8500	None	47.646E-6	0.0	47.457E-6	0.0	-35.145E-6	220750.0 (Negligible)
3					0.0	0.0	3.2000	None	14.702E-6	0.0	14.388E-6	0.0	16.893E-6	1.921E+6 (Negligible)
4					0.0	0.0	6.3500	None	66.345E-6	0.0	76.423E-6	0.0	9.0942E-6	1.0413E+6 (Negligible)
5					0.0	0.0	2.1500	None	129.76E-6	0.0	124.71E-6	0.0	47.238E-6	205520.0 (Negligible)
6					0.0	0.0	2.5100	None	319.54E-6	0.0	309.31E-6	0.0	83.965E-6	79680.0 (Negligible)
7					0.0	0.0	0.9400	None	147.39E-6	0.0	147.39E-6	0.0	13.403E-6	157340.0 (Negligible)
8					0.0	0.0	3.1700	None	339.43E-6	0.0	339.43E-6	0.0	172.79E-6	33052.0 (Negligible)
9					0.0	0.0	4.6400	None	111.22E-6	0.0	147.59E-6	0.0	22.202E-6	429970.0 (Negligible)
10					0.0	0.0	4.7940	None	0.0035206	0.048294	0.053028	-707.83E-6	436.42E-6	16247.1 (Very Slight)
11					0.0	0.0	1.8760	None	724.12E-6	0.070833	0.071328	-707.83E-6	436.42E-6	28215.1 (Very Slight)
12					0.0	0.0	4.3858	None	0.0019113	0.0	0.0017365	0.0	75.954E-6	25733.0 (Negligible)
13					0.0	0.0	1.6200	None	824.20E-6	0.0	0.0	0.0	72.102E-6	48247.1 (Very Slight)
14					0.0	0.0	4.2600	None	0.0011365	0.070833	0.071123	-707.83E-6	-570.09E-6	24488.1 (Very Slight)
15					0.0	0.0	4.2600	None	0.0011365	0.0	0.0003079	0.0	-121.20E-6	45679.0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Titles

Job No.: J20268  
 Job Title: 30 Ferncroft Avenue, London NW3 7PH  
 Sub-title: Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation  
 Calculation Heading: ML  
 Initials: ML  
 Checker: ML  
 Date Saved: 26-Feb-2021  
 Date Checked:  
 Notes:  
 File Name: Combined.xdd  
 File Path: G:\CURRENT\20-J20268 - 30 Ferncroft Avenue\APPENDIX\GMA

History

Date	Time	By	Notes
17-Feb-2021	22:22	Matt Legg	New
17-Feb-2021	23:11	Matt Legg	
26-Feb-2021	00:59	Matt Legg	
26-Feb-2021	18:22	Matt Legg	Open

Displacement Lines

Ref.	Name	x1	y1	z1	x2	y2	z2	Intervals	Surface type	Interpolate for displacements	Calculate imported
		[m]	[m]	[m]	[m]	[m]	[m]	[No.]	tunnels		
1	28A	17.30000	15.00000	99.55000	3.35000	15.00000	99.55000	7	Surface	No	Yes
2	28B	3.35000	15.00000	99.55000	3.35000	16.46000	99.55000	2	Surface	No	Yes
3	28C	3.35000	16.46000	99.55000	2.50000	16.46000	99.55000	2	Surface	No	Yes
4	28D	2.50000	16.46000	99.55000	2.50000	19.79000	99.55000	3	Surface	No	Yes
5	28E	2.50000	19.79000	99.55000	3.35000	19.79000	99.55000	2	Surface	No	Yes
6	28F	3.35000	19.79000	99.55000	3.35000	26.14000	99.55000	6	Surface	No	Yes
7	28G	3.35000	26.14000	99.55000	5.03000	27.49000	99.55000	2	Surface	No	Yes
8	28H	5.03000	27.49000	99.55000	7.55000	27.49000	99.55000	3	Surface	No	Yes
9	28I	7.55000	27.49000	99.55000	9.09000	26.14000	99.55000	2	Surface	No	Yes
10	28J	9.09000	26.14000	99.55000	9.09000	24.26000	99.55000	2	Surface	No	Yes
11	28K	9.09000	24.26000	99.55000	12.26000	24.26000	99.55000	3	Surface	No	Yes
12	28L	12.26000	24.26000	98.65000	12.26000	28.91000	98.65000	4	Surface	No	Yes
13	28M	12.26000	28.91000	98.65000	18.93000	28.91000	98.65000	6	Surface	No	Yes
14	28N	18.93000	28.91000	98.65000	18.93000	24.26000	98.65000	4	Surface	No	Yes
15	28O	18.93000	24.26000	98.65000	18.93000	19.26000	98.65000	5	Surface	No	Yes
16	28P	18.93000	19.26000	99.55000	17.30000	19.26000	99.55000	2	Surface	No	Yes
17	28Q	17.30000	19.26000	99.55000	17.30000	15.00000	99.55000	4	Surface	No	Yes

Displacement Grids

Ref.	Name	Extrusion Direction	Base line start: X [m]	Base line start: Y [m]	Base line start: Z (level) [m]	Base line end: X [m]	Base line end: Y [m]	Base line end: Z (level) [m]	Intervals [No.]	Extrusion Distance [m]	Extrusion Intervals [No.]	Surface type	Calculate for tunnels
1	Grid 1	Global X	0.00000	0.00000	100.05000	-	60.00000	100.05000	50	45.00000	45	Surface	Yes

Imported Displacements

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]
1	Drained.pdd - Immediate	1	17.30000	15.00000	99.55000	0.00000	0.00000	-2.40183 1,2,6
		2	15.30714	15.00000	99.55000	0.00000	0.00000	-1.56805 1,2,6
		3	13.31429	15.00000	99.55000	0.00000	0.00000	-1.09353 1,2,6
		4	11.32143	15.00000	99.55000	0.00000	0.00000	-0.79629 1,2,6
		5	9.32857	15.00000	99.55000	0.00000	0.00000	-0.59706 1,2,6
		6	7.33571	15.00000	99.55000	0.00000	0.00000	-0.45665 1,2,6
		7	5.34286	15.00000	99.55000	0.00000	0.00000	-0.35394 1,2,6
		8	3.35000	15.00000	99.55000	0.00000	0.00000	-0.27673 1,2,6
		9	3.35000	15.73000	99.55000	0.00000	0.00000	-0.28541 1,2,6
		10	3.35000	16.46000	99.55000	0.00000	0.00000	-0.29387 1,2,6
		11	2.92500	16.46000	99.55000	0.00000	0.00000	-0.27893 1,2,6
		12	2.50000	16.46000	99.55000	0.00000	0.00000	-0.31185 1,2,6
		13	2.50000	17.57000	99.55000	0.00000	0.00000	-0.27578 1,2,6
		14	2.50000	18.68000	99.55000	0.00000	0.00000	-0.28614 1,2,6
		15	2.50000	19.79000	99.55000	0.00000	0.00000	-0.29583 1,2,6
		16	2.92500	19.79000	99.55000	0.00000	0.00000	-0.31185 1,2,6
		17	3.35000	19.79000	99.55000	0.00000	0.00000	-0.32880 1,2,6
		18	3.35000	20.84833	99.55000	0.00000	0.00000	-0.33843 1,2,6
		19	3.35000	21.90667	99.55000	0.00000	0.00000	-0.34723 1,2,6
		20	3.35000	22.96500	99.55000	0.00000	0.00000	-0.35515 1,2,6
		21	3.35000	24.02333	99.55000	0.00000	0.00000	-0.36214 1,2,6
		22	3.35000	25.08167	99.55000	0.00000	0.00000	-0.36833 1,2,6
		23	3.35000	26.14000	99.55000	0.00000	0.00000	-0.37306 1,2,6
		24	4.19000	26.81500	99.55000	0.00000	0.00000	-0.41832 1,2,6
		25	5.03000	27.49000	99.55000	0.00000	0.00000	-0.46923 1,2,6
		26	5.87000	27.49000	99.55000	0.00000	0.00000	-0.52399 1,2,6
		27	6.71000	27.49000	99.55000	0.00000	0.00000	-0.58603 1,2,6
		28	7.55000	27.49000	99.55000	0.00000	0.00000	-0.65656 1,2,6
		29	8.32000	26.81500	99.55000	0.00000	0.00000	-0.72463 1,2,6
		30	9.09000	26.14000	99.55000	0.00000	0.00000	-0.79980 1,2,6
		31	9.09000	25.20000	99.55000	0.00000	0.00000	-0.78864 1,2,6
		32	9.09000	24.26000	99.55000	0.00000	0.00000	-0.77599 1,2,6
		33	10.14667	24.26000	99.55000	0.00000	0.00000	-0.90133 1,2,6
		34	11.20333	24.26000	99.55000	0.00000	0.00000	-1.05189 1,2,6
		35	12.26000	24.26000	99.55000	0.00000	0.00000	-1.23454 1,2,6
		36	12.26000	24.26000	98.65000	0.00000	0.00000	-1.23454 1,2,6
		37	12.26000	25.42250	98.65000	0.00000	0.00000	-1.26035 1,2,6
		38	12.26000	26.58500	98.65000	0.00000	0.00000	-1.28387 1,2,6
		39	12.26000	27.74750	98.65000	0.00000	0.00000	-1.30484 1,2,6
		40	12.26000	28.91000	98.65000	0.00000	0.00000	-1.32280 1,2,6
		41	13.37167	28.91000	98.65000	0.00000	0.00000	-1.58137 1,2,6
		42	14.48333	28.91000	98.65000	0.00000	0.00000	-1.91243 1,2,6
		43	15.59500	28.91000	98.65000	0.00000	0.00000	-2.33438 1,2,6
		44	16.70667	28.91000	98.65000	0.00000	0.00000	-2.88435 1,2,6
		45	17.81833	28.91000	98.65000	0.00000	0.00000	-3.61209 1,2,6
		46	18.93000	28.91000	98.65000	0.00000	0.00000	-4.57132 1,2,6
		47	18.93000	27.74750	98.65000	0.00000	0.00000	-4.45948 1,2,6
		48	18.93000	26.58500	98.65000	0.00000	0.00000	-4.36014 1,2,6
		49	18.93000	25.42250	98.65000	0.00000	0.00000	-4.26723 1,2,6
		50	18.93000	24.26000	98.65000	0.00000	0.00000	-4.17932 1,2,6
		51	18.93000	23.26000	98.65000	0.00000	0.00000	-4.10977 1,2,6
		52	18.93000	22.26000	98.65000	0.00000	0.00000	-4.05329 1,2,6
		53	18.93000	21.26000	98.65000	0.00000	0.00000	-4.02954 1,2,6
		54	18.93000	20.26000	98.65000	0.00000	0.00000	-4.06973 1,2,6
		55	18.93000	19.26000	98.65000	0.00000	0.00000	-4.13259 1,2,6
		56	18.93000	19.26000	99.55000	0.00000	0.00000	-4.13257 1,2,6
		57	18.11500	19.26000	99.55000	0.00000	0.00000	-3.34786 1,2,6
		58	17.30000	19.26000	99.55000	0.00000	0.00000	-2.77131 1,2,6
		59	17.30000	18.19500	99.55000	0.00000	0.00000	-2.71502 1,2,6
		60	17.30000	17.13000	99.55000	0.00000	0.00000	-2.63523 1,2,6
		61	17.30000	16.06500	99.55000	0.00000	0.00000	-2.53091 1,2,6
		62	0.00000	0.00000	100.05000	0.00000	0.00000	-0.07216 1
		63	1.00000	0.00000	100.05000	0.00000	0.00000	-0.07988 1



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
64		2.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.08827	1
65		3.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.09740	1
66		4.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.10730	1
67		5.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.11804	1
68		6.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.12968	1
69		7.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.14225	1
70		8.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.15582	1
71		9.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.17042	1
72		10.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.18609	1
73		11.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.20284	1
74		12.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.22067	1
75		13.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.23952	1
76		14.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.25930	1
77		15.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.27987	1
78		16.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.30099	1
79		17.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.32235	1
80		18.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.34356	1
81		19.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.36413	1
82		20.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.38350	1
83		21.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.40107	1
84		22.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.41625	1
85		23.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.42846	1
86		24.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.43721	1
87		25.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.44214	1
88		26.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.44304	1
89		27.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.43985	1
90		28.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.43268	1
91		29.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.42180	1
92		30.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.40762	1
93		31.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.39068	1
94		32.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.37156	1
95		33.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.35089	1
96		34.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.32927	1
97		35.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.30727	1
98		36.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.28534	1
99		37.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.26389	1
100		38.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.24319	1
101		39.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.22344	1
102		40.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.20478	1
103		41.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.18728	1
104		42.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.17095	1
105		43.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.15579	1
106		44.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.14176	1
107		45.00000	0.00000	100.05000	0.00000	0.00000	0.00000	-0.12881	1
108		0.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.07966	1
109		1.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.08831	1
110		2.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.09777	1
111		3.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.10809	1
112		4.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.11935	1
113		5.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.13163	1
114		6.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.14501	1
115		7.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.15957	1
116		8.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.17540	1
117		9.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.19258	1
118		10.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.21119	1
119		11.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.23129	1
120		12.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.25291	1
121		13.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.27604	1
122		14.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.30063	1
123		15.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.32653	1
124		16.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.35351	1
125		17.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.38118	1
126		18.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.40903	1
127		19.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.43640	1
128		20.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.46248	1
129		21.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.48640	1
130		22.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.50723	1
131		23.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.52411	1
132		24.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.53631	1
133		25.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.54327	1
134		26.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.54464	1
135		27.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.54034	1
136		28.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.53055	1
137		29.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.51566	1
138		30.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.49630	1
139		31.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.47328	1
140		32.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.44748	1
141		33.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.41985	1
142		34.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.39128	1
143		35.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.36254	1
144		36.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.33430	1
145		37.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.30703	1
146		38.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.28108	1
147		39.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.25666	1
148		40.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.23389	1
149		41.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.21276	1
150		42.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.19328	1
151		43.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.17537	1
152		44.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.15895	1
153		45.00000	1.20000	100.05000	0.00000	0.00000	0.00000	-0.14392	1
154		0.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.08759	1
155		1.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.09726	1
156		2.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.10787	1
157		3.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.11950	1
158		4.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.13226	1
159		5.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.14625	1
160		6.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.16160	1
161		7.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.17842	1
162		8.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.19685	1
163		9.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.21703	1
164		10.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.23910	1
165		11.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.26319	1
166		12.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.28942	1
167		13.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.31787	1
168		14.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.34855	1
169		15.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.38137	1
170		16.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.41611	1
171		17.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.45235	1
172		18.00000	2.40000	100.05000	0.00000	0.00000	0.00000	-0.4	



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]
		205	5.00000	3.60000	100.05000	0.00000	0.00000	-0.16190
		206	6.00000	3.60000	100.05000	0.00000	0.00000	-0.17944
		207	7.00000	3.60000	100.05000	0.00000	0.00000	-0.19880
		208	8.00000	3.60000	100.05000	0.00000	0.00000	-0.22018
		209	9.00000	3.60000	100.05000	0.00000	0.00000	-0.24381
		210	10.00000	3.60000	100.05000	0.00000	0.00000	-0.26992
		211	11.00000	3.60000	100.05000	0.00000	0.00000	-0.29876
		212	12.00000	3.60000	100.05000	0.00000	0.00000	-0.33057
		213	13.00000	3.60000	100.05000	0.00000	0.00000	-0.36558
		214	14.00000	3.60000	100.05000	0.00000	0.00000	-0.40396
		215	15.00000	3.60000	100.05000	0.00000	0.00000	-0.44575
		216	16.00000	3.60000	100.05000	0.00000	0.00000	-0.49085
		217	17.00000	3.60000	100.05000	0.00000	0.00000	-0.53883
		218	18.00000	3.60000	100.05000	0.00000	0.00000	-0.58891
		219	19.00000	3.60000	100.05000	0.00000	0.00000	-0.63985
		220	20.00000	3.60000	100.05000	0.00000	0.00000	-0.69393
		221	21.00000	3.60000	100.05000	0.00000	0.00000	-0.73704
		222	22.00000	3.60000	100.05000	0.00000	0.00000	-0.77893
		223	23.00000	3.60000	100.05000	0.00000	0.00000	-0.81342
		224	24.00000	3.60000	100.05000	0.00000	0.00000	-0.83867
		225	25.00000	3.60000	100.05000	0.00000	0.00000	-0.85335
		226	26.00000	3.60000	100.05000	0.00000	0.00000	-0.85667
		227	27.00000	3.60000	100.05000	0.00000	0.00000	-0.84842
		228	28.00000	3.60000	100.05000	0.00000	0.00000	-0.82897
		229	29.00000	3.60000	100.05000	0.00000	0.00000	-0.79825
		230	30.00000	3.60000	100.05000	0.00000	0.00000	-0.76076
		231	31.00000	3.60000	100.05000	0.00000	0.00000	-0.71543
		232	32.00000	3.60000	100.05000	0.00000	0.00000	-0.66550
		233	33.00000	3.60000	100.05000	0.00000	0.00000	-0.61325
		234	34.00000	3.60000	100.05000	0.00000	0.00000	-0.56078
		235	35.00000	3.60000	100.05000	0.00000	0.00000	-0.50974
		236	36.00000	3.60000	100.05000	0.00000	0.00000	-0.46133
		237	37.00000	3.60000	100.05000	0.00000	0.00000	-0.41626
		238	38.00000	3.60000	100.05000	0.00000	0.00000	-0.37486
		239	39.00000	3.60000	100.05000	0.00000	0.00000	-0.33717
		240	40.00000	3.60000	100.05000	0.00000	0.00000	-0.30308
		241	41.00000	3.60000	100.05000	0.00000	0.00000	-0.27236
		242	42.00000	3.60000	100.05000	0.00000	0.00000	-0.24474
		243	43.00000	3.60000	100.05000	0.00000	0.00000	-0.21993
		244	44.00000	3.60000	100.05000	0.00000	0.00000	-0.19764
		245	45.00000	3.60000	100.05000	0.00000	0.00000	-0.17762
		246	0.00000	4.80000	100.05000	0.00000	0.00000	-0.10463
		247	1.00000	4.80000	100.05000	0.00000	0.00000	-0.11657
		248	2.00000	4.80000	100.05000	0.00000	0.00000	-0.12977
		249	3.00000	4.80000	100.05000	0.00000	0.00000	-0.14438
		250	4.00000	4.80000	100.05000	0.00000	0.00000	-0.16057
		251	5.00000	4.80000	100.05000	0.00000	0.00000	-0.17852
		252	6.00000	4.80000	100.05000	0.00000	0.00000	-0.19847
		253	7.00000	4.80000	100.05000	0.00000	0.00000	-0.22065
		254	8.00000	4.80000	100.05000	0.00000	0.00000	-0.24536
		255	9.00000	4.80000	100.05000	0.00000	0.00000	-0.27291
		256	10.00000	4.80000	100.05000	0.00000	0.00000	-0.30369
		257	11.00000	4.80000	100.05000	0.00000	0.00000	-0.33810
		258	12.00000	4.80000	100.05000	0.00000	0.00000	-0.37659
		259	13.00000	4.80000	100.05000	0.00000	0.00000	-0.41963
		260	14.00000	4.80000	100.05000	0.00000	0.00000	-0.46767
		261	15.00000	4.80000	100.05000	0.00000	0.00000	-0.52108
		262	16.00000	4.80000	100.05000	0.00000	0.00000	-0.58000
		263	17.00000	4.80000	100.05000	0.00000	0.00000	-0.64423
		264	18.00000	4.80000	100.05000	0.00000	0.00000	-0.71395
		265	19.00000	4.80000	100.05000	0.00000	0.00000	-0.78453
		266	20.00000	4.80000	100.05000	0.00000	0.00000	-0.85637
		267	21.00000	4.80000	100.05000	0.00000	0.00000	-0.92506
		268	22.00000	4.80000	100.05000	0.00000	0.00000	-0.98678
		269	23.00000	4.80000	100.05000	0.00000	0.00000	-1.03792
		270	24.00000	4.80000	100.05000	0.00000	0.00000	-1.07551
		271	25.00000	4.80000	100.05000	0.00000	0.00000	-1.09749
		272	26.00000	4.80000	100.05000	0.00000	0.00000	-1.10273
		273	27.00000	4.80000	100.05000	0.00000	0.00000	-1.09093
		274	28.00000	4.80000	100.05000	0.00000	0.00000	-1.06261
		275	29.00000	4.80000	100.05000	0.00000	0.00000	-1.01916
		276	30.00000	4.80000	100.05000	0.00000	0.00000	-0.96282
		277	31.00000	4.80000	100.05000	0.00000	0.00000	-0.89673
		278	32.00000	4.80000	100.05000	0.00000	0.00000	-0.82458
		279	33.00000	4.80000	100.05000	0.00000	0.00000	-0.75022
		280	34.00000	4.80000	100.05000	0.00000	0.00000	-0.67701
		281	35.00000	4.80000	100.05000	0.00000	0.00000	-0.60745
		282	36.00000	4.80000	100.05000	0.00000	0.00000	-0.54305
		283	37.00000	4.80000	100.05000	0.00000	0.00000	-0.48451
		284	38.00000	4.80000	100.05000	0.00000	0.00000	-0.43193
		285	39.00000	4.80000	100.05000	0.00000	0.00000	-0.38506
		286	40.00000	4.80000	100.05000	0.00000	0.00000	-0.34342
		287	41.00000	4.80000	100.05000	0.00000	0.00000	-0.30652
		288	42.00000	4.80000	100.05000	0.00000	0.00000	-0.27380
		289	43.00000	4.80000	100.05000	0.00000	0.00000	-0.24478
		290	44.00000	4.80000	100.05000	0.00000	0.00000	-0.21899
		291	45.00000	4.80000	100.05000	0.00000	0.00000	-0.19604
		292	0.00000	6.00000	100.05000	0.00000	0.00000	-0.11367
		293	1.00000	6.00000	100.05000	0.00000	0.00000	-0.12684
		294	2.00000	6.00000	100.05000	0.00000	0.00000	-0.14146
		295	3.00000	6.00000	100.05000	0.00000	0.00000	-0.15773
		296	4.00000	6.00000	100.05000	0.00000	0.00000	-0.17583
		297	5.00000	6.00000	100.05000	0.00000	0.00000	-0.19603
		298	6.00000	6.00000	100.05000	0.00000	0.00000	-0.21860
		299	7.00000	6.00000	100.05000	0.00000	0.00000	-0.24389
		300	8.00000	6.00000	100.05000	0.00000	0.00000	-0.27227
		301	9.00000	6.00000	100.05000	0.00000	0.00000	-0.30423
		302	10.00000	6.00000	100.05000	0.00000	0.00000	-0.34031
		303	11.00000	6.00000	100.05000	0.00000	0.00000	-0.38115
		304	12.00000	6.00000	100.05000	0.00000	0.00000	-0.42752
		305	13.00000	6.00000	100.05000	0.00000	0.00000	-0.48025
		306	14.00000	6.00000	100.05000	0.00000	0.00000	-0.54027
		307	15.00000	6.00000	100.05000	0.00000	0.00000	-0.60854
		308	16.00000	6.00000	100.05000	0.00000	0.00000	-0.68586
		309	17.00000	6.00000	100.05000	0.00000	0.00000	-0.77267
		310	18.00000	6.00000	100.05000	0.00000	0.00000	-0.86852
		311	19.00000	6.00000	100.05000	0.00000	0.00000	-0.97151
		312	20.00000	6.00000	100.05000	0.00000	0.00000	-1.07771
		313	21.00000	6.00000	100.05000	0.00000	0.00000	-1.18120
		314	22.00000	6.00000	100.05000	0.00000	0.00000	-1.27531
		315	23.00000	6.00000	100.05000	0.00000	0.00000	-1.35307
		316	24.00000	6.00000	100.05000	0.00000	0.00000	-1.41030
		317	25.00000	6.00000	100.05000	0.00000	0.00000	-1.44380
		318	26.00000	6.00000	100.05000	0.00000	0.00000	-1.45212
		319	27.00000	6.00000	100.05000	0.00000	0.00000	-1.43492
		320	28.00000	6.00000	100.05000	0.00000	0.00000	-1.39287
		321	29.00000	6.00000	100.05000	0.00000	0.00000	-1.32778
		322	30.00000	6.00000	100.05000	0.00000	0.00000	-1.24293
		323	31.00000	6.00000	100.05000	0.00000	0.00000	-1.14138
		324	32.00000	6.00000	100.05000	0.00000	0.00000	-1.03564
		325	33.00000	6.00000	100.05000	0.00000	0.00000	-0.92661
		326	34.00000	6.00000	100.05000	0.00000	0.00000	-0.82206
		327	35.00000	6.00000	100.05000	0.00000	0.00000	-0.72571
		328	36.00000	6.00000	100.05000	0.00000	0.00000	-0.63926
		329	37.00000	6.00000	100.05000	0.00000		



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
		346	8.00000	7.20000	100.05000	0.00000	0.00000	-0.30073	1
		347	9.00000	7.20000	100.05000	0.00000	0.00000	-0.33754	1
		348	10.00000	7.20000	100.05000	0.00000	0.00000	-0.37953	1
		349	11.00000	7.20000	100.05000	0.00000	0.00000	-0.42766	1
		350	12.00000	7.20000	100.05000	0.00000	0.00000	-0.48310	1
		351	13.00000	7.20000	100.05000	0.00000	0.00000	-0.54725	1
		352	14.00000	7.20000	100.05000	0.00000	0.00000	-0.62181	1
		353	15.00000	7.20000	100.05000	0.00000	0.00000	-0.70874	1
		354	16.00000	7.20000	100.05000	0.00000	0.00000	-0.81018	1
		355	17.00000	7.20000	100.05000	0.00000	0.00000	-0.92819	1
		356	18.00000	7.20000	100.05000	0.00000	0.00000	-1.06397	1
		357	19.00000	7.20000	100.05000	0.00000	0.00000	-1.21641	1
		358	20.00000	7.20000	100.05000	0.00000	0.00000	-1.37985	1
		359	21.00000	7.20000	100.05000	0.00000	0.00000	-1.54303	1
		360	22.00000	7.20000	100.05000	0.00000	0.00000	-1.69194	1
		361	23.00000	7.20000	100.05000	0.00000	0.00000	-1.81460	1
		362	24.00000	7.20000	100.05000	0.00000	0.00000	-1.90352	1
		363	25.00000	7.20000	100.05000	0.00000	0.00000	-1.95516	1
		364	26.00000	7.20000	100.05000	0.00000	0.00000	-1.96832	1
		365	27.00000	7.20000	100.05000	0.00000	0.00000	-1.94291	1
		366	28.00000	7.20000	100.05000	0.00000	0.00000	-1.87950	1
		367	29.00000	7.20000	100.05000	0.00000	0.00000	-1.77975	1
		368	30.00000	7.20000	100.05000	0.00000	0.00000	-1.64771	1
		369	31.00000	7.20000	100.05000	0.00000	0.00000	-1.49136	1
		370	32.00000	7.20000	100.05000	0.00000	0.00000	-1.32300	1
		371	33.00000	7.20000	100.05000	0.00000	0.00000	-1.15663	1
		372	34.00000	7.20000	100.05000	0.00000	0.00000	-1.00312	1
		373	35.00000	7.20000	100.05000	0.00000	0.00000	-0.86766	1
		374	36.00000	7.20000	100.05000	0.00000	0.00000	-0.75099	1
		375	37.00000	7.20000	100.05000	0.00000	0.00000	-0.65160	1
		376	38.00000	7.20000	100.05000	0.00000	0.00000	-0.56724	1
		377	39.00000	7.20000	100.05000	0.00000	0.00000	-0.49560	1
		378	40.00000	7.20000	100.05000	0.00000	0.00000	-0.43456	1
		379	41.00000	7.20000	100.05000	0.00000	0.00000	-0.38232	1
		380	42.00000	7.20000	100.05000	0.00000	0.00000	-0.33739	1
		381	43.00000	7.20000	100.05000	0.00000	0.00000	-0.29853	1
		382	44.00000	7.20000	100.05000	0.00000	0.00000	-0.26475	1
		383	45.00000	7.20000	100.05000	0.00000	0.00000	-0.23523	1
		384	0.00000	8.40000	100.05000	0.00000	0.00000	-0.13248	1
		385	1.00000	8.40000	100.05000	0.00000	0.00000	-0.14630	1
		386	2.00000	8.40000	100.05000	0.00000	0.00000	-0.16599	1
		387	3.00000	8.40000	100.05000	0.00000	0.00000	-0.18582	1
		388	4.00000	8.40000	100.05000	0.00000	0.00000	-0.20809	1
		389	5.00000	8.40000	100.05000	0.00000	0.00000	-0.23119	1
		390	6.00000	8.40000	100.05000	0.00000	0.00000	-0.26156	1
		391	7.00000	8.40000	100.05000	0.00000	0.00000	-0.29375	1
		392	8.00000	8.40000	100.05000	0.00000	0.00000	-0.33045	1
		393	9.00000	8.40000	100.05000	0.00000	0.00000	-0.37249	1
		394	10.00000	8.40000	100.05000	0.00000	0.00000	-0.42093	1
		395	11.00000	8.40000	100.05000	0.00000	0.00000	-0.47710	1
		396	12.00000	8.40000	100.05000	0.00000	0.00000	-0.54271	1
		397	13.00000	8.40000	100.05000	0.00000	0.00000	-0.61992	1
		398	14.00000	8.40000	100.05000	0.00000	0.00000	-0.71151	1
		399	15.00000	8.40000	100.05000	0.00000	0.00000	-0.82106	1
		400	16.00000	8.40000	100.05000	0.00000	0.00000	-0.95309	1
		401	17.00000	8.40000	100.05000	0.00000	0.00000	-1.11317	1
		402	18.00000	8.40000	100.05000	0.00000	0.00000	-1.30755	1
		403	19.00000	8.40000	100.05000	0.00000	0.00000	-1.54096	1
		404	20.00000	8.40000	100.05000	0.00000	0.00000	-1.80887	1
		405	21.00000	8.40000	100.05000	0.00000	0.00000	-2.08587	1
		406	22.00000	8.40000	100.05000	0.00000	0.00000	-2.38636	1
		407	23.00000	8.40000	100.05000	0.00000	0.00000	-2.53630	1
		408	24.00000	8.40000	100.05000	0.00000	0.00000	-2.67642	1
		409	25.00000	8.40000	100.05000	0.00000	0.00000	-2.75589	1
		410	26.00000	8.40000	100.05000	0.00000	0.00000	-2.77633	1
		411	27.00000	8.40000	100.05000	0.00000	0.00000	-2.73872	1
		412	28.00000	8.40000	100.05000	0.00000	0.00000	-2.64265	1
		413	29.00000	8.40000	100.05000	0.00000	0.00000	-2.48716	1
		414	30.00000	8.40000	100.05000	0.00000	0.00000	-2.27381	1
		415	31.00000	8.40000	100.05000	0.00000	0.00000	-2.01293	1
		416	32.00000	8.40000	100.05000	0.00000	0.00000	-1.72961	1
		417	33.00000	8.40000	100.05000	0.00000	0.00000	-1.45956	1
		418	34.00000	8.40000	100.05000	0.00000	0.00000	-1.22671	1
		419	35.00000	8.40000	100.05000	0.00000	0.00000	-1.03442	1
		420	36.00000	8.40000	100.05000	0.00000	0.00000	-0.87740	1
		421	37.00000	8.40000	100.05000	0.00000	0.00000	-0.74911	1
		422	38.00000	8.40000	100.05000	0.00000	0.00000	-0.64374	1
		423	39.00000	8.40000	100.05000	0.00000	0.00000	-0.55657	1
		424	40.00000	8.40000	100.05000	0.00000	0.00000	-0.48388	1
		425	41.00000	8.40000	100.05000	0.00000	0.00000	-0.42275	1
		426	42.00000	8.40000	100.05000	0.00000	0.00000	-0.37092	1
		427	43.00000	8.40000	100.05000	0.00000	0.00000	-0.32664	1
		428	44.00000	8.40000	100.05000	0.00000	0.00000	-0.28852	1
		429	45.00000	8.40000	100.05000	0.00000	0.00000	-0.25549	1
		430	0.00000	9.60000	100.05000	0.00000	0.00000	-0.14213	1
		431	1.00000	9.60000	100.05000	0.00000	0.00000	-0.15933	1
		432	2.00000	9.60000	100.05000	0.00000	0.00000	-0.17862	1
		433	3.00000	9.60000	100.05000	0.00000	0.00000	-0.20033	1
		434	4.00000	9.60000	100.05000	0.00000	0.00000	-0.22481	1
		435	5.00000	9.60000	100.05000	0.00000	0.00000	-0.25251	1
		436	6.00000	9.60000	100.05000	0.00000	0.00000	-0.28397	1
		437	7.00000	9.60000	100.05000	0.00000	0.00000	-0.31988	1
		438	8.00000	9.60000	100.05000	0.00000	0.00000	-0.36108	1
		439	9.00000	9.60000	100.05000	0.00000	0.00000	-0.40863	1
		440	10.00000	9.60000	100.05000	0.00000	0.00000	-0.46391	1
		441	11.00000	9.60000	100.05000	0.00000	0.00000	-0.52869	1
		442	12.00000	9.60000	100.05000	0.00000	0.00000	-0.60530	1
		443	13.00000	9.60000	100.05000	0.00000	0.00000	-0.69684	1
		444	14.00000	9.60000	100.05000	0.00000	0.00000	-0.80751	1
		445	15.00000	9.60000	100.05000	0.00000	0.00000	-0.94306	1
		446	16.00000	9.60000	100.05000	0.00000	0.00000	-1.11161	1
		447	17.00000	9.60000	100.05000	0.00000	0.00000	-1.32494	1
		448	18.00000	9.60000	100.05000	0.00000	0.00000	-1.60094	1
		449	19.00000	9.60000	100.05000	0.00000	0.00000	-1.96872	1
		450	20.00000	9.60000	100.05000	0.00000	0.00000	-2.47223	1
		451	21.00000	9.60000	100.05000	0.00000	0.00000	-3.02628	1
		452	22.00000	9.60000	100.05000	0.00000	0.00000	-3.48894	1
		453	23.00000	9.60000	100.05000	0.00000	0.00000	-3.82673	1
		454	24.00000	9.60000	100.05000	0.00000	0.00000	-4.04673	1
		455	25.00000	9.60000	100.05000	0.00000	0.00000	-4.16512	1
		456	26.00000	9.60000	100.05000	0.00000	0.00000	-4.19643	1
		457	27.00000	9.60000	100.05000	0.00000	0.00000	-4.14169	1
		458	28.00000	9.60000	100.05000	0.00000	0.00000	-3.99849	1
		459	29.00000	9.60000	100.05000	0.00000	0.00000	-3.77580	1
		460	30.00000	9.60000	100.05000	0.00000	0.00000	-3.49703	1
		461	31.00000	9.60000	100.05000	0.00000	0.00000	-2.91724	1
		462	32.00000	9.60000	100.05000	0.00000	0.00000	-2.35326	1



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
487		11.00000	10.80000	100.05000	0.00000	0.00000	-0.58140	1	
488		12.00000	10.80000	100.05000	0.00000	0.00000	-0.66945	1	
489		13.00000	10.80000	100.05000	0.00000	0.00000	-0.77600	1	
490		14.00000	10.80000	100.05000	0.00000	0.00000	-0.90683	1	
491		15.00000	10.80000	100.05000	0.00000	0.00000	-1.07025	1	
492		16.00000	10.80000	100.05000	0.00000	0.00000	-1.27874	1	
493		17.00000	10.80000	100.05000	0.00000	0.00000	-1.55215	1	
494		18.00000	10.80000	100.05000	0.00000	0.00000	-1.92553	1	
495		19.00000	10.80000	100.05000	0.00000	0.00000	-2.47416	1	
496		20.00000	10.80000	100.05000	0.00000	0.00000	-3.53328	1	
497		21.00000	10.80000	100.05000	0.00000	0.00000	-4.96617	1	
498		22.00000	10.80000	100.05000	0.00000	0.00000	-6.03362	1	
499		23.00000	10.80000	100.05000	0.00000	0.00000	-6.60703	1	
500		24.00000	10.80000	100.05000	0.00000	0.00000	-6.93675	1	
501		25.00000	10.80000	100.05000	0.00000	0.00000	-7.10572	1	
502		26.00000	10.80000	100.05000	0.00000	0.00000	-7.14738	1	
503		27.00000	10.80000	100.05000	0.00000	0.00000	-7.07065	1	
504		28.00000	10.80000	100.05000	0.00000	0.00000	-6.86722	1	
505		29.00000	10.80000	100.05000	0.00000	0.00000	-6.50328	1	
506		30.00000	10.80000	100.05000	0.00000	0.00000	-5.89202	1	
507		31.00000	10.80000	100.05000	0.00000	0.00000	-4.76511	1	
508		32.00000	10.80000	100.05000	0.00000	0.00000	-3.30517	1	
509		33.00000	10.80000	100.05000	0.00000	0.00000	-2.31289	1	
510		34.00000	10.80000	100.05000	0.00000	0.00000	-1.77897	1	
511		35.00000	10.80000	100.05000	0.00000	0.00000	-1.41652	1	
512		36.00000	10.80000	100.05000	0.00000	0.00000	-1.15339	1	
513		37.00000	10.80000	100.05000	0.00000	0.00000	-0.95508	1	
514		38.00000	10.80000	100.05000	0.00000	0.00000	-0.80165	1	
515		39.00000	10.80000	100.05000	0.00000	0.00000	-0.68047	1	
516		40.00000	10.80000	100.05000	0.00000	0.00000	-0.58305	1	
517		41.00000	10.80000	100.05000	0.00000	0.00000	-0.50352	1	
518		42.00000	10.80000	100.05000	0.00000	0.00000	-0.43768	1	
519		43.00000	10.80000	100.05000	0.00000	0.00000	-0.38250	1	
520		44.00000	10.80000	100.05000	0.00000	0.00000	-0.33575	1	
521		45.00000	10.80000	100.05000	0.00000	0.00000	-0.29577	1	
522		0.00000	12.00000	100.05000	0.00000	0.00000	-0.16350	1	
523		1.00000	12.00000	100.05000	0.00000	0.00000	-0.18151	1	
524		2.00000	12.00000	100.05000	0.00000	0.00000	-0.20408	1	
525		3.00000	12.00000	100.05000	0.00000	0.00000	-0.22961	1	
526		4.00000	12.00000	100.05000	0.00000	0.00000	-0.25859	1	
527		5.00000	12.00000	100.05000	0.00000	0.00000	-0.29160	1	
528		6.00000	12.00000	100.05000	0.00000	0.00000	-0.32940	1	
529		7.00000	12.00000	100.05000	0.00000	0.00000	-0.37292	1	
530		8.00000	12.00000	100.05000	0.00000	0.00000	-0.42334	1	
531		9.00000	12.00000	100.05000	0.00000	0.00000	-0.48222	1	
532		10.00000	12.00000	100.05000	0.00000	0.00000	-0.55151	1	
533		11.00000	12.00000	100.05000	0.00000	0.00000	-0.63412	1	
534		12.00000	12.00000	100.05000	0.00000	0.00000	-0.73356	1	
535		13.00000	12.00000	100.05000	0.00000	0.00000	-0.85502	1	
536		14.00000	12.00000	100.05000	0.00000	0.00000	-1.00586	1	
537		15.00000	12.00000	100.05000	0.00000	0.00000	-1.19687	1	
538		16.00000	12.00000	100.05000	0.00000	0.00000	-1.44471	1	
539		17.00000	12.00000	100.05000	0.00000	0.00000	-1.77679	1	
540		18.00000	12.00000	100.05000	0.00000	0.00000	-2.24313	1	
541		19.00000	12.00000	100.05000	0.00000	0.00000	-2.95289	1	
542		20.00000	12.00000	100.05000	0.00000	0.00000	-4.33006	1	
543		21.00000	12.00000	100.05000	0.00000	0.00000	-6.90685	1	
544		22.00000	12.00000	100.05000	0.00000	0.00000	-9.08389	1	
545		23.00000	12.00000	100.05000	0.00000	0.00000	-9.91407	1	
546		24.00000	12.00000	100.05000	0.00000	0.00000	-10.35606	1	
547		25.00000	12.00000	100.05000	0.00000	0.00000	-10.57363	1	
548		26.00000	12.00000	100.05000	0.00000	0.00000	-10.62397	1	
549		27.00000	12.00000	100.05000	0.00000	0.00000	-10.52280	1	
550		28.00000	12.00000	100.05000	0.00000	0.00000	-10.25555	1	
551		29.00000	12.00000	100.05000	0.00000	0.00000	-9.76400	1	
552		30.00000	12.00000	100.05000	0.00000	0.00000	-8.87407	1	
553		31.00000	12.00000	100.05000	0.00000	0.00000	-6.47564	1	
554		32.00000	12.00000	100.05000	0.00000	0.00000	-4.02711	1	
555		33.00000	12.00000	100.05000	0.00000	0.00000	-2.73263	1	
556		34.00000	12.00000	100.05000	0.00000	0.00000	-2.04670	1	
557		35.00000	12.00000	100.05000	0.00000	0.00000	-1.59838	1	
558		36.00000	12.00000	100.05000	0.00000	0.00000	-1.28283	1	
559		37.00000	12.00000	100.05000	0.00000	0.00000	-1.05076	1	
560		38.00000	12.00000	100.05000	0.00000	0.00000	-0.87468	1	
561		39.00000	12.00000	100.05000	0.00000	0.00000	-0.73778	1	
562		40.00000	12.00000	100.05000	0.00000	0.00000	-0.62908	1	
563		41.00000	12.00000	100.05000	0.00000	0.00000	-0.54122	1	
564		42.00000	12.00000	100.05000	0.00000	0.00000	-0.46905	1	
565		43.00000	12.00000	100.05000	0.00000	0.00000	-0.40895	1	
566		44.00000	12.00000	100.05000	0.00000	0.00000	-0.35827	1	
567		45.00000	12.00000	100.05000	0.00000	0.00000	-0.31509	1	
568		0.00000	13.20000	100.05000	0.00000	0.00000	-0.17105	1	
569		1.00000	13.20000	100.05000	0.00000	0.00000	-0.19246	1	
570		2.00000	13.20000	100.05000	0.00000	0.00000	-0.21666	1	
571		3.00000	13.20000	100.05000	0.00000	0.00000	-0.24409	1	
572		4.00000	13.20000	100.05000	0.00000	0.00000	-0.27530	1	
573		5.00000	13.20000	100.05000	0.00000	0.00000	-0.31094	1	
574		6.00000	13.20000	100.05000	0.00000	0.00000	-0.35187	1	
575		7.00000	13.20000	100.05000	0.00000	0.00000	-0.39913	1	
576		8.00000	13.20000	100.05000	0.00000	0.00000	-0.45407	1	
577		9.00000	13.20000	100.05000	0.00000	0.00000	-0.51846	1	
578		10.00000	13.20000	100.05000	0.00000	0.00000	-0.59462	1	
579		11.00000	13.20000	100.05000	0.00000	0.00000	-0.68570	1	
580		12.00000	13.20000	100.05000	0.00000	0.00000	-0.79601	1	
581		13.00000	13.20000	100.05000	0.00000	0.00000	-0.93156	1	
582		14.00000	13.20000	100.05000	0.00000	0.00000	-1.10105	1	
583		15.00000	13.20000	100.05000	0.00000	0.00000	-1.31734	1	
584		16.00000	13.20000	100.05000	0.00000	0.00000	-1.60034	1	
585		17.00000	13.20000	100.05000	0.00000	0.00000	-1.98276	1	
586		18.00000	13.20000	100.05000	0.00000	0.00000	-2.52351	1	
587		19.00000	13.20000	100.05000	0.00000	0.00000	-3.34664	1	
588		20.00000	13.20000	100.05000	0.00000	0.00000	-4.89913	1	
589		21.00000	13.20000	100.05000	0.00000	0.00000	-7.72560	1	
590		22.00000	13.20000	100.05000	0.00000	0.00000	-10.14249	1	
591		23.00000	13.20000	100.05000	0.00000	0.00000	-11.23239	1	
592		24.00000	13.20000	100.05000	0.00000	0.00000	-11.64601	1	
593		25.00000	13.20000	100.05000	0.00000	0.00000	-11.89879	1	
594		26.00000	13.20000	100.05000	0.00000	0.00000	-11.95133	1	
595		27.00000	13.20000	100.05000	0.00000	0.00000	-11.82371	1	
596		28.00000	13.20000	100.05000	0.00000	0.00000	-11.49898	1	
597		29.00000	13.20000	100.05000	0.00000	0.00000	-10.90771	1	
598		30.00000	13.20000	100.05000	0.00000	0.00000	-9.85188	1	
599		31.00000	13.20000	100.05000	0.00000	0.00000	-7.20496	1	
600		32.00000	13.20000	100.05000	0.00000	0.00000	-4.51080	1	
601		33.00000	13.20000	100.05000	0.00000	0.00000	-3.04946	1	
602		34.00000	13.20000	100.05000	0.00000	0.00000	-2.26047	1	
603		35.00000	13.20000	100.05000	0.00000	0.00000	-1.74755	1	
604		36.00000	13.20000	100.05000	0.00000	0.00000	-1.39086	1	
605		37.00000	13.20000	100.05000	0.00000	0.00000	-1.13185	1	
606		38.00000	13.20000	100.05000	0.00000	0.00000	-0.93760	1	
607		39.00000	13.20000						



