Risk Assessment Considerations	
Site location and description/current use	The site is located in the London Borough of Camden. According to recent aerial imagery, the site is currently occupied by a residential building and its adjoining garden. The site is bordered to the north, east and west by further residential properties, and to the south by Elsworthy Road. The site is approximately centred on the OS grid reference: **TQ 27010 83943.**
Are there any indicators of current/historical military activity on/close to the site?	In-house records do not indicate that the site footprint had any former military use. No features such as WWII defensive positions, encampments or firing ranges are recorded to have been located at or in the immediate vicinity of the site. In addition, no information of ordnance being stored, produced, or disposed of within the proposed site boundary could be found. The closest Heavy Anti-Aircraft (HAA) battery, known locally as 'Big Bertha', was positioned approximately 570m east of the site at Primrose Hill.[1] The range of a fired projectile can be up to 15km. The conditions in which unexploded anti-aircraft ordnance may have fallen unrecorded are generally analogous to that of aerial delivered German bombs.
What was the pre- and post-WWII history of the site?	Pre-WWII OS mapping dated 1912 indicates that the site was occupied by a residential building and its adjoining garden. The site was bordered to the north, east and west by residential properties, and to the south by *Elsworthy Road*. Post-WWII OS mapping dated 1951 indicates no obvious structural deviation to the site or the immediate vicinity, with the exception of the erection of a building immediately west of the site.
Was the area subject to bombing during WWII?	During WWII, the site was situated in the Metropolitan Borough of Hampstead. According to official Home Office bombing statistics, this borough sustained an overall very high density of bombing with an average of 166 items dropped per 1,000 acres. This consisted of 321 high explosive (HE) bombs, six parachute mines, 31 oil bombs, five phosphorous bombs, ten V-1 pilotless aircrafts and three V-2 long-range rockets, totalling 376 recorded incidents across 2,265 acres. According to London Bomb Census mapping, an incendiary concentration is recorded over the general site area. However, no high explosive bombs are recorded on, or bordering the site. The closest high explosive bombing incident is located approximately 100m south-west.
Is there any evidence of bomb damage on/close to the site?	London County Council bomb damage mapping attributes no damage to the site. The closest recorded damage is to properties approximately 45m south-west of the site, which are listed as having experienced *blast damage* which was *minor in nature*. Furthermore, low-quality post-WWII aerial imagery dated 1946 indicates no obvious signs of bomb damage on-site or in the immediate vicinity (such as the clearance of structures, obvious roof damage or ground indentations to residential gardens).
To what degree would the site have been subject to access?	During WWII, the site was a residential structure in a highly urbanised area and was bordered by further residential properties. As such, it is anticipated that access and observation would have been frequent. Furthermore, given the lack of bomb damage on-site, there is no reason to believe that this level of access would have reduced at any point during WWII.

[1] https://www.bbc.co.uk/history/ww2peopleswar/stories/83/a2746983.shtml

To what degree has the site been developed post-WWII?	No evidence has been found to suggest that any significant structural change has occurred within the site and, according to recent aerial imagery, the site remains a residential property as it did during WWII.
What is the nature and extent of the intrusive works proposed?	The nature and extent of works proposed was not available at the time of writing.

Summary and Conclusions

During WWII, the site was situated in the Metropolitan Borough of Hampstead. According to official Home Office bombing statistics, this borough sustained an overall very high density of bombing with an average of 166 items dropped per 1,000 acres.

According to London Bomb Census mapping, an incendiary concentration is recorded over the general site area. However, no high explosive bombs are recorded on, or immediately bordering the site. The closest high explosive bombing incident is located approximately 100m south-west.

London County Council bomb damage mapping and low-quality post-WWII aerial photography dated 1946 corroborates the lack of bombing on site, evidencing no damage to the site.

Given this lack of bombing and damage recorded on site, in conjunction with the anticipated frequent access, the risk of UXO contamination within the site boundary is not thought to be elevated above the 'background' level for this area.

Recommendations

Given the findings of this preliminary report, the risk from UXO on site is not considered to be significantly elevated above the 'background level' for London. Whilst it would be possible to conduct further research in the form of a Detailed UXO Risk Assessment for this site, it is not thought likely to significantly alter the findings of this report. It is therefore recommended that **no further research** is taken.

If the client has any anecdotal or empirical evidence of UXO risk on site, please contact 1st Line Defence.

It should be noted that although the risk from unexploded ordnance on this site has been assessed as low/minimal, this does not mean there is 'no' risk of encountering UXO. This preliminary report has been undertaken with due diligence, and all reasonable care has been taken to access and analyse relevant historical information. By necessity, when dealing with historical evidence, and when making assessments of UXO risk, various assumptions have to be made which we have discussed and justified within this report. Our reports take a common-sense and practical approach to the assessment of UXO risk, and we strive to be reasonable and pragmatic in our conclusions. As referenced, it would be possible to undertake further research into this site, but based on the evidence to hand, this is not deemed strictly necessary, and no reasonably justifiable requirement for proactive on-site mitigation has been identified.