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
628		14.00000	14.40000	100.05000	0.00000	0.00000	-1.18960	1	
629		15.00000	14.40000	100.05000	0.00000	0.00000	-1.42755	1	
630		16.00000	14.40000	100.05000	0.00000	0.00000	-1.73959	1	
631		17.00000	14.40000	100.05000	0.00000	0.00000	-2.16152	1	
632		18.00000	14.40000	100.05000	0.00000	0.00000	-2.75637	1	
633		19.00000	14.40000	100.05000	0.00000	0.00000	-3.65281	1	
634		20.00000	14.40000	100.05000	0.00000	0.00000	-5.30016	1	
635		21.00000	14.40000	100.05000	0.00000	0.00000	-8.23615	1	
636		22.00000	14.40000	100.05000	0.00000	0.00000	-10.75666	1	
637		23.00000	14.40000	100.05000	0.00000	0.00000	-11.81515	1	
638		24.00000	14.40000	100.05000	0.00000	0.00000	-12.38356	1	
639		25.00000	14.40000	100.05000	0.00000	0.00000	-12.65258	1	
640		26.00000	14.40000	100.05000	0.00000	0.00000	-12.69614	1	
641		27.00000	14.40000	100.05000	0.00000	0.00000	-12.53761	1	
642		28.00000	14.40000	100.05000	0.00000	0.00000	-12.16140	1	
643		29.00000	14.40000	100.05000	0.00000	0.00000	-11.49745	1	
644		30.00000	14.40000	100.05000	0.00000	0.00000	-10.34732	1	
645		31.00000	14.40000	100.05000	0.00000	0.00000	-7.59142	1	
646		32.00000	14.40000	100.05000	0.00000	0.00000	-4.79265	1	
647		33.00000	14.40000	100.05000	0.00000	0.00000	-3.24884	1	
648		34.00000	14.40000	100.05000	0.00000	0.00000	-2.40119	1	
649		35.00000	14.40000	100.05000	0.00000	0.00000	-1.84975	1	
650		36.00000	14.40000	100.05000	0.00000	0.00000	-1.46789	1	
651		37.00000	14.40000	100.05000	0.00000	0.00000	-1.19219	1	
652		38.00000	14.40000	100.05000	0.00000	0.00000	-0.98648	1	
653		39.00000	14.40000	100.05000	0.00000	0.00000	-0.82864	1	
654		40.00000	14.40000	100.05000	0.00000	0.00000	-0.70457	1	
655		41.00000	14.40000	100.05000	0.00000	0.00000	-0.60498	1	
656		42.00000	14.40000	100.05000	0.00000	0.00000	-0.52355	1	
657		43.00000	14.40000	100.05000	0.00000	0.00000	-0.45594	1	
658		44.00000	14.40000	100.05000	0.00000	0.00000	-0.39904	1	
659		45.00000	14.40000	100.05000	0.00000	0.00000	-0.35061	1	
660		0.00000	15.60000	100.05000	0.00000	0.00000	-0.18946	1	
661		1.00000	15.60000	100.05000	0.00000	0.00000	-0.21358	1	
662		2.00000	15.60000	100.05000	0.00000	0.00000	-0.24091	1	
663		3.00000	15.60000	100.05000	0.00000	0.00000	-0.27200	1	
664		4.00000	15.60000	100.05000	0.00000	0.00000	-0.30748	1	
665		5.00000	15.60000	100.05000	0.00000	0.00000	-0.34815	1	
666		6.00000	15.60000	100.05000	0.00000	0.00000	-0.39500	1	
667		7.00000	15.60000	100.05000	0.00000	0.00000	-0.44829	1	
668		8.00000	15.60000	100.05000	0.00000	0.00000	-0.50863	1	
669		9.00000	15.60000	100.05000	0.00000	0.00000	-0.58713	1	
670		10.00000	15.60000	100.05000	0.00000	0.00000	-0.67559	1	
671		11.00000	15.60000	100.05000	0.00000	0.00000	-0.78177	1	
672		12.00000	15.60000	100.05000	0.00000	0.00000	-0.91084	1	
673		13.00000	15.60000	100.05000	0.00000	0.00000	-1.07004	1	
674		14.00000	15.60000	100.05000	0.00000	0.00000	-1.26974	1	
675		15.00000	15.60000	100.05000	0.00000	0.00000	-1.52522	1	
676		16.00000	15.60000	100.05000	0.00000	0.00000	-1.85982	1	
677		17.00000	15.60000	100.05000	0.00000	0.00000	-2.31099	1	
678		18.00000	15.60000	100.05000	0.00000	0.00000	-2.94369	1	
679		19.00000	15.60000	100.05000	0.00000	0.00000	-3.88817	1	
680		20.00000	15.60000	100.05000	0.00000	0.00000	-5.29336	1	
681		21.00000	15.60000	100.05000	0.00000	0.00000	-8.59217	1	
682		22.00000	15.60000	100.05000	0.00000	0.00000	-11.70081	1	
683		23.00000	15.60000	100.05000	0.00000	0.00000	-12.27195	1	
684		24.00000	15.60000	100.05000	0.00000	0.00000	-12.86043	1	
685		25.00000	15.60000	100.05000	0.00000	0.00000	-13.12505	1	
686		26.00000	15.60000	100.05000	0.00000	0.00000	-13.14210	1	
687		27.00000	15.60000	100.05000	0.00000	0.00000	-12.93970	1	
688		28.00000	15.60000	100.05000	0.00000	0.00000	-12.50752	1	
689		29.00000	15.60000	100.05000	0.00000	0.00000	-11.78034	1	
690		30.00000	15.60000	100.05000	0.00000	0.00000	-10.56492	1	
691		31.00000	15.60000	100.05000	0.00000	0.00000	-7.74858	1	
692		32.00000	15.60000	100.05000	0.00000	0.00000	-4.90139	1	
693		33.00000	15.60000	100.05000	0.00000	0.00000	-3.32460	1	
694		34.00000	15.60000	100.05000	0.00000	0.00000	-2.45736	1	
695		35.00000	15.60000	100.05000	0.00000	0.00000	-1.89510	1	
696		36.00000	15.60000	100.05000	0.00000	0.00000	-1.50713	1	
697		37.00000	15.60000	100.05000	0.00000	0.00000	-1.22749	1	
698		38.00000	15.60000	100.05000	0.00000	0.00000	-1.01872	1	
699		39.00000	15.60000	100.05000	0.00000	0.00000	-0.85817	1	
700		40.00000	15.60000	100.05000	0.00000	0.00000	-0.73152	1	
701		41.00000	15.60000	100.05000	0.00000	0.00000	-0.62945	1	
702		42.00000	15.60000	100.05000	0.00000	0.00000	-0.54566	1	
703		43.00000	15.60000	100.05000	0.00000	0.00000	-0.47580	1	
704		44.00000	15.60000	100.05000	0.00000	0.00000	-0.41681	1	
705		45.00000	15.60000	100.05000	0.00000	0.00000	-0.36647	1	
706		0.00000	16.80000	100.05000	0.00000	0.00000	-0.19815	1	
707		1.00000	16.80000	100.05000	0.00000	0.00000	-0.22354	1	
708		2.00000	16.80000	100.05000	0.00000	0.00000	-0.25236	1	
709		3.00000	16.80000	100.05000	0.00000	0.00000	-0.28517	1	
710		4.00000	16.80000	100.05000	0.00000	0.00000	-0.32265	1	
711		5.00000	16.80000	100.05000	0.00000	0.00000	-0.36565	1	
712		6.00000	16.80000	100.05000	0.00000	0.00000	-0.41322	1	
713		7.00000	16.80000	100.05000	0.00000	0.00000	-0.47271	1	
714		8.00000	16.80000	100.05000	0.00000	0.00000	-0.53982	1	
715		9.00000	16.80000	100.05000	0.00000	0.00000	-0.61878	1	
716		10.00000	16.80000	100.05000	0.00000	0.00000	-0.71253	1	
717		11.00000	16.80000	100.05000	0.00000	0.00000	-0.82503	1	
718		12.00000	16.80000	100.05000	0.00000	0.00000	-0.96167	1	
719		13.00000	16.80000	100.05000	0.00000	0.00000	-1.12999	1	
720		14.00000	16.80000	100.05000	0.00000	0.00000	-1.34072	1	
721		15.00000	16.80000	100.05000	0.00000	0.00000	-1.60962	1	
722		16.00000	16.80000	100.05000	0.00000	0.00000	-1.96059	1	
723		17.00000	16.80000	100.05000	0.00000	0.00000	-2.43191	1	
724		18.00000	16.80000	100.05000	0.00000	0.00000	-3.08982	1	
725		19.00000	16.80000	100.05000	0.00000	0.00000	-4.06670	1	
726		20.00000	16.80000	100.05000	0.00000	0.00000	-5.81385	1	
727		21.00000	16.80000	100.05000	0.00000	0.00000	-8.96296	1	
728		22.00000	16.80000	100.05000	0.00000	0.00000	-11.48994	1	
729		23.00000	16.80000	100.05000	0.00000	0.00000	-12.62244	1	
730		24.00000	16.80000	100.05000	0.00000	0.00000	-13.21344	1	
731		25.00000	16.80000	100.05000	0.00000	0.00000	-13.44788	1	
732		26.00000	16.80000	100.05000	0.00000	0.00000	-13.40847	1	
733		27.00000	16.80000	100.05000	0.00000	0.00000	-13.12850	1	
734		28.00000	16.80000	100.05000	0.00000	0.00000	-12.61600	1	
735		29.00000	16.80000	100.05000	0.00000	0.00000	-11.81282	1	
736		30.00000	16.80000	100.05000	0.00000	0.00000	-10.53366	1	
737		31.00000	16.80000	100.05000	0.00000	0.00000	-7.67529	1	
738		32.00000	16.80000	100.05000	0.00000	0.00000	-4.81869	1	
739		33.00000	16.80000	100.05000	0.00000	0.00000	-3.25674	1	
740		34.00000	16.80000	100.05000	0.00000	0.00000	-2.41441	1	
741		35.00000	16.80000	100.05000	0.00000	0.00000	-1.97531	1	
742		36.00000	16.80000	100.05000	0.00000	0.00000	-1.50444	1	
743		37.00000	16.80000	100.05000	0.00000	0.00000	-1.23589	1	
744		38.00000	16.80000	100.05000	0.00000	0.00000	-1.03361	1	
745		39.00000	16.80000	100.05000	0.00000	0.00000	-0.87637	1	
746		40.00000	16.80000	100.05000	0.00000	0.00000	-0.75097	1	
747		11.00000	18.00000	100.05000	0.00000	0.00000	-0.64886	1	
748		42.0000							



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
		769	17.00000	18.00000	100.05000	0.00000	0.00000	-2.52518	1
		770	18.00000	18.00000	100.05000	0.00000	0.00000	-3.19496	1
		771	19.00000	18.00000	100.05000	0.00000	0.00000	-4.18758	1
		772	20.00000	18.00000	100.05000	0.00000	0.00000	-5.96798	1
		773	21.00000	18.00000	100.05000	0.00000	0.00000	-9.08561	1
		774	22.00000	18.00000	100.05000	0.00000	0.00000	-11.79597	1
		775	23.00000	18.00000	100.05000	0.00000	0.00000	-12.97886	1
		776	24.00000	18.00000	100.05000	0.00000	0.00000	-13.56168	1
		777	25.00000	18.00000	100.05000	0.00000	0.00000	-13.72232	1
		778	26.00000	18.00000	100.05000	0.00000	0.00000	-13.55012	1
		779	27.00000	18.00000	100.05000	0.00000	0.00000	-13.11838	1
		780	28.00000	18.00000	100.05000	0.00000	0.00000	-12.46428	1
		781	29.00000	18.00000	100.05000	0.00000	0.00000	-11.54033	1
		782	30.00000	18.00000	100.05000	0.00000	0.00000	-10.16251	1
		783	31.00000	18.00000	100.05000	0.00000	0.00000	-7.25493	1
		784	32.00000	18.00000	100.05000	0.00000	0.00000	-4.43851	1
		785	33.00000	18.00000	100.05000	0.00000	0.00000	-2.98658	1
		786	34.00000	18.00000	100.05000	0.00000	0.00000	-2.24942	1
		787	35.00000	18.00000	100.05000	0.00000	0.00000	-1.78429	1
		788	36.00000	18.00000	100.05000	0.00000	0.00000	-1.45596	1
		789	37.00000	18.00000	100.05000	0.00000	0.00000	-1.21908	1
		790	38.00000	18.00000	100.05000	0.00000	0.00000	-1.03294	1
		791	39.00000	18.00000	100.05000	0.00000	0.00000	-0.88471	1
		792	40.00000	18.00000	100.05000	0.00000	0.00000	-0.76399	1
		793	41.00000	18.00000	100.05000	0.00000	0.00000	-0.66396	1
		794	42.00000	18.00000	100.05000	0.00000	0.00000	-0.57990	1
		795	43.00000	18.00000	100.05000	0.00000	0.00000	-0.50848	1
		796	44.00000	18.00000	100.05000	0.00000	0.00000	-0.44724	1
		797	45.00000	18.00000	100.05000	0.00000	0.00000	-0.39435	1
		798	0.00000	19.20000	100.05000	0.00000	0.00000	-0.21410	1
		799	1.00000	19.20000	100.05000	0.00000	0.00000	-0.24185	1
		800	2.00000	19.20000	100.05000	0.00000	0.00000	-0.27339	1
		801	3.00000	19.20000	100.05000	0.00000	0.00000	-0.30934	1
		802	4.00000	19.20000	100.05000	0.00000	0.00000	-0.35046	1
		803	5.00000	19.20000	100.05000	0.00000	0.00000	-0.39768	1
		804	6.00000	19.20000	100.05000	0.00000	0.00000	-0.45215	1
		805	7.00000	19.20000	100.05000	0.00000	0.00000	-0.51532	1
		806	8.00000	19.20000	100.05000	0.00000	0.00000	-0.58902	1
		807	9.00000	19.20000	100.05000	0.00000	0.00000	-0.67562	1
		808	10.00000	19.20000	100.05000	0.00000	0.00000	-0.77823	1
		809	11.00000	19.20000	100.05000	0.00000	0.00000	-0.89895	1
		810	12.00000	19.20000	100.05000	0.00000	0.00000	-1.04933	1
		811	13.00000	19.20000	100.05000	0.00000	0.00000	-1.23099	1
		812	14.00000	19.20000	100.05000	0.00000	0.00000	-1.45658	1
		813	15.00000	19.20000	100.05000	0.00000	0.00000	-1.74143	1
		814	16.00000	19.20000	100.05000	0.00000	0.00000	-2.10827	1
		815	17.00000	19.20000	100.05000	0.00000	0.00000	-2.59254	1
		816	18.00000	19.20000	100.05000	0.00000	0.00000	-3.25442	1
		817	19.00000	19.20000	100.05000	0.00000	0.00000	-4.21621	1
		818	20.00000	19.20000	100.05000	0.00000	0.00000	-5.59590	1
		819	21.00000	19.20000	100.05000	0.00000	0.00000	-7.42123	1
		820	22.00000	19.20000	100.05000	0.00000	0.00000	-12.25323	1
		821	23.00000	19.20000	100.05000	0.00000	0.00000	-13.57580	1
		822	24.00000	19.20000	100.05000	0.00000	0.00000	-14.14879	1
		823	25.00000	19.20000	100.05000	0.00000	0.00000	-14.14624	1
		824	26.00000	19.20000	100.05000	0.00000	0.00000	-13.61494	1
		825	27.00000	19.20000	100.05000	0.00000	0.00000	-12.77710	1
		826	28.00000	19.20000	100.05000	0.00000	0.00000	-11.85029	1
		827	29.00000	19.20000	100.05000	0.00000	0.00000	-10.71958	1
		828	30.00000	19.20000	100.05000	0.00000	0.00000	-9.11513	1
		829	31.00000	19.20000	100.05000	0.00000	0.00000	-5.94953	1
		830	32.00000	19.20000	100.05000	0.00000	0.00000	-3.34300	1
		831	33.00000	19.20000	100.05000	0.00000	0.00000	-2.39094	1
		832	34.00000	19.20000	100.05000	0.00000	0.00000	-1.94455	1
		833	35.00000	19.20000	100.05000	0.00000	0.00000	-1.62787	1
		834	36.00000	19.20000	100.05000	0.00000	0.00000	-1.38185	1
		835	37.00000	19.20000	100.05000	0.00000	0.00000	-1.18397	1
		836	38.00000	19.20000	100.05000	0.00000	0.00000	-1.02161	1
		837	39.00000	19.20000	100.05000	0.00000	0.00000	-0.88649	1
		838	40.00000	19.20000	100.05000	0.00000	0.00000	-0.77277	1
		839	41.00000	19.20000	100.05000	0.00000	0.00000	-0.67617	1
		840	42.00000	19.20000	100.05000	0.00000	0.00000	-0.59347	1
		841	43.00000	19.20000	100.05000	0.00000	0.00000	-0.52221	1
		842	44.00000	19.20000	100.05000	0.00000	0.00000	-0.46046	1
		843	45.00000	19.20000	100.05000	0.00000	0.00000	-0.40671	1
		844	0.00000	20.40000	100.05000	0.00000	0.00000	-0.22122	1
		845	1.00000	20.40000	100.05000	0.00000	0.00000	-0.25002	1
		846	2.00000	20.40000	100.05000	0.00000	0.00000	-0.28278	1
		847	3.00000	20.40000	100.05000	0.00000	0.00000	-0.32014	1
		848	4.00000	20.40000	100.05000	0.00000	0.00000	-0.36289	1
		849	5.00000	20.40000	100.05000	0.00000	0.00000	-0.41198	1
		850	6.00000	20.40000	100.05000	0.00000	0.00000	-0.46862	1
		851	7.00000	20.40000	100.05000	0.00000	0.00000	-0.53427	1
		852	8.00000	20.40000	100.05000	0.00000	0.00000	-0.61082	1
		853	9.00000	20.40000	100.05000	0.00000	0.00000	-0.70069	1
		854	10.00000	20.40000	100.05000	0.00000	0.00000	-0.80700	1
		855	11.00000	20.40000	100.05000	0.00000	0.00000	-0.93387	1
		856	12.00000	20.40000	100.05000	0.00000	0.00000	-1.08683	1
		857	13.00000	20.40000	100.05000	0.00000	0.00000	-1.27339	1
		858	14.00000	20.40000	100.05000	0.00000	0.00000	-1.50393	1
		859	15.00000	20.40000	100.05000	0.00000	0.00000	-1.79311	1
		860	16.00000	20.40000	100.05000	0.00000	0.00000	-2.16200	1
		861	17.00000	20.40000	100.05000	0.00000	0.00000	-2.64166	1
		862	18.00000	20.40000	100.05000	0.00000	0.00000	-3.27790	1
		863	19.00000	20.40000	100.05000	0.00000	0.00000	-4.12610	1
		864	20.00000	20.40000	100.05000	0.00000	0.00000	-5.01531	1
		865	21.00000	20.40000	100.05000	0.00000	0.00000	-8.58543	1
		866	22.00000	20.40000	100.05000	0.00000	0.00000	-12.87224	1
		867	23.00000	20.40000	100.05000	0.00000	0.00000	-14.48082	1
		868	24.00000	20.40000	100.05000	0.00000	0.00000	-15.94978	1
		869	25.00000	20.40000	100.05000	0.00000	0.00000	-14.77602	1
		870	26.00000	20.40000	100.05000	0.00000	0.00000	-13.05145	1
		871	27.00000	20.40000	100.05000	0.00000	0.00000	-10.76090	1
		872	28.00000	20.40000	100.05000	0.00000	0.00000	-9.40142	1
		873	29.00000	20.40000	100.05000	0.00000	0.00000	-7.99078	1
		874	30.00000	20.40000	100.05000	0.00000	0.00000	-5.93762	1
		875	31.00000	20.40000	100.05000	0.00000	0.00000	-0.61624	1
		876	32.00000	20.40000	100.05000	0.00000	0.00000	0.45656	1
		877	33.00000	20.40000	100.05000	0.00000	0.00000	-1.45872	1
		878	34.00000	20.40000	100.05000	0.00000	0.00000	-1.55413	1
		879	35.00000	20.40000	100.05000	0.00000	0.00000	-1.44219	1
		880	36.00000	20.40000	100.05000	0.00000	0.00000	-1.29210	1
		881	37.00000	20.40000	100.05000	0.00000	0.00000	-1.14350	1
		882	38.00000	20.40000	100.05000	0.00000	0.00000	-1.00750	1
		883	39.00000	20.40000	100.05000	0.00000	0.00000	-0.88659	1
		884	40.00000	20.40000	100.05000	0.			





30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
		910	20.00000	21.60000	100.05000	0.00000	0.00000	-4.79918	1
		911	21.00000	21.60000	100.05000	0.00000	0.00000	-8.64984	1
		912	22.00000	21.60000	100.05000	0.00000	0.00000	-13.50731	1
		913	23.00000	21.60000	100.05000	0.00000	0.00000	-15.31358	1
		914	24.00000	21.60000	100.05000	0.00000	0.00000	-15.88223	1
		915	25.00000	21.60000	100.05000	0.00000	0.00000	-15.41366	1
		916	26.00000	21.60000	100.05000	0.00000	0.00000	-13.13972	1
		917	27.00000	21.60000	100.05000	0.00000	0.00000	-10.21707	1
		918	28.00000	21.60000	100.05000	0.00000	0.00000	-8.53394	1
		919	29.00000	21.60000	100.05000	0.00000	0.00000	-6.89205	1
		920	30.00000	21.60000	100.05000	0.00000	0.00000	-4.53862	1
		921	31.00000	21.60000	100.05000	0.00000	0.00000	1.43241	1
		922	32.00000	21.60000	100.05000	0.00000	0.00000	2.11234	1
		923	33.00000	21.60000	100.05000	0.00000	0.00000	-0.76335	1
		924	34.00000	21.60000	100.05000	0.00000	0.00000	-1.23650	1
		925	35.00000	21.60000	100.05000	0.00000	0.00000	-1.29060	1
		926	36.00000	21.60000	100.05000	0.00000	0.00000	-1.22122	1
		927	37.00000	21.60000	100.05000	0.00000	0.00000	-1.11411	1
		928	38.00000	21.60000	100.05000	0.00000	0.00000	-0.99995	1
		929	39.00000	21.60000	100.05000	0.00000	0.00000	-0.89048	1
		930	40.00000	21.60000	100.05000	0.00000	0.00000	-0.78997	1
		931	41.00000	21.60000	100.05000	0.00000	0.00000	-0.69960	1
		932	42.00000	21.60000	100.05000	0.00000	0.00000	-0.61917	1
		933	43.00000	21.60000	100.05000	0.00000	0.00000	-0.54796	1
		934	44.00000	21.60000	100.05000	0.00000	0.00000	-0.48507	1
		935	45.00000	21.60000	100.05000	0.00000	0.00000	-0.42856	1
		936	0.00000	22.80000	100.05000	0.00000	0.00000	-0.23339	1
		937	1.00000	22.80000	100.05000	0.00000	0.00000	-0.26403	1
		938	2.00000	22.80000	100.05000	0.00000	0.00000	-0.29891	1
		939	3.00000	22.80000	100.05000	0.00000	0.00000	-0.33873	1
		940	4.00000	22.80000	100.05000	0.00000	0.00000	-0.38431	1
		941	5.00000	22.80000	100.05000	0.00000	0.00000	-0.43668	1
		942	6.00000	22.80000	100.05000	0.00000	0.00000	-0.49709	1
		943	7.00000	22.80000	100.05000	0.00000	0.00000	-0.56709	1
		944	8.00000	22.80000	100.05000	0.00000	0.00000	-0.64863	1
		945	9.00000	22.80000	100.05000	0.00000	0.00000	-0.74417	1
		946	10.00000	22.80000	100.05000	0.00000	0.00000	-0.85691	1
		947	11.00000	22.80000	100.05000	0.00000	0.00000	-0.99099	1
		948	12.00000	22.80000	100.05000	0.00000	0.00000	-1.15188	1
		949	13.00000	22.80000	100.05000	0.00000	0.00000	-1.34694	1
		950	14.00000	22.80000	100.05000	0.00000	0.00000	-1.58856	1
		951	15.00000	22.80000	100.05000	0.00000	0.00000	-1.88337	1
		952	16.00000	22.80000	100.05000	0.00000	0.00000	-2.25783	1
		953	17.00000	22.80000	100.05000	0.00000	0.00000	-2.73640	1
		954	18.00000	22.80000	100.05000	0.00000	0.00000	-3.35470	1
		955	19.00000	22.80000	100.05000	0.00000	0.00000	-4.14099	1
		956	20.00000	22.80000	100.05000	0.00000	0.00000	-4.86964	1
		957	21.00000	22.80000	100.05000	0.00000	0.00000	-8.80541	1
		958	22.00000	22.80000	100.05000	0.00000	0.00000	-13.78433	1
		959	23.00000	22.80000	100.05000	0.00000	0.00000	-15.67066	1
		960	24.00000	22.80000	100.05000	0.00000	0.00000	-16.24893	1
		961	25.00000	22.80000	100.05000	0.00000	0.00000	-15.71151	1
		962	26.00000	22.80000	100.05000	0.00000	0.00000	-13.29443	1
		963	27.00000	22.80000	100.05000	0.00000	0.00000	-10.20218	1
		964	28.00000	22.80000	100.05000	0.00000	0.00000	-8.37273	1
		965	29.00000	22.80000	100.05000	0.00000	0.00000	-6.60540	1
		966	30.00000	22.80000	100.05000	0.00000	0.00000	-4.13154	1
		967	31.00000	22.80000	100.05000	0.00000	0.00000	1.91496	1
		968	32.00000	22.80000	100.05000	0.00000	0.00000	2.53732	1
		969	33.00000	22.80000	100.05000	0.00000	0.00000	-0.49181	1
		970	34.00000	22.80000	100.05000	0.00000	0.00000	-1.09255	1
		971	35.00000	22.80000	100.05000	0.00000	0.00000	-1.22315	1
		972	36.00000	22.80000	100.05000	0.00000	0.00000	-1.19540	1
		973	37.00000	22.80000	100.05000	0.00000	0.00000	-1.11016	1
		974	38.00000	22.80000	100.05000	0.00000	0.00000	-1.00711	1
		975	39.00000	22.80000	100.05000	0.00000	0.00000	-0.90291	1
		976	40.00000	22.80000	100.05000	0.00000	0.00000	-0.80449	1
		977	41.00000	22.80000	100.05000	0.00000	0.00000	-0.71448	1
		978	42.00000	22.80000	100.05000	0.00000	0.00000	-0.63951	1
		979	43.00000	22.80000	100.05000	0.00000	0.00000	-0.56130	1
		980	44.00000	22.80000	100.05000	0.00000	0.00000	-0.49722	1
		981	45.00000	22.80000	100.05000	0.00000	0.00000	-0.44049	1
		982	0.00000	24.00000	100.05000	0.00000	0.00000	-0.23832	1
		983	1.00000	24.00000	100.05000	0.00000	0.00000	-0.26972	1
		984	2.00000	24.00000	100.05000	0.00000	0.00000	-0.30550	1
		985	3.00000	24.00000	100.05000	0.00000	0.00000	-0.34635	1
		986	4.00000	24.00000	100.05000	0.00000	0.00000	-0.39313	1
		987	5.00000	24.00000	100.05000	0.00000	0.00000	-0.44690	1
		988	6.00000	24.00000	100.05000	0.00000	0.00000	-0.50894	1
		989	7.00000	24.00000	100.05000	0.00000	0.00000	-0.58082	1
		990	8.00000	24.00000	100.05000	0.00000	0.00000	-0.66454	1
		991	9.00000	24.00000	100.05000	0.00000	0.00000	-0.76261	1
		992	10.00000	24.00000	100.05000	0.00000	0.00000	-0.87825	1
		993	11.00000	24.00000	100.05000	0.00000	0.00000	-1.01565	1
		994	12.00000	24.00000	100.05000	0.00000	0.00000	-1.18032	1
		995	13.00000	24.00000	100.05000	0.00000	0.00000	-1.37965	1
		996	14.00000	24.00000	100.05000	0.00000	0.00000	-1.62365	1
		997	15.00000	24.00000	100.05000	0.00000	0.00000	-1.92617	1
		998	16.00000	24.00000	100.05000	0.00000	0.00000	-2.30659	1
		999	17.00000	24.00000	100.05000	0.00000	0.00000	-2.79217	1
		1000	18.00000	24.00000	100.05000	0.00000	0.00000	-3.41987	1
		1001	19.00000	24.00000	100.05000	0.00000	0.00000	-4.22155	1
		1002	20.00000	24.00000	100.05000	0.00000	0.00000	-4.97834	1
		1003	21.00000	24.00000	100.05000	0.00000	0.00000	-8.35983	1
		1004	22.00000	24.00000	100.05000	0.00000	0.00000	-13.99468	1
		1005	23.00000	24.00000	100.05000	0.00000	0.00000	-15.93156	1
		1006	24.00000	24.00000	100.05000	0.00000	0.00000	-16.54430	1
		1007	25.00000	24.00000	100.05000	0.00000	0.00000	-16.02190	1
		1008	26.00000	24.00000	100.05000	0.00000	0.00000	-13.60108	1
		1009	27.00000	24.00000	100.05000	0.00000	0.00000	-10.48905	1
		1010	28.00000	24.00000	100.05000	0.00000	0.00000	-8.62612	1
		1011	29.00000	24.00000	100.05000	0.00000	0.00000	-6.81240	1
		1012	30.00000	24.00000	100.05000	0.00000	0.00000	-4.28253	1
		1013	31.00000	24.00000	100.05000	0.00000	0.00000	1.81823	1
		1014	32.00000	24.00000	100.05000	0.00000	0.00000	2.47777	1
		1015	33.00000	24.00000	100.05000	0.00000	0.00000	-0.53455	1
		1016	34.00000	24.00000	100.05000	0.00000	0.00000	-1.12958	1
		1017	35.00000	24.00000	100.05000	0.00000	0.00000	-1.25761	1
		1018	36.00000	24.00000	100.05000	0.00000	0.00000	-1.22748	1
		1019	37.00000	24.00000	100.05000	0.00000	0.00000	-1.13957	1
		1020	38.00000	24.00000	100.05000	0.00000	0.00000	-1.03367	1
		1021	39.00000	24.00000	100.05000	0.00000	0.00000	-0.92662	1
		1022	40.00000	24.00000	100.05000	0.00000	0.00000	-0.82549	1
		1023	41.00000	24.00000	100.05000	0.00000	0.00000	-0.73296	1
		1024	42.00000	24.00000	100.05000	0.00000	0.00000	-0.64869	1
		1025	43.00000	24.00000					



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]
		1051	23.00000	25.20000	100.05000	0.00000	0.00000	-16.18917
		1052	24.00000	25.20000	100.05000	0.00000	0.00000	-16.87653
		1053	25.00000	25.20000	100.05000	0.00000	0.00000	-16.45491
		1054	26.00000	25.20000	100.05000	0.00000	0.00000	-14.16003
		1055	27.00000	25.20000	100.05000	0.00000	0.00000	-11.16450
		1056	28.00000	25.20000	100.05000	0.00000	0.00000	-9.36971
		1057	29.00000	25.20000	100.05000	0.00000	0.00000	-7.56997
		1058	30.00000	25.20000	100.05000	0.00000	0.00000	-5.00596
		1059	31.00000	25.20000	100.05000	0.00000	0.00000	1.18197
		1060	32.00000	25.20000	100.05000	0.00000	0.00000	1.98777
		1061	33.00000	25.20000	100.05000	0.00000	0.00000	-0.86401
		1062	34.00000	25.20000	100.05000	0.00000	0.00000	-1.33882
		1063	35.00000	25.20000	100.05000	0.00000	0.00000	-1.39198
		1064	36.00000	25.20000	100.05000	0.00000	0.00000	-1.31734
		1065	37.00000	25.20000	100.05000	0.00000	0.00000	-1.20256
		1066	38.00000	25.20000	100.05000	0.00000	0.00000	-1.07982
		1067	39.00000	25.20000	100.05000	0.00000	0.00000	-0.96170
		1068	40.00000	25.20000	100.05000	0.00000	0.00000	-0.85296
		1069	41.00000	25.20000	100.05000	0.00000	0.00000	-0.75497
		1070	42.00000	25.20000	100.05000	0.00000	0.00000	-0.66764
		1071	43.00000	25.20000	100.05000	0.00000	0.00000	-0.59026
		1072	44.00000	25.20000	100.05000	0.00000	0.00000	-0.52191
		1073	45.00000	25.20000	100.05000	0.00000	0.00000	-0.46160
		1074	0.00000	26.40000	100.05000	0.00000	0.00000	-0.24557
		1075	1.00000	26.40000	100.05000	0.00000	0.00000	-0.27816
		1076	2.00000	26.40000	100.05000	0.00000	0.00000	-0.31532
		1077	3.00000	26.40000	100.05000	0.00000	0.00000	-0.35781
		1078	4.00000	26.40000	100.05000	0.00000	0.00000	-0.40653
		1079	5.00000	26.40000	100.05000	0.00000	0.00000	-0.46257
		1080	6.00000	26.40000	100.05000	0.00000	0.00000	-0.52731
		1081	7.00000	26.40000	100.05000	0.00000	0.00000	-0.60239
		1082	8.00000	26.40000	100.05000	0.00000	0.00000	-0.68992
		1083	9.00000	26.40000	100.05000	0.00000	0.00000	-0.79253
		1084	10.00000	26.40000	100.05000	0.00000	0.00000	-0.91358
		1085	11.00000	26.40000	100.05000	0.00000	0.00000	-1.05745
		1086	12.00000	26.40000	100.05000	0.00000	0.00000	-1.22986
		1087	13.00000	26.40000	100.05000	0.00000	0.00000	-1.43853
		1088	14.00000	26.40000	100.05000	0.00000	0.00000	-1.69379
		1089	15.00000	26.40000	100.05000	0.00000	0.00000	-2.01000
		1090	16.00000	26.40000	100.05000	0.00000	0.00000	-2.40730
		1091	17.00000	26.40000	100.05000	0.00000	0.00000	-2.89420
		1092	18.00000	26.40000	100.05000	0.00000	0.00000	-3.56973
		1093	19.00000	26.40000	100.05000	0.00000	0.00000	-4.40908
		1094	20.00000	26.40000	100.05000	0.00000	0.00000	-5.21789
		1095	21.00000	26.40000	100.05000	0.00000	0.00000	-6.09260
		1096	22.00000	26.40000	100.05000	0.00000	0.00000	-7.04164
		1097	23.00000	26.40000	100.05000	0.00000	0.00000	-8.07167
		1098	24.00000	26.40000	100.05000	0.00000	0.00000	-9.28439
		1099	25.00000	26.40000	100.05000	0.00000	0.00000	-10.69505
		1100	26.00000	26.40000	100.05000	0.00000	0.00000	-12.24388
		1101	27.00000	26.40000	100.05000	0.00000	0.00000	-13.91138
		1102	28.00000	26.40000	100.05000	0.00000	0.00000	-15.73679
		1103	29.00000	26.40000	100.05000	0.00000	0.00000	-17.72225
		1104	30.00000	26.40000	100.05000	0.00000	0.00000	-19.84777
		1105	31.00000	26.40000	100.05000	0.00000	0.00000	-22.17453
		1106	32.00000	26.40000	100.05000	0.00000	0.00000	-24.74444
		1107	33.00000	26.40000	100.05000	0.00000	0.00000	-27.52994
		1108	34.00000	26.40000	100.05000	0.00000	0.00000	-30.59594
		1109	35.00000	26.40000	100.05000	0.00000	0.00000	-34.00901
		1110	36.00000	26.40000	100.05000	0.00000	0.00000	-37.82334
		1111	37.00000	26.40000	100.05000	0.00000	0.00000	-42.09209
		1112	38.00000	26.40000	100.05000	0.00000	0.00000	-46.87133
		1113	39.00000	26.40000	100.05000	0.00000	0.00000	-52.21058
		1114	40.00000	26.40000	100.05000	0.00000	0.00000	-58.18529
		1115	41.00000	26.40000	100.05000	0.00000	0.00000	-64.87946
		1116	42.00000	26.40000	100.05000	0.00000	0.00000	-72.36663
		1117	43.00000	26.40000	100.05000	0.00000	0.00000	-80.70528
		1118	44.00000	26.40000	100.05000	0.00000	0.00000	-90.05396
		1119	45.00000	26.40000	100.05000	0.00000	0.00000	-100.47140
		1120	0.00000	27.60000	100.05000	0.00000	0.00000	-10.24779
		1121	1.00000	27.60000	100.05000	0.00000	0.00000	-10.28078
		1122	2.00000	27.60000	100.05000	0.00000	0.00000	-10.31842
		1123	3.00000	27.60000	100.05000	0.00000	0.00000	-10.36148
		1124	4.00000	27.60000	100.05000	0.00000	0.00000	-10.41089
		1125	5.00000	27.60000	100.05000	0.00000	0.00000	-10.46779
		1126	6.00000	27.60000	100.05000	0.00000	0.00000	-10.53357
		1127	7.00000	27.60000	100.05000	0.00000	0.00000	-10.60994
		1128	8.00000	27.60000	100.05000	0.00000	0.00000	-10.69906
		1129	9.00000	27.60000	100.05000	0.00000	0.00000	-10.80366
		1130	10.00000	27.60000	100.05000	0.00000	0.00000	-10.92721
		1131	11.00000	27.60000	100.05000	0.00000	0.00000	-11.07425
		1132	12.00000	27.60000	100.05000	0.00000	0.00000	-11.25071
		1133	13.00000	27.60000	100.05000	0.00000	0.00000	-11.46451
		1134	14.00000	27.60000	100.05000	0.00000	0.00000	-11.72638
		1135	15.00000	27.60000	100.05000	0.00000	0.00000	-12.05105
		1136	16.00000	27.60000	100.05000	0.00000	0.00000	-12.45911
		1137	17.00000	27.60000	100.05000	0.00000	0.00000	-12.97955
		1138	18.00000	27.60000	100.05000	0.00000	0.00000	-13.65192
		1139	19.00000	27.60000	100.05000	0.00000	0.00000	-14.51207
		1140	20.00000	27.60000	100.05000	0.00000	0.00000	-15.54702
		1141	21.00000	27.60000	100.05000	0.00000	0.00000	-16.84463
		1142	22.00000	27.60000	100.05000	0.00000	0.00000	-18.41703
		1143	23.00000	27.60000	100.05000	0.00000	0.00000	-20.27166
		1144	24.00000	27.60000	100.05000	0.00000	0.00000	-22.44124
		1145	25.00000	27.60000	100.05000	0.00000	0.00000	-24.97162
		1146	26.00000	27.60000	100.05000	0.00000	0.00000	-27.93256
		1147	27.00000	27.60000	100.05000	0.00000	0.00000	-31.36800
		1148	28.00000	27.60000	100.05000	0.00000	0.00000	-35.35737
		1149	29.00000	27.60000	100.05000	0.00000	0.00000	-39.94108
		1150	30.00000	27.60000	100.05000	0.00000	0.00000	-45.19026
		1151	31.00000	27.60000	100.05000	0.00000	0.00000	-51.17309
		1152	32.00000	27.60000	100.05000	0.00000	0.00000	-57.95208
		1153	33.00000	27.60000	100.05000	0.00000	0.00000	-65.57713
		1154	34.00000	27.60000	100.05000	0.00000	0.00000	-74.10949
		1155	35.00000	27.60000	100.05000	0.00000	0.00000	-83.69946
		1156	36.00000	27.60000	100.05000	0.00000	0.00000	-94.40301
		1157	37.00000	27.60000	100.05000	0.00000	0.00000	-106.28528
		1158	38.00000	27.60000	100.05000	0.00000	0.00000	-119.41063
		1159	39.00000	27.60000	100.05000	0.00000	0.00000	-133.83666
		1160	40.00000	27.60000	100.05000	0.00000	0.00000	-149.61961
		1161	41.00000	27.60000	100.05000	0.00000	0.00000	-166.90459
		1162	42.00000	27.60000	100.05000	0.00000	0.00000	-185.75544
		1163	43.00000	27.60000	100.05000	0.00000	0.00000	-206.24964
		1164	44.00000	27.60000	100.05000	0.00000	0.00000	-228.54513
		1165	45.00000	27.60000	100.05000	0.00000	0.00000	-252.70202
		1166	0.00000	28.80000	100.05000	0.00000	0.00000	-2.24899
		1167	1.00000	28.80000	100.05000	0.00000	0.00000	-2.28224
		1168	2.00000	28.80000	100.05000	0.00000	0.00000	-2.32020
		1169	3.00000	28.80000	100.05000	0.00000	0.00000	-2.36365
		1170	4.00000	28.80000	100.05000	0.00000	0.00000	-2.41358
		1171	5.00000	28.80000	100.05000	0.00000	0.00000	-2.47109
		1172	6.00000					



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
1192		26.00000	28.80000	100.05000	0.00000	0.00000	-18.53193	1	
1193		27.00000	28.80000	100.05000	0.00000	0.00000	-18.02744	1	
1194		28.00000	28.80000	100.05000	0.00000	0.00000	-17.06457	1	
1195		29.00000	28.80000	100.05000	0.00000	0.00000	-15.50571	1	
1196		30.00000	28.80000	100.05000	0.00000	0.00000	-12.90967	1	
1197		31.00000	28.80000	100.05000	0.00000	0.00000	-7.34261	1	
1198		32.00000	28.80000	100.05000	0.00000	0.00000	-3.78158	1	
1199		33.00000	28.80000	100.05000	0.00000	0.00000	-3.17788	1	
1200		34.00000	28.80000	100.05000	0.00000	0.00000	-2.57242	1	
1201		35.00000	28.80000	100.05000	0.00000	0.00000	-2.11668	1	
1202		36.00000	28.80000	100.05000	0.00000	0.00000	-1.76909	1	
1203		37.00000	28.80000	100.05000	0.00000	0.00000	-1.49689	1	
1204		38.00000	28.80000	100.05000	0.00000	0.00000	-1.27868	1	
1205		39.00000	28.80000	100.05000	0.00000	0.00000	-1.10038	1	
1206		40.00000	28.80000	100.05000	0.00000	0.00000	-0.95240	1	
1207		41.00000	28.80000	100.05000	0.00000	0.00000	-0.82807	1	
1208		42.00000	28.80000	100.05000	0.00000	0.00000	-0.72257	1	
1209		43.00000	28.80000	100.05000	0.00000	0.00000	-0.63234	1	
1210		44.00000	28.80000	100.05000	0.00000	0.00000	-0.55469	1	
1211		45.00000	28.80000	100.05000	0.00000	0.00000	-0.48750	1	
1212		0.00000	30.00000	100.05000	0.00000	0.00000	-0.24815	1	
1213		1.00000	30.00000	100.05000	0.00000	0.00000	-0.28250	1	
1214		2.00000	30.00000	100.05000	0.00000	0.00000	-0.32059	1	
1215		3.00000	30.00000	100.05000	0.00000	0.00000	-0.36425	1	
1216		4.00000	30.00000	100.05000	0.00000	0.00000	-0.41443	1	
1217		5.00000	30.00000	100.05000	0.00000	0.00000	-0.47233	1	
1218		6.00000	30.00000	100.05000	0.00000	0.00000	-0.53942	1	
1219		7.00000	30.00000	100.05000	0.00000	0.00000	-0.61753	1	
1220		8.00000	30.00000	100.05000	0.00000	0.00000	-0.70898	1	
1221		9.00000	30.00000	100.05000	0.00000	0.00000	-0.81673	1	
1222		10.00000	30.00000	100.05000	0.00000	0.00000	-0.94457	1	
1223		11.00000	30.00000	100.05000	0.00000	0.00000	-1.09748	1	
1224		12.00000	30.00000	100.05000	0.00000	0.00000	-1.28205	1	
1225		13.00000	30.00000	100.05000	0.00000	0.00000	-1.50710	1	
1226		14.00000	30.00000	100.05000	0.00000	0.00000	-1.78460	1	
1227		15.00000	30.00000	100.05000	0.00000	0.00000	-2.13094	1	
1228		16.00000	30.00000	100.05000	0.00000	0.00000	-2.56871	1	
1229		17.00000	30.00000	100.05000	0.00000	0.00000	-3.12889	1	
1230		18.00000	30.00000	100.05000	0.00000	0.00000	-3.85183	1	
1231		19.00000	30.00000	100.05000	0.00000	0.00000	-4.77094	1	
1232		20.00000	30.00000	100.05000	0.00000	0.00000	-5.86635	1	
1233		21.00000	30.00000	100.05000	0.00000	0.00000	-9.81166	1	
1234		22.00000	30.00000	100.05000	0.00000	0.00000	-15.06257	1	
1235		23.00000	30.00000	100.05000	0.00000	0.00000	-17.33367	1	
1236		24.00000	30.00000	100.05000	0.00000	0.00000	-18.52894	1	
1237		25.00000	30.00000	100.05000	0.00000	0.00000	-19.13575	1	
1238		26.00000	30.00000	100.05000	0.00000	0.00000	-19.55168	1	
1239		27.00000	30.00000	100.05000	0.00000	0.00000	-19.62083	1	
1240		28.00000	30.00000	100.05000	0.00000	0.00000	-18.78374	1	
1241		29.00000	30.00000	100.05000	0.00000	0.00000	-17.17532	1	
1242		30.00000	30.00000	100.05000	0.00000	0.00000	-14.03908	1	
1243		31.00000	30.00000	100.05000	0.00000	0.00000	-8.22109	1	
1244		32.00000	30.00000	100.05000	0.00000	0.00000	-4.46016	1	
1245		33.00000	30.00000	100.05000	0.00000	0.00000	-3.65366	1	
1246		34.00000	30.00000	100.05000	0.00000	0.00000	-2.88839	1	
1247		35.00000	30.00000	100.05000	0.00000	0.00000	-2.31735	1	
1248		36.00000	30.00000	100.05000	0.00000	0.00000	-1.89996	1	
1249		37.00000	30.00000	100.05000	0.00000	0.00000	-1.58365	1	
1250		38.00000	30.00000	100.05000	0.00000	0.00000	-1.33717	1	
1251		39.00000	30.00000	100.05000	0.00000	0.00000	-1.14041	1	
1252		40.00000	30.00000	100.05000	0.00000	0.00000	-0.98019	1	
1253		41.00000	30.00000	100.05000	0.00000	0.00000	-0.84760	1	
1254		42.00000	30.00000	100.05000	0.00000	0.00000	-0.73645	1	
1255		43.00000	30.00000	100.05000	0.00000	0.00000	-0.64231	1	
1256		44.00000	30.00000	100.05000	0.00000	0.00000	-0.56191	1	
1257		45.00000	30.00000	100.05000	0.00000	0.00000	-0.49278	1	
1258		0.00000	31.20000	100.05000	0.00000	0.00000	-0.24822	1	
1259		1.00000	31.20000	100.05000	0.00000	0.00000	-0.28150	1	
1260		2.00000	31.20000	100.05000	0.00000	0.00000	-0.31955	1	
1261		3.00000	31.20000	100.05000	0.00000	0.00000	-0.36318	1	
1262		4.00000	31.20000	100.05000	0.00000	0.00000	-0.41337	1	
1263		5.00000	31.20000	100.05000	0.00000	0.00000	-0.47135	1	
1264		6.00000	31.20000	100.05000	0.00000	0.00000	-0.53862	1	
1265		7.00000	31.20000	100.05000	0.00000	0.00000	-0.61708	1	
1266		8.00000	31.20000	100.05000	0.00000	0.00000	-0.70811	1	
1267		9.00000	31.20000	100.05000	0.00000	0.00000	-0.81780	1	
1268		10.00000	31.20000	100.05000	0.00000	0.00000	-0.94715	1	
1269		11.00000	31.20000	100.05000	0.00000	0.00000	-1.10243	1	
1270		12.00000	31.20000	100.05000	0.00000	0.00000	-1.29069	1	
1271		13.00000	31.20000	100.05000	0.00000	0.00000	-1.52146	1	
1272		14.00000	31.20000	100.05000	0.00000	0.00000	-1.80781	1	
1273		15.00000	31.20000	100.05000	0.00000	0.00000	-2.16788	1	
1274		16.00000	31.20000	100.05000	0.00000	0.00000	-2.62702	1	
1275		17.00000	31.20000	100.05000	0.00000	0.00000	-3.22038	1	
1276		18.00000	31.20000	100.05000	0.00000	0.00000	-3.99370	1	
1277		19.00000	31.20000	100.05000	0.00000	0.00000	-4.98205	1	
1278		20.00000	31.20000	100.05000	0.00000	0.00000	-5.94495	1	
1279		21.00000	31.20000	100.05000	0.00000	0.00000	-10.10768	1	
1280		22.00000	31.20000	100.05000	0.00000	0.00000	-15.32973	1	
1281		23.00000	31.20000	100.05000	0.00000	0.00000	-17.58242	1	
1282		24.00000	31.20000	100.05000	0.00000	0.00000	-18.80212	1	
1283		25.00000	31.20000	100.05000	0.00000	0.00000	-19.49627	1	
1284		26.00000	31.20000	100.05000	0.00000	0.00000	-20.13922	1	
1285		27.00000	31.20000	100.05000	0.00000	0.00000	-20.44110	1	
1286		28.00000	31.20000	100.05000	0.00000	0.00000	-19.59286	1	
1287		29.00000	31.20000	100.05000	0.00000	0.00000	-17.81132	1	
1288		30.00000	31.20000	100.05000	0.00000	0.00000	-14.42821	1	
1289		31.00000	31.20000	100.05000	0.00000	0.00000	-8.71356	1	
1290		32.00000	31.20000	100.05000	0.00000	0.00000	-4.98295	1	
1291		33.00000	31.20000	100.05000	0.00000	0.00000	-3.94942	1	
1292		34.00000	31.20000	100.05000	0.00000	0.00000	-3.09916	1	
1293		35.00000	31.20000	100.05000	0.00000	0.00000	-2.45820	1	
1294		36.00000	31.20000	100.05000	0.00000	0.00000	-1.99372	1	
1295		37.00000	31.20000	100.05000	0.00000	0.00000	-1.64677	1	
1296		38.00000	31.20000	100.05000	0.00000	0.00000	-1.37997	1	
1297		39.00000	31.20000	100.05000	0.00000	0.00000	-1.16957	1	
1298		40.00000	31.20000	100.05000	0.00000	0.00000	-1.00009	1	
1299		41.00000	31.20000	100.05000	0.00000	0.00000	-0.86119	1	
1300		42.00000	31.20000	100.05000	0.00000	0.00000	-0.74570	1	
1301		43.00000	31.20000	100.05000	0.00000	0.00000	-0.64857	1	
1302		44.00000	31.20000	100.05000	0.00000	0.00000	-0.56610	1	
1303		45.00000	31.20000	100.05000	0.00000	0.00000	-0.49553	1	
1304		0.00000	32.40000	100.05000	0.00000	0.00000	-0.24619	1	
1305		1.00000	32.40000	100.05000	0.00000	0.00000	-0.27923	1	
1306		2.00000	32.40000	100.05000	0.00000	0.00000	-0.31702	1	
1307		3.00000	32.40000	100.05000	0.00000	0.00000	-0.36039	1	
1308		4.00000	32.40000	100.05000	0.00000	0.00000	-0.41031	1	
1309		5.00000	32.40000	100.05000	0.00000	0.00000	-0.46804	1	
1310		6.00000	32.40000	100.05000	0.00000	0.00000	-0.53510	1	
1311	</								



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
		1333	29.00000	32.40000	100.05000	0.00000	0.00000	-16.90014	1
		1334	30.00000	32.40000	100.05000	0.00000	0.00000	-13.16816	1
		1335	31.00000	32.40000	100.05000	0.00000	0.00000	-9.50365	1
		1336	32.00000	32.40000	100.05000	0.00000	0.00000	-6.23284	1
		1337	33.00000	32.40000	100.05000	0.00000	0.00000	-4.24848	1
		1338	34.00000	32.40000	100.05000	0.00000	0.00000	-3.22003	1
		1339	35.00000	32.40000	100.05000	0.00000	0.00000	-2.53441	1
		1340	36.00000	32.40000	100.05000	0.00000	0.00000	-2.04512	1
		1341	37.00000	32.40000	100.05000	0.00000	0.00000	-1.68173	1
		1342	38.00000	32.40000	100.05000	0.00000	0.00000	-1.40353	1
		1343	39.00000	32.40000	100.05000	0.00000	0.00000	-1.18515	1
		1344	40.00000	32.40000	100.05000	0.00000	0.00000	-1.01013	1
		1345	41.00000	32.40000	100.05000	0.00000	0.00000	-0.86739	1
		1346	42.00000	32.40000	100.05000	0.00000	0.00000	-0.74928	1
		1347	43.00000	32.40000	100.05000	0.00000	0.00000	-0.65037	1
		1348	44.00000	32.40000	100.05000	0.00000	0.00000	-0.56971	1
		1349	45.00000	32.40000	100.05000	0.00000	0.00000	-0.49537	1
		1350	0.00000	33.60000	100.05000	0.00000	0.00000	-0.24304	1
		1351	1.00000	33.60000	100.05000	0.00000	0.00000	-0.27566	1
		1352	2.00000	33.60000	100.05000	0.00000	0.00000	-0.31299	1
		1353	3.00000	33.60000	100.05000	0.00000	0.00000	-0.35583	1
		1354	4.00000	33.60000	100.05000	0.00000	0.00000	-0.40518	1
		1355	5.00000	33.60000	100.05000	0.00000	0.00000	-0.46229	1
		1356	6.00000	33.60000	100.05000	0.00000	0.00000	-0.52871	1
		1357	7.00000	33.60000	100.05000	0.00000	0.00000	-0.60639	1
		1358	8.00000	33.60000	100.05000	0.00000	0.00000	-0.69788	1
		1359	9.00000	33.60000	100.05000	0.00000	0.00000	-0.80646	1
		1360	10.00000	33.60000	100.05000	0.00000	0.00000	-0.93650	1
		1361	11.00000	33.60000	100.05000	0.00000	0.00000	-1.09385	1
		1362	12.00000	33.60000	100.05000	0.00000	0.00000	-1.28655	1
		1363	13.00000	33.60000	100.05000	0.00000	0.00000	-1.52583	1
		1364	14.00000	33.60000	100.05000	0.00000	0.00000	-1.82768	1
		1365	15.00000	33.60000	100.05000	0.00000	0.00000	-2.21554	1
		1366	16.00000	33.60000	100.05000	0.00000	0.00000	-2.72499	1
		1367	17.00000	33.60000	100.05000	0.00000	0.00000	-3.41300	1
		1368	18.00000	33.60000	100.05000	0.00000	0.00000	-4.39992	1
		1369	19.00000	33.60000	100.05000	0.00000	0.00000	-5.84477	1
		1370	20.00000	33.60000	100.05000	0.00000	0.00000	-8.67066	1
		1371	21.00000	33.60000	100.05000	0.00000	0.00000	-12.83973	1
		1372	22.00000	33.60000	100.05000	0.00000	0.00000	-16.21460	1
		1373	23.00000	33.60000	100.05000	0.00000	0.00000	-19.25660	1
		1374	24.00000	33.60000	100.05000	0.00000	0.00000	-19.07961	1
		1375	25.00000	33.60000	100.05000	0.00000	0.00000	-19.72807	1
		1376	26.00000	33.60000	100.05000	0.00000	0.00000	-20.35756	1
		1377	27.00000	33.60000	100.05000	0.00000	0.00000	-20.57811	1
		1378	28.00000	33.60000	100.05000	0.00000	0.00000	-19.38200	1
		1379	29.00000	33.60000	100.05000	0.00000	0.00000	-16.26961	1
		1380	30.00000	33.60000	100.05000	0.00000	0.00000	-11.38467	1
		1381	31.00000	33.60000	100.05000	0.00000	0.00000	-7.95280	1
		1382	32.00000	33.60000	100.05000	0.00000	0.00000	-5.75502	1
		1383	33.00000	33.60000	100.05000	0.00000	0.00000	-4.21812	1
		1384	34.00000	33.60000	100.05000	0.00000	0.00000	-3.22545	1
		1385	35.00000	33.60000	100.05000	0.00000	0.00000	-2.54444	1
		1386	36.00000	33.60000	100.05000	0.00000	0.00000	-2.05378	1
		1387	37.00000	33.60000	100.05000	0.00000	0.00000	-1.68761	1
		1388	38.00000	33.60000	100.05000	0.00000	0.00000	-1.40664	1
		1389	39.00000	33.60000	100.05000	0.00000	0.00000	-1.18599	1
		1390	40.00000	33.60000	100.05000	0.00000	0.00000	-1.00927	1
		1391	41.00000	33.60000	100.05000	0.00000	0.00000	-0.86537	1
		1392	42.00000	33.60000	100.05000	0.00000	0.00000	-0.74653	1
		1393	43.00000	33.60000	100.05000	0.00000	0.00000	-0.64721	1
		1394	44.00000	33.60000	100.05000	0.00000	0.00000	-0.56337	1
		1395	45.00000	33.60000	100.05000	0.00000	0.00000	-0.49202	1
		1396	0.00000	34.80000	100.05000	0.00000	0.00000	-0.23878	1
		1397	1.00000	34.80000	100.05000	0.00000	0.00000	-0.27080	1
		1398	2.00000	34.80000	100.05000	0.00000	0.00000	-0.30743	1
		1399	3.00000	34.80000	100.05000	0.00000	0.00000	-0.34948	1
		1400	4.00000	34.80000	100.05000	0.00000	0.00000	-0.39794	1
		1401	5.00000	34.80000	100.05000	0.00000	0.00000	-0.45404	1
		1402	6.00000	34.80000	100.05000	0.00000	0.00000	-0.51932	1
		1403	7.00000	34.80000	100.05000	0.00000	0.00000	-0.59576	1
		1404	8.00000	34.80000	100.05000	0.00000	0.00000	-0.68590	1
		1405	9.00000	34.80000	100.05000	0.00000	0.00000	-0.79308	1
		1406	10.00000	34.80000	100.05000	0.00000	0.00000	-0.92176	1
		1407	11.00000	34.80000	100.05000	0.00000	0.00000	-1.07801	1
		1408	12.00000	34.80000	100.05000	0.00000	0.00000	-1.27020	1
		1409	13.00000	34.80000	100.05000	0.00000	0.00000	-1.51021	1
		1410	14.00000	34.80000	100.05000	0.00000	0.00000	-1.81523	1
		1411	15.00000	34.80000	100.05000	0.00000	0.00000	-2.21100	1
		1412	16.00000	34.80000	100.05000	0.00000	0.00000	-2.73750	1
		1413	17.00000	34.80000	100.05000	0.00000	0.00000	-3.46100	1
		1414	18.00000	34.80000	100.05000	0.00000	0.00000	-4.50309	1
		1415	19.00000	34.80000	100.05000	0.00000	0.00000	-6.13604	1
		1416	20.00000	34.80000	100.05000	0.00000	0.00000	-9.30391	1
		1417	21.00000	34.80000	100.05000	0.00000	0.00000	-13.46018	1
		1418	22.00000	34.80000	100.05000	0.00000	0.00000	-16.46861	1
		1419	23.00000	34.80000	100.05000	0.00000	0.00000	-18.08003	1
		1420	24.00000	34.80000	100.05000	0.00000	0.00000	-19.05063	1
		1421	25.00000	34.80000	100.05000	0.00000	0.00000	-19.64617	1
		1422	26.00000	34.80000	100.05000	0.00000	0.00000	-20.23539	1
		1423	27.00000	34.80000	100.05000	0.00000	0.00000	-20.40692	1
		1424	28.00000	34.80000	100.05000	0.00000	0.00000	-19.13171	1
		1425	29.00000	34.80000	100.05000	0.00000	0.00000	-15.88262	1
		1426	30.00000	34.80000	100.05000	0.00000	0.00000	-10.74746	1
		1427	31.00000	34.80000	100.05000	0.00000	0.00000	-7.28449	1
		1428	32.00000	34.80000	100.05000	0.00000	0.00000	-5.34936	1
		1429	33.00000	34.80000	100.05000	0.00000	0.00000	-4.05199	1
		1430	34.00000	34.80000	100.05000	0.00000	0.00000	-3.14694	1
		1431	35.00000	34.80000	100.05000	0.00000	0.00000	-2.49990	1
		1432	36.00000	34.80000	100.05000	0.00000	0.00000	-1.92471	1
		1433	37.00000	34.80000	100.05000	0.00000	0.00000	-1.66649	1
		1434	38.00000	34.80000	100.05000	0.00000	0.00000	-1.39002	1
		1435	39.00000	34.80000	100.05000	0.00000	0.00000	-1.17216	1
		1436	40.00000	34.80000	100.05000	0.00000	0.00000	-0.99736	1
		1437	41.00000	34.80000	100.05000	0.00000	0.00000	-0.85489	1
		1438	42.00000	34.80000	100.05000	0.00000	0.00000	-0.73720	1
		1439	43.00000	34.80000	100.05000	0.00000	0.00000	-0.63887	1
		1440	44.00000	34.80000	100.05000	0.00000	0.00000	-0.55592	1
		1441	45.00000	34.80000	100.05000	0.00000	0.00000	-0.48535	1
		1442	0.00000	36.00000	100.05000	0.00000	0.00000	-0.23345	1
		1443	1.00000	36.00000	100.05000	0.00000	0.00000	-0.26468	1
		1444	2.00000	36.00000	100.05000	0.00000	0.00000	-0.30039	1
		1445	3.00000	36.00000	100.05000	0.00000	0.00000	-0.34138	1
		1446	4.00000	36.00000	100.05000	0.00000	0.00000	-0.38861	1
		1447	5.00000	36.00000	100.05000				



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
1474		32.00000	36.00000	100.05000	0.00000	0.00000	-5.08813	1	
1475		33.00000	36.00000	100.05000	0.00000	0.00000	-3.87298	1	
1476		34.00000	36.00000	100.05000	0.00000	0.00000	-3.02737	1	
1477		35.00000	36.00000	100.05000	0.00000	0.00000	-2.41749	1	
1478		36.00000	36.00000	100.05000	0.00000	0.00000	-1.96539	1	
1479		37.00000	36.00000	100.05000	0.00000	0.00000	-1.62204	1	
1480		38.00000	36.00000	100.05000	0.00000	0.00000	-1.35553	1	
1481		39.00000	36.00000	100.05000	0.00000	0.00000	-1.14463	1	
1482		40.00000	36.00000	100.05000	0.00000	0.00000	-0.97486	1	
1483		41.00000	36.00000	100.05000	0.00000	0.00000	-0.83617	1	
1484		42.00000	36.00000	100.05000	0.00000	0.00000	-0.72142	1	
1485		43.00000	36.00000	100.05000	0.00000	0.00000	-0.62542	1	
1486		44.00000	36.00000	100.05000	0.00000	0.00000	-0.54436	1	
1487		45.00000	36.00000	100.05000	0.00000	0.00000	-0.47536	1	
1488		0.00000	37.20000	100.05000	0.00000	0.00000	-0.22709	1	
1489		1.00000	37.20000	100.05000	0.00000	0.00000	-0.25735	1	
1490		2.00000	37.20000	100.05000	0.00000	0.00000	-0.29193	1	
1491		3.00000	37.20000	100.05000	0.00000	0.00000	-0.33158	1	
1492		4.00000	37.20000	100.05000	0.00000	0.00000	-0.37725	1	
1493		5.00000	37.20000	100.05000	0.00000	0.00000	-0.43008	1	
1494		6.00000	37.20000	100.05000	0.00000	0.00000	-0.48955	1	
1495		7.00000	37.20000	100.05000	0.00000	0.00000	-0.56351	1	
1496		8.00000	37.20000	100.05000	0.00000	0.00000	-0.64841	1	
1497		9.00000	37.20000	100.05000	0.00000	0.00000	-0.74947	1	
1498		10.00000	37.20000	100.05000	0.00000	0.00000	-0.87104	1	
1499		11.00000	37.20000	100.05000	0.00000	0.00000	-1.01507	1	
1500		12.00000	37.20000	100.05000	0.00000	0.00000	-1.20193	1	
1501		13.00000	37.20000	100.05000	0.00000	0.00000	-1.43163	1	
1502		14.00000	37.20000	100.05000	0.00000	0.00000	-1.72585	1	
1503		15.00000	37.20000	100.05000	0.00000	0.00000	-2.11138	1	
1504		16.00000	37.20000	100.05000	0.00000	0.00000	-2.60400	1	
1505		17.00000	37.20000	100.05000	0.00000	0.00000	-3.35284	1	
1506		18.00000	37.20000	100.05000	0.00000	0.00000	-4.40488	1	
1507		19.00000	37.20000	100.05000	0.00000	0.00000	-6.05786	1	
1508		20.00000	37.20000	100.05000	0.00000	0.00000	-9.22728	1	
1509		21.00000	37.20000	100.05000	0.00000	0.00000	-13.30638	1	
1510		22.00000	37.20000	100.05000	0.00000	0.00000	-16.16594	1	
1511		23.00000	37.20000	100.05000	0.00000	0.00000	-17.62890	1	
1512		24.00000	37.20000	100.05000	0.00000	0.00000	-18.48651	1	
1513		25.00000	37.20000	100.05000	0.00000	0.00000	-19.00633	1	
1514		26.00000	37.20000	100.05000	0.00000	0.00000	-19.54893	1	
1515		27.00000	37.20000	100.05000	0.00000	0.00000	-19.69297	1	
1516		28.00000	37.20000	100.05000	0.00000	0.00000	-18.40061	1	
1517		29.00000	37.20000	100.05000	0.00000	0.00000	-15.14181	1	
1518		30.00000	37.20000	100.05000	0.00000	0.00000	-10.02077	1	
1519		31.00000	37.20000	100.05000	0.00000	0.00000	-6.63243	1	
1520		32.00000	37.20000	100.05000	0.00000	0.00000	-4.83139	1	
1521		33.00000	37.20000	100.05000	0.00000	0.00000	-3.67510	1	
1522		34.00000	37.20000	100.05000	0.00000	0.00000	-2.87894	1	
1523		35.00000	37.20000	100.05000	0.00000	0.00000	-2.30659	1	
1524		36.00000	37.20000	100.05000	0.00000	0.00000	-1.88370	1	
1525		37.00000	37.20000	100.05000	0.00000	0.00000	-1.55785	1	
1526		38.00000	37.20000	100.05000	0.00000	0.00000	-1.30541	1	
1527		39.00000	37.20000	100.05000	0.00000	0.00000	-1.10480	1	
1528		40.00000	37.20000	100.05000	0.00000	0.00000	-0.94270	1	
1529		41.00000	37.20000	100.05000	0.00000	0.00000	-0.80982	1	
1530		42.00000	37.20000	100.05000	0.00000	0.00000	-0.69957	1	
1531		43.00000	37.20000	100.05000	0.00000	0.00000	-0.60711	1	
1532		44.00000	37.20000	100.05000	0.00000	0.00000	-0.52889	1	
1533		45.00000	37.20000	100.05000	0.00000	0.00000	-0.46220	1	
1534		0.00000	38.40000	100.05000	0.00000	0.00000	-0.21978	1	
1535		1.00000	38.40000	100.05000	0.00000	0.00000	-0.24889	1	
1536		2.00000	38.40000	100.05000	0.00000	0.00000	-0.28213	1	
1537		3.00000	38.40000	100.05000	0.00000	0.00000	-0.32021	1	
1538		4.00000	38.40000	100.05000	0.00000	0.00000	-0.36400	1	
1539		5.00000	38.40000	100.05000	0.00000	0.00000	-0.41460	1	
1540		6.00000	38.40000	100.05000	0.00000	0.00000	-0.47339	1	
1541		7.00000	38.40000	100.05000	0.00000	0.00000	-0.54213	1	
1542		8.00000	38.40000	100.05000	0.00000	0.00000	-0.62312	1	
1543		9.00000	38.40000	100.05000	0.00000	0.00000	-0.71940	1	
1544		10.00000	38.40000	100.05000	0.00000	0.00000	-0.83505	1	
1545		11.00000	38.40000	100.05000	0.00000	0.00000	-0.97571	1	
1546		12.00000	38.40000	100.05000	0.00000	0.00000	-1.14928	1	
1547		13.00000	38.40000	100.05000	0.00000	0.00000	-1.36711	1	
1548		14.00000	38.40000	100.05000	0.00000	0.00000	-1.64597	1	
1549		15.00000	38.40000	100.05000	0.00000	0.00000	-2.01136	1	
1550		16.00000	38.40000	100.05000	0.00000	0.00000	-2.50363	1	
1551		17.00000	38.40000	100.05000	0.00000	0.00000	-3.19021	1	
1552		18.00000	38.40000	100.05000	0.00000	0.00000	-4.19410	1	
1553		19.00000	38.40000	100.05000	0.00000	0.00000	-5.78250	1	
1554		20.00000	38.40000	100.05000	0.00000	0.00000	-8.87303	1	
1555		21.00000	38.40000	100.05000	0.00000	0.00000	-12.86084	1	
1556		22.00000	38.40000	100.05000	0.00000	0.00000	-15.62953	1	
1557		23.00000	38.40000	100.05000	0.00000	0.00000	-17.01503	1	
1558		24.00000	38.40000	100.05000	0.00000	0.00000	-17.81662	1	
1559		25.00000	38.40000	100.05000	0.00000	0.00000	-18.30503	1	
1560		26.00000	38.40000	100.05000	0.00000	0.00000	-18.84237	1	
1561		27.00000	38.40000	100.05000	0.00000	0.00000	-19.00887	1	
1562		28.00000	38.40000	100.05000	0.00000	0.00000	-17.76689	1	
1563		29.00000	38.40000	100.05000	0.00000	0.00000	-14.58187	1	
1564		30.00000	38.40000	100.05000	0.00000	0.00000	-9.54770	1	
1565		31.00000	38.40000	100.05000	0.00000	0.00000	-6.24772	1	
1566		32.00000	38.40000	100.05000	0.00000	0.00000	-4.52787	1	
1567		33.00000	38.40000	100.05000	0.00000	0.00000	-3.44071	1	
1568		34.00000	38.40000	100.05000	0.00000	0.00000	-2.70000	1	
1569		35.00000	38.40000	100.05000	0.00000	0.00000	-2.17022	1	
1570		36.00000	38.40000	100.05000	0.00000	0.00000	-1.77717	1	
1571		37.00000	38.40000	100.05000	0.00000	0.00000	-1.47689	1	
1572		38.00000	38.40000	100.05000	0.00000	0.00000	-1.24194	1	
1573		39.00000	38.40000	100.05000	0.00000	0.00000	-1.05433	1	
1574		40.00000	38.40000	100.05000	0.00000	0.00000	-0.90205	1	
1575		41.00000	38.40000	100.05000	0.00000	0.00000	-0.77670	1	
1576		42.00000	38.40000	100.05000	0.00000	0.00000	-0.67227	1	
1577		43.00000	38.40000	100.05000	0.00000	0.00000	-0.58441	1	
1578		44.00000	38.40000	100.05000	0.00000	0.00000	-0.50986	1	
1579		45.00000	38.40000	100.05000	0.00000	0.00000	-0.44613	1	
1580		0.00000	39.60000	100.05000	0.00000	0.00000	-0.23160	1	
1581		1.00000	39.60000	100.05000	0.00000	0.00000	-0.23942	1	
1582		2.00000	39.60000	100.05000	0.00000	0.00000	-0.27113	1	
1583		3.00000	39.60000	100.05000	0.00000	0.00000	-0.30740	1	
1584		4.00000	39.60000	100.05000	0.00000	0.00000	-0.34903	1	
1585		5.00000	39.60000	100.05000	0.00000	0.00000	-0.39705	1	
1586		6.00000	39.60000	100.05000	0.00000	0.00000	-0.45271	1	
1587		7.00000	39.60000	100.05000	0.00000	0.00000	-0.51764	1	
1588		8.00000	39.60000	100.05000	0.00000	0.00000	-0.59394	1	
1589		9.00000	39.60000	100.05000	0.00000	0.00000	-0.68439	1	
1590		10.00000	39.60000	100.05000	0.00000	0.00000	-0.79270	1	
1591		11.00000	39.60000	100.05000	0.00000	0.00000	-0.92397	1	
1592		12.00000	39.60000	100.05000	0.00000	0.00000	-1.08534	1	
1593		13.0							



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
		1615	35.00000	39.60000	100.05000	0.00000	0.00000	-2.00987	1
		1616	36.00000	39.60000	100.05000	0.00000	0.00000	-1.65453	1
		1617	37.00000	39.60000	100.05000	0.00000	0.00000	-1.38187	1
		1618	38.00000	39.60000	100.05000	0.00000	0.00000	-1.16732	1
		1619	39.00000	39.60000	100.05000	0.00000	0.00000	-0.99500	1
		1620	40.00000	39.60000	100.05000	0.00000	0.00000	-0.85430	1
		1621	41.00000	39.60000	100.05000	0.00000	0.00000	-0.73784	1
		1622	42.00000	39.60000	100.05000	0.00000	0.00000	-0.64033	1
		1623	43.00000	39.60000	100.05000	0.00000	0.00000	-0.55792	1
		1624	44.00000	39.60000	100.05000	0.00000	0.00000	-0.48771	1
		1625	45.00000	39.60000	100.05000	0.00000	0.00000	-0.42748	1
		1626	0.00000	40.80000	100.05000	0.00000	0.00000	-0.20266	1
		1627	1.00000	40.80000	100.05000	0.00000	0.00000	-0.22906	1
		1628	2.00000	40.80000	100.05000	0.00000	0.00000	-0.25909	1
		1629	3.00000	40.80000	100.05000	0.00000	0.00000	-0.29336	1
		1630	4.00000	40.80000	100.05000	0.00000	0.00000	-0.33260	1
		1631	5.00000	40.80000	100.05000	0.00000	0.00000	-0.37773	1
		1632	6.00000	40.80000	100.05000	0.00000	0.00000	-0.42988	1
		1633	7.00000	40.80000	100.05000	0.00000	0.00000	-0.49052	1
		1634	8.00000	40.80000	100.05000	0.00000	0.00000	-0.56149	1
		1635	9.00000	40.80000	100.05000	0.00000	0.00000	-0.64524	1
		1636	10.00000	40.80000	100.05000	0.00000	0.00000	-0.74503	1
		1637	11.00000	40.80000	100.05000	0.00000	0.00000	-0.86527	1
		1638	12.00000	40.80000	100.05000	0.00000	0.00000	-1.01208	1
		1639	13.00000	40.80000	100.05000	0.00000	0.00000	-1.19416	1
		1640	14.00000	40.80000	100.05000	0.00000	0.00000	-1.42420	1
		1641	15.00000	40.80000	100.05000	0.00000	0.00000	-1.72133	1
		1642	16.00000	40.80000	100.05000	0.00000	0.00000	-2.11580	1
		1643	17.00000	40.80000	100.05000	0.00000	0.00000	-2.65886	1
		1644	18.00000	40.80000	100.05000	0.00000	0.00000	-3.44804	1
		1645	19.00000	40.80000	100.05000	0.00000	0.00000	-4.71428	1
		1646	20.00000	40.80000	100.05000	0.00000	0.00000	-7.33076	1
		1647	21.00000	40.80000	100.05000	0.00000	0.00000	-10.67544	1
		1648	22.00000	40.80000	100.05000	0.00000	0.00000	-12.85508	1
		1649	23.00000	40.80000	100.05000	0.00000	0.00000	-13.98358	1
		1650	24.00000	40.80000	100.05000	0.00000	0.00000	-14.87880	1
		1651	25.00000	40.80000	100.05000	0.00000	0.00000	-14.86222	1
		1652	26.00000	40.80000	100.05000	0.00000	0.00000	-15.38774	1
		1653	27.00000	40.80000	100.05000	0.00000	0.00000	-15.67630	1
		1654	28.00000	40.80000	100.05000	0.00000	0.00000	-14.77297	1
		1655	29.00000	40.80000	100.05000	0.00000	0.00000	-12.21692	1
		1656	30.00000	40.80000	100.05000	0.00000	0.00000	-7.83532	1
		1657	31.00000	40.80000	100.05000	0.00000	0.00000	-5.03616	1
		1658	32.00000	40.80000	100.05000	0.00000	0.00000	-3.66812	1
		1659	33.00000	40.80000	100.05000	0.00000	0.00000	-2.92059	1
		1660	34.00000	40.80000	100.05000	0.00000	0.00000	-2.84188	1
		1661	35.00000	40.80000	100.05000	0.00000	0.00000	-1.82899	1
		1662	36.00000	40.80000	100.05000	0.00000	0.00000	-1.51734	1
		1663	37.00000	40.80000	100.05000	0.00000	0.00000	-1.27591	1
		1664	38.00000	40.80000	100.05000	0.00000	0.00000	-1.08416	1
		1665	39.00000	40.80000	100.05000	0.00000	0.00000	-0.92384	1
		1666	40.00000	40.80000	100.05000	0.00000	0.00000	-0.80100	1
		1667	41.00000	40.80000	100.05000	0.00000	0.00000	-0.69443	1
		1668	42.00000	40.80000	100.05000	0.00000	0.00000	-0.60464	1
		1669	43.00000	40.80000	100.05000	0.00000	0.00000	-0.52832	1
		1670	44.00000	40.80000	100.05000	0.00000	0.00000	-0.46298	1
		1671	45.00000	40.80000	100.05000	0.00000	0.00000	-0.40669	1
		1672	0.00000	42.00000	100.05000	0.00000	0.00000	-0.19310	1
		1673	1.00000	42.00000	100.05000	0.00000	0.00000	-0.21797	1
		1674	2.00000	42.00000	100.05000	0.00000	0.00000	-0.24620	1
		1675	3.00000	42.00000	100.05000	0.00000	0.00000	-0.27831	1
		1676	4.00000	42.00000	100.05000	0.00000	0.00000	-0.31498	1
		1677	5.00000	42.00000	100.05000	0.00000	0.00000	-0.35699	1
		1678	6.00000	42.00000	100.05000	0.00000	0.00000	-0.40536	1
		1679	7.00000	42.00000	100.05000	0.00000	0.00000	-0.46134	1
		1680	8.00000	42.00000	100.05000	0.00000	0.00000	-0.52652	1
		1681	9.00000	42.00000	100.05000	0.00000	0.00000	-0.60298	1
		1682	10.00000	42.00000	100.05000	0.00000	0.00000	-0.69344	1
		1683	11.00000	42.00000	100.05000	0.00000	0.00000	-0.80153	1
		1684	12.00000	42.00000	100.05000	0.00000	0.00000	-0.93224	1
		1685	13.00000	42.00000	100.05000	0.00000	0.00000	-1.09245	1
		1686	14.00000	42.00000	100.05000	0.00000	0.00000	-1.29203	1
		1687	15.00000	42.00000	100.05000	0.00000	0.00000	-1.54540	1
		1688	16.00000	42.00000	100.05000	0.00000	0.00000	-1.87463	1
		1689	17.00000	42.00000	100.05000	0.00000	0.00000	-2.31560	1
		1690	18.00000	42.00000	100.05000	0.00000	0.00000	-2.93330	1
		1691	19.00000	42.00000	100.05000	0.00000	0.00000	-3.87671	1
		1692	20.00000	42.00000	100.05000	0.00000	0.00000	-5.77622	1
		1693	21.00000	42.00000	100.05000	0.00000	0.00000	-7.80685	1
		1694	22.00000	42.00000	100.05000	0.00000	0.00000	-8.95083	1
		1695	23.00000	42.00000	100.05000	0.00000	0.00000	-9.65240	1
		1696	24.00000	42.00000	100.05000	0.00000	0.00000	-10.08725	1
		1697	25.00000	42.00000	100.05000	0.00000	0.00000	-10.36751	1
		1698	26.00000	42.00000	100.05000	0.00000	0.00000	-10.77450	1
		1699	27.00000	42.00000	100.05000	0.00000	0.00000	-11.03626	1
		1700	28.00000	42.00000	100.05000	0.00000	0.00000	-10.45916	1
		1701	29.00000	42.00000	100.05000	0.00000	0.00000	-9.19126	1
		1702	30.00000	42.00000	100.05000	0.00000	0.00000	-6.16324	1
		1703	31.00000	42.00000	100.05000	0.00000	0.00000	-4.12829	1
		1704	32.00000	42.00000	100.05000	0.00000	0.00000	-3.10683	1
		1705	33.00000	42.00000	100.05000	0.00000	0.00000	-2.44491	1
		1706	34.00000	42.00000	100.05000	0.00000	0.00000	-1.97910	1
		1707	35.00000	42.00000	100.05000	0.00000	0.00000	-1.63472	1
		1708	36.00000	42.00000	100.05000	0.00000	0.00000	-1.37081	1
		1709	37.00000	42.00000	100.05000	0.00000	0.00000	-1.16397	1
		1710	38.00000	42.00000	100.05000	0.00000	0.00000	-0.99537	1
		1711	39.00000	42.00000	100.05000	0.00000	0.00000	-0.85804	1
		1712	40.00000	42.00000	100.05000	0.00000	0.00000	-0.74384	1
		1713	41.00000	42.00000	100.05000	0.00000	0.00000	-0.64777	1
		1714	42.00000	42.00000	100.05000	0.00000	0.00000	-0.56620	1
		1715	43.00000	42.00000	100.05000	0.00000	0.00000	-0.49640	1
		1716	44.00000	42.00000	100.05000	0.00000	0.00000	-0.43628	1
		1717	45.00000	42.00000	100.05000	0.00000	0.00000	-0.38422	1
		1718	0.00000	43.20000	100.05000	0.00000	0.00000	-0.18303	1
		1719	1.00000	43.20000	100.05000	0.00000	0.00000	-0.20631	1
		1720	2.00000	43.20000	100.05000	0.00000	0.00000	-0.23264	1
		1721	3.00000	43.20000	100.05000	0.00000	0.00000	-0.26251	1
		1722	4.00000	43.20000	100.05000	0.00000	0.00000	-0.29647	1
		1723	5.00000	43.20000	100.05000	0.00000	0.00000	-0.33523	1
		1724	6.00000	43.20000	100.05000	0.00000	0.00000	-0.37964	1
		1725	7.00000	43.20000	100.05000	0.00000	0.00000	-0.43075	1
		1726	8.00000	43.20000	100.05000	0.00000	0.00000	-0.48989	1
		1727	9.00000	43.20000	100.05000	0.00000	0.00000	-0.55874	1
		1728	10.00000	43.20000	100.05000	0.00000	0.00000	-0.63949	1
		1729	11.00000	43.20000	100.05000	0.00000			



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
		1756	38.00000	43.20000	100.05000	0.00000	0.00000	-0.90410	1
		1757	39.00000	43.20000	100.05000	0.00000	0.00000	-0.78492	1
		1758	40.00000	43.20000	100.05000	0.00000	0.00000	-0.68454	1
		1759	41.00000	43.20000	100.05000	0.00000	0.00000	-0.59918	1
		1760	42.00000	43.20000	100.05000	0.00000	0.00000	-0.52602	1
		1761	43.00000	43.20000	100.05000	0.00000	0.00000	-0.46293	1
		1762	44.00000	43.20000	100.05000	0.00000	0.00000	-0.40821	1
		1763	45.00000	43.20000	100.05000	0.00000	0.00000	-0.36055	1
		1764	0.00000	44.40000	100.05000	0.00000	0.00000	-0.17261	1
		1765	1.00000	44.40000	100.05000	0.00000	0.00000	-0.19424	1
		1766	2.00000	44.40000	100.05000	0.00000	0.00000	-0.21864	1
		1767	3.00000	44.40000	100.05000	0.00000	0.00000	-0.24620	1
		1768	4.00000	44.40000	100.05000	0.00000	0.00000	-0.27741	1
		1769	5.00000	44.40000	100.05000	0.00000	0.00000	-0.31285	1
		1770	6.00000	44.40000	100.05000	0.00000	0.00000	-0.35324	1
		1771	7.00000	44.40000	100.05000	0.00000	0.00000	-0.39943	1
		1772	8.00000	44.40000	100.05000	0.00000	0.00000	-0.45248	1
		1773	9.00000	44.40000	100.05000	0.00000	0.00000	-0.51371	1
		1774	10.00000	44.40000	100.05000	0.00000	0.00000	-0.58479	1
		1775	11.00000	44.40000	100.05000	0.00000	0.00000	-0.66782	1
		1776	12.00000	44.40000	100.05000	0.00000	0.00000	-0.76351	1
		1777	13.00000	44.40000	100.05000	0.00000	0.00000	-0.88133	1
		1778	14.00000	44.40000	100.05000	0.00000	0.00000	-1.01975	1
		1779	15.00000	44.40000	100.05000	0.00000	0.00000	-1.18649	1
		1780	16.00000	44.40000	100.05000	0.00000	0.00000	-1.38872	1
		1781	17.00000	44.40000	100.05000	0.00000	0.00000	-1.63488	1
		1782	18.00000	44.40000	100.05000	0.00000	0.00000	-1.93328	1
		1783	19.00000	44.40000	100.05000	0.00000	0.00000	-2.28691	1
		1784	20.00000	44.40000	100.05000	0.00000	0.00000	-2.68049	1
		1785	21.00000	44.40000	100.05000	0.00000	0.00000	-3.07044	1
		1786	22.00000	44.40000	100.05000	0.00000	0.00000	-3.40793	1
		1787	23.00000	44.40000	100.05000	0.00000	0.00000	-3.66691	1
		1788	24.00000	44.40000	100.05000	0.00000	0.00000	-3.84046	1
		1789	25.00000	44.40000	100.05000	0.00000	0.00000	-3.92840	1
		1790	26.00000	44.40000	100.05000	0.00000	0.00000	-3.92603	1
		1791	27.00000	44.40000	100.05000	0.00000	0.00000	-3.81846	1
		1792	28.00000	44.40000	100.05000	0.00000	0.00000	-3.59116	1
		1793	29.00000	44.40000	100.05000	0.00000	0.00000	-3.24863	1
		1794	30.00000	44.40000	100.05000	0.00000	0.00000	-2.82934	1
		1795	31.00000	44.40000	100.05000	0.00000	0.00000	-2.40351	1
		1796	32.00000	44.40000	100.05000	0.00000	0.00000	-2.02614	1
		1797	33.00000	44.40000	100.05000	0.00000	0.00000	-1.71248	1
		1798	34.00000	44.40000	100.05000	0.00000	0.00000	-1.45670	1
		1799	35.00000	44.40000	100.05000	0.00000	0.00000	-1.24797	1
		1800	36.00000	44.40000	100.05000	0.00000	0.00000	-1.07622	1
		1801	37.00000	44.40000	100.05000	0.00000	0.00000	-0.93343	1
		1802	38.00000	44.40000	100.05000	0.00000	0.00000	-0.81347	1
		1803	39.00000	44.40000	100.05000	0.00000	0.00000	-0.71176	1
		1804	40.00000	44.40000	100.05000	0.00000	0.00000	-0.62479	1
		1805	41.00000	44.40000	100.05000	0.00000	0.00000	-0.54993	1
		1806	42.00000	44.40000	100.05000	0.00000	0.00000	-0.48511	1
		1807	43.00000	44.40000	100.05000	0.00000	0.00000	-0.42870	1
		1808	44.00000	44.40000	100.05000	0.00000	0.00000	-0.37940	1
		1809	45.00000	44.40000	100.05000	0.00000	0.00000	-0.33617	1
		1810	0.00000	45.60000	100.05000	0.00000	0.00000	-0.16197	1
		1811	1.00000	45.60000	100.05000	0.00000	0.00000	-0.18195	1
		1812	2.00000	45.60000	100.05000	0.00000	0.00000	-0.20439	1
		1813	3.00000	45.60000	100.05000	0.00000	0.00000	-0.22964	1
		1814	4.00000	45.60000	100.05000	0.00000	0.00000	-0.25810	1
		1815	5.00000	45.60000	100.05000	0.00000	0.00000	-0.29025	1
		1816	6.00000	45.60000	100.05000	0.00000	0.00000	-0.32666	1
		1817	7.00000	45.60000	100.05000	0.00000	0.00000	-0.36800	1
		1818	8.00000	45.60000	100.05000	0.00000	0.00000	-0.41511	1
		1819	9.00000	45.60000	100.05000	0.00000	0.00000	-0.46896	1
		1820	10.00000	45.60000	100.05000	0.00000	0.00000	-0.53078	1
		1821	11.00000	45.60000	100.05000	0.00000	0.00000	-0.60204	1
		1822	12.00000	45.60000	100.05000	0.00000	0.00000	-0.68455	1
		1823	13.00000	45.60000	100.05000	0.00000	0.00000	-0.78049	1
		1824	14.00000	45.60000	100.05000	0.00000	0.00000	-0.89246	1
		1825	15.00000	45.60000	100.05000	0.00000	0.00000	-1.02344	1
		1826	16.00000	45.60000	100.05000	0.00000	0.00000	-1.17651	1
		1827	17.00000	45.60000	100.05000	0.00000	0.00000	-1.35429	1
		1828	18.00000	45.60000	100.05000	0.00000	0.00000	-1.55750	1
		1829	19.00000	45.60000	100.05000	0.00000	0.00000	-1.78241	1
		1830	20.00000	45.60000	100.05000	0.00000	0.00000	-2.01799	1
		1831	21.00000	45.60000	100.05000	0.00000	0.00000	-2.24592	1
		1832	22.00000	45.60000	100.05000	0.00000	0.00000	-2.44617	1
		1833	23.00000	45.60000	100.05000	0.00000	0.00000	-2.60350	1
		1834	24.00000	45.60000	100.05000	0.00000	0.00000	-2.70904	1
		1835	25.00000	45.60000	100.05000	0.00000	0.00000	-2.75792	1
		1836	26.00000	45.60000	100.05000	0.00000	0.00000	-2.74631	1
		1837	27.00000	45.60000	100.05000	0.00000	0.00000	-2.67068	1
		1838	28.00000	45.60000	100.05000	0.00000	0.00000	-2.53087	1
		1839	29.00000	45.60000	100.05000	0.00000	0.00000	-2.33490	1
		1840	30.00000	45.60000	100.05000	0.00000	0.00000	-2.10169	1
		1841	31.00000	45.60000	100.05000	0.00000	0.00000	-1.85704	1
		1842	32.00000	45.60000	100.05000	0.00000	0.00000	-1.62357	1
		1843	33.00000	45.60000	100.05000	0.00000	0.00000	-1.41380	1
		1844	34.00000	45.60000	100.05000	0.00000	0.00000	-1.23121	1
		1845	35.00000	45.60000	100.05000	0.00000	0.00000	-1.07443	1
		1846	36.00000	45.60000	100.05000	0.00000	0.00000	-0.94024	1
		1847	37.00000	45.60000	100.05000	0.00000	0.00000	-0.82518	1
		1848	38.00000	45.60000	100.05000	0.00000	0.00000	-0.72615	1
		1849	39.00000	45.60000	100.05000	0.00000	0.00000	-0.64050	1
		1850	40.00000	45.60000	100.05000	0.00000	0.00000	-0.56616	1
		1851	41.00000	45.60000	100.05000	0.00000	0.00000	-0.50119	1
		1852	42.00000	45.60000	100.05000	0.00000	0.00000	-0.44435	1
		1853	43.00000	45.60000	100.05000	0.00000	0.00000	-0.39441	1
		1854	44.00000	45.60000	100.05000	0.00000	0.00000	-0.35041	1
		1855	45.00000	45.60000	100.05000	0.00000	0.00000	-0.31154	1
		1856	0.00000	46.80000	100.05000	0.00000	0.00000	-0.15124	1
		1857	1.00000	46.80000	100.05000	0.00000	0.00000	-0.16958	1
		1858	2.00000	46.80000	100.05000	0.00000	0.00000	-0.19010	1
		1859	3.00000	46.80000	100.05000	0.00000	0.00000	-0.21307	1
		1860	4.00000	46.80000	100.05000	0.00000	0.00000	-0.23884	1
		1861	5.00000	46.80000	100.05000	0.00000	0.00000	-0.26778	1
		1862	6.00000	46.80000	100.05000	0.00000	0.00000	-0.30035	1
		1863	7.00000	46.80000	100.05000	0.00000	0.00000	-0.33705	1
		1864	8.00000	46.80000	100.05000	0.00000	0.00000	-0.37851	1
		1865	9.00000	46.80000	100.05000	0.00000	0.00000	-0.42343	1
		1866	10.00000	46.80000	100.05000	0.00000	0.00000	-0.47867	1
		1867	11.00000	46.80000	100.05000	0.00000	0.00000	-0.53920	1
		1868	12.00000	46.80000	100.05000	0.00000	0.00000	-0.60815	1
		1869	13.00000	46.80000	100.05000	0.00000	0.00000	-0.68678	1
		1870	14.00000	46.80000	100.05000	0.00000	0.00000		



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]
1897		41.00000	46.80000	100.05000	0.00000	0.00000	-0.45393	1
1898		42.00000	46.80000	100.05000	0.00000	0.00000	-0.40454	1
1899		43.00000	46.80000	100.05000	0.00000	0.00000	-0.36071	1
1900		44.00000	46.80000	100.05000	0.00000	0.00000	-0.32175	1
1901		45.00000	46.80000	100.05000	0.00000	0.00000	-0.28707	1
1902		1.00000	48.00000	100.05000	0.00000	0.00000	-0.14056	1
1903		2.00000	48.00000	100.05000	0.00000	0.00000	-0.15729	1
1904		3.00000	48.00000	100.05000	0.00000	0.00000	-0.17593	1
1905		4.00000	48.00000	100.05000	0.00000	0.00000	-0.19671	1
1906		5.00000	48.00000	100.05000	0.00000	0.00000	-0.21990	1
1907		6.00000	48.00000	100.05000	0.00000	0.00000	-0.24578	1
1908		7.00000	48.00000	100.05000	0.00000	0.00000	-0.27470	1
1909		8.00000	48.00000	100.05000	0.00000	0.00000	-0.30704	1
1910		9.00000	48.00000	100.05000	0.00000	0.00000	-0.34326	1
1911		10.00000	48.00000	100.05000	0.00000	0.00000	-0.38384	1
1912		11.00000	48.00000	100.05000	0.00000	0.00000	-0.42834	1
1913		12.00000	48.00000	100.05000	0.00000	0.00000	-0.48037	1
1914		13.00000	48.00000	100.05000	0.00000	0.00000	-0.53758	1
1915		14.00000	48.00000	100.05000	0.00000	0.00000	-0.60162	1
1916		15.00000	48.00000	100.05000	0.00000	0.00000	-0.67309	1
1917		16.00000	48.00000	100.05000	0.00000	0.00000	-0.75239	1
1918		17.00000	48.00000	100.05000	0.00000	0.00000	-0.83954	1
1919		18.00000	48.00000	100.05000	0.00000	0.00000	-0.93391	1
1920		19.00000	48.00000	100.05000	0.00000	0.00000	-1.03387	1
1921		20.00000	48.00000	100.05000	0.00000	0.00000	-1.13649	1
1922		21.00000	48.00000	100.05000	0.00000	0.00000	-1.24747	1
1923		22.00000	48.00000	100.05000	0.00000	0.00000	-1.33151	1
1924		23.00000	48.00000	100.05000	0.00000	0.00000	-1.41298	1
1925		24.00000	48.00000	100.05000	0.00000	0.00000	-1.47683	1
1926		25.00000	48.00000	100.05000	0.00000	0.00000	-1.51906	1
1927		26.00000	48.00000	100.05000	0.00000	0.00000	-1.53703	1
1928		27.00000	48.00000	100.05000	0.00000	0.00000	-1.52943	1
1929		28.00000	48.00000	100.05000	0.00000	0.00000	-1.49644	1
1930		29.00000	48.00000	100.05000	0.00000	0.00000	-1.43989	1
1931		30.00000	48.00000	100.05000	0.00000	0.00000	-1.36345	1
1932		31.00000	48.00000	100.05000	0.00000	0.00000	-1.27248	1
1933		32.00000	48.00000	100.05000	0.00000	0.00000	-1.17290	1
1934		33.00000	48.00000	100.05000	0.00000	0.00000	-1.07076	1
1935		34.00000	48.00000	100.05000	0.00000	0.00000	-0.97066	1
1936		35.00000	48.00000	100.05000	0.00000	0.00000	-0.87573	1
1937		36.00000	48.00000	100.05000	0.00000	0.00000	-0.78769	1
1938		37.00000	48.00000	100.05000	0.00000	0.00000	-0.70720	1
1939		38.00000	48.00000	100.05000	0.00000	0.00000	-0.63425	1
1940		39.00000	48.00000	100.05000	0.00000	0.00000	-0.56851	1
1941		40.00000	48.00000	100.05000	0.00000	0.00000	-0.50943	1
1942		41.00000	48.00000	100.05000	0.00000	0.00000	-0.45842	1
1943		42.00000	48.00000	100.05000	0.00000	0.00000	-0.40889	1
1944		43.00000	48.00000	100.05000	0.00000	0.00000	-0.36629	1
1945		44.00000	48.00000	100.05000	0.00000	0.00000	-0.32809	1
1946		45.00000	48.00000	100.05000	0.00000	0.00000	-0.29385	1
1947		0.00000	49.20000	100.05000	0.00000	0.00000	-0.26313	1
1948		1.00000	49.20000	100.05000	0.00000	0.00000	-0.13003	1
1949		2.00000	49.20000	100.05000	0.00000	0.00000	-0.14522	1
1950		3.00000	49.20000	100.05000	0.00000	0.00000	-0.16207	1
1951		4.00000	49.20000	100.05000	0.00000	0.00000	-0.18075	1
1952		5.00000	49.20000	100.05000	0.00000	0.00000	-0.20148	1
1953		6.00000	49.20000	100.05000	0.00000	0.00000	-0.22449	1
1954		7.00000	49.20000	100.05000	0.00000	0.00000	-0.25002	1
1955		8.00000	49.20000	100.05000	0.00000	0.00000	-0.27836	1
1956		9.00000	49.20000	100.05000	0.00000	0.00000	-0.30980	1
1957		10.00000	49.20000	100.05000	0.00000	0.00000	-0.34469	1
1958		11.00000	49.20000	100.05000	0.00000	0.00000	-0.38335	1
1959		12.00000	49.20000	100.05000	0.00000	0.00000	-0.42616	1
1960		13.00000	49.20000	100.05000	0.00000	0.00000	-0.47343	1
1961		14.00000	49.20000	100.05000	0.00000	0.00000	-0.52546	1
1962		15.00000	49.20000	100.05000	0.00000	0.00000	-0.58240	1
1963		16.00000	49.20000	100.05000	0.00000	0.00000	-0.64424	1
1964		17.00000	49.20000	100.05000	0.00000	0.00000	-0.71061	1
1965		18.00000	49.20000	100.05000	0.00000	0.00000	-0.78071	1
1966		19.00000	49.20000	100.05000	0.00000	0.00000	-0.85310	1
1967		20.00000	49.20000	100.05000	0.00000	0.00000	-0.92569	1
1968		21.00000	49.20000	100.05000	0.00000	0.00000	-0.99570	1
1969		22.00000	49.20000	100.05000	0.00000	0.00000	-1.05991	1
1970		23.00000	49.20000	100.05000	0.00000	0.00000	-1.11498	1
1971		24.00000	49.20000	100.05000	0.00000	0.00000	-1.15786	1
1972		25.00000	49.20000	100.05000	0.00000	0.00000	-1.18608	1
1973		26.00000	49.20000	100.05000	0.00000	0.00000	-1.19798	1
1974		27.00000	49.20000	100.05000	0.00000	0.00000	-1.19281	1
1975		28.00000	49.20000	100.05000	0.00000	0.00000	-1.17082	1
1976		29.00000	49.20000	100.05000	0.00000	0.00000	-1.13246	1
1977		30.00000	49.20000	100.05000	0.00000	0.00000	-1.08240	1
1978		31.00000	49.20000	100.05000	0.00000	0.00000	-1.02129	1
1979		32.00000	49.20000	100.05000	0.00000	0.00000	-0.95338	1
1980		33.00000	49.20000	100.05000	0.00000	0.00000	-0.88209	1
1981		34.00000	49.20000	100.05000	0.00000	0.00000	-0.81034	1
1982		35.00000	49.20000	100.05000	0.00000	0.00000	-0.74038	1
1983		36.00000	49.20000	100.05000	0.00000	0.00000	-0.67369	1
1984		37.00000	49.20000	100.05000	0.00000	0.00000	-0.61117	1
1985		38.00000	49.20000	100.05000	0.00000	0.00000	-0.55322	1
1986		39.00000	49.20000	100.05000	0.00000	0.00000	-0.49995	1
1987		40.00000	49.20000	100.05000	0.00000	0.00000	-0.45124	1
1988		41.00000	49.20000	100.05000	0.00000	0.00000	-0.40688	1
1989		42.00000	49.20000	100.05000	0.00000	0.00000	-0.36658	1
1990		43.00000	49.20000	100.05000	0.00000	0.00000	-0.33005	1
1991		44.00000	49.20000	100.05000	0.00000	0.00000	-0.29699	1
1992		45.00000	49.20000	100.05000	0.00000	0.00000	-0.26706	1
1993		0.00000	50.40000	100.05000	0.00000	0.00000	-0.24001	1
1994		1.00000	50.40000	100.05000	0.00000	0.00000	-0.11975	1
1995		2.00000	50.40000	100.05000	0.00000	0.00000	-0.13347	1
1996		3.00000	50.40000	100.05000	0.00000	0.00000	-0.14862	1
1997		4.00000	50.40000	100.05000	0.00000	0.00000	-0.16534	1
1998		5.00000	50.40000	100.05000	0.00000	0.00000	-0.18379	1
1999		6.00000	50.40000	100.05000	0.00000	0.00000	-0.20413	1
2000		7.00000	50.40000	100.05000	0.00000	0.00000	-0.22656	1
2001		8.00000	50.40000	100.05000	0.00000	0.00000	-0.25125	1
2002		9.00000	50.40000	100.05000	0.00000	0.00000	-0.27843	1
2003		10.00000	50.40000	100.05000	0.00000	0.00000	-0.30828	1
2004		11.00000	50.40000	100.05000	0.00000	0.00000	-0.34101	1
2005		12.00000	50.40000	100.05000	0.00000	0.00000	-0.37681	1
2006		13.00000	50.40000	100.05000	0.00000	0.00000	-0.41580	1
2007		14.00000	50.40000	100.05000	0.00000	0.00000	-0.45806	1
2008		15.00000	50.40000	100.05000	0.00000	0.00000	-0.50354	1
2009		16.00000	50.40000	100.05000	0.00000	0.00000	-0.55202	1
2010		17.00000	50.40000	100.05000	0.00000	0.00000	-0.60304	1
2011		18.00000	50.40000	100.05000	0.00000	0.00000	-0.65585	1
2012		19.00000	50.40000	100.05000	0.00000	0.00000	-0.70932	1
2013		20.00000	50.40000	100.05000	0.00000	0.00000	-0.76194	1
2014		21.00000	50.40000	100.05000	0.00000	0.00000	-0.81188	1
2015		22.00000	50.40000	100.05000	0.00000	0.00000	-0.85711	1
2016		23.00000	50.40000	100.05000	0.00000	0.000		





30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]	
2038		44.00000	50.40000	100.05000	0.00000	0.00000	0.00000	-0.24162	1
2039		45.00000	50.40000	100.05000	0.00000	0.00000	0.00000	-0.21793	1
2040		0.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.10981	1
2041		1.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.12215	1
2042		2.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.13571	1
2043		3.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.15060	1
2044		4.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.16694	1
2045		5.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.18485	1
2046		6.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.20447	1
2047		7.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.22590	1
2048		8.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.24930	1
2049		9.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.27477	1
2050		10.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.30241	1
2051		11.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.33229	1
2052		12.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.36445	1
2053		13.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.39883	1
2054		14.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.43528	1
2055		15.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.47354	1
2056		16.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.51316	1
2057		17.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.55349	1
2058		18.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.59367	1
2059		19.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.63263	1
2060		20.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.66914	1
2061		21.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.70184	1
2062		22.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.72942	1
2063		23.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.75367	1
2064		24.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.76460	1
2065		25.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.77056	1
2066		26.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.76828	1
2067		27.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.75786	1
2068		28.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.73984	1
2069		29.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.71508	1
2070		30.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.68473	1
2071		31.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.65010	1
2072		32.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.61253	1
2073		33.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.57329	1
2074		34.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.53349	1
2075		35.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.49404	1
2076		36.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.45562	1
2077		37.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.41874	1
2078		38.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.38391	1
2079		39.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.35074	1
2080		40.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.31992	1
2081		41.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.29126	1
2082		42.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.26472	1
2083		43.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.24024	1
2084		44.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.21772	1
2085		45.00000	51.60000	100.05000	0.00000	0.00000	0.00000	-0.19705	1
2086		0.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.10027	1
2087		1.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.11132	1
2088		2.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.12341	1
2089		3.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.13662	1
2090		4.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.15104	1
2091		5.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.16675	1
2092		6.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.18384	1
2093		7.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.20240	1
2094		8.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.22248	1
2095		9.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.24416	1
2096		10.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.26747	1
2097		11.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.29241	1
2098		12.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.31895	1
2099		13.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.34699	1
2100		14.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.37635	1
2101		15.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.40675	1
2102		16.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.43780	1
2103		17.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.46899	1
2104		18.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.49966	1
2105		19.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.52904	1
2106		20.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.55627	1
2107		21.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.58146	1
2108		22.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.60073	1
2109		23.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.61627	1
2110		24.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.62647	1
2111		25.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.63090	1
2112		26.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.62936	1
2113		27.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.62194	1
2114		28.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.60897	1
2115		29.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.59101	1
2116		30.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.56880	1
2117		31.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.54218	1
2118		32.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.51504	1
2119		33.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.48526	1
2120		34.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.45463	1
2121		35.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.42382	1
2122		36.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.39339	1
2123		37.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.36378	1
2124		38.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.33529	1
2125		39.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.30815	1
2126		40.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.28249	1
2127		41.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.25838	1
2128		42.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.23585	1
2129		43.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.21489	1
2130		44.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.19545	1
2131		45.00000	52.80000	100.05000	0.00000	0.00000	0.00000	-0.17749	1
2132		0.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.09119	1
2133		1.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.10105	1
2134		2.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.11179	1
2135		3.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.12347	1
2136		4.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.13615	1
2137		5.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.14988	1
2138		6.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.16474	1
2139		7.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.18075	1
2140		8.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.19796	1
2141		9.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.21638	1
2142		10.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.23603	1
2143		11.00000	54.00000	100.05000	0.00000	0.00000	0.00000	-0.25685	1
2144		12.00000	54.00000	100.05000	0.00000				



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]
2179		1.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.09136
2180		2.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.10087
2181		3.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.11117
2182		4.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.12228
2183		5.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.13427
2184		6.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.14714
2185		7.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.16093
2186		8.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.17566
2187		9.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.19131
2188		10.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.20786
2189		11.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.22527
2190		12.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.24345
2191		13.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.26228
2192		14.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.28159
2193		15.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.30117
2194		16.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.32076
2195		17.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.34002
2196		18.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.35859
2197		19.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.37607
2198		20.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.39200
2199		21.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.40597
2200		22.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.41755
2201		23.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.42639
2202		24.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.43220
2203		25.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.43477
2204		26.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.43404
2205		27.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.43003
2206		28.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.42287
2207		29.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.41283
2208		30.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.40022
2209		31.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.38543
2210		32.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.36889
2211		33.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.35103
2212		34.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.33226
2213		35.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.31297
2214		36.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.29349
2215		37.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.27413
2216		38.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.25510
2217		39.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.23661
2218		40.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.21880
2219		41.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.20177
2220		42.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.18560
2221		43.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.17031
2222		44.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.15594
2223		45.00000	55.20000	100.05000	0.00000	0.00000	0.00000	-0.14247
2224		46.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.07451
2225		1.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.08228
2226		2.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.09068
2227		3.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.09973
2228		4.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.10946
2229		5.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.11988
2230		6.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.13103
2231		7.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.14289
2232		8.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.15548
2233		9.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.16877
2234		10.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.18272
2235		11.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.19729
2236		12.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.21238
2237		13.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.22788
2238		14.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.24366
2239		15.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.25952
2240		16.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.27525
2241		17.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.29060
2242		18.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.30529
2243		19.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.31901
2244		20.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.33145
2245		21.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.34230
2246		22.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.35126
2247		23.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.35808
2248		24.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.36257
2249		25.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.36458
2250		26.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.36405
2251		27.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.36102
2252		28.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.35556
2253		29.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.34786
2254		30.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.33813
2255		31.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.32666
2256		32.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.31373
2257		33.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.29966
2258		34.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.28476
2259		35.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.26931
2260		36.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.25359
2261		37.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.23781
2262		38.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.22219
2263		39.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.20689
2264		40.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.19202
2265		41.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.17771
2266		42.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.16401
2267		43.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.15098
2268		44.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.13864
2269		45.00000	56.40000	100.05000	0.00000	0.00000	0.00000	-0.12702
2270		0.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.06694
2271		1.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.07382
2272		2.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.08122
2273		3.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.08915
2274		4.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.09765
2275		5.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.10670
2276		6.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.11633
2277		7.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.12653
2278		8.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.13728
2279		9.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.14857
2280		10.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.16034
2281		11.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.17254
2282		12.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.18510
2283		13.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.19791
2284		14.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.21085
2285		15.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.22377
2286		16.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.23649
2287		17.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.24892
2288		18.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.26054
2289		19.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.27142
2290		20.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.28123
2291		21.00000	57.60000	100.05000	0.00000	0.00000	0.00000	-0.28975</



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Set: Ref.	Set: Name	Result: Ref.	Coordinates: x [m]	Coordinates: y [m]	Coordinates: z [m]	Displacements: x [mm]	Displacements: y [mm]	Displacements: z [mm]
2320		4.00000	58.80000	100.05000	0.00000	0.00000	-0.08682	1
2321		5.00000	58.80000	100.05000	0.00000	0.00000	-0.09468	1
2322		6.00000	58.80000	100.05000	0.00000	0.00000	-0.10299	1
2323		7.00000	58.80000	100.05000	0.00000	0.00000	-0.11175	1
2324		8.00000	58.80000	100.05000	0.00000	0.00000	-0.12093	1
2325		9.00000	58.80000	100.05000	0.00000	0.00000	-0.13051	1
2326		10.00000	58.80000	100.05000	0.00000	0.00000	-0.14045	1
2327		11.00000	58.80000	100.05000	0.00000	0.00000	-0.15070	1
2328		12.00000	58.80000	100.05000	0.00000	0.00000	-0.16117	1
2329		13.00000	58.80000	100.05000	0.00000	0.00000	-0.17179	1
2330		14.00000	58.80000	100.05000	0.00000	0.00000	-0.18244	1
2331		15.00000	58.80000	100.05000	0.00000	0.00000	-0.19301	1
2332		16.00000	58.80000	100.05000	0.00000	0.00000	-0.20336	1
2333		17.00000	58.80000	100.05000	0.00000	0.00000	-0.21333	1
2334		18.00000	58.80000	100.05000	0.00000	0.00000	-0.22275	1
2335		19.00000	58.80000	100.05000	0.00000	0.00000	-0.23146	1
2336		20.00000	58.80000	100.05000	0.00000	0.00000	-0.23927	1
2337		21.00000	58.80000	100.05000	0.00000	0.00000	-0.24603	1
2338		22.00000	58.80000	100.05000	0.00000	0.00000	-0.25159	1
2339		23.00000	58.80000	100.05000	0.00000	0.00000	-0.25580	1
2340		24.00000	58.80000	100.05000	0.00000	0.00000	-0.25857	1
2341		25.00000	58.80000	100.05000	0.00000	0.00000	-0.25983	1
2342		26.00000	58.80000	100.05000	0.00000	0.00000	-0.25954	1
2343		27.00000	58.80000	100.05000	0.00000	0.00000	-0.25773	1
2344		28.00000	58.80000	100.05000	0.00000	0.00000	-0.25442	1
2345		29.00000	58.80000	100.05000	0.00000	0.00000	-0.24971	1
2346		30.00000	58.80000	100.05000	0.00000	0.00000	-0.24371	1
2347		31.00000	58.80000	100.05000	0.00000	0.00000	-0.23656	1
2348		32.00000	58.80000	100.05000	0.00000	0.00000	-0.22842	1
2349		33.00000	58.80000	100.05000	0.00000	0.00000	-0.21946	1
2350		34.00000	58.80000	100.05000	0.00000	0.00000	-0.20985	1
2351		35.00000	58.80000	100.05000	0.00000	0.00000	-0.19975	1
2352		36.00000	58.80000	100.05000	0.00000	0.00000	-0.18933	1
2353		37.00000	58.80000	100.05000	0.00000	0.00000	-0.17873	1
2354		38.00000	58.80000	100.05000	0.00000	0.00000	-0.16680	1
2355		39.00000	58.80000	100.05000	0.00000	0.00000	-0.15453	1
2356		40.00000	58.80000	100.05000	0.00000	0.00000	-0.14174	1
2357		41.00000	58.80000	100.05000	0.00000	0.00000	-0.13699	1
2358		42.00000	58.80000	100.05000	0.00000	0.00000	-0.12717	1
2359		43.00000	58.80000	100.05000	0.00000	0.00000	-0.11771	1
2360		44.00000	58.80000	100.05000	0.00000	0.00000	-0.10866	1
2361		45.00000	58.80000	100.05000	0.00000	0.00000	-0.10003	1
2362		0.00000	60.00000	100.05000	0.00000	0.00000	-0.05338	1
2363		1.00000	60.00000	100.05000	0.00000	0.00000	-0.05872	1
2364		2.00000	60.00000	100.05000	0.00000	0.00000	-0.06443	1
2365		3.00000	60.00000	100.05000	0.00000	0.00000	-0.07050	1
2366		4.00000	60.00000	100.05000	0.00000	0.00000	-0.07694	1
2367		5.00000	60.00000	100.05000	0.00000	0.00000	-0.08375	1
2368		6.00000	60.00000	100.05000	0.00000	0.00000	-0.09091	1
2369		7.00000	60.00000	100.05000	0.00000	0.00000	-0.09843	1
2370		8.00000	60.00000	100.05000	0.00000	0.00000	-0.10627	1
2371		9.00000	60.00000	100.05000	0.00000	0.00000	-0.11441	1
2372		10.00000	60.00000	100.05000	0.00000	0.00000	-0.12281	1
2373		11.00000	60.00000	100.05000	0.00000	0.00000	-0.13142	1
2374		12.00000	60.00000	100.05000	0.00000	0.00000	-0.14018	1
2375		13.00000	60.00000	100.05000	0.00000	0.00000	-0.14900	1
2376		14.00000	60.00000	100.05000	0.00000	0.00000	-0.15781	1
2377		15.00000	60.00000	100.05000	0.00000	0.00000	-0.16650	1
2378		16.00000	60.00000	100.05000	0.00000	0.00000	-0.17496	1
2379		17.00000	60.00000	100.05000	0.00000	0.00000	-0.18306	1
2380		18.00000	60.00000	100.05000	0.00000	0.00000	-0.19069	1
2381		19.00000	60.00000	100.05000	0.00000	0.00000	-0.19771	1
2382		20.00000	60.00000	100.05000	0.00000	0.00000	-0.20399	1
2383		21.00000	60.00000	100.05000	0.00000	0.00000	-0.20940	1
2384		22.00000	60.00000	100.05000	0.00000	0.00000	-0.21383	1
2385		23.00000	60.00000	100.05000	0.00000	0.00000	-0.21719	1
2386		24.00000	60.00000	100.05000	0.00000	0.00000	-0.21940	1
2387		25.00000	60.00000	100.05000	0.00000	0.00000	-0.22040	1
2388		26.00000	60.00000	100.05000	0.00000	0.00000	-0.22019	1
2389		27.00000	60.00000	100.05000	0.00000	0.00000	-0.21875	1
2390		28.00000	60.00000	100.05000	0.00000	0.00000	-0.21614	1
2391		29.00000	60.00000	100.05000	0.00000	0.00000	-0.21239	1
2392		30.00000	60.00000	100.05000	0.00000	0.00000	-0.20761	1
2393		31.00000	60.00000	100.05000	0.00000	0.00000	-0.20189	1
2394		32.00000	60.00000	100.05000	0.00000	0.00000	-0.19535	1
2395		33.00000	60.00000	100.05000	0.00000	0.00000	-0.18812	1
2396		34.00000	60.00000	100.05000	0.00000	0.00000	-0.18032	1
2397		35.00000	60.00000	100.05000	0.00000	0.00000	-0.17209	1
2398		36.00000	60.00000	100.05000	0.00000	0.00000	-0.16354	1
2399		37.00000	60.00000	100.05000	0.00000	0.00000	-0.15481	1
2400		38.00000	60.00000	100.05000	0.00000	0.00000	-0.14599	1
2401		39.00000	60.00000	100.05000	0.00000	0.00000	-0.13718	1
2402		40.00000	60.00000	100.05000	0.00000	0.00000	-0.12847	1
2403		41.00000	60.00000	100.05000	0.00000	0.00000	-0.11992	1
2404		42.00000	60.00000	100.05000	0.00000	0.00000	-0.11159	1
2405		43.00000	60.00000	100.05000	0.00000	0.00000	-0.10353	1
2406		44.00000	60.00000	100.05000	0.00000	0.00000	-0.09578	1
2407		45.00000	60.00000	100.05000	0.00000	0.00000	-0.08837	1

- 1 - Data point coincident with displacement location. Its displacement has been added to those calculated by XDisp.
- 2 - Data point coincident with horizontal movement calculation point for a specific building. Its displacement has been added before performing building damage calculations.
- 6 - Data point coincident with vertical movement calculation point for a specific building. Its displacement has been added before performing building damage calculations.

Polygonal Excavations

Ref.	1										
Excavation Name:	Installation of Underpins										
Surface level [m]:	100.05										
Contribution:	Positive										
Surface movement curves which are selected are applied between surface and [m]:	93.750										
Corner	x	y	Base Level	Arc Enabled	Stiffened	Prev. Side	Prev. Side	Prev. Side	Next Side	Next Side	Next Side
	[m]	[m]	[m]			d [m]	p1 [%]	p2* [%]	d [m]	p1 [%]	p2* [%]
1	20.000	10.000	97.750	Yes	Yes	0.0	67.000	25.000	0.0	67.000	25.000
2	20.000	20.000	97.750	Yes	No	-	-	-	0.0	67.000	25.000
3	20.000	42.340	96.000	Yes	Yes	0.0	67.000	25.000	0.0	67.000	25.000
4	26.070	42.340	93.750	Yes	No	-	-	-	-	-	-
5	29.770	42.340	93.750	Yes	Yes	0.0	67.000	25.000	0.0	67.000	25.000
6	29.770	33.030	93.750	Yes	No	-	-	-	-	-	-
7	31.940	33.030	96.000	Yes	Yes	0.0	67.000	25.000	0.0	67.000	25.000
8	31.940	27.010	99.350	Yes	No	-	-	-	-	-	-
9	31.940	20.000	99.350	Yes	No	-	-	-	-	-	-
10	31.940	10.000	97.750	Yes	Yes	0.0	67.000	25.000	0.0	67.000	25.000

Side	x1 [m]	y1 [m]	x2 [m]	y2 [m]	G.M. Curve: Vertical	G.M. Curve: Horizontal
1	20.000	10.000	20.000	20.000	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(b))	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(a))
2	20.000	20.000	20.000	42.340	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(b))	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(a))
3	20.000	42.340	26.070	42.340	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(b))	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(a))
4	26.070	42.340	29.770	42.340	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(b))	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(a))
5	29.770	42.340	29.770	33.030	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(b))	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(a))
6	29.770	33.030	31.940	33.030	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(b))	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(a))



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Side	x1 [m]	y1 [m]	x2 [m]	y2 [m]	G.M. Curve: Vertical	G.M. Curve: Horizontal
7	31.940	33.030	31.940	27.010	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(b))	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(a))
8	31.940	27.010	31.940	20.000	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(b))	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(a))
9	31.940	20.000	31.940	10.000	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(b))	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(a))
10	31.940	10.000	20.000	10.000	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(b))	Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(a))

Ref. 2  
**Excavation Name:** Excavation  
**Surface level [m]:** 100.05  
**Contribution:** Positive  
 Surface movement curves which are selected are applied between surface and [m]: 93.750

Corner	x [m]	y [m]	Base Level [m]	Arc Enabled	Stiffened	Prev. Side: d [m]	Prev. Side: p1 [%]	Prev. Side: p2* [%]	Next Side: d [m]	Next Side: p1 [%]	Next Side: p2* [%]
1	20.000	10.000	97.750	Yes	Yes	0.0	67.000	25.000	0.0	67.000	25.000
2	20.000	20.000	97.750	Yes	No	-	-	-	-	-	-
3	20.000	42.340	96.000	Yes	Yes	0.0	67.000	25.000	0.0	67.000	25.000
4	26.070	42.340	93.750	Yes	No	-	-	-	-	-	-
5	29.770	42.340	93.750	Yes	Yes	0.0	67.000	25.000	0.0	67.000	25.000
6	29.770	33.030	93.750	Yes	No	-	-	-	-	-	-
7	31.940	33.030	96.000	Yes	Yes	0.0	67.000	25.000	0.0	67.000	25.000
8	31.940	27.010	99.350	Yes	No	-	-	-	-	-	-
9	31.940	20.000	99.350	Yes	No	-	-	-	-	-	-
10	31.940	10.000	97.750	Yes	Yes	0.0	67.000	25.000	0.0	67.000	25.000

Side	x1 [m]	y1 [m]	x2 [m]	y2 [m]	G.M. Curve: Vertical	G.M. Curve: Horizontal
1	20.000	10.000	20.000	20.000	No vertical ground movement	Copy of Exc. in front of high stiffness wall in stiff clay (CIRIA C760 Fig. 6.15(a))
2	20.000	20.000	20.000	42.340	No vertical ground movement	Copy of Exc. in front of high stiffness wall in stiff clay (CIRIA C760 Fig. 6.15(a))
3	20.000	42.340	26.070	42.340	No vertical ground movement	Copy of Exc. in front of high stiffness wall in stiff clay (CIRIA C760 Fig. 6.15(a))
4	26.070	42.340	29.770	42.340	No vertical ground movement	Copy of Exc. in front of high stiffness wall in stiff clay (CIRIA C760 Fig. 6.15(a))
5	29.770	42.340	29.770	33.030	No vertical ground movement	Copy of Exc. in front of high stiffness wall in stiff clay (CIRIA C760 Fig. 6.15(a))
6	29.770	33.030	31.940	33.030	No vertical ground movement	Copy of Exc. in front of high stiffness wall in stiff clay (CIRIA C760 Fig. 6.15(a))
7	31.940	33.030	31.940	27.010	No vertical ground movement	Copy of Exc. in front of high stiffness wall in stiff clay (CIRIA C760 Fig. 6.15(a))
8	31.940	27.010	31.940	20.000	No vertical ground movement	Copy of Exc. in front of high stiffness wall in stiff clay (CIRIA C760 Fig. 6.15(a))
9	31.940	20.000	31.940	10.000	No vertical ground movement	Copy of Exc. in front of high stiffness wall in stiff clay (CIRIA C760 Fig. 6.15(a))
10	31.940	10.000	20.000	10.000	No vertical ground movement	Copy of Exc. in front of high stiffness wall in stiff clay (CIRIA C760 Fig. 6.15(a))

Circular Excavations

Vertical Ground Movement Curves

**Curve Name:** No vertical ground movement  
**Coordinates:** [Distance from wall / wall depth or max. excavation depth (x), Depth / wall depth or max. excavation depth (y), Settlement / wall depth or max. excavation depth (z) (%)]  
 [0.000,0.000,0.000][1.000,0.000,0.000][0.000,1.000,0.000][1.000,1.000,0.000]

**Curve Fitting Method:** Polynomial  
**x Order:** 1  
**y Order:** 0  
 Polynomial: z = 0.0x + 0.0  
**Coeff. of Determination:**

**Curve Name:** Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(b))  
**Coordinates:** [Distance from wall / wall depth or max. excavation depth (x), Depth / wall depth or max. excavation depth (y), Settlement / wall depth or max. excavation depth (z) (%)]  
 [0.000,0.000,0.050][0.050,0.000,0.047][0.100,0.000,0.043][0.150,0.000,0.040][0.200,0.000,0.037][0.250,0.000,0.034][0.300,0.000,0.031][0.350,0.000,0.028][0.400,0.000,0.025][0.450,0.000,0.022][0.500,0.000,0.020][0.550,0.000,0.018][0.600,0.000,0.015][0.650,0.000,0.013][0.700,0.000,0.012][0.750,0.000,0.010][0.800,0.000,0.008][0.850,0.000,0.007][0.900,0.000,0.006][0.950,0.000,0.005][1.000,0.000,0.004][1.050,0.000,0.003][1.100,0.000,0.003][1.150,0.000,0.002][1.200,0.000,0.002][1.250,0.000,0.001][1.300,0.000,0.001][1.350,0.000,0.001][1.400,0.000,0.001][1.450,0.000,0.000][1.500,0.000,0.000]

**Curve Fitting Method:** Polynomial  
**x Order:** 4  
**y Order:** 0  
 Polynomial: z = -1.2355E-2x<sup>4</sup> + 3.4814E-2x<sup>3</sup> - 2.8885E-3x<sup>2</sup> - 6.5618E-2x + 4.9987E-2  
**Coeff. of Determination:** 1.0000

Horizontal Ground Movement Curves

**Curve Name:** Inst. of planar diaphragm wall in stiff clay (CIRIA C760 Fig. 6.9(a))  
**Coordinates:** [Distance from wall / wall depth or max. excavation depth (x), Depth / wall depth or max. excavation depth (y), Horizontal movement / wall depth or max. excavation depth (z) (%)]  
 [0.000,0.000,0.050][1.500,0.000,0.000]

**Curve Fitting Method:** Polynomial  
**x Order:** 1  
**y Order:** 0  
 Polynomial: z = -3.33E-2x + 5.00E-2  
**Coeff. of Determination:** 1.00

**Curve Name:** Copy of Exc. in front of high stiffness wall in stiff clay (CIRIA C760 Fig. 6.15(a))  
**Coordinates:** [Distance from wall / wall depth or max. excavation depth (x), Depth / wall depth or max. excavation depth (y), Horizontal movement / wall depth or max. excavation depth (z) (%)]  
 [0.000,0.000,0.150][4.000,0.000,0.000]

**Curve Fitting Method:** Polynomial  
**x Order:** 1  
**y Order:** 0  
 Polynomial: z = -3.75E-2x + 1.50E-1  
**Coeff. of Determination:** 1.00

Damage Category Strains



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Side	x1 [m]	y1 [m]	x2 [m]	y2 [m]	G.M. Curve: Vertical	G.M. Curve: Horizontal
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Ref.	Name	0 (Negligible)	1 (Very Slight)	2 (Slight)	3 (Moderate)
		to	to	to	to
		1 (Very Slight)	2 (Slight)	3 (Moderate)	4 (Severe)

1	Burland Strain Limits	0.0	500.00E-6	750.00E-6	0.0015000
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Specific Buildings - Geometry

Ref.	Building Name	Sub-Building Name	Displacement	Distance Along Line: Start	Distance Along Line: End	Vertical Offsets from Line for Movement Calculations	Vertical Displacement	Damage Category	Poisson's Ratio	E/G
				[m]	[m]	[m]	[mm]			
1	28	Ferncroft Avenue	28A	28A	0.00000	13.95000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
2			28B	28B	0.00000	1.46000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
3			28C	28C	0.00000	0.85000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
4			28D	28D	0.00000	3.32000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
5			28E	28E	0.00000	0.85000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
6			28F	28F	0.00000	6.35000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
7			28G	28G	0.00000	2.15000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
8			28H	28H	0.00000	2.51000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
9			28I	28I	0.00000	2.04000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
10			28J	28J	0.00000	1.87000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
11			28K	28K	0.00000	3.17000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
12			28L	28L	0.00000	4.64000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
13			28M	28M	0.00000	6.67000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
14			28N	28N	0.00000	4.64000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
15			28O	28O	0.00000	5.00000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
16			28P	28P	0.00000	1.62000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000
17			28Q	28Q	0.00000	4.26000	0.0	0.10000	Burland Strain Limits	0.20000 2.6000

Specific Buildings - Bending Parameters

Ref.	Building Name	Sub-Building Name	Height	Default	Hogging: 2nd Mom. of Area (per unit width)	Hogging: Dist. of Bending from N.A.	Hogging: Dist. of N.A. from Edge of Beam in Tension	Sagging: 2nd Mom. of Area (per unit width)	Sagging: Dist. of Bending from N.A.	Sagging: Dist. of N.A. from Edge of Beam in Tension
			[m]	Yes	[m³]	[m]	[m]	[m³]	[m]	[m]
1	28	Ferncroft Avenue	28A	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
2			28B	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
3			28C	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
4			28D	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
5			28E	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
6			28F	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
7			28G	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
8			28H	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
9			28I	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
10			28J	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
11			28K	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
12			28L	4.0000	Yes	21.333	4.0000	4.0000	5.3333	2.0000
13			28M	4.0000	Yes	21.333	4.0000	4.0000	5.3333	2.0000
14			28N	4.0000	Yes	21.333	4.0000	4.0000	5.3333	2.0000
15			28O	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
16			28P	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000
17			28Q	7.0000	Yes	114.33	7.0000	7.0000	28.583	3.5000

Warnings

- 1 Multiple excavations have been specified. Displacements resulting from each excavation are summed with no account taken of the interactions between excavations (e.g. overlapping zones of influence or 'shielding' of one excavation by another).
- 2 The following polygonal excavations have one or more re-entrant corners: 1, 2. The use of re-entrant corners is permitted but not recommended. CIRIA C580/C760, on which XDisp's method for modelling ground movements behind walls of excavations is based, considers only movements for points lying at right angles behind single walls. It does not consider how movements should be calculated within the zone of influence of re-entrant corners, i.e. where movements would be influenced by two walls adjacent to the re-entrant corner. XDisp will merely sum the effects from both walls, making no allowance for interaction or stiffening of the corner. Re-entrant corners should be used with caution. Results in their vicinity should be validated independently.

Errors

None

Displacement Results - Displacement Lines

Stage: Ref.	Stage: Name	Disp. Line: Ref.	Disp. Line: Name	Chainage [m]	x [m]	y [m]	z [m]	δx [mm]	δy [mm]	δz [mm]	δθ// [mm]	δθperp. [mm]	Angle [°]
0	Base Model	1	28A	0.0	17.30000	15.00000	99.55000	2.6875	0.0	-2.3597	-2.6875	0.0	180.00
				1.9929	15.30714	15.00000	99.55000	1.6902	0.0	-1.5681	-1.6902	0.0	180.00
				3.9857	13.31429	15.00000	99.55000	0.94286	0.0	-1.0935	-0.94286	0.0	180.00
				5.9786	11.32143	15.00000	99.55000	0.19554	0.0	-0.79629	-0.19554	0.0	180.00
				7.9714	9.32857	15.00000	99.55000	0.0	0.0	-0.59706	0.0	0.0	180.00
				9.9643	7.33571	15.00000	99.55000	0.0	0.0	-0.45665	0.0	0.0	180.00
				11.957	5.34286	15.00000	99.55000	0.0	0.0	-0.35394	0.0	0.0	180.00
				13.950	3.35000	15.00000	99.55000	0.0	0.0	-0.27673	0.0	0.0	180.00
				15.943	1.35714	15.00000	99.55000	0.0	0.0	-0.21357	0.0	0.0	90.000
				17.936	-0.63571	15.00000	99.55000	0.0	0.0	-0.28541	0.0	0.0	90.000
				19.929	-2.64286	15.00000	99.55000	0.0	0.0	-0.29387	0.0	0.0	180.00
				21.922	-4.65000	15.00000	99.55000	0.0	0.0	-0.27893	0.0	0.0	180.00
				23.915	-6.65714	15.00000	99.55000	0.0	0.0	-0.27673	0.0	0.0	90.000
				25.908	-8.66429	15.00000	99.55000	0.0	0.0	-0.26481	0.0	0.0	90.000
				27.901	-10.67143	15.00000	99.55000	0.0	0.0	-0.27578	0.0	0.0	90.000
				29.894	-12.67857	15.00000	99.55000	0.0	0.0	-0.28614	0.0	0.0	90.000
				31.887	-14.68571	15.00000	99.55000	0.0	0.0	-0.29583	0.0	0.0	90.000
				33.880	-16.69286	15.00000	99.55000	0.0	0.0	-0.29593	0.0	0.0	0.0
				35.873	-18.70000	15.00000	99.55000	0.0	0.0	-0.31185	0.0	0.0	0.0
				37.866	-20.70714	15.00000	99.55000	0.0	0.0	-0.32880	0.0	0.0	90.000
				39.859	-22.71429	15.00000	99.55000	0.0	0.0	-0.32880	0.0	0.0	90.000
				41.852	-24.72143	15.00000	99.55000	0.0	0.0	-0.33843	0.0	0.0	90.000
				43.845	-26.72857	15.00000	99.55000	0.0	0.0	-0.34723	0.0	0.0	90.000
				45.838	-28.73571	15.00000	99.55000	0.0	0.0	-0.35515	0.0	0.0	90.000
				47.831	-30.74286	15.00000	99.55000	0.0	0.0	-0.36214	0.0	0.0	90.000
				49.824	-32.75000	15.00000	99.55000	0.0	0.0	-0.36813	0.0	0.0	90.000
				51.817	-34.75714	15.00000	99.55000	0.0	0.0	-0.37306	0.0	0.0	90.000
				53.810	-36.76429	15.00000	99.55000	0.0	0.0	-0.37306	0.0	0.0	38.784
				55.803	-38.77143	15.00000	99.55000	0.0	0.0	-0.41832	0.0	0.0	38.784
				57.796	-40.77857	15.00000	99.55000	0.0	0.0	-0.46923	0.0	0.0	0.0
				59.789	-42.78571	15.00000	99.55000	0.0	0.0	-0.46923	0.0	0.0	0.0
				61.782	-44.79286	15.00000	99.55000	0.0	0.0	-0.52359	0.0	0.0	0.0
				63.775	-46.80000	15.00000	99.55000	0.0	0.0	-0.52359	0.0	0.0	0.0
				65.768	-48.80714	15.00000	99.55000	0.0	0.0	-0.65656	0.0	0.0	0.0
				67.761	-50.81429	15.00000	99.55000	0.0	0.0	-0.65656	0.0	0.0	318.76
				69.754	-52.82143	15.00000	99.55000	0.0	0.0	-0.72463	0.0	0.0	318.76
				71.747	-54.82857	15.00000	99.55000	0.080214	0.0	-0.79989	0.060318	0.052877	318.76
				73.740	-56.83571	15.00000	99.55000	0.080214	0.0	-0.79989	0.0	0.08214	270.00
				75.733	-58.84286	15.00000	99.55000	0.0	0.0	-0.78864	0.0	0.0	270.00
				77.726	-60.85000	15.00000	99.55000	0.0	0.0	-0.78864	0.0	0.0	270.00
				79.719	-62.85714	15.00000	99.55000	0.0	0.0	-0.77599	0.0	0.0	270.00



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Line Name	Chainage [m]	x [m]	y [m]	z [m]	δx [mm]	δy [mm]	δz [mm]	δH/δV [mm]	δPerp. [mm]	Angle [°]	
11	28K			0.0	9.09000	24.26000	99.55000	0.0	0.0	-0.77599	0.0	0.0	*	
				1.0567	10.14667	24.26000	99.55000	0.25556	0.0	-0.90133	0.25556	0.0	*	
				2.1133	11.20333	24.26000	99.55000	0.65181	0.0	-1.0519	0.65181	0.0	*	
				3.1700	12.26000	24.26000	99.55000	1.0481	0.0	-1.2345	1.0481	0.0	*	
12	28L			0.0	12.26000	24.26000	98.65000	1.0481	0.0	-1.2345	0.0	-1.0481	90.000	*
				1.1625	12.26000	25.42250	98.65000	1.1947	0.0	-1.2603	0.0	-1.1847	90.000	*
				2.3250	12.26000	26.58500	98.65000	1.3213	0.0	-1.2839	0.0	-1.3213	90.000	*
				3.4875	12.26000	27.74750	98.65000	1.4578	0.0	-1.3048	0.0	-1.4578	90.000	*
				4.6500	12.26000	28.91000	98.65000	1.5944	0.0	-1.3228	0.0	-1.5944	90.000	*
13	28M			0.0	12.26000	28.91000	98.65000	1.5944	0.0	-1.3228	1.5944	0.0	0.0	*
				1.1117	13.37167	28.91000	98.65000	2.0113	0.0	-1.5834	2.0113	0.0	0.0	*
				2.2233	14.48333	28.91000	98.65000	2.4282	0.0	-1.9124	2.4282	0.0	0.0	*
				3.3350	15.59500	28.91000	98.65000	2.8757	0.0	-2.3288	2.8757	0.0	0.0	*
				4.4467	16.70667	28.91000	98.65000	3.6631	0.0	-2.8071	3.6631	0.0	0.0	*
				5.5583	17.81833	28.91000	98.65000	4.4506	0.0	-3.2926	4.4506	0.0	0.0	*
				6.6700	18.93000	28.91000	98.65000	5.2380	0.0	-3.7444	5.2380	0.0	0.0	*
14	28N			0.0	18.93000	28.91000	98.65000	5.2380	0.0	-3.7444	0.0	5.2380	270.000	*
				1.1625	18.93000	27.74750	98.65000	5.0559	0.0	-3.6760	0.0	5.0559	270.000	*
				2.3250	18.93000	26.58500	98.65000	4.8738	0.0	-3.6199	0.0	4.8738	270.000	*
				3.4875	18.93000	25.42250	98.65000	4.6916	0.0	-3.5700	0.0	4.6916	270.000	*
				4.6500	18.93000	24.26000	98.65000	4.5095	0.0	-3.5249	0.0	4.5095	270.000	*
15	28O			0.0	18.93000	24.26000	98.65000	4.5095	0.0	-3.5249	0.0	4.5095	270.000	*
				1.0000	18.93000	23.26000	98.65000	4.3528	0.0	-3.4919	0.0	4.3528	270.000	*
				2.0000	18.93000	22.26000	98.65000	4.1962	0.0	-3.4717	0.0	4.1962	270.000	*
				3.0000	18.93000	21.26000	98.65000	4.0395	0.0	-3.4840	0.0	4.0395	270.000	*
				4.0000	18.93000	20.26000	98.65000	3.8828	0.0	-3.5600	0.0	3.8828	270.000	*
				5.0000	18.93000	19.26000	98.65000	3.8421	0.0	-3.6321	0.0	3.8421	270.000	*
16	28P			0.0	18.93000	19.26000	99.55000	3.8421	0.0	-3.6321	-3.8421	0.0	180.000	*
				0.81500	18.11500	19.26000	99.55000	3.2648	0.0	-3.1671	-3.2648	0.0	180.000	*
				1.6300	17.30000	19.26000	99.55000	2.6875	0.0	-2.7291	-2.6875	0.0	180.000	*
17	28Q			0.0	17.30000	19.26000	99.55000	2.6875	0.0	-2.7291	0.0	2.6875	270.000	*
				1.0650	17.30000	18.19500	99.55000	2.6875	0.0	-2.6729	0.0	2.6875	270.000	*
				2.1300	17.30000	17.13000	99.55000	2.6875	0.0	-2.5931	0.0	2.6875	270.000	*
				3.1950	17.30000	16.06500	99.55000	2.6875	0.0	-2.4888	0.0	2.6875	270.000	*
				4.2600	17.30000	15.00000	99.55000	2.6875	0.0	-2.3597	0.0	2.6875	270.000	*

\* Result includes imported displacement(s).

Displacement Results - Displacement Grids

Stage Ref.	Stage Name	Disp. Grid Ref.	Disp. Grid Name	x [m]	y [m]	z [m]	δx [mm]	δy [mm]	δz [mm]	
0	Base Model 1	Grid 1		0.00000	0.00000	100.05000	0.0	0.0	-0.072158	*
				1.00000	0.00000	100.05000	0.0	0.0	-0.079878	*
				2.00000	0.00000	100.05000	0.0	0.0	-0.088274	*
				3.00000	0.00000	100.05000	0.0	0.0	-0.097399	*
				4.00000	0.00000	100.05000	0.0	0.0	-0.10730	*
				5.00000	0.00000	100.05000	0.0	0.0	-0.11804	*
				6.00000	0.00000	100.05000	0.0	0.0	-0.12968	*
				7.00000	0.00000	100.05000	0.0	0.0	-0.14225	*
				8.00000	0.00000	100.05000	0.0	0.0	-0.15582	*
				9.00000	0.00000	100.05000	0.0	0.0	-0.17042	*
				10.00000	0.00000	100.05000	0.0	0.0	-0.18609	*
				11.00000	0.00000	100.05000	0.0	0.0	-0.20284	*
				12.00000	0.00000	100.05000	0.0	0.0	-0.22067	*
				13.00000	0.00000	100.05000	0.0	0.0	-0.23952	*
				14.00000	0.00000	100.05000	0.0	0.0	-0.25930	*
				15.00000	0.00000	100.05000	0.0	0.0	-0.27987	*
				16.00000	0.00000	100.05000	0.0	0.0	-0.30099	*
				17.00000	0.00000	100.05000	0.0	0.0	-0.32235	*
				18.00000	0.00000	100.05000	0.0	0.0	-0.34356	*
				19.00000	0.00000	100.05000	0.0	0.0	-0.36413	*
				20.00000	0.00000	100.05000	0.0	0.0	-0.38350	*
				21.00000	0.00000	100.05000	0.0	0.0	-0.40107	*
				22.00000	0.00000	100.05000	0.0	0.0	-0.41625	*
				23.00000	0.00000	100.05000	0.0	0.0	-0.42846	*
				24.00000	0.00000	100.05000	0.0	0.0	-0.43721	*
				25.00000	0.00000	100.05000	0.0	0.0	-0.44214	*
				26.00000	0.00000	100.05000	0.0	0.0	-0.44304	*
				27.00000	0.00000	100.05000	0.0	0.0	-0.43995	*
				28.00000	0.00000	100.05000	0.0	0.0	-0.43268	*
				29.00000	0.00000	100.05000	0.0	0.0	-0.42180	*
				30.00000	0.00000	100.05000	0.0	0.0	-0.40762	*
				31.00000	0.00000	100.05000	0.0	0.0	-0.39068	*
				32.00000	0.00000	100.05000	0.0	0.0	-0.37156	*
				33.00000	0.00000	100.05000	0.0	0.0	-0.35089	*
				34.00000	0.00000	100.05000	0.0	0.0	-0.32927	*
				35.00000	0.00000	100.05000	0.0	0.0	-0.30727	*
				36.00000	0.00000	100.05000	0.0	0.0	-0.28534	*
				37.00000	0.00000	100.05000	0.0	0.0	-0.26389	*
				38.00000	0.00000	100.05000	0.0	0.0	-0.24319	*
				39.00000	0.00000	100.05000	0.0	0.0	-0.22344	*
				40.00000	0.00000	100.05000	0.0	0.0	-0.20478	*
				41.00000	0.00000	100.05000	0.0	0.0	-0.18728	*
				42.00000	0.00000	100.05000	0.0	0.0	-0.17095	*
				43.00000	0.00000	100.05000	0.0	0.0	-0.15579	*
				44.00000	0.00000	100.05000	0.0	0.0	-0.14176	*
				45.00000	0.00000	100.05000	0.0	0.0	-0.12881	*
				0.00000	1.20000	100.05000	0.0	0.0	-0.079659	*
				1.00000	1.20000	100.05000	0.0	0.0	-0.088313	*
				2.00000	1.20000	100.05000	0.0	0.0	-0.097377	*
				3.00000	1.20000	100.05000	0.0	0.0	-0.10809	*
				4.00000	1.20000	100.05000	0.0	0.0	-0.11935	*
				5.00000	1.20000	100.05000	0.0	0.0	-0.13163	*
				6.00000	1.20000	100.05000	0.0	0.0	-0.14501	*
				7.00000	1.20000	100.05000	0.0	0.0	-0.15957	*
				8.00000	1.20000	100.05000	0.0	0.0	-0.17540	*
				9.00000	1.20000	100.05000	0.0	0.0	-0.19258	*
				10.00000	1.20000	100.05000	0.0	0.0	-0.21119	*
				11.00000	1.20000	100.05000	0.0	0.0	-0.23129	*
				12.00000	1.20000	100.05000	0.0	0.0	-0.25291	*
				13.00000	1.20000	100.05000	0.0	0.0	-0.27604	*
				14.00000	1.20000	100.05000	0.0	0.0	-0.30063	*
				15.00000	1.20000	100.05000	0.0	0.0	-0.32653	*
				16.00000	1.20000	100.05000	0.0	0.0	-0.35351	*
				17.00000	1.20000	100.05000	0.0	0.0	-0.38118	*
				18.00000	1.20000	100.05000	0.0046839	0.036248	-0.40903	*
				19.00000	1.20000	100.05000	0.0046376	0.078479	-0.43640	*
				20.00000	1.20000	100.05000	0.0	0.10050	-0.46248	*
				21.00000	1.20000	100.05000	0.0	0.15000	-0.48640	*
				22.00000	1.20000	100.05000	0.0	0.15000	-0.50723	*
				23.00000	1.20000	100.05000	0.0	0.15000	-0.52411	*
				24.00000	1.20000	100.05000	0.0	0.15000	-0.53631	*
				25.00000	1.20000	100.05000	0.0	0.15000	-0.54327	*
				26.00000	1.20000	100.05000	0.0	0.15000	-0.54644	*
				27.00000	1.20000	100.05000	0.0	0.15000	-0.54034	*
				28.00000	1.20000	100.05000	0.0	0.15000	-0.53055	*



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No. Sheet No. Rev.

J20268

Drg. Ref.

Made by  
ML

Date  
26-Feb-2021

Checked

Date

Stage: Ref.	Stage: Name	Disp. Grid: Ref.	Disp. Grid: Name	x	y	z	Δx	Δy	Δz	
				[m]	[m]	[m]	[mm]	[mm]	[mm]	*
4.00000	2.40000	100.05000		0.0	0.0	-0.13226				*
5.00000	2.40000	100.05000		0.0	0.0	-0.14625				*
6.00000	2.40000	100.05000		0.0	0.0	-0.16160				*
7.00000	2.40000	100.05000		0.0	0.0	-0.17842				*
8.00000	2.40000	100.05000		0.0	0.0	-0.19685				*
9.00000	2.40000	100.05000		0.0	0.0	-0.21703				*
10.00000	2.40000	100.05000		0.0	0.0	-0.23910				*
11.00000	2.40000	100.05000		0.0	0.0	-0.26319				*
12.00000	2.40000	100.05000		0.0	0.0	-0.28942				*
13.00000	2.40000	100.05000		0.0	0.0	-0.31787				*
14.00000	2.40000	100.05000		0.0	0.0	-0.34855				*
15.00000	2.40000	100.05000		0.0071368	0.013825	-0.38137				*
16.00000	2.40000	100.05000		0.035371	0.094250	-0.41611				*
17.00000	2.40000	100.05000		0.046193	0.18101	-0.45235				*
18.00000	2.40000	100.05000		0.041197	0.26778	-0.48942				*
19.00000	2.40000	100.05000		0.023963	0.34528	-0.52643				*
20.00000	2.40000	100.05000		0.0	0.40200	-0.56219				*
21.00000	2.40000	100.05000		0.0	0.60000	-0.59538				*
22.00000	2.40000	100.05000		0.0	0.60000	-0.62458				*
23.00000	2.40000	100.05000		0.0	0.60000	-0.64843				*
24.00000	2.40000	100.05000		0.0	0.60000	-0.66579				*
25.00000	2.40000	100.05000		0.0	0.60000	-0.67579				*
26.00000	2.40000	100.05000		0.0	0.60000	-0.67791				*
27.00000	2.40000	100.05000		0.0	0.60000	-0.67202				*
28.00000	2.40000	100.05000		0.0	0.60000	-0.65836				*
29.00000	2.40000	100.05000		0.0	0.60000	-0.63756				*
30.00000	2.40000	100.05000		0.0	0.60000	-0.61058				*
31.00000	2.40000	100.05000		0.0	0.60000	-0.57865				*
32.00000	2.40000	100.05000		-0.0015075	0.39941	-0.54316				*
33.00000	2.40000	100.05000		0.025250	0.34110	-0.50556				*
34.00000	2.40000	100.05000		-0.041888	0.26273	-0.46117				*
35.00000	2.40000	100.05000		-0.046015	0.17573	-0.42915				*
36.00000	2.40000	100.05000		-0.034175	0.089198	-0.39238				*
37.00000	2.40000	100.05000		-0.0048823	0.0092930	-0.35745				*
38.00000	2.40000	100.05000		0.0	0.0	-0.32475				*
39.00000	2.40000	100.05000		0.0	0.0	-0.29445				*
40.00000	2.40000	100.05000		0.0	0.0	-0.26658				*
41.00000	2.40000	100.05000		0.0	0.0	-0.24110				*
42.00000	2.40000	100.05000		0.0	0.0	-0.21787				*
43.00000	2.40000	100.05000		0.0	0.0	-0.19676				*
44.00000	2.40000	100.05000		0.0	0.0	-0.17759				*
45.00000	2.40000	100.05000		0.0	0.0	-0.16021				*
0.00000	3.60000	100.05000		0.0	0.0	-0.09527				*
1.00000	3.60000	100.05000		0.0	0.0	-0.10669				*
2.00000	3.60000	100.05000		0.0	0.0	-0.11855				*
3.00000	3.60000	100.05000		0.0	0.0	-0.13161				*
4.00000	3.60000	100.05000		0.0	0.0	-0.14602				*
5.00000	3.60000	100.05000		0.0	0.0	-0.16190				*
6.00000	3.60000	100.05000		0.0	0.0	-0.17944				*
7.00000	3.60000	100.05000		0.0	0.0	-0.19880				*
8.00000	3.60000	100.05000		0.0	0.0	-0.22018				*
9.00000	3.60000	100.05000		0.0	0.0	-0.24381				*
10.00000	3.60000	100.05000		0.0	0.0	-0.26992				*
11.00000	3.60000	100.05000		0.0	0.0	-0.29876				*
12.00000	3.60000	100.05000		0.0	0.0	-0.33057				*
13.00000	3.60000	100.05000		0.0	0.0	-0.36558				*
14.00000	3.60000	100.05000		0.038416	0.042824	-0.40396				*
15.00000	3.60000	100.05000		0.085372	0.12753	-0.44575				*
16.00000	3.60000	100.05000		0.11021	0.23012	-0.49085				*
17.00000	3.60000	100.05000		0.11154	0.34822	-0.53883				*
18.00000	3.60000	100.05000		0.090197	0.47528	-0.58891				*
19.00000	3.60000	100.05000		0.050367	0.59937	-0.63985				*
20.00000	3.60000	100.05000		0.0	0.70350	-0.68993				*
21.00000	3.60000	100.05000		0.0	1.0500	-0.73704				*
22.00000	3.60000	100.05000		0.0	1.0500	-0.77893				*
23.00000	3.60000	100.05000		0.0	1.0500	-0.81342				*
24.00000	3.60000	100.05000		0.0	1.0500	-0.83867				*
25.00000	3.60000	100.05000		0.0	1.0500	-0.85335				*
26.00000	3.60000	100.05000		0.0	1.0500	-0.85667				*
27.00000	3.60000	100.05000		0.0	1.0500	-0.84842				*
28.00000	3.60000	100.05000		0.0	1.0500	-0.82897				*
29.00000	3.60000	100.05000		0.0	1.0500	-0.79925				*
30.00000	3.60000	100.05000		0.0	1.0500	-0.76076				*
31.00000	3.60000	100.05000		0.0	1.0500	-0.71543				*
32.00000	3.60000	100.05000		-0.003133	0.69817	-0.66550				*
33.00000	3.60000	100.05000		-0.053150	0.59230	-0.61325				*
34.00000	3.60000	100.05000		-0.092059	0.46760	-0.56078				*
35.00000	3.60000	100.05000		-0.11212	0.34079	-0.50974				*
36.00000	3.60000	100.05000		-0.10937	0.22349	-0.46133				*
37.00000	3.60000	100.05000		-0.083158	0.12193	-0.41626				*
38.00000	3.60000	100.05000		-0.034946	0.038316	-0.37486				*
39.00000	3.60000	100.05000		0.0	0.0	-0.33717				*
40.00000	3.60000	100.05000		0.0	0.0	-0.30308				*
41.00000	3.60000	100.05000		0.0	0.0	-0.27236				*
42.00000	3.60000	100.05000		0.0	0.0	-0.24474				*
43.00000	3.60000	100.05000		0.0	0.0	-0.21993				*
44.00000	3.60000	100.05000		0.0	0.0	-0.19764				*
45.00000	3.60000	100.05000		0.0	0.0	-0.17762				*
0.00000	4.80000	100.05000		0.0	0.0	-0.10463				*
1.00000	4.80000	100.05000		0.0	0.0	-0.11657				*
2.00000	4.80000	100.05000		0.0	0.0	-0.12977				*
3.00000	4.80000	100.05000		0.0	0.0	-0.14438				*
4.00000	4.80000	100.05000		0.0	0.0	-0.16057				*
5.00000	4.80000	100.05000		0.0	0.0	-0.17852				*
6.00000	4.80000	100.05000		0.0	0.0	-0.19847				*
7.00000	4.80000	100.05000		0.0	0.0	-0.22065				*
8.00000	4.80000	100.05000		0.0	0.0	-0.24536				*
9.00000	4.80000	100.05000		0.0	0.0	-0.27291				*
10.00000	4.80000	100.05000		0.0	0.0	-0.30369				*
11.00000	4.80000	100.05000		0.0	0.0	-0.33810				*
12.00000	4.80000	100.05000		0.0	0.0	-0.37659				*
13.00000	4.80000	100.05000		0.059089	0.036600	-0.41963				*
14.00000	4.80000	100.05000		0.13617	0.10742	-0.46767				*
15.00000	4.80000	100.05000		0.18155	0.19401	-0.52108				*
16.00000	4.80000	100.05000		-0.20659	0.31611	-0.58000				*
17.00000	4.80000	100.05000		0.19967	0.46772	-0.64423				*
18.00000	4.80000	100.05000		0.15904	0.64452	-0.71295				*
19.00000	4.80000	100.05000		0.088552	0.83229	-0.78453				*
20.00000	4.80000	100.05000		0.0	1.0050	-0.85637				*
21.00000	4.80000	100.05000		0.0	1.5000	-0.92506				*
22.00000	4.80000	100.05000		0.0	1.5000	-0.98678				*
23.00000	4.80000	100.05000		0.0	1.5000	-1.0379				*
24.00000	4.80000	100.05000		0.0	1.5000	-1.0755				*
25.00000	4.80000	100.05000		0.0	1.5000	-1.09975				*
26.00000	4.80000	100.05000		0.0	1.5000	-1.11027				*
27.00000	4.80000	100.05000		0.0	1.5000	-1.0909				*
28.00000	4.80000	100.05000		0.0	1.5000	-1.0626				*
29.00000	4.80000	100.05000		0.0	1.5000	-1.0192				*
30.00000	4.80000	100.05000		0.0	1.5000	-0.96282				*
31.00000	4.80000	100.05000		0.0	1.5000	-0.88673				*
32.00000	4.80000	100.05000		-0.0055085	0.99566	-0.82458				*
33.00000	4.80000	100.05000		-0.093447	0.82114	-0.75022				*
34.00000	4.80000	100.05000		-0.16239	0.63340	-0.67701				*
35.00000	4.80000	100.05000		-0.20104						



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x [m]	y [m]	z [m]	δx [mm]	δy [mm]	δz [mm]	
7.00000	6.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-2.4388	*
8.00000	6.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.27227	*
9.00000	6.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.30423	*
10.00000	6.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.34031	*
11.00000	6.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.38115	*
12.00000	6.00000	100.05000		0.040475	0.014153	0.0	0.0	0.0	-0.42752	*
13.00000	6.00000	100.05000		0.16741	0.070504	0.0	0.16741	0.070504	-0.48025	*
14.00000	6.00000	100.05000		0.26519	0.13960	0.0	0.26519	0.13960	-0.54027	*
15.00000	6.00000	100.05000		0.32427	0.22526	0.0	0.32427	0.22526	-0.60854	*
16.00000	6.00000	100.05000		0.33217	0.33217	0.0	0.33217	0.33217	-0.68586	*
17.00000	6.00000	100.05000		0.32261	0.51326	0.0	0.32261	0.51326	-0.77267	*
18.00000	6.00000	100.05000		0.26166	0.74829	0.0	0.26166	0.74829	-0.86852	*
19.00000	6.00000	100.05000		0.14846	1.0262	0.0	0.14846	1.0262	-0.97151	*
20.00000	6.00000	100.05000		0.0	1.3065	0.0	0.0	1.3065	-1.0777	*
21.00000	6.00000	100.05000		0.0	1.9500	0.0	0.0	1.9500	-1.1812	*
22.00000	6.00000	100.05000		0.0	1.9500	0.0	0.0	1.9500	-1.2751	*
23.00000	6.00000	100.05000		0.0	1.9500	0.0	0.0	1.9500	-1.3531	*
24.00000	6.00000	100.05000		0.0	1.9500	0.0	0.0	1.9500	-1.4103	*
25.00000	6.00000	100.05000		0.0	1.9500	0.0	0.0	1.9500	-1.4438	*
26.00000	6.00000	100.05000		0.0	1.9500	0.0	0.0	1.9500	-1.4521	*
27.00000	6.00000	100.05000		0.0	1.9500	0.0	0.0	1.9500	-1.4349	*
28.00000	6.00000	100.05000		0.0	1.9500	0.0	0.0	1.9500	-1.3929	*
29.00000	6.00000	100.05000		0.0	1.9500	0.0	0.0	1.9500	-1.3278	*
30.00000	6.00000	100.05000		0.0	1.9500	0.0	0.0	1.9500	-1.2429	*
31.00000	6.00000	100.05000		0.0	1.9500	0.0	0.0	1.9500	-1.1434	*
32.00000	6.00000	100.05000		-0.00931	1.2307	0.0	-0.00931	1.2307	-1.0356	*
33.00000	6.00000	100.05000		-0.15652	1.0089	0.0	-0.15652	1.0089	-0.92661	*
34.00000	6.00000	100.05000		-0.26685	0.73275	0.0	-0.26685	0.73275	-0.82206	*
35.00000	6.00000	100.05000		-0.32457	0.50088	0.0	-0.32457	0.50088	-0.72571	*
36.00000	6.00000	100.05000		-0.33340	0.32507	0.0	-0.33340	0.32507	-0.63926	*
37.00000	6.00000	100.05000		-0.32203	0.21957	0.0	-0.32203	0.21957	-0.56298	*
38.00000	6.00000	100.05000		-0.26030	0.13503	0.0	-0.26030	0.13503	-0.49620	*
39.00000	6.00000	100.05000		-0.16054	0.066797	0.0	-0.16054	0.066797	-0.43804	*
40.00000	6.00000	100.05000		-0.032095	0.011109	0.0	-0.032095	0.011109	-0.38743	*
41.00000	6.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.34333	*
42.00000	6.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.30482	*
43.00000	6.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.27109	*
44.00000	6.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.24145	*
45.00000	6.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.21532	*
0.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.12397	*
1.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.13744	*
2.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.15357	*
3.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.17157	*
4.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.19172	*
5.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.21430	*
6.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.23969	*
7.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.26833	*
8.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.30073	*
9.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.33754	*
10.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.37953	*
11.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.42766	*
12.00000	7.20000	100.05000		0.13305	0.029102	0.0	0.13305	0.029102	-1.48310	*
13.00000	7.20000	100.05000		0.29054	0.075431	0.0	0.29054	0.075431	-1.54725	*
14.00000	7.20000	100.05000		0.42213	0.13440	0.0	0.42213	0.13440	-1.62181	*
15.00000	7.20000	100.05000		0.51652	0.21141	0.0	0.51652	0.21141	-1.70874	*
16.00000	7.20000	100.05000		0.55598	0.31474	0.0	0.55598	0.31474	-1.81018	*
17.00000	7.20000	100.05000		0.51301	0.45681	0.0	0.51301	0.45681	-1.92819	*
18.00000	7.20000	100.05000		0.42698	0.73167	0.0	0.42698	0.73167	-2.0635	*
19.00000	7.20000	100.05000		0.27231	1.2135	0.0	0.27231	1.2135	-2.2022	*
20.00000	7.20000	100.05000		0.0	1.7532	0.0	0.0	1.7532	-2.3568	*
21.00000	7.20000	100.05000		0.0	2.6167	0.0	0.0	2.6167	-2.5086	*
22.00000	7.20000	100.05000		0.0	2.6167	0.0	0.0	2.6167	-2.6575	*
23.00000	7.20000	100.05000		0.0	2.6167	0.0	0.0	2.6167	-2.7801	*
24.00000	7.20000	100.05000		0.0	2.6167	0.0	0.0	2.6167	-2.8691	*
25.00000	7.20000	100.05000		0.0	2.6167	0.0	0.0	2.6167	-2.9207	*
26.00000	7.20000	100.05000		0.0	2.6167	0.0	0.0	2.6167	-2.9339	*
27.00000	7.20000	100.05000		0.0	2.6167	0.0	0.0	2.6167	-2.9085	*
28.00000	7.20000	100.05000		0.0	2.6167	0.0	0.0	2.6167	-2.8450	*
29.00000	7.20000	100.05000		0.0	2.6167	0.0	0.0	2.6167	-2.7453	*
30.00000	7.20000	100.05000		0.0	2.6167	0.0	0.0	2.6167	-2.6133	*
31.00000	7.20000	100.05000		0.0	2.6167	0.0	0.0	2.6167	-2.4569	*
32.00000	7.20000	100.05000		-0.017842	1.7229	0.0	-0.017842	1.7229	-2.3001	*
33.00000	7.20000	100.05000		-0.28560	1.1813	0.0	-0.28560	1.1813	-2.1431	*
34.00000	7.20000	100.05000		-0.43337	0.71005	0.0	-0.43337	0.71005	-2.0031	*
35.00000	7.20000	100.05000		-0.51857	0.44891	0.0	-0.51857	0.44891	-1.86766	*
36.00000	7.20000	100.05000		-0.55561	0.30759	0.0	-0.55561	0.30759	-1.75099	*
37.00000	7.20000	100.05000		-0.51219	0.20614	0.0	-0.51219	0.20614	-1.65160	*
38.00000	7.20000	100.05000		-0.41515	0.13042	0.0	-0.41515	0.13042	-1.56724	*
39.00000	7.20000	100.05000		-0.28174	0.072338	0.0	-0.28174	0.072338	-1.49560	*
40.00000	7.20000	100.05000		-0.12295	0.026640	0.0	-0.12295	0.026640	-1.43456	*
41.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.38232	*
42.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.33739	*
43.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.29853	*
44.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.26475	*
45.00000	7.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.23523	*
0.00000	8.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.13248	*
1.00000	8.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.14830	*
2.00000	8.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.16599	*
3.00000	8.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.18582	*
4.00000	8.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.20809	*
5.00000	8.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.23319	*
6.00000	8.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.26156	*
7.00000	8.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.29375	*
8.00000	8.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.33045	*
9.00000	8.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.37249	*
10.00000	8.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.42093	*
11.00000	8.40000	100.05000		0.012717	0.0012366	0.0	0.012717	0.0012366	-1.47710	*
12.00000	8.40000	100.05000		0.22046	0.024542	0.0	0.22046	0.024542	-1.54271	*
13.00000	8.40000	100.05000		0.41639	0.054168	0.0	0.41639	0.054168	-1.61992	*
14.00000	8.40000	100.05000		0.59505	0.093021	0.0	0.59505	0.093021	-1.71151	*
15.00000	8.40000	100.05000		0.74716	0.14603	0.0	0.74716	0.14603	-1.82106	*
16.00000	8.40000	100.05000		0.85581	0.22219	0.0	0.85581	0.22219	-1.95309	*
17.00000	8.40000	100.05000		0.89418	0.34181	0.0	0.89418	0.34181	-2.1114	*
18.00000	8.40000	100.05000		0.86129	0.59832	0.0	0.86129	0.59832	-2.2785	*
19.00000	8.40000	100.05000		0.58028	1.2117	0.0	0.58028	1.2117	-2.4420	*
20.00000	8.40000	100.05000		0.0	2.3227	0.0	0.0	2.3227	-2.6275	*
21.00000	8.40000	100.05000		0.0	3.4667	0.0	0.0	3.4667	-2.8152	*
22.00000	8.4000									





30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x [m]	y [m]	z [m]	Δx [mm]	Δy [mm]	Δz [mm]	
10.00000	9.60000	100.05000					0.0	0.0	-0.46391	*
11.00000	9.60000	100.05000					0.046316	0.0010132	-0.52869	*
12.00000	9.60000	100.05000					0.28707	0.0070964	-0.60530	*
13.00000	9.60000	100.05000					0.52483	0.014912	-0.69684	*
14.00000	9.60000	100.05000					0.75811	0.025321	-0.80751	*
15.00000	9.60000	100.05000					0.98426	0.039870	-0.94206	*
16.00000	9.60000	100.05000					1.1980	0.061627	-1.1116	*
17.00000	9.60000	100.05000					1.4715	0.10363	-1.3114	*
18.00000	9.60000	100.05000					1.7810	0.19826	-1.5120	*
19.00000	9.60000	100.05000					1.7901	0.46475	-1.6767	*
20.00000	9.60000	100.05000					0.0	2.8922	-0.19765	*
21.00000	9.60000	100.05000					0.0	4.3167	-2.1371	*
22.00000	9.60000	100.05000					0.0	4.3167	-2.5998	*
23.00000	9.60000	100.05000					0.0	4.3167	-2.9376	*
24.00000	9.60000	100.05000					0.0	4.3167	-3.1576	*
25.00000	9.60000	100.05000					0.0	4.3167	-3.2769	*
26.00000	9.60000	100.05000					0.0	4.3167	-3.3073	*
27.00000	9.60000	100.05000					0.0	4.3167	-3.2525	*
28.00000	9.60000	100.05000					0.0	4.3167	-3.1093	*
29.00000	9.60000	100.05000					0.0	4.3167	-2.8666	*
30.00000	9.60000	100.05000					0.0	4.3167	-2.5079	*
31.00000	9.60000	100.05000					0.0	4.3167	-2.0281	*
32.00000	9.60000	100.05000					-0.20443	2.5466	-1.7880	*
33.00000	9.60000	100.05000					-1.8115	0.43617	-1.5769	*
34.00000	9.60000	100.05000					-1.7668	0.19008	-1.4114	*
35.00000	9.60000	100.05000					-1.4496	0.099881	-1.2100	*
36.00000	9.60000	100.05000					-1.1856	0.060023	-1.0144	*
37.00000	9.60000	100.05000					-0.97097	0.038836	-0.85214	*
38.00000	9.60000	100.05000					-0.74428	0.024600	-0.72314	*
39.00000	9.60000	100.05000					-0.51067	0.014381	-0.61906	*
40.00000	9.60000	100.05000					-0.27210	0.006890	-0.53398	*
41.00000	9.60000	100.05000					-0.031797	690.84E-6	-0.46357	*
42.00000	9.60000	100.05000					0.0	0.0	-0.40465	*
43.00000	9.60000	100.05000					0.0	0.0	-0.35484	*
44.00000	9.60000	100.05000					0.0	0.0	-0.31232	*
45.00000	9.60000	100.05000					0.0	0.0	-0.27579	*
0.00000	10.80000	100.05000					0.0	0.0	-0.15183	*
1.00000	10.80000	100.05000					0.0	0.0	-0.17043	*
2.00000	10.80000	100.05000					0.0	0.0	-0.19136	*
3.00000	10.80000	100.05000					0.0	0.0	-0.21497	*
4.00000	10.80000	100.05000					0.0	0.0	-0.24170	*
5.00000	10.80000	100.05000					0.0	0.0	-0.27205	*
6.00000	10.80000	100.05000					0.0	0.0	-0.30668	*
7.00000	10.80000	100.05000					0.0	0.0	-0.34639	*
8.00000	10.80000	100.05000					0.0	0.0	-0.39220	*
9.00000	10.80000	100.05000					0.0	0.0	-0.44541	*
10.00000	10.80000	100.05000					0.0	0.0	-0.50773	*
11.00000	10.80000	100.05000					0.075000	0.0	-0.58140	*
12.00000	10.80000	100.05000					0.450000	0.0	-0.66945	*
13.00000	10.80000	100.05000					0.825000	0.0	-0.77600	*
14.00000	10.80000	100.05000					1.2000	0.0	-0.90683	*
15.00000	10.80000	100.05000					1.5750	0.0	-1.0703	*
16.00000	10.80000	100.05000					1.9500	0.0	-1.2787	*
17.00000	10.80000	100.05000					2.4750	0.0	-1.5296	*
18.00000	10.80000	100.05000					3.1833	0.0	-1.7744	*
19.00000	10.80000	100.05000					3.8917	0.0	-1.9375	*
20.00000	10.80000	100.05000					4.6000	0.0	-2.3836	*
21.00000	10.80000	100.05000					Point lies within an excavation.			*
22.00000	10.80000	100.05000					Point lies within an excavation.			*
23.00000	10.80000	100.05000					Point lies within an excavation.			*
24.00000	10.80000	100.05000					Point lies within an excavation.			*
25.00000	10.80000	100.05000					Point lies within an excavation.			*
26.00000	10.80000	100.05000					Point lies within an excavation.			*
27.00000	10.80000	100.05000					Point lies within an excavation.			*
28.00000	10.80000	100.05000					Point lies within an excavation.			*
29.00000	10.80000	100.05000					Point lies within an excavation.			*
30.00000	10.80000	100.05000					Point lies within an excavation.			*
31.00000	10.80000	100.05000					Point lies within an excavation.			*
32.00000	10.80000	100.05000					-4.3015	0.0	-2.2589	*
33.00000	10.80000	100.05000					-1.9392	0.0	-1.8650	*
34.00000	10.80000	100.05000					-2.8848	0.0	-1.6735	*
35.00000	10.80000	100.05000					-2.1765	0.0	-1.4060	*
36.00000	10.80000	100.05000					-1.7355	0.0	-1.1534	*
37.00000	10.80000	100.05000					-1.3605	0.0	-0.95508	*
38.00000	10.80000	100.05000					-0.9850	0.0	-0.80165	*
39.00000	10.80000	100.05000					-0.61050	0.0	-0.68047	*
40.00000	10.80000	100.05000					-0.23550	0.0	-0.58305	*
41.00000	10.80000	100.05000					0.0	0.0	-0.50352	*
42.00000	10.80000	100.05000					0.0	0.0	-0.43768	*
43.00000	10.80000	100.05000					0.0	0.0	-0.38250	*
44.00000	10.80000	100.05000					0.0	0.0	-0.33575	*
45.00000	10.80000	100.05000					0.0	0.0	-0.29577	*
0.00000	12.00000	100.05000					0.0	0.0	-0.16150	*
1.00000	12.00000	100.05000					0.0	0.0	-0.18151	*
2.00000	12.00000	100.05000					0.0	0.0	-0.20408	*
3.00000	12.00000	100.05000					0.0	0.0	-0.22961	*
4.00000	12.00000	100.05000					0.0	0.0	-0.25859	*
5.00000	12.00000	100.05000					0.0	0.0	-0.29160	*
6.00000	12.00000	100.05000					0.0	0.0	-0.32940	*
7.00000	12.00000	100.05000					0.0	0.0	-0.37292	*
8.00000	12.00000	100.05000					0.0	0.0	-0.42334	*
9.00000	12.00000	100.05000					0.0	0.0	-0.48222	*
10.00000	12.00000	100.05000					0.0	0.0	-0.55157	*
11.00000	12.00000	100.05000					0.075000	0.0	-0.63442	*
12.00000	12.00000	100.05000					0.450000	0.0	-0.73356	*
13.00000	12.00000	100.05000					0.825000	0.0	-0.85502	*
14.00000	12.00000	100.05000					1.2000	0.0	-1.0059	*
15.00000	12.00000	100.05000					1.5750	0.0	-1.1969	*
16.00000	12.00000	100.05000					1.9500	0.0	-1.4447	*
17.00000	12.00000	100.05000					2.4750	0.0	-1.7543	*
18.00000	12.00000	100.05000					3.1833	0.0	-2.0920	*
19.00000	12.00000	100.05000					3.8917	0.0	-2.4163	*
20.00000	12.00000	100.05000					4.6000	0.0	-3.1804	*
21.00000	12.00000	100.05000					Point lies within an excavation.			*
22.00000	12.00000	100.05000					Point lies within an excavation.			*
23.00000	12.00000	100.05000					Point lies within an excavation.			*
24.00000	12.00000	100.05000					Point lies within an excavation.			*
25.00000	12.00000	100.05000					Point lies within an excavation.			*
26.00000	12.00000	100.05000					Point lies within an excavation.			*
27.00000	12.00000	100.05000					Point lies within an excavation.			*
28.00000	12.00000	100.05000					Point lies within an excavation.			*
29.00000	12.00000	100.05000					Point lies within an excavation.			*
30.00000	12.00000	100.05000					Point lies within an excavation.			*
31.00000	12.00000	100.05000					Point lies within an excavation.			*
32.00000	12.00000	100.05000					-3.2175	0.0	-3.0768	*
33.00000	12.00000	100.05000					-3.2092	0.0	-2.3692	*
34.00000	12.00000	100.05000					-2.5008	0.0	-1.9809	*
35.00000	12.00000	100.05000					-1.8225	0.0	-1.5984	*
36.00000	12.00000	100.05000					-1.4475	0.0	-1.2828	*
37.00000	12.00000	100.05000					-1.0725	0.0	-1.0508	*
38.00000	12.00000	100.05000					-0.69750	0.0	-0.87468	*
39.00000	12.00000	100.05000					-0.32250	0.0	-0.73778	*
40.00000	12.00000	100.05000					0.0	0.0	-0.62908	*
41.00000	12.00000	100.05000					0.0	0.0	-0.54122	*
42.00000	12.00000	100.05000					0.0	0.0	-0.46905	*
43.00000	12.00000	100.05000					0.0	0.0	-0.40895	*
44.00000	12.00000	100.05000					0.0	0.0	-0.35827	*
45.00000	12.00000	100.05000					0.0	0.0	-0.31509	*
0.00000	13.20000	100.05000								



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x [m]	y [m]	z [m]	δx [mm]	δy [mm]	δz [mm]	
13.00000	13.20000	100.05000		0.82500	0.0	0.0	0.0	0.0	-0.93156	*
14.00000	13.20000	100.05000		1.2000	0.0	0.0	0.0	0.0	-1.1011	*
15.00000	13.20000	100.05000		1.5750	0.0	0.0	0.0	0.0	-1.3173	*
16.00000	13.20000	100.05000		1.9500	0.0	0.0	0.0	0.0	-1.6003	*
17.00000	13.20000	100.05000		2.4750	0.0	0.0	0.0	0.0	-1.9603	*
18.00000	13.20000	100.05000		3.1833	0.0	0.0	0.0	0.0	-2.3724	*
19.00000	13.20000	100.05000		3.8917	0.0	0.0	0.0	0.0	-2.8100	*
20.00000	13.20000	100.05000		4.6000	0.0	0.0	0.0	0.0	-3.7494	*
21.00000	13.20000	100.05000							Point lies within an excavation.	*
22.00000	13.20000	100.05000							Point lies within an excavation.	*
23.00000	13.20000	100.05000							Point lies within an excavation.	*
24.00000	13.20000	100.05000							Point lies within an excavation.	*
25.00000	13.20000	100.05000							Point lies within an excavation.	*
26.00000	13.20000	100.05000							Point lies within an excavation.	*
27.00000	13.20000	100.05000							Point lies within an excavation.	*
28.00000	13.20000	100.05000							Point lies within an excavation.	*
29.00000	13.20000	100.05000							Point lies within an excavation.	*
30.00000	13.20000	100.05000							Point lies within an excavation.	*
31.00000	13.20000	100.05000							Point lies within an excavation.	*
32.00000	13.20000	100.05000		-3.5335	0.0	0.0	0.0	0.0	-3.6564	*
33.00000	13.20000	100.05000		-2.8252	0.0	0.0	0.0	0.0	-2.7675	*
34.00000	13.20000	100.05000		-2.1168	0.0	0.0	0.0	0.0	-2.2243	*
35.00000	13.20000	100.05000		-1.5345	0.0	0.0	0.0	0.0	-1.7476	*
36.00000	13.20000	100.05000		-1.1595	0.0	0.0	0.0	0.0	-1.3909	*
37.00000	13.20000	100.05000		-0.78450	0.0	0.0	0.0	0.0	-1.1319	*
38.00000	13.20000	100.05000		-0.40950	0.0	0.0	0.0	0.0	-0.93760	*
39.00000	13.20000	100.05000		-0.034500	0.0	0.0	0.0	0.0	-0.78800	*
40.00000	13.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.67012	*
41.00000	13.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.57538	*
42.00000	13.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.49790	*
43.00000	13.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.43358	*
44.00000	13.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.37947	*
45.00000	13.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.33345	*
0.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.18040	*
1.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.20338	*
2.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.22898	*
3.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.25827	*
4.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.29165	*
5.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.32986	*
6.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.37381	*
7.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.42468	*
8.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.48395	*
9.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.55358	*
10.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.63615	*
11.00000	14.40000	100.05000		0.075000	0.0	0.0	0.0	0.0	-0.73517	*
12.00000	14.40000	100.05000		0.45000	0.0	0.0	0.0	0.0	-0.85843	*
13.00000	14.40000	100.05000		0.82500	0.0	0.0	0.0	0.0	-1.0037	*
14.00000	14.40000	100.05000		1.2000	0.0	0.0	0.0	0.0	-1.1896	*
15.00000	14.40000	100.05000		1.5750	0.0	0.0	0.0	0.0	-1.4276	*
16.00000	14.40000	100.05000		1.9500	0.0	0.0	0.0	0.0	-1.7396	*
17.00000	14.40000	100.05000		2.4750	0.0	0.0	0.0	0.0	-2.1390	*
18.00000	14.40000	100.05000		3.1833	0.0	0.0	0.0	0.0	-2.6053	*
19.00000	14.40000	100.05000		3.8917	0.0	0.0	0.0	0.0	-3.1162	*
20.00000	14.40000	100.05000		4.6000	0.0	0.0	0.0	0.0	-4.1505	*
21.00000	14.40000	100.05000							Point lies within an excavation.	*
22.00000	14.40000	100.05000							Point lies within an excavation.	*
23.00000	14.40000	100.05000							Point lies within an excavation.	*
24.00000	14.40000	100.05000							Point lies within an excavation.	*
25.00000	14.40000	100.05000							Point lies within an excavation.	*
26.00000	14.40000	100.05000							Point lies within an excavation.	*
27.00000	14.40000	100.05000							Point lies within an excavation.	*
28.00000	14.40000	100.05000							Point lies within an excavation.	*
29.00000	14.40000	100.05000							Point lies within an excavation.	*
30.00000	14.40000	100.05000							Point lies within an excavation.	*
31.00000	14.40000	100.05000							Point lies within an excavation.	*
32.00000	14.40000	100.05000		-3.1495	0.0	0.0	0.0	0.0	-4.0343	*
33.00000	14.40000	100.05000		-2.4412	0.0	0.0	0.0	0.0	-3.0425	*
34.00000	14.40000	100.05000		-1.7328	0.0	0.0	0.0	0.0	-2.3844	*
35.00000	14.40000	100.05000		-1.2465	0.0	0.0	0.0	0.0	-1.8497	*
36.00000	14.40000	100.05000		-0.87150	0.0	0.0	0.0	0.0	-1.4679	*
37.00000	14.40000	100.05000		-0.49650	0.0	0.0	0.0	0.0	-1.1922	*
38.00000	14.40000	100.05000		-0.12150	0.0	0.0	0.0	0.0	-0.98648	*
39.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.82864	*
40.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.70457	*
41.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.60498	*
42.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.52355	*
43.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.45594	*
44.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.39904	*
45.00000	14.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.35061	*
0.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.18946	*
1.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.21358	*
2.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.24091	*
3.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.27200	*
4.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.30748	*
5.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.34815	*
6.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.39500	*
7.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.44929	*
8.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.51263	*
9.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.58713	*
10.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.67559	*
11.00000	15.60000	100.05000		0.075000	0.0	0.0	0.0	0.0	-0.78177	*
12.00000	15.60000	100.05000		0.45000	0.0	0.0	0.0	0.0	-0.91084	*
13.00000	15.60000	100.05000		0.82500	0.0	0.0	0.0	0.0	-1.0700	*
14.00000	15.60000	100.05000		1.2000	0.0	0.0	0.0	0.0	-1.2697	*
15.00000	15.60000	100.05000		1.5750	0.0	0.0	0.0	0.0	-1.5252	*
16.00000	15.60000	100.05000		1.9500	0.0	0.0	0.0	0.0	-1.8598	*
17.00000	15.60000	100.05000		2.4750	0.0	0.0	0.0	0.0	-2.2885	*
18.00000	15.60000	100.05000		3.1833	0.0	0.0	0.0	0.0	-2.7926	*
19.00000	15.60000	100.05000		3.8917	0.0	0.0	0.0	0.0	-3.3516	*
20.00000	15.60000	100.05000		4.6000	0.0	0.0	0.0	0.0	-4.4437	*
21.00000	15.60000	100.05000							Point lies within an excavation.	*
22.00000	15.60000	100.05000							Point lies within an excavation.	*
23.00000	15.60000	100.05000							Point lies within an excavation.	*
24.00000	15.60000	100.05000							Point lies within an excavation.	*
25.00000	15.60000	100.05000							Point lies within an excavation.	*
26.00000	15.60000	100.05000							Point lies within an excavation.	*
27.00000	15.60000	100.05000							Point lies within an excavation.	*
28.00000	15.60000	100.05000							Point lies within an excavation.	*
29.00000	15.60000	100.05000							Point lies within an excavation.	*
30.00000	15.60000	100.05000							Point lies within an excavation.	*
31.00000	15.60000	100.05000							Point lies within an excavation.	*
32.00000	15.60000	100.05000		-2.7655	0.0	0.0	0.0	0.0	-4.2390	*
33.00000	15.60000	100.05000		-2.0572	0.0	0.0	0.0	0.0	-3.1875	*
34.00000	15.60000	100.05000		-1.3488	0.0	0.0	0.0	0.0	-2.4546	*
35.00000	15.60000	100.05000		-0.8980	0.0	0.0	0.0	0.0	-1.8951	*
36.00000	15.60000	100.05000		-0.58350	0.0	0.0	0.0	0.0	-1.5071	*
37.00000	15.60000	100.05000		-0.20850	0.0	0.0	0.0	0.0	-1.2275	*
38.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-1.0187	*
39.00000	15.60000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.85817	*
40.00000	15.60000	100.05000		0.0	0.0	0.0	0.			



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x	y	z	Δx	Δy	Δz
				[m]	[m]	[m]	[mm]	[mm]	[mm]
16.00000	16.80000	100.05000		1.9500	0.0	-1.9606	*		
17.00000	16.80000	100.05000		2.4750	0.0	-2.4094	*		
18.00000	16.80000	100.05000		3.1833	0.0	-2.9387	*		
19.00000	16.80000	100.05000		3.8917	0.0	-3.5301	*		
20.00000	16.80000	100.05000		4.6000	0.0	-4.6642	*		
21.00000	16.80000	100.05000				Point lies within an excavation.	*		
22.00000	16.80000	100.05000				Point lies within an excavation.	*		
23.00000	16.80000	100.05000				Point lies within an excavation.	*		
24.00000	16.80000	100.05000				Point lies within an excavation.	*		
25.00000	16.80000	100.05000				Point lies within an excavation.	*		
26.00000	16.80000	100.05000				Point lies within an excavation.	*		
27.00000	16.80000	100.05000				Point lies within an excavation.	*		
28.00000	16.80000	100.05000				Point lies within an excavation.	*		
29.00000	16.80000	100.05000				Point lies within an excavation.	*		
30.00000	16.80000	100.05000				Point lies within an excavation.	*		
31.00000	16.80000	100.05000				Point lies within an excavation.	*		
32.00000	16.80000	100.05000		-2.3815	0.0	-4.2523	*		
33.00000	16.80000	100.05000		-1.6732	0.0	-3.1786	*		
34.00000	16.80000	100.05000		-1.0455	0.0	-2.4144	*		
35.00000	16.80000	100.05000		-0.67050	0.0	-1.8753	*		
36.00000	16.80000	100.05000		-0.29550	0.0	-1.5044	*		
37.00000	16.80000	100.05000		0.0	0.0	-1.2359	*		
38.00000	16.80000	100.05000		0.0	0.0	-1.0336	*		
39.00000	16.80000	100.05000		0.0	0.0	-0.87637	*		
40.00000	16.80000	100.05000		0.0	0.0	-0.75097	*		
41.00000	16.80000	100.05000		0.0	0.0	-0.64866	*		
42.00000	16.80000	100.05000		0.0	0.0	-0.56427	*		
43.00000	16.80000	100.05000		0.0	0.0	-0.49320	*		
44.00000	16.80000	100.05000		0.0	0.0	-0.43281	*		
45.00000	16.80000	100.05000		0.0	0.0	-0.38100	*		
0.00000	18.00000	100.05000		0.0	0.0	-0.20639	*		
1.00000	18.00000	100.05000		0.0	0.0	-0.23300	*		
2.00000	18.00000	100.05000		0.0	0.0	-0.26322	*		
3.00000	18.00000	100.05000		0.0	0.0	-0.29765	*		
4.00000	18.00000	100.05000		0.0	0.0	-0.33701	*		
5.00000	18.00000	100.05000		0.0	0.0	-0.38220	*		
6.00000	18.00000	100.05000		0.0	0.0	-0.43432	*		
7.00000	18.00000	100.05000		0.0	0.0	-0.49476	*		
8.00000	18.00000	100.05000		0.0	0.0	-0.56532	*		
9.00000	18.00000	100.05000		0.0	0.0	-0.64831	*		
10.00000	18.00000	100.05000		0.0	0.0	-0.74676	*		
11.00000	18.00000	100.05000		0.075000	0.0	-0.86474	*		
12.00000	18.00000	100.05000		0.45000	0.0	-1.0078	*		
13.00000	18.00000	100.05000		0.82500	0.0	-1.1835	*		
14.00000	18.00000	100.05000		1.2000	0.0	-1.4027	*		
15.00000	18.00000	100.05000		1.5750	0.0	-1.6812	*		
16.00000	18.00000	100.05000		1.9500	0.0	-2.0427	*		
17.00000	18.00000	100.05000		2.4750	0.0	-2.5027	*		
18.00000	18.00000	100.05000		3.1833	0.0	-3.0438	*		
19.00000	18.00000	100.05000		3.8917	0.0	-3.6510	*		
20.00000	18.00000	100.05000		4.6000	0.0	-4.3183	*		
21.00000	18.00000	100.05000				Point lies within an excavation.	*		
22.00000	18.00000	100.05000				Point lies within an excavation.	*		
23.00000	18.00000	100.05000				Point lies within an excavation.	*		
24.00000	18.00000	100.05000				Point lies within an excavation.	*		
25.00000	18.00000	100.05000				Point lies within an excavation.	*		
26.00000	18.00000	100.05000				Point lies within an excavation.	*		
27.00000	18.00000	100.05000				Point lies within an excavation.	*		
28.00000	18.00000	100.05000				Point lies within an excavation.	*		
29.00000	18.00000	100.05000				Point lies within an excavation.	*		
30.00000	18.00000	100.05000				Point lies within an excavation.	*		
31.00000	18.00000	100.05000				Point lies within an excavation.	*		
32.00000	18.00000	100.05000		-1.9975	0.0	-3.9690	*		
33.00000	18.00000	100.05000		-1.2892	0.0	-2.9525	*		
34.00000	18.00000	100.05000		-0.7575	0.0	-2.2494	*		
35.00000	18.00000	100.05000		-0.38250	0.0	-1.7843	*		
36.00000	18.00000	100.05000		-0.0075000	0.0	-1.4598	*		
37.00000	18.00000	100.05000		0.0	0.0	-1.2191	*		
38.00000	18.00000	100.05000		0.0	0.0	-1.0329	*		
39.00000	18.00000	100.05000		0.0	0.0	-0.88471	*		
40.00000	18.00000	100.05000		0.0	0.0	-0.76399	*		
41.00000	18.00000	100.05000		0.0	0.0	-0.66396	*		
42.00000	18.00000	100.05000		0.0	0.0	-0.57990	*		
43.00000	18.00000	100.05000		0.0	0.0	-0.50848	*		
44.00000	18.00000	100.05000		0.0	0.0	-0.44724	*		
45.00000	18.00000	100.05000		0.0	0.0	-0.39435	*		
0.00000	19.20000	100.05000		0.0	0.0	-0.21410	*		
1.00000	19.20000	100.05000		0.0	0.0	-0.24185	*		
2.00000	19.20000	100.05000		0.0	0.0	-0.27339	*		
3.00000	19.20000	100.05000		0.0	0.0	-0.30934	*		
4.00000	19.20000	100.05000		0.0	0.0	-0.35046	*		
5.00000	19.20000	100.05000		0.0	0.0	-0.39768	*		
6.00000	19.20000	100.05000		0.0	0.0	-0.45215	*		
7.00000	19.20000	100.05000		0.0	0.0	-0.51532	*		
8.00000	19.20000	100.05000		0.0	0.0	-0.58902	*		
9.00000	19.20000	100.05000		0.0	0.0	-0.67652	*		
10.00000	19.20000	100.05000		0.0	0.0	-0.77823	*		
11.00000	19.20000	100.05000		0.075000	0.0	-0.90095	*		
12.00000	19.20000	100.05000		0.45000	0.0	-1.0493	*		
13.00000	19.20000	100.05000		0.82500	0.0	-1.2310	*		
14.00000	19.20000	100.05000		1.2000	0.0	-1.4566	*		
15.00000	19.20000	100.05000		1.5750	0.0	-1.7414	*		
16.00000	19.20000	100.05000		1.9500	0.0	-2.1083	*		
17.00000	19.20000	100.05000		2.4750	0.0	-2.5700	*		
18.00000	19.20000	100.05000		3.1833	0.0	-3.1033	*		
19.00000	19.20000	100.05000		3.8917	0.0	-3.6796	*		
20.00000	19.20000	100.05000		4.6000	0.0	-4.3032	*		
21.00000	19.20000	100.05000				Point lies within an excavation.	*		
22.00000	19.20000	100.05000				Point lies within an excavation.	*		
23.00000	19.20000	100.05000				Point lies within an excavation.	*		
24.00000	19.20000	100.05000				Point lies within an excavation.	*		
25.00000	19.20000	100.05000				Point lies within an excavation.	*		
26.00000	19.20000	100.05000				Point lies within an excavation.	*		
27.00000	19.20000	100.05000				Point lies within an excavation.	*		
28.00000	19.20000	100.05000				Point lies within an excavation.	*		
29.00000	19.20000	100.05000				Point lies within an excavation.	*		
30.00000	19.20000	100.05000				Point lies within an excavation.	*		
31.00000	19.20000	100.05000				Point lies within an excavation.	*		
32.00000	19.20000	100.05000		-1.6135	0.0	-2.9685	*		
33.00000	19.20000	100.05000		-0.90517	0.0	-2.3818	*		
34.00000	19.20000	100.05000		-0.46950	0.0	-1.9446	*		
35.00000	19.20000	100.05000		-0.094500	0.0	-1.6279	*		
36.00000	19.20000	100.05000		0.0	0.0	-1.3819	*		
37.00000	19.20000	100.05000		0.0	0.0	-1.1840	*		
38.00000	19.20000	100.05000		0.0	0.0	-1.0216	*		
39.00000	19.20000	100.05000		0.0	0.0	-0.88649	*		
40.00000	19.20000	100.05000		0.0	0.0	-0.77277	*		
41.00000	19.20000	100.05000		0.0	0.0	-0.67617	*		
42.00000	19.20000	100.05000		0.0	0.0	-0.59347	*		
43.00000	19.20000	100.05000		0.0	0.0	-0.52921	*		
44.00000	19.20000	100.05000		0.0	0.0	-0.46046	*		
45.00000	19.20000	100.05000		0.0	0.0	-0.40671	*		
0.00000	20.40000	100.05000		0.0	0.0	-0.22122	*		
1.00000	20.40000	100.05000		0.0	0.0	-0.25002	*		
2.00000	20.40000	100.05000		0.0	0.0	-0.28278	*		
3.00000	20.40000	100.05000		0.0	0.0	-0.32014	*		
4.00000	20.40000	100.05000		0.0	0.0	-0.36289	*		
5.00000	20.40000	100.05000		0.0	0.0	-0.41198	*		
6.00000	20.40000	100.05000		0.0	0.0	-0.46862	*		
7.00000	20.40000	100.05000		0.0	0.0	-0.53427	*		
8.00000	20.40000	100.05000		0.0	0.0	-0.61082	*		
9.00000	20.40000	100.05000		0.0	0.0	-0.70069	*		
10.00000	20.40000	100.05000		0.0	0.0	-0.80700	*		
11.00000	20.40000	100.05000		0.12200	0.0	-0.93387	*		
12.00000	20.40000	100.05000		0.49700	0.0	-1.0868	*		
13.00000	20.40000	100.05000		0.87200	0.0	-1.2734	*		
14.00000	20.40000	100.05000		1					



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x [m]	y [m]	z [m]	Δx [mm]	Δy [mm]	Δz [mm]	
19.00000	20.40000	100.05000		3.9543	0.0	-3.5756	*			
20.00000	20.40000	100.05000		4.6627	0.0	-3.8499	*			
21.00000	20.40000	100.05000				Point lies within an excavation.	*			
22.00000	20.40000	100.05000				Point lies within an excavation.	*			
23.00000	20.40000	100.05000				Point lies within an excavation.	*			
24.00000	20.40000	100.05000				Point lies within an excavation.	*			
25.00000	20.40000	100.05000				Point lies within an excavation.	*			
26.00000	20.40000	100.05000				Point lies within an excavation.	*			
27.00000	20.40000	100.05000				Point lies within an excavation.	*			
28.00000	20.40000	100.05000				Point lies within an excavation.	*			
29.00000	20.40000	100.05000				Point lies within an excavation.	*			
30.00000	20.40000	100.05000				Point lies within an excavation.	*			
31.00000	20.40000	100.05000				Point lies within an excavation.	*			
32.00000	20.40000	100.05000		-1.3575	0.0	0.76709	*			
33.00000	20.40000	100.05000		-0.65250	0.0	-1.4587	*			
34.00000	20.40000	100.05000		-0.27750	0.0	-1.5541	*			
35.00000	20.40000	100.05000		0.0	0.0	-1.4422	*			
36.00000	20.40000	100.05000		0.0	0.0	-1.2921	*			
37.00000	20.40000	100.05000		0.0	0.0	-1.1435	*			
38.00000	20.40000	100.05000		0.0	0.0	-1.0075	*			
39.00000	20.40000	100.05000		0.0	0.0	-0.8659	*			
40.00000	20.40000	100.05000		0.0	0.0	-0.78033	*			
41.00000	20.40000	100.05000		0.0	0.0	-0.68738	*			
42.00000	20.40000	100.05000		0.0	0.0	-0.60615	*			
43.00000	20.40000	100.05000		0.0	0.0	-0.53512	*			
44.00000	20.40000	100.05000		0.0	0.0	-0.47292	*			
45.00000	20.40000	100.05000		0.0	0.0	-0.41836	*			
0.00000	21.60000	100.05000		0.0	0.0	-0.22767	*			
1.00000	21.60000	100.05000		0.0	0.0	-0.25744	*			
2.00000	21.60000	100.05000		0.0	0.0	-0.29131	*			
3.00000	21.60000	100.05000		0.0	0.0	-0.32997	*			
4.00000	21.60000	100.05000		0.0	0.0	-0.37420	*			
5.00000	21.60000	100.05000		0.0	0.0	-0.42501	*			
6.00000	21.60000	100.05000		0.0	0.0	-0.48362	*			
7.00000	21.60000	100.05000		0.0	0.0	-0.55155	*			
8.00000	21.60000	100.05000		0.0	0.0	-0.63071	*			
9.00000	21.60000	100.05000		0.0	0.0	-0.72353	*			
10.00000	21.60000	100.05000		0.0	0.0	-0.83318	*			
11.00000	21.60000	100.05000		0.26300	0.0	-0.96379	*			
12.00000	21.60000	100.05000		0.63800	0.0	-1.1208	*			
13.00000	21.60000	100.05000		1.0130	0.0	-1.3197	*			
14.00000	21.60000	100.05000		1.3980	0.0	-1.5466	*			
15.00000	21.60000	100.05000		1.7630	0.0	-1.8395	*			
16.00000	21.60000	100.05000		2.1380	0.0	-2.2102	*			
17.00000	21.60000	100.05000		2.7257	0.0	-2.6534	*			
18.00000	21.60000	100.05000		3.4340	0.0	-3.1176	*			
19.00000	21.60000	100.05000		4.1423	0.0	-3.4966	*			
20.00000	21.60000	100.05000		4.8507	0.0	-3.5868	*			
21.00000	21.60000	100.05000				Point lies within an excavation.	*			
22.00000	21.60000	100.05000				Point lies within an excavation.	*			
23.00000	21.60000	100.05000				Point lies within an excavation.	*			
24.00000	21.60000	100.05000				Point lies within an excavation.	*			
25.00000	21.60000	100.05000				Point lies within an excavation.	*			
26.00000	21.60000	100.05000				Point lies within an excavation.	*			
27.00000	21.60000	100.05000				Point lies within an excavation.	*			
28.00000	21.60000	100.05000				Point lies within an excavation.	*			
29.00000	21.60000	100.05000				Point lies within an excavation.	*			
30.00000	21.60000	100.05000				Point lies within an excavation.	*			
31.00000	21.60000	100.05000				Point lies within an excavation.	*			
32.00000	21.60000	100.05000		-1.3575	0.0	2.4229	*			
33.00000	21.60000	100.05000		-0.65250	0.0	-0.76335	*			
34.00000	21.60000	100.05000		-0.27750	0.0	-1.2365	*			
35.00000	21.60000	100.05000		0.0	0.0	-1.2906	*			
36.00000	21.60000	100.05000		0.0	0.0	-1.2212	*			
37.00000	21.60000	100.05000		0.0	0.0	-1.1141	*			
38.00000	21.60000	100.05000		0.0	0.0	-0.99995	*			
39.00000	21.60000	100.05000		0.0	0.0	-0.89048	*			
40.00000	21.60000	100.05000		0.0	0.0	-0.78997	*			
41.00000	21.60000	100.05000		0.0	0.0	-0.69960	*			
42.00000	21.60000	100.05000		0.0	0.0	-0.61917	*			
43.00000	21.60000	100.05000		0.0	0.0	-0.54796	*			
44.00000	21.60000	100.05000		0.0	0.0	-0.48507	*			
45.00000	21.60000	100.05000		0.0	0.0	-0.42956	*			
0.00000	22.80000	100.05000		0.0	0.0	-0.23339	*			
1.00000	22.80000	100.05000		0.0	0.0	-0.26403	*			
2.00000	22.80000	100.05000		0.0	0.0	-0.29891	*			
3.00000	22.80000	100.05000		0.0	0.0	-0.33873	*			
4.00000	22.80000	100.05000		0.0	0.0	-0.38431	*			
5.00000	22.80000	100.05000		0.0	0.0	-0.43668	*			
6.00000	22.80000	100.05000		0.0	0.0	-0.49709	*			
7.00000	22.80000	100.05000		0.0	0.0	-0.56709	*			
8.00000	22.80000	100.05000		0.0	0.0	-0.64863	*			
9.00000	22.80000	100.05000		0.0	0.0	-0.74417	*			
10.00000	22.80000	100.05000		0.029006	0.0	-0.85691	*			
11.00000	22.80000	100.05000		0.40401	0.0	-0.99099	*			
12.00000	22.80000	100.05000		0.77901	0.0	-1.1519	*			
13.00000	22.80000	100.05000		1.1540	0.0	-1.3469	*			
14.00000	22.80000	100.05000		1.5290	0.0	-1.5862	*			
15.00000	22.80000	100.05000		1.9040	0.0	-1.8834	*			
16.00000	22.80000	100.05000		2.2790	0.0	-2.2579	*			
17.00000	22.80000	100.05000		2.9137	0.0	-2.6937	*			
18.00000	22.80000	100.05000		3.6220	0.0	-3.1384	*			
19.00000	22.80000	100.05000		4.3303	0.0	-3.5022	*			
20.00000	22.80000	100.05000		5.0387	0.0	-3.6103	*			
21.00000	22.80000	100.05000				Point lies within an excavation.	*			
22.00000	22.80000	100.05000				Point lies within an excavation.	*			
23.00000	22.80000	100.05000				Point lies within an excavation.	*			
24.00000	22.80000	100.05000				Point lies within an excavation.	*			
25.00000	22.80000	100.05000				Point lies within an excavation.	*			
26.00000	22.80000	100.05000				Point lies within an excavation.	*			
27.00000	22.80000	100.05000				Point lies within an excavation.	*			
28.00000	22.80000	100.05000				Point lies within an excavation.	*			
29.00000	22.80000	100.05000				Point lies within an excavation.	*			
30.00000	22.80000	100.05000				Point lies within an excavation.	*			
31.00000	22.80000	100.05000				Point lies within an excavation.	*			
32.00000	22.80000	100.05000		-1.3575	0.0	2.8479	*			
33.00000	22.80000	100.05000		-0.65250	0.0	-0.49181	*			
34.00000	22.80000	100.05000		-0.27750	0.0	-1.0926	*			
35.00000	22.80000	100.05000		0.0	0.0	-1.2232	*			
36.00000	22.80000	100.05000		0.0	0.0	-1.1954	*			
37.00000	22.80000	100.05000		0.0	0.0	-1.1102	*			
38.00000	22.80000	100.05000		0.0	0.0	-1.0071	*			
39.00000	22.80000	100.05000		0.0	0.0	-0.90291	*			
40.00000	22.80000	100.05000		0.0	0.0	-0.80449	*			
41.00000	22.80000	100.05000		0.0	0.0	-0.71448	*			
42.00000	22.80000	100.05000		0.0	0.0	-0.63351	*			
43.00000	22.80000	100.05000		0.0	0.0	-0.56130	*			
44.00000	22.80000	100.05000		0.0	0.0	-0.49722	*			
45.00000	22.80000	100.05000		0.0	0.0	-0.44049	*			
0.00000	24.00000	100.05000		0.0	0.0	-0.23832	*			
1.00000	24.00000	100.05000		0.0	0.0	-0.26972	*			
2.00000	24.00000	100.05000		0.0	0.0	-0.30550	*			
3.00000	24.00000	100.05000		0.0	0.0	-0.34635	*			
4.00000	24.00000	100.05000		0.0	0.0	-0.39313	*			
5.00000	24.00000	100.05000		0.0	0.0	-0.44690	*			
6.00000	24.00000	100.05000		0.0	0.0	-0.50894	*			
7.00000	24.00000	100.05000		0.0	0.0	-0.58082	*			
8.00000	24.00000	100.05000		0.0	0.0	-0.66454	*			
9.00000	24.00000	100.05000		0.0	0.0	-0.76261	*			
10.00000	24.00000	100.05000		0.17001	0.0	-0.87825	*			
11.00000	24.00000	100.05000		0.54501	0.0	-1.0156	*			
12.00000	24.00000	100.05000		0.92001	0.0	-1.1803	*			
13.00000	24.00000	100.05000		1.2950	0.0	-1.3796	*			
14.00000	24.00000	100.05000		1.6700	0.0	-1.6236	*			
15.00000	24.00000	100.05000		2.0450	0.0	-1.9262	*			
16.00000	24.00000	100.05000		2.4200	0.0	-2.3066	*			
17.00000	24.00000	100.05000		3.1017	0.0	-2.7382	*			
18.00000	24.00000	100.05000		3.8100	0.0	-3.1731	*			
19.00000	24.00000	100.05000		4.5183	0.0	-3.5384	*			
20.00000	24.00000	100.05000		5.2267	0.0	-3.6720	*			
21.00000	24.00000	100.05000				Point lies within an excavation.	*			





30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x [m]	y [m]	z [m]	$\delta x$ [mm]	$\delta y$ [mm]	$\delta z$ [mm]	
25.00000	27.60000	100.05000								Point lies within an excavation. *
26.00000	27.60000	100.05000								Point lies within an excavation. *
27.00000	27.60000	100.05000								Point lies within an excavation. *
28.00000	27.60000	100.05000								Point lies within an excavation. *
29.00000	27.60000	100.05000								Point lies within an excavation. *
30.00000	27.60000	100.05000								Point lies within an excavation. *
31.00000	27.60000	100.05000								Point lies within an excavation. *
32.00000	27.60000	100.05000					-2.0141	0.0	-1.9457	*
33.00000	27.60000	100.05000					-1.3058	0.0	-2.4115	*
34.00000	27.60000	100.05000					-0.76398	0.0	-2.1595	*
35.00000	27.60000	100.05000					-0.39498	0.0	-1.8685	*
36.00000	27.60000	100.05000					-0.019983	0.0	-1.6130	*
37.00000	27.60000	100.05000					0.0	0.0	-1.3953	*
38.00000	27.60000	100.05000					0.0	0.0	-1.2106	*
39.00000	27.60000	100.05000					0.0	0.0	-1.0537	*
40.00000	27.60000	100.05000					0.0	0.0	-0.91961	*
41.00000	27.60000	100.05000					0.0	0.0	-0.80459	*
42.00000	27.60000	100.05000					0.0	0.0	-0.70544	*
43.00000	27.60000	100.05000					0.0	0.0	-0.61964	*
44.00000	27.60000	100.05000					0.0	0.0	-0.54513	*
45.00000	27.60000	100.05000					0.0	0.0	-0.48021	*
0.00000	28.80000	100.05000					0.0	0.0	-0.24899	*
1.00000	28.80000	100.05000					0.0	0.0	-0.28224	*
2.00000	28.80000	100.05000					0.0	0.0	-0.32020	*
3.00000	28.80000	100.05000					0.0	0.0	-0.36365	*
4.00000	28.80000	100.05000					0.0	0.0	-0.41356	*
5.00000	28.80000	100.05000					0.0	0.0	-0.47109	*
6.00000	28.80000	100.05000					0.0	0.0	-0.53767	*
7.00000	28.80000	100.05000					0.0	0.0	-0.61507	*
8.00000	28.80000	100.05000					0.0	0.0	-0.70552	*
9.00000	28.80000	100.05000					0.35902	0.0	-0.81185	*
10.00000	28.80000	100.05000					0.73402	0.0	-0.93771	*
11.00000	28.80000	100.05000					1.1090	0.0	-1.0878	*
12.00000	28.80000	100.05000					1.4840	0.0	-1.2684	*
13.00000	28.80000	100.05000					1.8590	0.0	-1.4877	*
14.00000	28.80000	100.05000					2.2340	0.0	-1.7569	*
15.00000	28.80000	100.05000					2.6090	0.0	-2.0915	*
16.00000	28.80000	100.05000					3.1454	0.0	-2.4883	*
17.00000	28.80000	100.05000					3.8537	0.0	-2.9339	*
18.00000	28.80000	100.05000					4.5620	0.0	-3.3621	*
19.00000	28.80000	100.05000					5.2704	0.0	-3.7666	*
20.00000	28.80000	100.05000					5.9787	0.0	-3.9953	*
21.00000	28.80000	100.05000								Point lies within an excavation. *
22.00000	28.80000	100.05000								Point lies within an excavation. *
23.00000	28.80000	100.05000								Point lies within an excavation. *
24.00000	28.80000	100.05000								Point lies within an excavation. *
25.00000	28.80000	100.05000								Point lies within an excavation. *
26.00000	28.80000	100.05000								Point lies within an excavation. *
27.00000	28.80000	100.05000								Point lies within an excavation. *
28.00000	28.80000	100.05000								Point lies within an excavation. *
29.00000	28.80000	100.05000								Point lies within an excavation. *
30.00000	28.80000	100.05000								Point lies within an excavation. *
31.00000	28.80000	100.05000								Point lies within an excavation. *
32.00000	28.80000	100.05000					-3.3497	0.0	-2.9732	*
33.00000	28.80000	100.05000					-2.6414	0.0	-2.9326	*
34.00000	28.80000	100.05000					-1.9330	0.0	-2.5467	*
35.00000	28.80000	100.05000					-1.3966	0.0	-2.1167	*
36.00000	28.80000	100.05000					-1.0216	0.0	-1.7691	*
37.00000	28.80000	100.05000					-0.64664	0.0	-1.4969	*
38.00000	28.80000	100.05000					-0.27164	0.0	-1.2787	*
39.00000	28.80000	100.05000					0.0	0.0	-1.1004	*
40.00000	28.80000	100.05000					0.0	0.0	-0.95240	*
41.00000	28.80000	100.05000					0.0	0.0	-0.82807	*
42.00000	28.80000	100.05000					0.0	0.0	-0.72257	*
43.00000	28.80000	100.05000					0.0	0.0	-0.63234	*
44.00000	28.80000	100.05000					0.0	0.0	-0.55469	*
45.00000	28.80000	100.05000					0.0	0.0	-0.48750	*
0.00000	30.00000	100.05000					0.0	0.0	-0.24915	*
1.00000	30.00000	100.05000					0.0	0.0	-0.28250	*
2.00000	30.00000	100.05000					0.0	0.0	-0.32059	*
3.00000	30.00000	100.05000					0.0	0.0	-0.36425	*
4.00000	30.00000	100.05000					0.0	0.0	-0.41443	*
5.00000	30.00000	100.05000					0.0	0.0	-0.47233	*
6.00000	30.00000	100.05000					0.0	0.0	-0.53942	*
7.00000	30.00000	100.05000					0.0	0.0	-0.61753	*
8.00000	30.00000	100.05000					0.12502	0.0	-0.70898	*
9.00000	30.00000	100.05000					0.50002	0.0	-0.81673	*
10.00000	30.00000	100.05000					0.87502	0.0	-0.94457	*
11.00000	30.00000	100.05000					1.25000	0.0	-1.0975	*
12.00000	30.00000	100.05000					1.62500	0.0	-1.2820	*
13.00000	30.00000	100.05000					2.00000	0.0	-1.5071	*
14.00000	30.00000	100.05000					2.37500	0.0	-1.7846	*
15.00000	30.00000	100.05000					2.75000	0.0	-2.1309	*
16.00000	30.00000	100.05000					3.1334	0.0	-2.5374	*
17.00000	30.00000	100.05000					3.5177	0.0	-2.9932	*
18.00000	30.00000	100.05000					4.75000	0.0	-3.4349	*
19.00000	30.00000	100.05000					5.4584	0.0	-3.8628	*
20.00000	30.00000	100.05000					6.1667	0.0	-4.1251	*
21.00000	30.00000	100.05000								Point lies within an excavation. *
22.00000	30.00000	100.05000								Point lies within an excavation. *
23.00000	30.00000	100.05000								Point lies within an excavation. *
24.00000	30.00000	100.05000								Point lies within an excavation. *
25.00000	30.00000	100.05000								Point lies within an excavation. *
26.00000	30.00000	100.05000								Point lies within an excavation. *
27.00000	30.00000	100.05000								Point lies within an excavation. *
28.00000	30.00000	100.05000								Point lies within an excavation. *
29.00000	30.00000	100.05000								Point lies within an excavation. *
30.00000	30.00000	100.05000								Point lies within an excavation. *
31.00000	30.00000	100.05000								Point lies within an excavation. *
32.00000	30.00000	100.05000					-4.652	0.0	-3.3179	*
33.00000	30.00000	100.05000					-3.9769	0.0	-3.1189	*
34.00000	30.00000	100.05000					-3.2686	0.0	-2.7291	*
35.00000	30.00000	100.05000					-2.5602	0.0	-2.2930	*
36.00000	30.00000	100.05000					-2.0233	0.0	-1.9000	*
37.00000	30.00000	100.05000					-1.6483	0.0	-1.5836	*
38.00000	30.00000	100.05000					-1.2733	0.0	-1.3372	*
39.00000	30.00000	100.05000					-0.89831	0.0	-1.1404	*
40.00000	30.00000	100.05000					-0.52331	0.0	-0.98019	*
41.00000	30.00000	100.05000					-0.14831	0.0	-0.84760	*
42.00000	30.00000	100.05000					0.0	0.0	-0.73645	*
43.00000	30.00000	100.05000					0.0	0.0	-0.64231	*
44.00000	30.00000	100.05000					0.0	0.0	-0.56191	*
45.00000	30.00000	100.05000					0.0	0.0	-0.49278	*
0.00000	31.20000	100.05000					0.0	0.0	-0.24822	*
1.00000	31.20000	100.05000					0.0	0.0	-0.28150	*
2.00000	31.20000	100.05000					0.0	0.0	-0.31955	*
3.00000	31.20000	100.05000					0.0	0.0	-0.36318	*
4.00000	31.20000	100.05000					0.0	0.0	-0.41337	*
5.00000	31.20000	100.05000					0.0	0.0	-0.47135	*
6.00000	31.20000	100.05000					0.0	0.0	-0.53862	*
7.00000	31.20000	100.05000					0.0	0.0	-0.61708	*
8.00000	31.20000	100.05000					0.26603	0.0	-0.70911	*
9.00000	31.20000	100.05000					0.64103	0.0	-0.81780	*
10.00000	31.20000	100.05000					1.01600	0.0	-0.94715	*
11.00000	31.20000	100.05000					1.39100	0.0	-1.1024	*
12.00000	31.20000	100.05000					1.76600	0.0	-1.2907	*
13.00000	31.20000	100.05000					2.14100	0.0	-1.5215	*
14.00000	31.20000	100.05000					2.51600	0.0	-1.8078	*
15.00000	31.20000	100.05000					2.89100	0.0	-2.1679	*
16.00000	31.20000	100.05000					3.5214	0.0	-2.5	



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Grid Ref.	Disp. Grid Name	x [m]	y [m]	z [m]	$\delta x$ [mm]	$\delta y$ [mm]	$\delta z$ [mm]	
28.00000	31.20000	100.05000								Point lies within an excavation. *
29.00000	31.20000	100.05000								Point lies within an excavation. *
30.00000	31.20000	100.05000								Point lies within an excavation. *
31.00000	31.20000	100.05000								Point lies within an excavation. *
32.00000	31.20000	100.05000					-6.0208	0.0	-3.5069	*
33.00000	31.20000	100.05000					-5.3125	0.0	-3.1462	*
34.00000	31.20000	100.05000					-4.6041	0.0	-2.7246	*
35.00000	31.20000	100.05000					-3.8958	0.0	-2.3433	*
36.00000	31.20000	100.05000					-3.1875	0.0	-1.9692	*
37.00000	31.20000	100.05000					-2.6500	0.0	-1.6468	*
38.00000	31.20000	100.05000					-2.2750	0.0	-1.3800	*
39.00000	31.20000	100.05000					-1.9000	0.0	-1.1696	*
40.00000	31.20000	100.05000					-1.5250	0.0	-1.0001	*
41.00000	31.20000	100.05000					-1.1500	0.0	-0.86119	*
42.00000	31.20000	100.05000					-0.77497	0.0	-0.74570	*
43.00000	31.20000	100.05000					-0.39997	0.0	-0.64857	*
44.00000	31.20000	100.05000					-0.024967	0.0	-0.56610	*
45.00000	31.20000	100.05000					0.0	0.0	-0.49553	*
0.00000	32.40000	100.05000					0.0	0.0	-0.24619	*
1.00000	32.40000	100.05000					0.0	0.0	-0.27923	*
2.00000	32.40000	100.05000					0.0	0.0	-0.31703	*
3.00000	32.40000	100.05000					0.0	0.0	-0.36039	*
4.00000	32.40000	100.05000					0.0	0.0	-0.41031	*
5.00000	32.40000	100.05000					0.0	0.0	-0.46804	*
6.00000	32.40000	100.05000					0.0	0.0	-0.53510	*
7.00000	32.40000	100.05000					0.032028	0.0	-0.61344	*
8.00000	32.40000	100.05000					0.40703	0.0	-0.70553	*
9.00000	32.40000	100.05000					0.78203	0.0	-0.81455	*
10.00000	32.40000	100.05000					1.1570	0.0	-0.94472	*
11.00000	32.40000	100.05000					1.5320	0.0	-1.1016	*
12.00000	32.40000	100.05000					1.9070	0.0	-1.2928	*
13.00000	32.40000	100.05000					2.2820	0.0	-1.5286	*
14.00000	32.40000	100.05000					2.6570	0.0	-1.8236	*
15.00000	32.40000	100.05000					3.0320	0.0	-2.1984	*
16.00000	32.40000	100.05000					3.7094	0.0	-2.6351	*
17.00000	32.40000	100.05000					4.4177	0.0	-3.1420	*
18.00000	32.40000	100.05000					5.1260	0.0	-3.6897	*
19.00000	32.40000	100.05000					5.8344	0.0	-4.3453	*
20.00000	32.40000	100.05000					6.5427	0.0	-4.9953	*
21.00000	32.40000	100.05000								Point lies within an excavation. *
22.00000	32.40000	100.05000								Point lies within an excavation. *
23.00000	32.40000	100.05000								Point lies within an excavation. *
24.00000	32.40000	100.05000								Point lies within an excavation. *
25.00000	32.40000	100.05000								Point lies within an excavation. *
26.00000	32.40000	100.05000								Point lies within an excavation. *
27.00000	32.40000	100.05000								Point lies within an excavation. *
28.00000	32.40000	100.05000								Point lies within an excavation. *
29.00000	32.40000	100.05000								Point lies within an excavation. *
30.00000	32.40000	100.05000								Point lies within an excavation. *
31.00000	32.40000	100.05000								Point lies within an excavation. *
32.00000	32.40000	100.05000					-7.1563	0.0	-4.4230	*
33.00000	32.40000	100.05000					-6.6480	0.0	-3.0764	*
34.00000	32.40000	100.05000					-5.9397	0.0	-2.5772	*
35.00000	32.40000	100.05000					-5.2313	0.0	-2.2513	*
36.00000	32.40000	100.05000					-4.5230	0.0	-1.9493	*
37.00000	32.40000	100.05000					-3.8147	0.0	-1.6568	*
38.00000	32.40000	100.05000					-3.2766	0.0	-1.4035	*
39.00000	32.40000	100.05000					-2.9016	0.0	-1.1852	*
40.00000	32.40000	100.05000					-2.5266	0.0	-1.0101	*
41.00000	32.40000	100.05000					-2.1516	0.0	-0.86739	*
42.00000	32.40000	100.05000					-1.7766	0.0	-0.74928	*
43.00000	32.40000	100.05000					-1.4016	0.0	-0.65037	*
44.00000	32.40000	100.05000					-1.0266	0.0	-0.56671	*
45.00000	32.40000	100.05000					-0.65163	0.0	-0.49537	*
0.00000	33.60000	100.05000					0.0	0.0	-0.24304	*
1.00000	33.60000	100.05000					0.0	0.0	-0.27566	*
2.00000	33.60000	100.05000					0.0	0.0	-0.31299	*
3.00000	33.60000	100.05000					0.0	0.0	-0.35583	*
4.00000	33.60000	100.05000					0.0	0.0	-0.40518	*
5.00000	33.60000	100.05000					0.0	0.0	-0.46229	*
6.00000	33.60000	100.05000					0.0	0.0	-0.52871	*
7.00000	33.60000	100.05000					0.17303	0.0	-0.60639	*
8.00000	33.60000	100.05000					0.54803	0.0	-0.69788	*
9.00000	33.60000	100.05000					0.92303	0.0	-0.80646	*
10.00000	33.60000	100.05000					1.29800	0.0	-0.93650	*
11.00000	33.60000	100.05000					1.67300	0.0	-1.0938	*
12.00000	33.60000	100.05000					2.0480	0.0	-1.2866	*
13.00000	33.60000	100.05000					2.4230	0.0	-1.5258	*
14.00000	33.60000	100.05000					2.7980	0.0	-1.8277	*
15.00000	33.60000	100.05000					3.1730	0.0	-2.1223	*
16.00000	33.60000	100.05000					3.8974	0.0	-2.6673	*
17.00000	33.60000	100.05000					4.6057	0.0	-3.2092	*
18.00000	33.60000	100.05000					5.3140	0.0	-3.8503	*
19.00000	33.60000	100.05000					6.0224	0.0	-4.7998	*
20.00000	33.60000	100.05000					6.7307	0.0	-6.984	*
21.00000	33.60000	100.05000								Point lies within an excavation. *
22.00000	33.60000	100.05000								Point lies within an excavation. *
23.00000	33.60000	100.05000								Point lies within an excavation. *
24.00000	33.60000	100.05000								Point lies within an excavation. *
25.00000	33.60000	100.05000								Point lies within an excavation. *
26.00000	33.60000	100.05000								Point lies within an excavation. *
27.00000	33.60000	100.05000								Point lies within an excavation. *
28.00000	33.60000	100.05000								Point lies within an excavation. *
29.00000	33.60000	100.05000								Point lies within an excavation. *
30.00000	33.60000	100.05000					-12.437	-11.719	-5.7305	*
31.00000	33.60000	100.05000					-11.729	-9.6456	-3.4643	*
32.00000	33.60000	100.05000					-11.277	-4.7235	-2.9369	*
33.00000	33.60000	100.05000					-13.256	-1.1382	-2.2862	*
34.00000	33.60000	100.05000					-13.066	-0.56591	-1.9648	*
35.00000	33.60000	100.05000					-12.265	-0.34598	-1.8299	*
36.00000	33.60000	100.05000					-11.281	-0.23069	-1.6970	*
37.00000	33.60000	100.05000					-10.220	-0.16044	-1.5250	*
38.00000	33.60000	100.05000					-9.1212	-0.11321	-1.3456	*
39.00000	33.60000	100.05000					-8.2054	-0.087673	-1.1728	*
40.00000	33.60000	100.05000					-7.5389	-0.068430	-1.0093	*
41.00000	33.60000	100.05000					-6.9384	-0.053415	-0.86537	*
42.00000	33.60000	100.05000					-6.3329	-0.041373	-0.74653	*
43.00000	33.60000	100.05000					-5.7236	-0.031502	-0.64721	*
44.00000	33.60000	100.05000					-5.1115	-0.023263	-0.56337	*
45.00000	33.60000	100.05000					-4.4972	-0.016283	-0.49202	*
0.00000	34.80000	100.05000					0.0	0.0	-0.23878	*
1.00000	34.80000	100.05000					0.0	0.0	-0.27080	*
2.00000	34.80000	100.05000					0.0	0.0	-0.30743	*
3.00000	34.80000	100.05000					0.0	0.0	-0.34948	*
4.00000	34.80000	100.05000					0.0	0.0	-0.39794	*
5.00000	34.80000	100.05000					0.0	0.0	-0.45404	*
6.00000	34.80000	100.05000					0.0	0.0	-0.51932	*
7.00000	34.80000	100.05000					0.31403	0.0	-0.59576	*
8.00000	34.80000	100.05000					0.68903	0.0	-0.68590	*
9.00000	34.80000	100.05000					1.06440	0.0	-0.79308	*
10.00000	34.80000	100.05000					1.4390	0.0	-0.92176	*
11.00000	34.80000	100.05000					1.8140	0.0	-1.0780	*
12.00000	34.80000	100.05000					2.1890	0.0	-1.2702	*
13.00000	34.80000	100.05000					2.5640	0.0	-1.5102	*
14.00000	34.80000	100.05000					2.9390	0.0	-1.8152	*
15.00000	34.80000	100.05000					3.3770	0.0	-2.2003	*
16.00000	34.80000	100.05000					4.0854	0.0	-2.6688	*
17.00000	34.80000	100.05000					4.7937	0.0	-3.2317	*



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x [m]	y [m]	z [m]	δx [mm]	δy [mm]	δz [mm]	
31.00000	34.80000	100.05000		-11.729	-8.7956	-3.5350	*			
32.00000	34.80000	100.05000		-11.094	-4.4625	-2.9786	*			
33.00000	34.80000	100.05000		-11.452	-2.5323	-2.3896	*			
34.00000	34.80000	100.05000		-11.397	-1.3955	-2.0845	*			
35.00000	34.80000	100.05000		-11.075	-0.93411	-1.8765	*			
36.00000	34.80000	100.05000		-11.421	-0.64944	-1.7029	*			
37.00000	34.80000	100.05000		-9.5874	-0.46088	-1.5149	*			
38.00000	34.80000	100.05000		-8.6911	-0.33537	-1.3290	*			
39.00000	34.80000	100.05000		-7.8641	-0.26159	-1.1590	*			
40.00000	34.80000	100.05000		-7.2661	-0.20509	-0.99736	*			
41.00000	34.80000	100.05000		-6.7200	-0.16041	-0.85489	*			
42.00000	34.80000	100.05000		-6.1586	-0.12443	-0.73720	*			
43.00000	34.80000	100.05000		-5.5857	-0.094697	-0.63887	*			
44.00000	34.80000	100.05000		-5.0043	-0.069767	-0.55592	*			
45.00000	34.80000	100.05000		-4.4161	-0.048570	-0.48535	*			
0.00000	36.00000	100.05000		0.0	0.0	-0.23345	*			
1.00000	36.00000	100.05000		0.0	0.0	-0.26468	*			
2.00000	36.00000	100.05000		0.0	0.0	-0.30039	*			
3.00000	36.00000	100.05000		0.0	0.0	-0.34138	*			
4.00000	36.00000	100.05000		0.0	0.0	-0.38861	*			
5.00000	36.00000	100.05000		0.0	0.0	-0.44328	*			
6.00000	36.00000	100.05000		0.080036	0.0	-0.50691	*			
7.00000	36.00000	100.05000		0.45504	0.0	-0.58145	*			
8.00000	36.00000	100.05000		0.83004	0.0	-0.66941	*			
9.00000	36.00000	100.05000		1.20500	0.0	-0.77411	*			
10.00000	36.00000	100.05000		1.58000	0.0	-0.90001	*			
11.00000	36.00000	100.05000		1.95500	0.0	-1.0532	*			
12.00000	36.00000	100.05000		2.33000	0.0	-1.2423	*			
13.00000	36.00000	100.05000		2.70500	0.0	-1.4793	*			
14.00000	36.00000	100.05000		3.08000	0.0	-1.7821	*			
15.00000	36.00000	100.05000		3.46500	0.0	-2.1601	*			
16.00000	36.00000	100.05000		4.2734	0.0	-2.6269	*			
17.00000	36.00000	100.05000		4.9817	0.0	-3.1872	*			
18.00000	36.00000	100.05000		5.6900	0.0	-3.9019	*			
19.00000	36.00000	100.05000		6.3984	0.0	-5.0457	*			
20.00000	36.00000	100.05000		7.1067	0.0	-7.6072	*			
21.00000	36.00000	100.05000				Point lies within an excavation.	*			
22.00000	36.00000	100.05000				Point lies within an excavation.	*			
23.00000	36.00000	100.05000				Point lies within an excavation.	*			
24.00000	36.00000	100.05000				Point lies within an excavation.	*			
25.00000	36.00000	100.05000				Point lies within an excavation.	*			
26.00000	36.00000	100.05000				Point lies within an excavation.	*			
27.00000	36.00000	100.05000				Point lies within an excavation.	*			
28.00000	36.00000	100.05000				Point lies within an excavation.	*			
29.00000	36.00000	100.05000				Point lies within an excavation.	*			
30.00000	36.00000	100.05000		-12.437	-10.019	-6.1439	*			
31.00000	36.00000	100.05000		-11.729	-7.9456	-3.8006	*			
32.00000	36.00000	100.05000		-11.059	-3.9524	-3.0579	*			
33.00000	36.00000	100.05000		-10.952	-2.8550	-2.4333	*			
34.00000	36.00000	100.05000		-10.673	-1.9151	-2.0985	*			
35.00000	36.00000	100.05000		-10.206	-1.2457	-1.8763	*			
36.00000	36.00000	100.05000		-9.6945	-0.91207	-1.6767	*			
37.00000	36.00000	100.05000		-9.0018	-0.66635	-1.4852	*			
38.00000	36.00000	100.05000		-8.2814	-0.51410	-1.2945	*			
39.00000	36.00000	100.05000		-7.5259	-0.40596	-1.1315	*			
40.00000	36.00000	100.05000		-6.9870	-0.32071	-0.97486	*			
41.00000	36.00000	100.05000		-6.4901	-0.25204	-0.83617	*			
42.00000	36.00000	100.05000		-5.9698	-0.19569	-0.72142	*			
43.00000	36.00000	100.05000		-5.4319	-0.14869	-0.62542	*			
44.00000	36.00000	100.05000		-4.8804	-0.10894	-0.54436	*			
45.00000	36.00000	100.05000		-4.3180	-0.074911	-0.47536	*			
0.00000	37.20000	100.05000		0.0	0.0	-0.22709	*			
1.00000	37.20000	100.05000		0.0	0.0	-0.25735	*			
2.00000	37.20000	100.05000		0.0	0.0	-0.29193	*			
3.00000	37.20000	100.05000		0.0	0.0	-0.33158	*			
4.00000	37.20000	100.05000		0.0	0.0	-0.37725	*			
5.00000	37.20000	100.05000		0.0	0.0	-0.43008	*			
6.00000	37.20000	100.05000		0.22104	0.0	-0.49155	*			
7.00000	37.20000	100.05000		0.59604	0.0	-0.56351	*			
8.00000	37.20000	100.05000		0.97104	0.0	-0.64841	*			
9.00000	37.20000	100.05000		1.34600	0.0	-0.74947	*			
10.00000	37.20000	100.05000		1.72100	0.0	-0.87104	*			
11.00000	37.20000	100.05000		2.09600	0.0	-1.0191	*			
12.00000	37.20000	100.05000		2.47100	0.0	-1.2019	*			
13.00000	37.20000	100.05000		2.84600	0.0	-1.4316	*			
14.00000	37.20000	100.05000		3.22100	0.0	-1.7258	*			
15.00000	37.20000	100.05000		3.7531	0.0	-2.0873	*			
16.00000	37.20000	100.05000		4.4614	0.0	-2.5356	*			
17.00000	37.20000	100.05000		5.1697	0.0	-3.0691	*			
18.00000	37.20000	100.05000		5.8781	0.0	-3.7571	*			
19.00000	37.20000	100.05000		6.5864	0.0	-4.8751	*			
20.00000	37.20000	100.05000		7.2947	0.0	-7.4041	*			
21.00000	37.20000	100.05000				Point lies within an excavation.	*			
22.00000	37.20000	100.05000				Point lies within an excavation.	*			
23.00000	37.20000	100.05000				Point lies within an excavation.	*			
24.00000	37.20000	100.05000				Point lies within an excavation.	*			
25.00000	37.20000	100.05000				Point lies within an excavation.	*			
26.00000	37.20000	100.05000				Point lies within an excavation.	*			
27.00000	37.20000	100.05000				Point lies within an excavation.	*			
28.00000	37.20000	100.05000				Point lies within an excavation.	*			
29.00000	37.20000	100.05000				Point lies within an excavation.	*			
30.00000	37.20000	100.05000		-12.437	-9.1693	-6.2925	*			
31.00000	37.20000	100.05000		-11.729	-7.0956	-3.9013	*			
32.00000	37.20000	100.05000		-11.044	-3.4082	-2.9894	*			
33.00000	37.20000	100.05000		-10.712	-2.7125	-2.3760	*			
34.00000	37.20000	100.05000		-10.306	-2.0406	-2.0342	*			
35.00000	37.20000	100.05000		-9.7894	-1.4705	-1.8053	*			
36.00000	37.20000	100.05000		-9.1645	-1.0228	-1.6147	*			
37.00000	37.20000	100.05000		-8.5687	-0.79359	-1.4276	*			
38.00000	37.20000	100.05000		-7.9235	-0.63625	-1.2444	*			
39.00000	37.20000	100.05000		-7.2162	-0.50950	-1.0916	*			
40.00000	37.20000	100.05000		-6.7218	-0.40607	-0.94270	*			
41.00000	37.20000	100.05000		-6.2645	-0.32059	-0.80982	*			
42.00000	37.20000	100.05000		-5.7794	-0.24907	-0.69557	*			
43.00000	37.20000	100.05000		-5.2725	-0.18851	-0.60711	*			
44.00000	37.20000	100.05000		-4.7483	-0.13667	-0.52889	*			
45.00000	37.20000	100.05000		-4.2101	-0.091876	-0.46220	*			
0.00000	38.40000	100.05000		0.0	0.0	-0.21978	*			
1.00000	38.40000	100.05000		0.0	0.0	-0.24889	*			
2.00000	38.40000	100.05000		0.0	0.0	-0.28213	*			
3.00000	38.40000	100.05000		0.0	0.0	-0.32021	*			
4.00000	38.40000	100.05000		0.0	0.0	-0.36400	*			
5.00000	38.40000	100.05000		0.0	0.0	-0.41460	*			
6.00000	38.40000	100.05000		0.36204	0.0	-0.47339	*			
7.00000	38.40000	100.05000		0.73704	0.0	-0.54213	*			
8.00000	38.40000	100.05000		1.11200	0.0	-0.62312	*			
9.00000	38.40000	100.05000		1.48700	0.0	-0.71940	*			
10.00000	38.40000	100.05000		1.86200	0.0	-0.83505	*			
11.00000	38.40000	100.05000		2.23700	0.0	-0.97571	*			
12.00000	38.40000	100.05000		2.61200	0.0	-1.1453	*			
13.00000	38.40000	100.05000		2.98700	0.0	-1.3671	*			
14.00000	38.40000	100.05000		3.36200	0.0	-1.6460	*			
15.00000	38.40000	100.05000		3.9411	0.0	-1.9807	*			
16.00000	38.40000	100.05000		4.6494	0.0	-2.339	*			
17.00000	38.40000	100.05000		5.3577	0.0	-2.8776	*			
18.00000	38.40000	100.05000		6.0661	0.0	-3.5059	*			
19.00000	38.									





30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x [m]	y [m]	z [m]	Δx [mm]	Δy [mm]	Δz [mm]	
34.00000	38.40000	100.05000		-10.073	-1.9088	-1.8925	*			
35.00000	38.40000	100.05000		-9.5149	-1.4767	-1.6932	*			
36.00000	38.40000	100.05000		-8.9187	-1.1497	-1.5173	*			
37.00000	38.40000	100.05000		-8.2745	-0.87959	-1.3467	*			
38.00000	38.40000	100.05000		-7.6281	-0.70134	-1.1809	*			
39.00000	38.40000	100.05000		-6.9479	-0.56894	-1.0312	*			
40.00000	38.40000	100.05000		-6.4828	-0.45705	-0.90205	*			
41.00000	38.40000	100.05000		-6.0547	-0.36200	-0.77670	*			
42.00000	38.40000	100.05000		-5.5972	-0.28073	-0.67227	*			
43.00000	38.40000	100.05000		-5.1160	-0.21071	-0.58441	*			
44.00000	38.40000	100.05000		-4.6152	-0.14994	-0.50986	*			
45.00000	38.40000	100.05000		-4.0985	-0.096813	-0.44613	*			
0.00000	39.60000	100.05000		0.0	0.0	-0.21160	*			
1.00000	39.60000	100.05000		0.0	0.0	-0.23942	*			
2.00000	39.60000	100.05000		0.0	0.0	-0.27113	*			
3.00000	39.60000	100.05000		0.0	0.0	-0.30740	*			
4.00000	39.60000	100.05000		0.0	0.0	-0.34903	*			
5.00000	39.60000	100.05000		0.12804	0.0	-0.39705	*			
6.00000	39.60000	100.05000		0.50304	0.0	-0.45271	*			
7.00000	39.60000	100.05000		0.87804	0.0	-0.51764	*			
8.00000	39.60000	100.05000		1.2530	0.0	-0.59394	*			
9.00000	39.60000	100.05000		1.6280	0.0	-0.68439	*			
10.00000	39.60000	100.05000		2.0030	0.0	-0.79270	*			
11.00000	39.60000	100.05000		2.3780	0.0	-0.92397	*			
12.00000	39.60000	100.05000		2.7530	0.0	-1.0853	*			
13.00000	39.60000	100.05000		3.1280	0.0	-1.2870	*			
14.00000	39.60000	100.05000		3.5030	0.0	-1.5441	*			
15.00000	39.60000	100.05000		4.1291	0.0	-1.8419	*			
16.00000	39.60000	100.05000		4.8374	0.0	-2.2039	*			
17.00000	39.60000	100.05000		5.5457	0.0	-2.6143	*			
18.00000	39.60000	100.05000		6.2541	0.0	-3.1465	*			
19.00000	39.60000	100.05000		6.9624	0.0	-4.0709	*			
20.00000	39.60000	100.05000		7.6707	0.0	-6.3617	*			
21.00000	39.60000	100.05000		Point lies within an excavation.			*			
22.00000	39.60000	100.05000		Point lies within an excavation.			*			
23.00000	39.60000	100.05000		Point lies within an excavation.			*			
24.00000	39.60000	100.05000		Point lies within an excavation.			*			
25.00000	39.60000	100.05000		Point lies within an excavation.			*			
26.00000	39.60000	100.05000		Point lies within an excavation.			*			
27.00000	39.60000	100.05000		Point lies within an excavation.			*			
28.00000	39.60000	100.05000		Point lies within an excavation.			*			
29.00000	39.60000	100.05000		Point lies within an excavation.			*			
30.00000	39.60000	100.05000		-12.437	-7.4693	-5.7037	*			
31.00000	39.60000	100.05000		-11.729	-5.3956	-3.3359	*			
32.00000	39.60000	100.05000		-11.031	-4.4019	-2.3979	*			
33.00000	39.60000	100.05000		-10.494	-2.0920	-1.9333	*			
34.00000	39.60000	100.05000		-9.9416	-1.7728	-1.6906	*			
35.00000	39.60000	100.05000		-9.3612	-1.4668	-1.5328	*			
36.00000	39.60000	100.05000		-8.7472	-1.1889	-1.3947	*			
37.00000	39.60000	100.05000		-8.0982	-0.94605	-1.2517	*			
38.00000	39.60000	100.05000		-7.4162	-0.73958	-1.1063	*			
39.00000	39.60000	100.05000		-6.7239	-0.58650	-0.98184	*			
40.00000	39.60000	100.05000		-6.2757	-0.47361	-0.85430	*			
41.00000	39.60000	100.05000		-5.8670	-0.37510	-0.73784	*			
42.00000	39.60000	100.05000		-5.4297	-0.28998	-0.64033	*			
43.00000	39.60000	100.05000		-4.9683	-0.21343	-0.55792	*			
44.00000	39.60000	100.05000		-4.4867	-0.14686	-0.48771	*			
45.00000	39.60000	100.05000		-3.9881	-0.087935	-0.42748	*			
0.00000	40.80000	100.05000		0.0	0.0	-0.20266	*			
1.00000	40.80000	100.05000		0.0	0.0	-0.22906	*			
2.00000	40.80000	100.05000		0.0	0.0	-0.25909	*			
3.00000	40.80000	100.05000		0.0	0.0	-0.29336	*			
4.00000	40.80000	100.05000		0.0	0.0	-0.33260	*			
5.00000	40.80000	100.05000		0.26905	0.0	-0.37773	*			
6.00000	40.80000	100.05000		0.64405	0.0	-0.42968	*			
7.00000	40.80000	100.05000		1.0190	0.0	-0.49052	*			
8.00000	40.80000	100.05000		1.3940	0.0	-0.56149	*			
9.00000	40.80000	100.05000		1.7690	0.0	-0.64524	*			
10.00000	40.80000	100.05000		2.1440	0.0	-0.74503	*			
11.00000	40.80000	100.05000		2.5190	0.0	-0.86527	*			
12.00000	40.80000	100.05000		2.8940	0.0	-1.0121	*			
13.00000	40.80000	100.05000		3.2690	0.0	-1.1942	*			
14.00000	40.80000	100.05000		3.6440	0.0	-1.4242	*			
15.00000	40.80000	100.05000		4.3171	0.0	-1.6761	*			
16.00000	40.80000	100.05000		5.0254	0.0	-1.9722	*			
17.00000	40.80000	100.05000		5.7337	0.0	-2.2856	*			
18.00000	40.80000	100.05000		6.4421	0.0	-2.6778	*			
19.00000	40.80000	100.05000		7.1504	0.0	-3.3931	*			
20.00000	40.80000	100.05000		7.8587	0.0	-5.3666	*			
21.00000	40.80000	100.05000		Point lies within an excavation.			*			
22.00000	40.80000	100.05000		Point lies within an excavation.			*			
23.00000	40.80000	100.05000		Point lies within an excavation.			*			
24.00000	40.80000	100.05000		Point lies within an excavation.			*			
25.00000	40.80000	100.05000		Point lies within an excavation.			*			
26.00000	40.80000	100.05000		Point lies within an excavation.			*			
27.00000	40.80000	100.05000		Point lies within an excavation.			*			
28.00000	40.80000	100.05000		Point lies within an excavation.			*			
29.00000	40.80000	100.05000		Point lies within an excavation.			*			
30.00000	40.80000	100.05000		-12.437	-6.6193	-4.7707	*			
31.00000	40.80000	100.05000		-11.729	-4.6232	-2.6858	*			
32.00000	40.80000	100.05000		-11.028	-2.1049	-1.9200	*			
33.00000	40.80000	100.05000		-10.447	-1.8727	-1.5969	*			
34.00000	40.80000	100.05000		-9.8562	-1.6264	-1.4470	*			
35.00000	40.80000	100.05000		-9.2469	-1.3816	-1.3539	*			
36.00000	40.80000	100.05000		-8.6143	-1.1499	-1.2575	*			
37.00000	40.80000	100.05000		-7.9561	-0.93866	-1.1457	*			
38.00000	40.80000	100.05000		-7.2722	-0.75152	-1.0232	*			
39.00000	40.80000	100.05000		-6.5640	-0.58922	-0.91568	*			
40.00000	40.80000	100.05000		-6.1013	-0.45824	-0.80100	*			
41.00000	40.80000	100.05000		-5.7044	-0.36085	-0.69443	*			
42.00000	40.80000	100.05000		-5.2802	-0.27387	-0.60464	*			
43.00000	40.80000	100.05000		-4.8334	-0.19617	-0.52832	*			
44.00000	40.80000	100.05000		-4.3667	-0.12664	-0.46298	*			
45.00000	40.80000	100.05000		-3.8829	-0.064281	-0.40669	*			
0.00000	42.00000	100.05000		0.0	0.0	-0.19310	*			
1.00000	42.00000	100.05000		0.0	0.0	-0.21797	*			
2.00000	42.00000	100.05000		0.0	0.0	-0.24620	*			
3.00000	42.00000	100.05000		0.0	0.0	-0.27831	*			
4.00000	42.00000	100.05000		0.035049	0.0	-0.31498	*			
5.00000	42.00000	100.05000		0.41005	0.0	-0.35698	*			
6.00000	42.00000	100.05000		0.78505	0.0	-0.40536	*			
7.00000	42.00000	100.05000		1.1600	0.0	-0.46134	*			
8.00000	42.00000	100.05000		1.5350	0.0	-0.52652	*			
9.00000	42.00000	100.05000		1.9100	0.0	-0.60298	*			
10.00000	42.00000	100.05000		2.2850	0.0	-0.69344	*			
11.00000	42.00000	100.05000		2.6600	0.0	-0.80153	*			
12.00000	42.00000	100.05000		3.0350	0.0	-0.93224	*			
13.00000	42.00000	100.05000		3.4100	0.0	-1.0925	*			
14.00000	42.00000	100.05000		3.7867	0.0	-1.2895	*			
15.00000	42.00000	100.05000		4.3051	0.0	-1.4919	*			
16.00000	42.00000	100.05000		5.2134	0.0	-1.7123	*			
17.00000	42.00000	100.05000		5.9217	0.0	-1.9106	*			
18.00000	42.00000	100.05000		6.6301	0.0	-2.1215	*			
19.00000	42.00000	100.05000		7.3384	0.0	-2.5083	*			
20.00000	42.00000	100.05000		8.0467	0.0	-3.1651	*			
21.00000	42.00000	100.05000		Point lies within an excavation.			*			
22.00000	42.00000	100.05000								



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x	y	z	δx	δy	δz	
				[m]	[m]	[m]	[mm]	[mm]	[mm]	*
37.00000	42.00000	100.05000		-7.7405	-0.37488	-1.0326				*
38.00000	42.00000	100.05000		-7.1516	-0.71002	-0.93436				*
39.00000	42.00000	100.05000		-6.4429	-0.56238	-0.84488				*
40.00000	42.00000	100.05000		-5.9756	-0.43253	-0.74384				*
41.00000	42.00000	100.05000		-5.5657	-0.32145	-0.64777				*
42.00000	42.00000	100.05000		-5.1501	-0.23657	-0.56620				*
43.00000	42.00000	100.05000		-4.7133	-0.15941	-0.49640				*
44.00000	42.00000	100.05000		-4.2577	-0.089304	-0.43628				*
45.00000	42.00000	100.05000		-3.7853	-0.025592	-0.38422				*
0.00000	43.20000	100.05000		0.0	0.0	-0.18303				*
1.00000	43.20000	100.05000		0.0	0.0	-0.20634				*
2.00000	43.20000	100.05000		0.0	0.0	-0.23264				*
3.00000	43.20000	100.05000		0.0	0.0	-0.26251				*
4.00000	43.20000	100.05000		0.042542	-0.0011339	-0.29647				*
5.00000	43.20000	100.05000		0.28181	-0.0080350	-0.33523				*
6.00000	43.20000	100.05000		0.51938	-0.015918	-0.37964				*
7.00000	43.20000	100.05000		0.75485	-0.025008	-0.43075				*
8.00000	43.20000	100.05000		0.98770	-0.035605	-0.48989				*
9.00000	43.20000	100.05000		1.2172	-0.048117	-0.55874				*
10.00000	43.20000	100.05000		1.4424	-0.063112	-0.63949				*
11.00000	43.20000	100.05000		1.6619	-0.081409	-0.73498				*
12.00000	43.20000	100.05000		1.8736	-0.10423	-0.84899				*
13.00000	43.20000	100.05000		2.0740	-0.13348	-0.98662				*
14.00000	43.20000	100.05000		2.2606	-0.17250	-1.1540				*
15.00000	43.20000	100.05000		2.6088	-0.24433	-1.3308				*
16.00000	43.20000	100.05000		2.8962	-0.3066	-1.5303				*
17.00000	43.20000	100.05000		3.0666	-0.52337	-1.7328				*
18.00000	43.20000	100.05000		2.9697	-0.84771	-1.9706				*
19.00000	43.20000	100.05000		2.0793	-1.6201	-2.3701				*
20.00000	43.20000	100.05000		0.0	-5.0189	-2.7543				*
21.00000	43.20000	100.05000		0.0	-8.2322	-2.8549				*
22.00000	43.20000	100.05000		0.0	-8.9735	-3.2767				*
23.00000	43.20000	100.05000		0.0	-9.7149	-3.5239				*
24.00000	43.20000	100.05000		0.0	-10.456	-3.6224				*
25.00000	43.20000	100.05000		0.0	-11.198	-3.6007				*
26.00000	43.20000	100.05000		0.0	-11.939	-3.4705				*
27.00000	43.20000	100.05000		0.0	-11.991	-3.3434				*
28.00000	43.20000	100.05000		0.0	-11.991	-2.9768				*
29.00000	43.20000	100.05000		0.0	-11.991	-2.3289				*
30.00000	43.20000	100.05000		-0.99565	-11.625	-2.4401				*
31.00000	43.20000	100.05000		-3.9652	-10.9640	-1.9923				*
32.00000	43.20000	100.05000		-5.1651	-2.7857	-1.5520				*
33.00000	43.20000	100.05000		-5.5059	-2.2243	-1.3447				*
34.00000	43.20000	100.05000		-5.5088	-1.8390	-1.2308				*
35.00000	43.20000	100.05000		-5.3503	-1.5387	-1.1464				*
36.00000	43.20000	100.05000		-5.0978	-1.2748	-1.0615				*
37.00000	43.20000	100.05000		-4.7821	-1.0485	-0.96635				*
38.00000	43.20000	100.05000		-4.4195	-0.84913	-0.86607				*
39.00000	43.20000	100.05000		-4.0195	-0.67332	-0.77777				*
40.00000	43.20000	100.05000		-3.7588	-0.52618	-0.68454				*
41.00000	43.20000	100.05000		-3.5122	-0.39883	-0.59918				*
42.00000	43.20000	100.05000		-3.2454	-0.28816	-0.52602				*
43.00000	43.20000	100.05000		-2.9650	-0.19681	-0.46293				*
44.00000	43.20000	100.05000		-2.6642	-0.11434	-0.40821				*
45.00000	43.20000	100.05000		-2.3864	-0.066966	-0.36055				*
0.00000	44.40000	100.05000		0.0	0.0	-0.17261				*
1.00000	44.40000	100.05000		0.0	0.0	-0.19424				*
2.00000	44.40000	100.05000		0.0	0.0	-0.21864				*
3.00000	44.40000	100.05000		0.0	0.0	-0.24620				*
4.00000	44.40000	100.05000		0.015324	-0.0010383	-0.27741				*
5.00000	44.40000	100.05000		0.23714	-0.017256	-0.31285				*
6.00000	44.40000	100.05000		0.45484	-0.035736	-0.35324				*
7.00000	44.40000	100.05000		0.66751	-0.056986	-0.39943				*
8.00000	44.40000	100.05000		0.87394	-0.081670	-0.45248				*
9.00000	44.40000	100.05000		1.0725	-0.11068	-0.51371				*
10.00000	44.40000	100.05000		1.2610	-0.14526	-0.58479				*
11.00000	44.40000	100.05000		1.4361	-0.18713	-0.66782				*
12.00000	44.40000	100.05000		1.5934	-0.23883	-0.76551				*
13.00000	44.40000	100.05000		1.7259	-0.30416	-0.88133				*
14.00000	44.40000	100.05000		1.8227	-0.38910	-1.0197				*
15.00000	44.40000	100.05000		1.9683	-0.53112	-1.1669				*
16.00000	44.40000	100.05000		2.0422	-0.74373	-1.3327				*
17.00000	44.40000	100.05000		1.9230	-1.0577	-1.5060				*
18.00000	44.40000	100.05000		1.4880	-1.5645	-1.7030				*
19.00000	44.40000	100.05000		0.93188	-2.7747	-1.8931				*
20.00000	44.40000	100.05000		0.0	-4.4494	-2.1482				*
21.00000	44.40000	100.05000		0.0	-7.3822	-2.1102				*
22.00000	44.40000	100.05000		0.0	-8.1235	-2.2779				*
23.00000	44.40000	100.05000		0.0	-8.8649	-2.3640				*
24.00000	44.40000	100.05000		0.0	-9.6062	-2.3624				*
25.00000	44.40000	100.05000		0.0	-10.348	-2.2735				*
26.00000	44.40000	100.05000		0.0	-11.089	-2.0928				*
27.00000	44.40000	100.05000		0.0	-11.141	-1.9727				*
28.00000	44.40000	100.05000		0.0	-11.141	-1.7454				*
29.00000	44.40000	100.05000		0.0	-11.141	-1.4029				*
30.00000	44.40000	100.05000		-0.39339	-11.625	-1.6419				*
31.00000	44.40000	100.05000		-1.8677	-7.4389	-1.4885				*
32.00000	44.40000	100.05000		-2.8368	-3.6890	-1.3557				*
33.00000	44.40000	100.05000		-3.6754	-2.8986	-1.1901				*
34.00000	44.40000	100.05000		-4.0626	-2.3369	-1.0545				*
35.00000	44.40000	100.05000		-4.1839	-1.9079	-1.0240				*
36.00000	44.40000	100.05000		-4.1389	-1.5614	-0.95110				*
37.00000	44.40000	100.05000		-3.9820	-1.2709	-0.86902				*
38.00000	44.40000	100.05000		-3.7451	-1.0220	-0.78347				*
39.00000	44.40000	100.05000		-3.4490	-0.80643	-0.71176				*
40.00000	44.40000	100.05000		-3.2878	-0.63894	-0.62479				*
41.00000	44.40000	100.05000		-3.0949	-0.49178	-0.54993				*
42.00000	44.40000	100.05000		-2.8752	-0.36286	-0.48511				*
43.00000	44.40000	100.05000		-2.6327	-0.25040	-0.42870				*
44.00000	44.40000	100.05000		-2.4070	-0.18571	-0.37940				*
45.00000	44.40000	100.05000		-2.2051	-0.15777	-0.33617				*
0.00000	45.60000	100.05000		0.0	0.0	-0.16197				*
1.00000	45.60000	100.05000		0.0	0.0	-0.18195				*
2.00000	45.60000	100.05000		0.0	0.0	-0.20439				*
3.00000	45.60000	100.05000		0.0	0.0	-0.22964				*
4.00000	45.60000	100.05000		0.0	0.0	-0.25810				*
5.00000	45.60000	100.05000		0.17705	-0.021709	-0.29025				*
6.00000	45.60000	100.05000		0.37490	-0.049851	-0.32666				*
7.00000	45.60000	100.05000		0.56503	-0.082046	-0.36800				*
8.00000	45.60000	100.05000		0.74569	-0.11922	-0.41511				*
9.00000	45.60000	100.05000		0.91456	-0.16257	-0.46896				*
10.00000	45.60000	100.05000		1.0685	-0.21374	-0.53078				*
11.00000	45.60000	100.05000		1.2033	-0.27494	-0.60204				*
12.00000	45.60000	100.05000		1.3130	-0.34925	-0.68455				*
13.00000	45.60000	100.05000		1.3881	-0.44107	-0.78045				*
14.00000	45.60000	100.05000		1.4192	-0.55676	-0.89246				*
15.00000	45.60000	100.05000		1.3979	-0.71212	-1.0199				*
16.00000	45.60000	100.05000		1.3527	-0.96750	-1.1524				*
17.00000	45.60000	100.05000		1.1749	-1.3506	-1.3001				*
18.00000	45.60000	100.05000		0.94428	-2.0255	-1.4473				*
19.00000	45.60000	100.05000		0.53857	-2.9039	-1.6043				*
20.00000										



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x	y	z	Δx	Δy	Δz
				[m]	[m]	[m]	[mm]	[mm]	[mm]
40.00000	45.60000	100.05000					-2.8254	-0.70618	-0.56610
41.00000	45.60000	100.05000					-2.6808	-0.54436	-0.50119
42.00000	45.60000	100.05000					-2.5042	-0.40162	-0.44435
43.00000	45.60000	100.05000					-2.3473	-0.33378	-0.39441
44.00000	45.60000	100.05000					-2.1848	-0.28499	-0.35041
45.00000	45.60000	100.05000					-2.0113	-0.24227	-0.31154
0.00000	46.80000	100.05000					0.0	0.0	-0.15124
1.00000	46.80000	100.05000					0.0	0.0	-0.16958
2.00000	46.80000	100.05000					0.0	0.0	-0.19010
3.00000	46.80000	100.05000					0.0	0.0	-0.21307
4.00000	46.80000	100.05000					0.0	0.0	-0.23891
5.00000	46.80000	100.05000					0.10650	-0.019008	-0.26778
6.00000	46.80000	100.05000					0.28538	-0.055468	-0.30035
7.00000	46.80000	100.05000					0.45434	-0.096897	-0.33705
8.00000	46.80000	100.05000					0.61127	-0.14433	-0.37851
9.00000	46.80000	100.05000					0.75348	-0.19910	-0.42543
10.00000	46.80000	100.05000					0.87747	-0.26293	-0.47867
11.00000	46.80000	100.05000					0.97865	-0.33805	-0.53920
12.00000	46.80000	100.05000					1.0509	-0.42743	-0.60815
13.00000	46.80000	100.05000					1.0862	-0.53494	-0.68678
14.00000	46.80000	100.05000					1.0736	-0.65655	-0.77644
15.00000	46.80000	100.05000					0.99924	-0.82595	-0.87843
16.00000	46.80000	100.05000					0.89742	-1.0761	-0.99101
17.00000	46.80000	100.05000					0.80908	-1.5168	-1.1036
18.00000	46.80000	100.05000					0.62230	-2.0618	-1.2266
19.00000	46.80000	100.05000					0.34138	-2.6843	-1.5402
20.00000	46.80000	100.05000					0.0	-3.3104	-1.4946
21.00000	46.80000	100.05000					0.0	-5.6822	-1.5388
22.00000	46.80000	100.05000					0.0	-6.4235	-1.5822
23.00000	46.80000	100.05000					0.0	-7.1649	-1.5840
24.00000	46.80000	100.05000					0.0	-7.5062	-1.5402
25.00000	46.80000	100.05000					0.0	-8.6476	-1.4488
26.00000	46.80000	100.05000					0.0	-9.3889	-1.3093
27.00000	46.80000	100.05000					0.0	-9.4408	-1.2499
28.00000	46.80000	100.05000					0.0	-9.4408	-1.1622
29.00000	46.80000	100.05000					0.0	-9.4408	-1.0427
30.00000	46.80000	100.05000					-0.15477	-9.9911	-1.1461
31.00000	46.80000	100.05000					-0.79856	-7.2780	-1.0611
32.00000	46.80000	100.05000					-1.3395	-4.4356	-1.0014
33.00000	46.80000	100.05000					-1.7576	-3.4762	-0.95135
34.00000	46.80000	100.05000					-2.0324	-2.6824	-0.89934
35.00000	46.80000	100.05000					-2.3153	-2.1720	-0.83400
36.00000	46.80000	100.05000					-2.4857	-1.7758	-0.76599
37.00000	46.80000	100.05000					-2.5290	-1.4345	-0.69854
38.00000	46.80000	100.05000					-2.4714	-1.1379	-0.64075
39.00000	46.80000	100.05000					-2.4476	-0.91657	-0.57271
40.00000	46.80000	100.05000					-2.3855	-0.72448	-0.50968
41.00000	46.80000	100.05000					-2.3012	-0.59191	-0.45393
42.00000	46.80000	100.05000					-2.2065	-0.50850	-0.40454
43.00000	46.80000	100.05000					-2.0909	-0.43618	-0.36071
44.00000	46.80000	100.05000					-1.9581	-0.37297	-0.32175
45.00000	46.80000	100.05000					-1.8112	-0.31728	-0.28707
0.00000	48.00000	100.05000					0.0	0.0	-0.14056
1.00000	48.00000	100.05000					0.0	0.0	-0.15729
2.00000	48.00000	100.05000					0.0	0.0	-0.17593
3.00000	48.00000	100.05000					0.0	0.0	-0.19671
4.00000	48.00000	100.05000					0.0	0.0	-0.21990
5.00000	48.00000	100.05000					0.029995	-0.0072214	-0.24578
6.00000	48.00000	100.05000					0.19148	-0.050407	-0.27470
7.00000	48.00000	100.05000					0.34140	-0.099075	-0.30704
8.00000	48.00000	100.05000					0.47756	-0.15425	-0.34326
9.00000	48.00000	100.05000					0.59718	-0.21721	-0.38384
10.00000	48.00000	100.05000					0.69682	-0.28952	-0.42934
11.00000	48.00000	100.05000					0.77215	-0.37313	-0.48037
12.00000	48.00000	100.05000					0.81777	-0.47041	-0.53758
13.00000	48.00000	100.05000					0.82703	-0.58421	-0.60162
14.00000	48.00000	100.05000					0.79195	-0.71780	-0.67309
15.00000	48.00000	100.05000					0.74690	-0.91797	-0.75239
16.00000	48.00000	100.05000					0.68070	-1.1853	-0.83954
17.00000	48.00000	100.05000					0.56980	-1.5035	-0.93931
18.00000	48.00000	100.05000					0.41603	-1.8792	-1.0311
19.00000	48.00000	100.05000					0.22426	-2.3225	-1.1253
20.00000	48.00000	100.05000					0.0	-2.7409	-1.2229
21.00000	48.00000	100.05000					0.0	-4.8322	-1.2826
22.00000	48.00000	100.05000					0.0	-5.5735	-1.3281
23.00000	48.00000	100.05000					0.0	-6.3149	-1.3426
24.00000	48.00000	100.05000					0.0	-7.0562	-1.3212
25.00000	48.00000	100.05000					0.0	-7.7976	-1.2618
26.00000	48.00000	100.05000					0.0	-8.5389	-1.1645
27.00000	48.00000	100.05000					0.0	-8.5908	-1.1248
28.00000	48.00000	100.05000					0.0	-8.5908	-1.0682
29.00000	48.00000	100.05000					0.0	-8.5908	-0.99178
30.00000	48.00000	100.05000					-0.11102	-9.0457	-1.0274
31.00000	48.00000	100.05000					-0.57878	-6.6440	-0.95898
32.00000	48.00000	100.05000					-0.99108	-4.1989	-0.90255
33.00000	48.00000	100.05000					-1.3280	-3.4179	-0.85092
34.00000	48.00000	100.05000					-1.5694	-2.7257	-0.79795
35.00000	48.00000	100.05000					-1.7178	-2.1301	-0.74099
36.00000	48.00000	100.05000					-1.8513	-1.6948	-0.68076
37.00000	48.00000	100.05000					-1.9346	-1.3628	-0.62600
38.00000	48.00000	100.05000					-1.9865	-1.1026	-0.56851
39.00000	48.00000	100.05000					-2.0257	-0.94373	-0.50943
40.00000	48.00000	100.05000					-2.0251	-0.81487	-0.45642
41.00000	48.00000	100.05000					-1.9900	-0.70350	-0.40889
42.00000	48.00000	100.05000					-1.9266	-0.60657	-0.36629
43.00000	48.00000	100.05000					-1.8397	-0.52163	-0.32809
44.00000	48.00000	100.05000					-1.7333	-0.44671	-0.29385
45.00000	48.00000	100.05000					-1.6105	-0.38023	-0.26313
0.00000	49.20000	100.05000					0.0	0.0	-0.13003
1.00000	49.20000	100.05000					0.0	0.0	-0.14522
2.00000	49.20000	100.05000					0.0	0.0	-0.16207
3.00000	49.20000	100.05000					0.0	0.0	-0.18075
4.00000	49.20000	100.05000					0.0	0.0	-0.20148
5.00000	49.20000	100.05000					0.0	0.0	-0.22449
6.00000	49.20000	100.05000					0.097470	-0.033155	-0.25002
7.00000	49.20000	100.05000					0.23098	-0.086998	-0.27836
8.00000	49.20000	100.05000					0.34976	-0.14739	-0.30980
9.00000	49.20000	100.05000					0.45122	-0.21541	-0.34469
10.00000	49.20000	100.05000					0.53226	-0.29234	-0.38335
11.00000	49.20000	100.05000					0.58919	-0.37966	-0.42636
12.00000	49.20000	100.05000					0.61770	-0.47902	-0.47343
13.00000	49.20000	100.05000					0.61287	-0.59219	-0.52546
14.00000	49.20000	100.05000					0.60786	-0.75923	-0.58240
15.00000	49.20000	100.05000					0.57974	-0.96368	-0.64424
16.00000	49.20000	100.05000					0.5242	-1.2008	-0.71061
17.00000	49.20000	100.05000					0.42875	-1.4688	-0.78071
18.00000	49.20000	100.05000					0.30660	-1.7598	-0.85310
19.00000	49.20000	100.05000					0.16013	-2.0594	-0.92569
20.00000	49.20000	100.05000					0.0	-2.3467	-0.99570
21.00000	49.20000	100.05000					0.0	-4.0585	-1.0599
22.00000	49.20000	100.05000					0.0	-4.7235	-1.0969
23.00000	49.20000	100.05000					0.0	-5.4649	-1.1137
24.00000	49.20000	100.05000					0.0	-6.2062	-1.1116
25.00000	49.20000	100.05000					0.0	-6.9476	-1.0837
26.00000	49.20000	100.05000					0.0	-7.6889	-1.0274
27.00000	49.20000	100.05000					0.0	-7.7408	-1.0014
28.00000	49.20000	100.05000							



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x	y	z	δx	δy	δz
				[m]	[m]	[m]	[mm]	[mm]	[mm]
43.00000	49.20000	100.05000		-1.1994	-0.58796	-0.29698	*		
44.00000	49.20000	100.05000		-1.5154	-0.50418	-0.26706	*		
45.00000	49.20000	100.05000		-1.4136	-0.42921	-0.24001	*		
0.00000	50.40000	100.05000		0.0	0.0	-0.11975	*		
1.00000	50.40000	100.05000		0.0	0.0	-0.13347	*		
2.00000	50.40000	100.05000		0.0	0.0	-0.14962	*		
3.00000	50.40000	100.05000		0.0	0.0	-0.16534	*		
4.00000	50.40000	100.05000		0.0	0.0	-0.18379	*		
5.00000	50.40000	100.05000		0.0	0.0	-0.20413	*		
6.00000	50.40000	100.05000		0.0066849	-0.0028453	-0.22656	*		
7.00000	51.40000	100.05000		0.1265	-0.053897	-0.25125	*		
8.00000	50.40000	100.05000		0.23138	-0.12316	-0.27843	*		
9.00000	50.40000	100.05000		0.31896	-0.19347	-0.30828	*		
10.00000	50.40000	100.05000		0.38666	-0.27177	-0.34101	*		
11.00000	50.40000	100.05000		0.43157	-0.35905	-0.37681	*		
12.00000	50.40000	100.05000		0.45194	-0.45773	-0.41580	*		
13.00000	50.40000	100.05000		0.47159	-0.59578	-0.45806	*		
14.00000	50.40000	100.05000		0.46991	-0.75622	-0.50354	*		
15.00000	50.40000	100.05000		0.44506	-0.93946	-0.55202	*		
16.00000	50.40000	100.05000		0.39602	-1.1442	-0.60304	*		
17.00000	50.40000	100.05000		0.32324	-1.3664	-0.65885	*		
18.00000	50.40000	100.05000		0.22923	-1.5987	-0.70932	*		
19.00000	50.40000	100.05000		0.11903	-1.8297	-0.76194	*		
20.00000	50.40000	100.05000		0.0	-2.0452	-0.81188	*		
21.00000	50.40000	100.05000		0.0	-3.6085	-0.85711	*		
22.00000	50.40000	100.05000		0.0	-4.1645	-0.89525	*		
23.00000	50.40000	100.05000		0.0	-4.7205	-0.92530	*		
24.00000	50.40000	100.05000		0.0	-5.3562	-0.93086	*		
25.00000	50.40000	100.05000		0.0	-6.0976	-0.91262	*		
26.00000	50.40000	100.05000		0.0	-6.8389	-0.86173	*		
27.00000	50.40000	100.05000		0.0	-6.8908	-0.86466	*		
28.00000	50.40000	100.05000		0.0	-6.8908	-0.83899	*		
29.00000	50.40000	100.05000		0.0	-6.8908	-0.80400	*		
30.00000	50.40000	100.05000		-0.062553	-7.0887	-0.78521	*		
31.00000	50.40000	100.05000		-0.32898	-5.0431	-0.74231	*		
32.00000	50.40000	100.05000		-0.57363	-3.5095	-0.69929	*		
33.00000	50.40000	100.05000		-0.78247	-3.0066	-0.65683	*		
34.00000	50.40000	100.05000		-0.94648	-2.5320	-0.61647	*		
35.00000	50.40000	100.05000		-1.0713	-2.1177	-0.57659	*		
36.00000	50.40000	100.05000		-1.1792	-1.7909	-0.52775	*		
37.00000	50.40000	100.05000		-1.2544	-1.5037	-0.48161	*		
38.00000	50.40000	100.05000		-1.3112	-1.2655	-0.43844	*		
39.00000	50.40000	100.05000		-1.3891	-1.1093	-0.39836	*		
40.00000	50.40000	100.05000		-1.4299	-0.96989	-0.36135	*		
41.00000	50.40000	100.05000		-1.4382	-0.84340	-0.32733	*		
42.00000	50.40000	100.05000		-1.4183	-0.73401	-0.29634	*		
43.00000	50.40000	100.05000		-1.3739	-0.63408	-0.26763	*		
44.00000	50.40000	100.05000		-1.3083	-0.54416	-0.24162	*		
45.00000	50.40000	100.05000		-1.2243	-0.46299	-0.21793	*		
0.00000	51.60000	100.05000		0.0	0.0	-0.10981	*		
1.00000	51.60000	100.05000		0.0	0.0	-0.12235	*		
2.00000	51.60000	100.05000		0.0	0.0	-0.13571	*		
3.00000	51.60000	100.05000		0.0	0.0	-0.15060	*		
4.00000	51.60000	100.05000		0.0	0.0	-0.16694	*		
5.00000	51.60000	100.05000		0.0	0.0	-0.18485	*		
6.00000	51.60000	100.05000		0.0	0.0	-0.20447	*		
7.00000	51.60000	100.05000		0.030408	-0.017671	-0.22590	*		
8.00000	51.60000	100.05000		0.12454	-0.081790	-0.24930	*		
9.00000	51.60000	100.05000		0.20204	-0.15212	-0.27477	*		
10.00000	51.60000	100.05000		0.26084	-0.22295	-0.30241	*		
11.00000	51.60000	100.05000		0.30256	-0.31753	-0.33229	*		
12.00000	51.60000	100.05000		0.33705	-0.42943	-0.36445	*		
13.00000	51.60000	100.05000		0.35479	-0.55767	-0.39883	*		
14.00000	51.60000	100.05000		0.35453	-0.70236	-0.43528	*		
15.00000	51.60000	100.05000		0.33546	-0.86260	-0.47354	*		
16.00000	51.60000	100.05000		0.29753	-1.0360	-0.51316	*		
17.00000	51.60000	100.05000		0.24182	-1.2184	-0.55349	*		
18.00000	51.60000	100.05000		0.17079	-1.4031	-0.59367	*		
19.00000	51.60000	100.05000		0.088424	-1.5816	-0.63263	*		
20.00000	51.60000	100.05000		0.0	-1.7437	-0.66914	*		
21.00000	51.60000	100.05000		0.0	-3.1585	-0.70184	*		
22.00000	51.60000	100.05000		0.0	-3.7145	-0.72942	*		
23.00000	51.60000	100.05000		0.0	-4.2705	-0.75067	*		
24.00000	51.60000	100.05000		0.0	-4.8266	-0.76460	*		
25.00000	51.60000	100.05000		0.0	-5.3826	-0.77056	*		
26.00000	51.60000	100.05000		0.0	-5.9889	-0.75885	*		
27.00000	51.60000	100.05000		0.0	-6.6408	-0.74631	*		
28.00000	51.60000	100.05000		0.0	-6.0408	-0.72828	*		
29.00000	51.60000	100.05000		0.0	-6.0408	-0.70353	*		
30.00000	51.60000	100.05000		-0.047734	-6.0943	-0.67715	*		
31.00000	51.60000	100.05000		-0.25150	-4.1595	-0.64557	*		
32.00000	51.60000	100.05000		-0.44218	-3.1956	-0.61253	*		
33.00000	51.60000	100.05000		-0.61666	-2.8315	-0.57329	*		
34.00000	51.60000	100.05000		-0.76822	-2.4831	-0.53349	*		
35.00000	51.60000	100.05000		-0.89386	-2.1378	-0.49404	*		
36.00000	51.60000	100.05000		-0.99247	-1.8600	-0.45562	*		
37.00000	51.60000	100.05000		-1.0644	-1.5915	-0.41874	*		
38.00000	51.60000	100.05000		-1.1111	-1.3522	-0.38371	*		
39.00000	51.60000	100.05000		-1.1344	-1.1407	-0.35074	*		
40.00000	51.60000	100.05000		-1.1326	-0.9012	-0.31992	*		
41.00000	51.60000	100.05000		-1.2025	-0.87614	-0.29126	*		
42.00000	51.60000	100.05000		-1.1959	-0.76273	-0.26472	*		
43.00000	51.60000	100.05000		-1.1657	-0.65979	-0.24024	*		
44.00000	51.60000	100.05000		-1.1146	-0.56620	-0.21772	*		
45.00000	51.60000	100.05000		-1.0452	-0.48097	-0.19705	*		
0.00000	52.80000	100.05000		0.0	0.0	-0.10027	*		
1.00000	52.80000	100.05000		0.0	0.0	-0.11132	*		
2.00000	52.80000	100.05000		0.0	0.0	-0.12341	*		
3.00000	52.80000	100.05000		0.0	0.0	-0.13662	*		
4.00000	52.80000	100.05000		0.0	0.0	-0.15104	*		
5.00000	52.80000	100.05000		0.0	0.0	-0.16675	*		
6.00000	52.80000	100.05000		0.0	0.0	-0.18384	*		
7.00000	52.80000	100.05000		0.0	0.0	-0.20240	*		
8.00000	52.80000	100.05000		0.030211	-0.024055	-0.22248	*		
9.00000	52.80000	100.05000		0.10084	-0.09562	-0.24416	*		
10.00000	52.80000	100.05000		0.15745	-0.16988	-0.26747	*		
11.00000	52.80000	100.05000		0.20363	-0.26115	-0.29241	*		
12.00000	52.80000	100.05000		0.23626	-0.36473	-0.31895	*		
13.00000	52.80000	100.05000		0.25441	-0.48057	-0.34699	*		
14.00000	52.80000	100.05000		-0.25745	-0.60800	-0.37635	*		
15.00000	52.80000	100.05000		0.24518	-0.74546	-0.40675	*		
16.00000	52.80000	100.05000		0.21805	-0.89025	-0.43780	*		
17.00000	52.80000	100.05000		0.17731	-1.0383	-0.46899	*		
18.00000	52.80000	100.05000		0.12517	-1.1843	-0.49966	*		
19.00000	52.80000	100.05000		0.064762	-1.3214	-0.52904	*		
20.00000	52.80000	100.05000		0.0	-1.4422	-0.55627	*		
21.00000	52.80000	100.05000		0.0	-2.7085	-0.58046	*		
22.00000	52.80000	100.05000		0.0	-3.2645	-0.60073	*		
23.00000	52.80000	100.05000		0.0	-3.8205	-0.61627	*		
24.00000	52.80000	100.05000		0.0	-4.3766	-0.62647	*		
25.00000	52.80000	100.05000		0.0	-4.9326	-0.63090	*		
26.00000	52.80000	100.05000		0.0	-5.4886	-0.62936	*		
27.00000	52.80000	100.05000		0.0	-5.5275	-0.62194	*		
28.00000	52.80000	100.05000		0.0	-5.5275	-0.60897	*		
29.00000	52.80000	100.05000		0.0	-5.5275	-0.59101	*		
30.00000	52.80000	100.05000		-0.038675	-5.3163	-0.56880	*		
31.00000	52.80000	100.05000		-0.20494	-3.4642	-0.54318	*		
32.00000	52.80000	100.05000		-0.36368	-3.0334	-0.51504	*		
33.00000	52.80000	100.05000		-0.50955	-2.7249	-0.48526	*		
34.00000	52.80000	100.05000		-0.63840	-2.4242	-0.45463	*		
35.00000	52.80000	100.05000		-0.74744	-2.1375	-0.42382	*		
36.00000	52.80000	100.05000		-0.83519	-1.8695	-0.39339	*		
37.00000	52.80000	100.05000		-0.90129	-1.6226	-0.36378	*		
38.00000	52.80000	100.05000		-0.94618	-1.3979	-0.33529	*		
39.00000	52.80000	100.05000		-0.97090	-1.1954	-0.30815	*		
40.00000	52.80000	100.05000		-0.97683	-1.0144	-0.28249	*		
41.00000	52.80000	100.05000		-0.99385	-0.88200	-0.25838	*		
42.00000	52.80000	100.05000		-0.99596	-0.76915	-0.23585	*		
43.00000									



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage: Ref.	Stage: Name	Disp. Ref.	Disp. Grid: Name	x	y	z	Δx	Δy	Δz	
				[m]	[m]	[m]	[mm]	[mm]	[mm]	
0.00000	54.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.091189	*
1.00000	54.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.10105	*
2.00000	54.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.11179	*
3.00000	54.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.12347	*
4.00000	54.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.13615	*
5.00000	54.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.14988	*
6.00000	54.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.16474	*
7.00000	54.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.18075	*
8.00000	54.00000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.19796	*
9.00000	54.00000	100.05000		0.015362	-0.016947	-0.21638	0.015362	-0.016947	-0.21638	*
10.00000	54.00000	100.05000		0.071009	-0.091542	-0.23603	0.071009	-0.091542	-0.23603	*
11.00000	54.00000	100.05000		0.11539	-0.17563	-0.25685	0.11539	-0.17563	-0.25685	*
12.00000	54.00000	100.05000		0.14783	-0.26909	-0.27880	0.14783	-0.26909	-0.27880	*
13.00000	54.00000	100.05000		0.16781	-0.37137	-0.30174	0.16781	-0.37137	-0.30174	*
14.00000	54.00000	100.05000		0.17511	-0.48138	-0.32549	0.17511	-0.48138	-0.32549	*
15.00000	54.00000	100.05000		0.16988	-0.59729	-0.34951	0.16988	-0.59729	-0.34951	*
16.00000	54.00000	100.05000		0.15278	-0.71642	-0.37437	0.15278	-0.71642	-0.37437	*
17.00000	54.00000	100.05000		0.12506	-0.83517	-0.39876	0.12506	-0.83517	-0.39876	*
18.00000	54.00000	100.05000		0.088605	-0.94903	-0.42249	0.088605	-0.94903	-0.42249	*
19.00000	54.00000	100.05000		0.045926	-1.0528	-0.44499	0.045926	-1.0528	-0.44499	*
20.00000	54.00000	100.05000		0.0	-1.1407	-0.46567	0.0	-1.1407	-0.46567	*
21.00000	54.00000	100.05000		0.0	-2.2585	-0.48390	0.0	-2.2585	-0.48390	*
22.00000	54.00000	100.05000		0.0	-2.8145	-0.49909	0.0	-2.8145	-0.49909	*
23.00000	54.00000	100.05000		0.0	-3.3705	-0.51072	0.0	-3.3705	-0.51072	*
24.00000	54.00000	100.05000		0.0	-3.9266	-0.51834	0.0	-3.9266	-0.51834	*
25.00000	54.00000	100.05000		0.0	-4.4826	-0.52169	0.0	-4.4826	-0.52169	*
26.00000	54.00000	100.05000		0.0	-5.0386	-0.52064	0.0	-5.0386	-0.52064	*
27.00000	54.00000	100.05000		0.0	-5.5775	-0.51524	0.0	-5.5775	-0.51524	*
28.00000	54.00000	100.05000		0.0	-5.0775	-0.50570	0.0	-5.0775	-0.50570	*
29.00000	54.00000	100.05000		0.0	-5.0775	-0.49239	0.0	-5.0775	-0.49239	*
30.00000	54.00000	100.05000		-0.031871	-4.5763	-0.47530	-0.031871	-4.5763	-0.47530	*
31.00000	54.00000	100.05000		-0.16905	-3.1017	-0.45649	-0.16905	-3.1017	-0.45649	*
32.00000	54.00000	100.05000		-0.30065	-2.8437	-0.43507	-0.30065	-2.8437	-0.43507	*
33.00000	54.00000	100.05000		-0.42260	-2.5816	-0.41215	-0.42260	-2.5816	-0.41215	*
34.00000	54.00000	100.05000		-0.53158	-2.3221	-0.38829	-0.53158	-2.3221	-0.38829	*
35.00000	54.00000	100.05000		-0.62513	-2.0705	-0.36401	-0.62513	-2.0705	-0.36401	*
36.00000	54.00000	100.05000		-0.70172	-1.8311	-0.33975	-0.70172	-1.8311	-0.33975	*
37.00000	54.00000	100.05000		-0.76062	-1.6066	-0.31585	-0.76062	-1.6066	-0.31585	*
38.00000	54.00000	100.05000		-0.80175	-1.3987	-0.29261	-0.80175	-1.3987	-0.29261	*
39.00000	54.00000	100.05000		-0.82556	-1.2082	-0.27023	-0.82556	-1.2082	-0.27023	*
40.00000	54.00000	100.05000		-0.83285	-1.0350	-0.24886	-0.83285	-1.0350	-0.24886	*
41.00000	54.00000	100.05000		-0.82462	-0.87877	-0.22860	-0.82462	-0.87877	-0.22860	*
42.00000	54.00000	100.05000		-0.81807	-0.75471	-0.20950	-0.81807	-0.75471	-0.20950	*
43.00000	54.00000	100.05000		-0.80480	-0.65235	-0.19159	-0.80480	-0.65235	-0.19159	*
44.00000	54.00000	100.05000		-0.77277	-0.55744	-0.17486	-0.77277	-0.55744	-0.17486	*
45.00000	54.00000	100.05000		-0.72360	-0.46945	-0.15929	-0.72360	-0.46945	-0.15929	*
0.00000	55.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.082592	*
1.00000	55.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.091362	*
2.00000	55.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.10087	*
3.00000	55.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.11117	*
4.00000	55.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.12228	*
5.00000	55.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.13427	*
6.00000	55.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.14714	*
7.00000	55.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.16093	*
8.00000	55.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.17566	*
9.00000	55.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.19131	*
10.00000	55.20000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.20786	*
11.00000	55.20000	100.05000		0.036700	-0.064852	-0.22527	0.036700	-0.064852	-0.22527	*
12.00000	55.20000	100.05000		0.070062	-0.14729	-0.24345	0.070062	-0.14729	-0.24345	*
13.00000	55.20000	100.05000		0.092720	-0.23275	-0.26228	0.092720	-0.23275	-0.26228	*
14.00000	55.20000	100.05000		0.10469	-0.32892	-0.28159	0.10469	-0.32892	-0.28159	*
15.00000	55.20000	100.05000		0.10633	-0.42492	-0.30117	0.10633	-0.42492	-0.30117	*
16.00000	55.20000	100.05000		0.098350	-0.52126	-0.32076	0.098350	-0.52126	-0.32076	*
17.00000	55.20000	100.05000		0.081925	-0.61479	-0.34002	0.081925	-0.61479	-0.34002	*
18.00000	55.20000	100.05000		0.058664	-0.70178	-0.35859	0.058664	-0.70178	-0.35859	*
19.00000	55.20000	100.05000		0.030580	-0.77805	-0.37607	0.030580	-0.77805	-0.37607	*
20.00000	55.20000	100.05000		0.0	-0.83917	-0.39200	0.0	-0.83917	-0.39200	*
21.00000	55.20000	100.05000		0.0	-1.8085	-0.40597	0.0	-1.8085	-0.40597	*
22.00000	55.20000	100.05000		0.0	-2.3645	-0.41755	0.0	-2.3645	-0.41755	*
23.00000	55.20000	100.05000		0.0	-2.9205	-0.42639	0.0	-2.9205	-0.42639	*
24.00000	55.20000	100.05000		0.0	-3.4766	-0.43220	0.0	-3.4766	-0.43220	*
25.00000	55.20000	100.05000		0.0	-4.0326	-0.43477	0.0	-4.0326	-0.43477	*
26.00000	55.20000	100.05000		0.0	-4.5886	-0.43404	0.0	-4.5886	-0.43404	*
27.00000	55.20000	100.05000		0.0	-4.6275	-0.43003	0.0	-4.6275	-0.43003	*
28.00000	55.20000	100.05000		0.0	-4.6275	-0.42287	0.0	-4.6275	-0.42287	*
29.00000	55.20000	100.05000		0.0	-4.6275	-0.41283	0.0	-4.6275	-0.41283	*
30.00000	55.20000	100.05000		-0.026337	-3.8342	-0.40022	-0.026337	-3.8342	-0.40022	*
31.00000	55.20000	100.05000		-0.13979	-2.8508	-0.38543	-0.13979	-2.8508	-0.38543	*
32.00000	55.20000	100.05000		-0.24898	-2.5339	-0.36889	-0.24898	-2.5339	-0.36889	*
33.00000	55.20000	100.05000		-0.35073	-2.4108	-0.35103	-0.35073	-2.4108	-0.35103	*
34.00000	55.20000	100.05000		-0.44237	-2.1869	-0.33226	-0.44237	-2.1869	-0.33226	*
35.00000	55.20000	100.05000		-0.52179	-1.9668	-0.31297	-0.52179	-1.9668	-0.31297	*
36.00000	55.20000	100.05000		-0.58752	-1.7542	-0.29349	-0.58752	-1.7542	-0.29349	*
37.00000	55.20000	100.05000		-0.63868	-1.5518	-0.27413	-0.63868	-1.5518	-0.27413	*
38.00000	55.20000	100.05000		-0.67492	-1.3615	-0.25510	-0.67492	-1.3615	-0.25510	*
39.00000	55.20000	100.05000		-0.69631	-1.1845	-0.23661	-0.69631	-1.1845	-0.23661	*
40.00000	55.20000	100.05000		-0.70325	-1.0213	-0.21880	-0.70325	-1.0213	-0.21880	*
41.00000	55.20000	100.05000		-0.69635	-0.87200	-0.20177	-0.69635	-0.87200	-0.20177	*
42.00000	55.20000	100.05000		-0.67639	-0.73625	-0.18560	-0.67639	-0.73625	-0.18560	*
43.00000	55.20000	100.05000		-0.65198	-0.62136	-0.17031	-0.65198	-0.62136	-0.17031	*
44.00000	55.20000	100.05000		-0.62537	-0.52807	-0.15594	-0.62537	-0.52807	-0.15594	*
45.00000	55.20000	100.05000		-0.58266	-0.44085	-0.14247	-0.58266	-0.44085	-0.14247	*
0.00000	56.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.074505	*
1.00000	56.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.082283	*
2.00000	56.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.090661	*
3.00000	56.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.099730	*
4.00000	56.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.10946	*
5.00000	56.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.11988	*
6.00000	56.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.13103	*
7.00000	56.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.14289	*
8.00000	56.40000	100.05000		0.0	0.0	0.0	0.0	0.0	-0.15548	*
9.00000	56.40000	100.05000		0.0	0.0	0.0	0			



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Disp. Ref.	Disp. Grid Name	x [m]	y [m]	z [m]	δx [mm]	δy [mm]	δz [mm]	
3.00000	57.60000	100.05000		0.0	0.0	-0.089155	*			
4.00000	57.60000	100.05000		0.0	0.0	-0.097646	*			
5.00000	57.60000	100.05000		0.0	0.0	-0.10670	*			
6.00000	57.60000	100.05000		0.0	0.0	-0.11633	*			
7.00000	57.60000	100.05000		0.0	0.0	-0.12653	*			
8.00000	57.60000	100.05000		0.0	0.0	-0.13728	*			
9.00000	57.60000	100.05000		0.0	0.0	-0.14857	*			
10.00000	57.60000	100.05000		0.0	0.0	-0.16034	*			
11.00000	57.60000	100.05000		0.0	0.0	-0.17254	*			
12.00000	57.60000	100.05000		0.0	0.0	-0.18510	*			
13.00000	57.60000	100.05000		0.0	0.0	-0.19791	*			
14.00000	57.60000	100.05000		0.0	0.0	-0.21085	*			
15.00000	57.60000	100.05000		0.0053572	-0.026613	-0.22377	*			
16.00000	57.60000	100.05000		0.012989	-0.084825	-0.23649	*			
17.00000	57.60000	100.05000		0.015013	-0.13757	-0.24882	*			
18.00000	57.60000	100.05000		0.012592	-0.19223	-0.26054	*			
19.00000	57.60000	100.05000		0.0070867	-0.21605	-0.27142	*			
20.00000	57.60000	100.05000		0.0	-0.23617	-0.28123	*			
21.00000	57.60000	100.05000		0.0	-0.90851	-0.28975	*			
22.00000	57.60000	100.05000		0.0	-1.4645	-0.29677	*			
23.00000	57.60000	100.05000		0.0	-0.02095	-0.30231	*			
24.00000	57.60000	100.05000		0.0	-2.5766	-0.30561	*			
25.00000	57.60000	100.05000		0.0	-3.1326	-0.30720	*			
26.00000	57.60000	100.05000		0.0	-3.6886	-0.30682	*			
27.00000	57.60000	100.05000		0.0	-3.7275	-0.30448	*			
28.00000	57.60000	100.05000		0.0	-3.7275	-0.30026	*			
29.00000	57.60000	100.05000		0.0	-3.7275	-0.29427	*			
30.00000	57.60000	100.05000		-0.017879	-2.4670	-0.28668	*			
31.00000	57.60000	100.05000		-0.094954	-2.3255	-0.27767	*			
32.00000	57.60000	100.05000		-0.16336	-2.1722	-0.26745	*			
33.00000	57.60000	100.05000		-0.23907	-2.0108	-0.25627	*			
34.00000	57.60000	100.05000		-0.30226	-1.8450	-0.24434	*			
35.00000	57.60000	100.05000		-0.35742	-1.6780	-0.23189	*			
36.00000	57.60000	100.05000		-0.40332	-1.5126	-0.21912	*			
37.00000	57.60000	100.05000		-0.43910	-1.3512	-0.20622	*			
38.00000	57.60000	100.05000		-0.46418	-1.1956	-0.19335	*			
39.00000	57.60000	100.05000		-0.47828	-1.0471	-0.18065	*			
40.00000	57.60000	100.05000		-0.48135	-0.90693	-0.16823	*			
41.00000	57.60000	100.05000		-0.47355	-0.77556	-0.15618	*			
42.00000	57.60000	100.05000		-0.45116	-0.65336	-0.14458	*			
43.00000	57.60000	100.05000		-0.42459	-0.54045	-0.13348	*			
44.00000	57.60000	100.05000		-0.38831	-0.43673	-0.12291	*			
45.00000	57.60000	100.05000		-0.34085	-0.34200	-0.11290	*			
0.00000	58.80000	100.05000		0.0	0.0	-0.059901	*			
1.00000	58.80000	100.05000		0.0	0.0	-0.065972	*			
2.00000	58.80000	100.05000		0.0	0.0	-0.072474	*			
3.00000	58.80000	100.05000		0.0	0.0	-0.079421	*			
4.00000	58.80000	100.05000		0.0	0.0	-0.086821	*			
5.00000	58.80000	100.05000		0.0	0.0	-0.094678	*			
6.00000	58.80000	100.05000		0.0	0.0	-0.10299	*			
7.00000	58.80000	100.05000		0.0	0.0	-0.11175	*			
8.00000	58.80000	100.05000		0.0	0.0	-0.12093	*			
9.00000	58.80000	100.05000		0.0	0.0	-0.13051	*			
10.00000	58.80000	100.05000		0.0	0.0	-0.14045	*			
11.00000	58.80000	100.05000		0.0	0.0	-0.15070	*			
12.00000	58.80000	100.05000		0.0	0.0	-0.16117	*			
13.00000	58.80000	100.05000		0.0	0.0	-0.17179	*			
14.00000	58.80000	100.05000		0.0	0.0	-0.18244	*			
15.00000	58.80000	100.05000		0.0	0.0	-0.19301	*			
16.00000	58.80000	100.05000		0.0	0.0	-0.20336	*			
17.00000	58.80000	100.05000		0.0	0.0	-0.21333	*			
18.00000	58.80000	100.05000		0.0	0.0	-0.22275	*			
19.00000	58.80000	100.05000		0.0	0.0	-0.23146	*			
20.00000	58.80000	100.05000		0.0	0.0	-0.23927	*			
21.00000	58.80000	100.05000		0.0	-0.45851	-0.24603	*			
22.00000	58.80000	100.05000		0.0	-1.0145	-0.25159	*			
23.00000	58.80000	100.05000		0.0	-1.5705	-0.25580	*			
24.00000	58.80000	100.05000		0.0	-2.1266	-0.25857	*			
25.00000	58.80000	100.05000		0.0	-2.6826	-0.25983	*			
26.00000	58.80000	100.05000		0.0	-3.2386	-0.25954	*			
27.00000	58.80000	100.05000		0.0	-3.7775	-0.25773	*			
28.00000	58.80000	100.05000		0.0	-3.7775	-0.25442	*			
29.00000	58.80000	100.05000		0.0	-3.7775	-0.24971	*			
30.00000	58.80000	100.05000		-0.014574	-2.1710	-0.24371	*			
31.00000	58.80000	100.05000		-0.077406	-2.0544	-0.23656	*			
32.00000	58.80000	100.05000		-0.13807	-1.9262	-0.22842	*			
33.00000	58.80000	100.05000		-0.19489	-1.7896	-0.21946	*			
34.00000	58.80000	100.05000		-0.24637	-1.6477	-0.20985	*			
35.00000	58.80000	100.05000		-0.29118	-1.5030	-0.19975	*			
36.00000	58.80000	100.05000		-0.33216	-1.3581	-0.18933	*			
37.00000	58.80000	100.05000		-0.35679	-1.2151	-0.17873	*			
38.00000	58.80000	100.05000		-0.37618	-1.0758	-0.16810	*			
39.00000	58.80000	100.05000		-0.38608	-0.94149	-0.15753	*			
40.00000	58.80000	100.05000		-0.38632	-0.81326	-0.14714	*			
41.00000	58.80000	100.05000		-0.37692	-0.69188	-0.13699	*			
42.00000	58.80000	100.05000		-0.35803	-0.57783	-0.12717	*			
43.00000	58.80000	100.05000		-0.32990	-0.47141	-0.11771	*			
44.00000	58.80000	100.05000		-0.29286	-0.37272	-0.10866	*			
45.00000	58.80000	100.05000		-0.24730	-0.28174	-0.10003	*			
0.00000	60.00000	100.05000		0.0	0.0	-0.053777	*			
1.00000	60.00000	100.05000		0.0	0.0	-0.058723	*			
2.00000	60.00000	100.05000		0.0	0.0	-0.064428	*			
3.00000	60.00000	100.05000		0.0	0.0	-0.070499	*			
4.00000	60.00000	100.05000		0.0	0.0	-0.076938	*			
5.00000	60.00000	100.05000		0.0	0.0	-0.083745	*			
6.00000	60.00000	100.05000		0.0	0.0	-0.090913	*			
7.00000	60.00000	100.05000		0.0	0.0	-0.098429	*			
8.00000	60.00000	100.05000		0.0	0.0	-0.10627	*			
9.00000	60.00000	100.05000		0.0	0.0	-0.11441	*			
10.00000	60.00000	100.05000		0.0	0.0	-0.12281	*			
11.00000	60.00000	100.05000		0.0	0.0	-0.13142	*			
12.00000	60.00000	100.05000		0.0	0.0	-0.14018	*			
13.00000	60.00000	100.05000		0.0	0.0	-0.14900	*			
14.00000	60.00000	100.05000		0.0	0.0	-0.15781	*			
15.00000	60.00000	100.05000		0.0	0.0	-0.16668	*			
16.00000	60.00000	100.05000		0.0	0.0	-0.17496	*			
17.00000	60.00000	100.05000		0.0	0.0	-0.18306	*			
18.00000	60.00000	100.05000		0.0	0.0	-0.19069	*			
19.00000	60.00000	100.05000		0.0	0.0	-0.19771	*			
20.00000	60.00000	100.05000		0.0	0.0	-0.20399	*			
21.00000	60.00000	100.05000		0.0	-0.0085132	-0.20940	*			
22.00000	60.00000	100.05000		0.0	-0.56453	-0.21383	*			
23.00000	60.00000	100.05000		0.0	-1.1205	-0.21719	*			
24.00000	60.00000	100.05000		0.0	-1.6766	-0.21940	*			
25.00000	60.00000	100.05000		-0.030115	-2.2326	-0.22040	*			
26.00000	60.00000	100.05000		0.0	-2.7886	-0.22019	*			
27.00000	60.00000	100.05000		0.0	-2.8275	-0.21875	*			
28.00000	60.00000	100.05000		0.0	-2.8275	-0.21614	*			
29.00000	60.00000	100.05000		0.0	-2.8275	-0.21239	*			
30.00000	60.00000	100.05000		-0.011719	-1.8744	-0.20761	*			
31.00000	60.00000	100.05000		-0.062229	-1.7791	-0.20189	*			
32.00000	60.00000	100.05000		-0.11095	-1.6728	-0.19535	*			
33.00000	60.00000	100.05000		-0.15649	-1.5579	-0.18812	*			
34.00000	60.00000	100.05000		-0.19757	-1.4370	-0.18032	*			
35.00000	60.00000	100.05000		-0.23308	-1.3124	-0.17209	*			
36.00000	60.00000	100.05000		-0.26206	-1.1862	-0.16354	*			
37.00000	60.00000	100.05000		-0.28374	-1.0603	-0.15481	*			
38.00000	60.00000	100.05000		-0.29757	-0.93634	-0.14599	*			
39.00000	60.00000	100.05000		-0.30315	-0.81565	-0.13718	*			
40.00000	60.00000	100.05000		-0.30026	-0.69929	-0.12847	*			
41.00000	60.00000	100.05000		-0.28881	-0.58809	-0.11992	*			
42.00000	60.00000	100.05000		-0.26886	-0.48263	-0.11159	*			
43.00000	60.00000	100.05000		-0.24053	-0.38333	-0.10353	*			
44.00000	60.00000	100.05000		-0.20405	-0.29043	-0.095784	*			
45.00000	60.00000	100.05000		-0.15969	-0.20404	-0.088368	*			

\* Result includes imported displacement(s).

Specific Building Damage Results - Horizontal Displacements

Stage	Stage Name	Specific Building	Sub-building	Dist.	x	y	z	δx	δy	δR//	δRperp.
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30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Ref.	Building Ref.	Name	Name	[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0	Base Model 1	28 Ferncroft Avenue	28A	0.0	17.30000	15.00000	99.55000	2.6875	0.0	-2.6875	0.0
				1.9929	15.30714	15.00000	99.55000	1.6902	0.0	-1.6902	0.0
				3.9857	13.31429	15.00000	99.55000	0.94286	0.0	-0.94286	0.0
				5.9786	11.32143	15.00000	99.55000	0.19554	0.0	-0.19554	0.0
				7.9714	9.32857	15.00000	99.55000	0.0	0.0	0.0	0.0
				9.9643	7.33571	15.00000	99.55000	0.0	0.0	0.0	0.0
				11.957	5.34286	15.00000	99.55000	0.0	0.0	0.0	0.0
				13.950	3.35000	15.00000	99.55000	0.0	0.0	0.0	0.0
	2		28B	0.0	3.35000	15.00000	99.55000	0.0	0.0	0.0	0.0
				0.73000	3.35000	15.73000	99.55000	0.0	0.0	0.0	0.0
				1.4600	3.35000	16.46000	99.55000	0.0	0.0	0.0	0.0
	3		28C	0.0	3.35000	16.46000	99.55000	0.0	0.0	0.0	0.0
				0.42500	2.92500	16.46000	99.55000	0.0	0.0	0.0	0.0
				0.85000	2.50000	16.46000	99.55000	0.0	0.0	0.0	0.0
	4		28D	0.0	2.50000	16.46000	99.55000	0.0	0.0	0.0	0.0
				1.1100	2.50000	17.57000	99.55000	0.0	0.0	0.0	0.0
				2.2200	2.50000	18.68000	99.55000	0.0	0.0	0.0	0.0
				3.3300	2.50000	19.79000	99.55000	0.0	0.0	0.0	0.0
	5		28E	0.0	2.50000	19.79000	99.55000	0.0	0.0	0.0	0.0
				0.42500	2.92500	19.79000	99.55000	0.0	0.0	0.0	0.0
				0.85000	3.35000	19.79000	99.55000	0.0	0.0	0.0	0.0
	6		28F	0.0	3.35000	19.79000	99.55000	0.0	0.0	0.0	0.0
				1.0583	3.35000	20.84833	99.55000	0.0	0.0	0.0	0.0
				2.1167	3.35000	21.90667	99.55000	0.0	0.0	0.0	0.0
				3.1750	3.35000	22.96500	99.55000	0.0	0.0	0.0	0.0
				4.2333	3.35000	24.02333	99.55000	0.0	0.0	0.0	0.0
				5.2917	3.35000	25.08167	99.55000	0.0	0.0	0.0	0.0
				6.3500	3.35000	26.14000	99.55000	0.0	0.0	0.0	0.0
	7		28G	0.0	3.35000	26.14000	99.55000	0.0	0.0	0.0	0.0
				1.0776	4.19000	26.81500	99.55000	0.0	0.0	0.0	0.0
				2.1552	5.03000	27.49000	99.55000	0.0	0.0	0.0	0.0
	8		28H	0.0	5.03000	27.49000	99.55000	0.0	0.0	0.0	0.0
				0.84000	5.87000	27.49000	99.55000	0.0	0.0	0.0	0.0
				1.6800	6.71000	27.49000	99.55000	0.0	0.0	0.0	0.0
				2.5200	7.55000	27.49000	99.55000	0.0	0.0	0.0	0.0
	9		28I	0.0	7.55000	27.49000	99.55000	0.0	0.0	0.0	0.0
				1.0240	8.32000	26.81500	99.55000	0.0	0.0	0.0	0.0
				2.0480	9.09000	26.14000	99.55000	0.080214	0.0	0.060318	0.052877
	10		28J	0.0	9.09000	26.14000	99.55000	0.080214	0.0	0.0	0.080214
				0.94000	9.09000	25.20000	99.55000	0.0	0.0	0.0	0.0
				1.8800	9.09000	24.26000	99.55000	0.0	0.0	0.0	0.0
				2.8200	9.09000	24.26000	99.55000	0.0	0.0	0.0	0.0
	11		28K	0.0	9.09000	24.26000	99.55000	0.0	0.0	0.0	0.0
				1.0567	10.14667	24.26000	99.55000	0.25556	0.0	0.25556	0.0
				2.1133	11.20333	24.26000	99.55000	0.65181	0.0	0.65181	0.0
				3.1700	12.26000	24.26000	99.55000	1.0481	0.0	1.0481	0.0
	12		28L	0.0	12.26000	24.26000	98.65000	1.0481	0.0	0.0	-1.0481
				1.1625	12.26000	25.42250	98.65000	1.1847	0.0	0.0	-1.1847
				2.3250	12.26000	26.58500	98.65000	1.3213	0.0	0.0	-1.3213
				3.4875	12.26000	27.74750	98.65000	1.4578	0.0	0.0	-1.4578
				4.6500	12.26000	28.91000	98.65000	1.5944	0.0	0.0	-1.5944
	13		28M	0.0	12.26000	28.91000	98.65000	1.5944	0.0	1.5944	0.0
				1.1117	13.37167	28.91000	98.65000	2.0113	0.0	2.0113	0.0
				2.2233	14.48333	28.91000	98.65000	2.4282	0.0	2.4282	0.0
				3.3350	15.59500	28.91000	98.65000	2.8757	0.0	2.8757	0.0
				4.4467	16.70667	28.91000	98.65000	3.6631	0.0	3.6631	0.0
				5.5583	17.81833	28.91000	98.65000	4.4506	0.0	4.4506	0.0
				6.6700	18.93000	28.91000	98.65000	5.2380	0.0	5.2380	0.0
	14		28N	0.0	18.93000	28.91000	98.65000	5.2380	0.0	0.0	5.2380
				1.1625	18.93000	27.74750	98.65000	5.0559	0.0	0.0	5.0559
				2.3250	18.93000	26.58500	98.65000	4.8738	0.0	0.0	4.8738
				3.4875	18.93000	25.42250	98.65000	4.6916	0.0	0.0	4.6916
				4.6500	18.93000	24.26000	98.65000	4.5095	0.0	0.0	4.5095
	15		28O	0.0	18.93000	24.26000	98.65000	4.5095	0.0	0.0	4.5095
				1.0000	18.93000	23.26000	98.65000	4.3528	0.0	0.0	4.3528
				2.0000	18.93000	22.26000	98.65000	4.1962	0.0	0.0	4.1962
				3.0000	18.93000	21.26000	98.65000	4.0395	0.0	0.0	4.0395
				4.0000	18.93000	20.26000	98.65000	3.8828	0.0	0.0	3.8828
				5.0000	18.93000	19.26000	98.65000	3.8421	0.0	0.0	3.8421
	16		28P	0.0	18.93000	19.26000	99.55000	3.8421	0.0	-3.8421	0.0
				0.81500	18.11500	19.26000	99.55000	3.2648	0.0	-3.2648	0.0
				1.6300	17.30000	19.26000	99.55000	2.6875	0.0	-2.6875	0.0
	17		28Q	0.0	17.30000	19.26000	99.55000	2.6875	0.0	0.0	2.6875
				1.0650	17.30000	18.19500	99.55000	2.6875	0.0	0.0	2.6875
				2.1300	17.30000	17.13000	99.55000	2.6875	0.0	0.0	2.6875
				3.1950	17.30000	16.06500	99.55000	2.6875	0.0	0.0	2.6875
				4.2600	17.30000	15.00000	99.55000	2.6875	0.0	0.0	2.6875

d - Displacements include imported displacements.

Specific Building Damage Results - Vertical Displacements

Stage Ref.	Stage Name	Specific Building Ref.	Specific Building Name	Sub-building Name	Vertical Offset	Dist.	x	y	z	δz	
					[m]		[m]	[m]	[m]	[mm]	
0	Base Model 1	28 Ferncroft Avenue	28A		0.0		0.0	17.30000	15.00000	99.55000	-2.3597
							1.9929	15.30714	15.00000	99.55000	-1.5681
							3.9857	13.31429	15.00000	99.55000	-1.0935
							5.9786	11.32143	15.00000	99.55000	-0.79629
							7.9714	9.32857	15.00000	99.55000	-0.59706
							9.9643	7.33571	15.00000	99.55000	-0.45665
							11.957	5.34286	15.00000	99.55000	-0.35394
							13.950	3.35000	15.00000	99.55000	-0.27673
	2		28B		0.0		0.0	3.35000	15.00000	99.55000	-0.27673
							0.73000	3.35000	15.73000	99.55000	-0.28541
							1.4600	3.35000	16.46000	99.55000	-0.29387
							0.0	3.35000	16.46000	99.55000	-0.29387
							0.42500	2.92500	16.46000	99.55000	-0.27893
	3		28C		0.0		0.0	3.35000	16.46000	99.55000	-0.26481
							0.85000	2.50000	16.46000	99.55000	-0.26481
							0.0	2.50000	16.46000	99.55000	-0.26481
							1.1100	2.50000	17.57000	99.55000	-0.27578
							2.2200	2.50000	18.68000	99.55000	-0.28614
							3.3300	2.50000	19.79000	99.55000	-0.29583
	4		28D		0.0		0.0	2.50000	19.79000	99.55000	-0.29583
							0.42500	2.92500	19.79000	99.55000	-0.31185
							0.85				



30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning Combined Installation and Excavation

Job No.	Sheet No.	Rev.
J20268		
Drg. Ref.		
Made by ML	Date 26-Feb-2021	Checked Date

Stage Ref.	Stage Name	Specific Building Ref.	Specific Building Name	Sub-building Name	Vertical Offset	Dist. [m]	x [m]	y [m]	z [m]	δz [mm]	
						11.117	13.37167	28.91000	98.65000	-1.5834	d
						2.2233	14.48333	28.91000	98.65000	-1.9124	d
						3.3350	15.59500	28.91000	98.65000	-2.3288	d
						4.4467	16.70667	28.91000	98.65000	-2.8071	d
						5.5583	17.81833	28.91000	98.65000	-3.2926	d
						6.6700	18.93000	28.91000	98.65000	-3.7444	d
		14		28N	0.0	0.0	18.93000	28.91000	98.65000	-3.7444	d
						1.1625	18.93000	27.74750	98.65000	-3.6760	d
						2.3250	18.93000	26.58500	98.65000	-3.6199	d
						3.4875	18.93000	25.42250	98.65000	-3.5700	d
						4.6500	18.93000	24.26000	98.65000	-3.5249	d
		15		28O	0.0	0.0	18.93000	24.26000	98.65000	-3.5249	d
						1.0000	18.93000	23.26000	98.65000	-3.4919	d
						2.0000	18.93000	22.26000	98.65000	-3.4717	d
						3.0000	18.93000	21.26000	98.65000	-3.4840	d
						4.0000	18.93000	20.26000	98.65000	-3.5600	d
						5.0000	18.93000	19.26000	98.65000	-3.6321	d
		16		28P	0.0	0.0	18.93000	19.26000	99.55000	-3.6321	d
						0.81500	18.11500	19.26000	99.55000	-3.1671	d
						1.6300	17.30000	19.26000	99.55000	-2.7291	d
						4.0000	17.30000	19.26000	99.55000	-2.7291	d
		17		28Q	0.0	1.0650	17.30000	18.19500	99.55000	-2.6729	d
						2.1300	17.30000	17.13000	99.55000	-2.5931	d
						3.1950	17.30000	16.06500	99.55000	-2.4888	d
						4.2600	17.30000	15.00000	99.55000	-2.3597	d

d - Displacements include imported displacements.

Specific Building Damage Results - Detail

Stage Ref.	Stage Name	Damage Category	Specific Building Ref.	Specific Building Name	Sub-building Name	Vertical Offset	Segment	Start [m]	Length [m]	Curvature	Deflection [mm]	Average Ratio [%]	Max Horizontal Strain [%]	Max Tensile Strain [%]	Max Gradient of Horizontal Displacement Curve	Max Gradient of Vertical Displacement Curve	Min Radius of Curvature [m]
0	Base Model	(Negligible)	1	28 Ferncroft Avenue	28A	0.0	1	0.0	13.950	None	0.0048080	0.019265	0.026569	-500.20E-6	-397.03E-6	11294.0	
		(Negligible)	2		28B	0.0	1	0.0	1.4600	None	7.7265E-6	0.0	7.6175E-6	0.0	11.890E-6	2.3382E+6	0
		(Negligible)	3		28C	0.0	1	0.0	0.85000	None	47.646E-6	0.0	47.457E-6	0.0	-35.145E-6	220750.0	0
		(Negligible)	4		28D	0.0	1	0.0	3.3200	None	19.502E-6	0.0	18.418E-6	0.0	9.8793E-6	1.7621E+6	0
		(Negligible)	5		28E	0.0	1	0.0	0.85000	None	54.734E-6	0.0	54.538E-6	0.0	39.895E-6	192160.0	0
		(Negligible)	6		28F	0.0	1	0.0	6.3500	None	66.345E-6	0.0	76.425E-6	0.0	9.0942E-6	1.0413E+6	0
		(Negligible)	7		28G	0.0	1	0.0	2.1500	None	129.76E-6	0.0	126.71E-6	0.0	47.238E-6	205520.0	0
		(Negligible)	8		28H	0.0	1	0.0	2.5100	None	319.54E-6	0.0	309.31E-6	0.0	83.965E-6	79680.0	0
		(Negligible)	9		28I	0.0	1	0.0	2.0400	None	171.99E-6	0.0029338	0.0030093	-58.903E-6	73.403E-6	147340.0	0
		(Negligible)	10		28J	0.0	1	0.0	1.8700	None	39.262E-6	0.0	38.588E-6	0.0	-13.451E-6	592500.0	0
		(Negligible)	11		28K	0.0	1	0.0	3.1700	None	939.43E-6	0.033062	0.033684	-374.86E-6	172.79E-6	33052.0	0
		(Negligible)	12		28L	0.0	1	0.0	4.6400	None	111.22E-6	0.0	147.59E-6	0.0	22.202E-6	429970.0	0
		(Very Slight)	13		28M	0.0	1	0.0	4.7940	None	0.0035206	0.048284	0.053028	-707.83E-6	436.42E-6	16247.1	1
		(Very Slight)	14		28N	0.0	1	0.0	4.6400	None	724.12E-6	0.070833	0.071328	-707.83E-6	436.42E-6	28215.1	1
		(Negligible)	15		28O	0.0	1	0.0	4.3858	None	0.0019113	0.0	0.0017365	0.0	75.954E-6	25733.0	0
		(Negligible)				2		4.3858	0.61416	None	0.0	0.0	35.763E-9	0.0	72.102E-6	48247.0	0
		(Very Slight)	16		28P	0.0	1	0.0	1.6200	None	824.20E-6	0.070833	0.071123	-707.83E-6	-570.09E-6	24488.1	1
		(Negligible)	17		28Q	0.0	1	0.0	4.2600	None	0.0011365	0.0	0.0010379	0.0	-121.20E-6	45679.0	0

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Specific Building Damage Results - Critical Values for All Segments within Each Sub-Building

Stage Ref.	Stage Name	Damage Category	Specific Building Ref.	Specific Building Name	Sub-building Name	Vertical Offset	Deflection Ratio [%]	Average Horizontal Strain [%]	Max Settlement [mm]	Max Tensile Strain [%]	Max Gradient of Horizontal Displacement Curve	Max Gradient of Vertical Displacement Curve	Min Radius of Curvature (Hogging) [m]	Min Radius of Curvature (Sagging) [m]	Damage
0	Base Model	(Negligible)	1	28 Ferncroft Avenue	28A	0.0	0.0048080	0.019265	-397.03E-6	2.3597	0.026569	-500.20E-6	-397.03E-6	-	0
		(Negligible)	2		28B	0.0	7.7265E-6	0.0	11.890E-6	0.29387	7.6175E-6	0.0	11.890E-6	-	0
		(Negligible)	3		28C	0.0	47.646E-6	0.0	-35.145E-6	0.29387	47.457E-6	0.0	-35.145E-6	-	0
		(Negligible)	4		28D	0.0	19.502E-6	0.0	9.8793E-6	0.29574	18.418E-6	0.0	9.8793E-6	-	0
		(Negligible)	5		28E	0.0	54.734E-6	0.0	39.895E-6	0.32880	54.538E-6	0.0	39.895E-6	-	0
		(Negligible)	6		28F	0.0	66.345E-6	0.0	9.0942E-6	0.37306	76.425E-6	0.0	9.0942E-6	-	0
		(Negligible)	7		28G	0.0	129.76E-6	0.0	47.238E-6	0.46898	126.71E-6	0.0	47.238E-6	-	0
		(Negligible)	8		28H	0.0	319.54E-6	0.0	83.965E-6	0.65572	309.31E-6	0.0	83.965E-6	-	0
		(Negligible)	9		28I	0.0	171.99E-6	0.0029338	73.403E-6	0.79921	0.0030093	-58.903E-6	73.403E-6	-	0
		(Negligible)	10		28J	0.0	39.262E-6	0.0	-13.451E-6	0.79980	38.588E-6	0.0	-13.451E-6	-	0
		(Negligible)	11		28K	0.0	939.43E-6	0.033062	172.79E-6	1.2345	0.033684	-374.86E-6	172.79E-6	-	0
		(Negligible)	12		28L	0.0	111.22E-6	0.0	22.202E-6	1.3226	147.59E-6	0.0	22.202E-6	-	0
		(Slight)	13		28M	0.0	0.0035206	0.070833	436.42E-6	3.7444	0.071328	-707.83E-6	436.42E-6	-	1 (Very)
		(Negligible)	14		28N	0.0	316.02E-6	0.0	-58.844E-6	3.7444	419.32E-6	0.0	-58.844E-6	-	0
		(Negligible)	15		28O	0.0	0.0019113	0.0	75.954E-6	3.6321	0.0017365	0.0	75.954E-6	-	0
		(Slight)	16		28P	0.0	824.20E-6	0.070833	-570.09E-6	3.6321	0.071123	-707.83E-6	-570.09E-6	-	1 (Very)
		(Negligible)	17		28Q	0.0	0.0011365	0.0	-121.20E-6	2.7291	0.0010379	0.0	-121.20E-6	-	0

Specific Building Damage Results - Critical Segments within Each Building

Stage Ref.	Stage Name	Damage Category	Specific Building Ref.	Specific Building Name	Parameter	Critical Sub-Building	Critical Segment	Start [m]	End [m]	Curvature	Max Slope	Max Settlement [mm]	Max Tensile Strain [%]	Min Radius of Curvature (Hogging) [m]	Min Radius of Curvature (Sagging) [m]	Damage
0	Base Model	(Negligible)	0	28 Ferncroft Avenue	Max Slope	28A	1	0.0	13.950	None	397.03E-6	2.3597	0.026569	-	-	0
		(Negligible)			Max Settlement	28A	1	0.0	13.950	None	397.03E-6	2.3597	0.026569	-	-	0





30 Ferncroft Avenue, London NW3 7PH

Analysis of Horizontal and Vertical Movements from Underpinning  
Combined Installation and Excavation

Job No. Sheet No. Rev.

J20268

Drg. Ref.

Made by  
ML

Date  
26-Feb-2021

Checked

Date

Stage:	Stage Name	Specific Building:	Parameter	Critical	Critical	Start	End	Curvature	Max Slope	Max	Max	Min	Min	Damage
Category	Ref.	Building Ref.	Name	Sub-Building	Segment					Settlement	Tensile Strain	Radius of Curvature	Radius of Curvature	
(Negligible)			Max Tensile Strain	28A	1	0.0	13.950	None	397.03E-6	2.3597	<b>0.026569</b>	-	-	0
-			Min Radius of Curvature (Hogging)	-	-	-	-	-	-	-	-	-	-	-
-			Min Radius of Curvature (Sagging)	-	-	-	-	-	-	-	-	-	-	-
Slight)		0	Max Slope	28P	1	0.0	1.6200	None	<b>570.09E-6</b>	3.6321	0.071123	-	-	1 (Very
Slight)			Max Settlement	28M	2	4.7940	6.6700	None	436.42E-6	<b>3.7444</b>	0.071328	-	-	1 (Very
Slight)			Max Tensile Strain	28M	2	4.7940	6.6700	None	436.42E-6	3.7444	<b>0.071328</b>	-	-	1 (Very
-			Min Radius of Curvature (Hogging)	-	-	-	-	-	-	-	-	-	-	-
-			Min Radius of Curvature (Sagging)	-	-	-	-	-	-	-	-	-	-	-



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**GMA Plan**

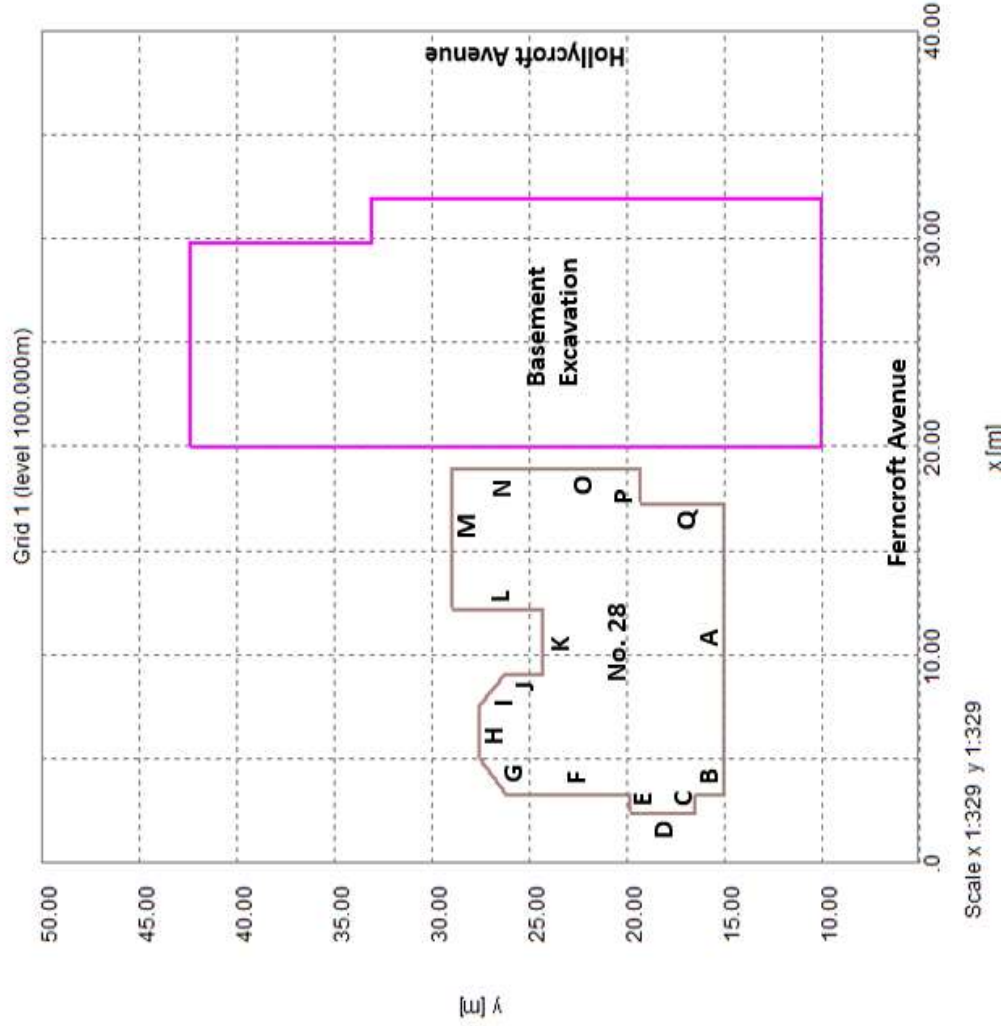
**Site** 30 Ferncroft Avenue, London NW3 7PH

**Client** Mr Dukagjic Lipa

**Engineer** Mint Structures

**Job Number**  
J20268

**Sheet**  
1 / 1



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