It should however be stressed that if any suspect items are encountered during the proposed works, 1st Line Defence should be contacted for advice/assistance, and to re-assess the risk as necessary. Furthermore, we would recommend that ground personnel are always made aware of the potential for encountering UXO, what to look out for and what to do in the unlikely event that a suspect item is encountered, and that a UXO Risk Management Plan is put together for the proposed works. We would be happy to provide a template and guidance for this – contact us on 01992 245020. Should the scope of works change or additional works be proposed, 1st Line Defence should be contacted to re-evaluate the risk.

1st Line Defence

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Hertfordshire EN11 0EX

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Email info@1stlinedefence.co.uk
Web www.1stlinedefence.co.uk

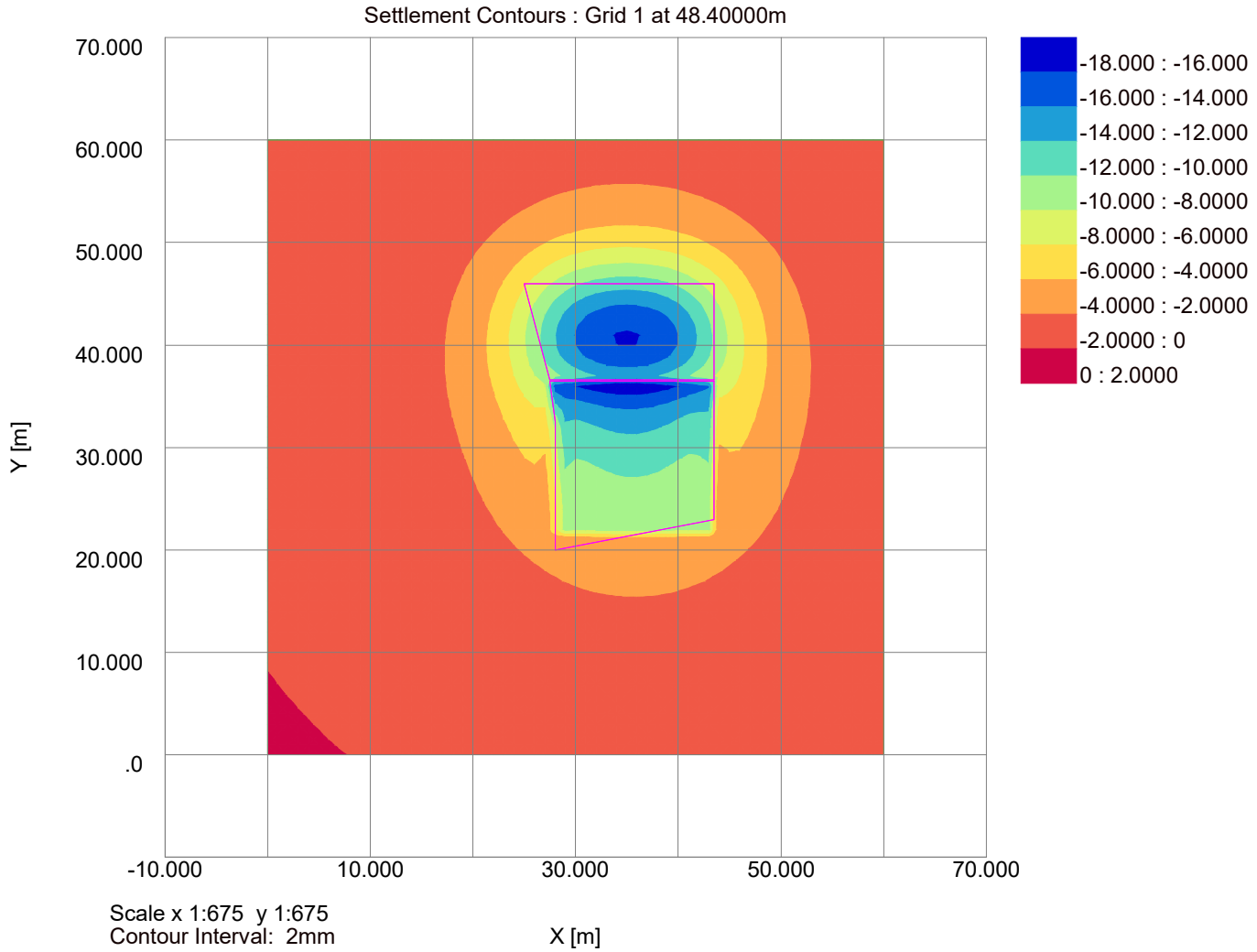
1ST LINE DEFENCE

Front cover image credit: London County Council Bomb Damage Mapping (London Metropolitan Archives)

appendix d

Ground Movement Analysis

PDisp Analysis – Short Term Movements
PDisp Analysis – Total Movements
XDisp Analysis – All Input Data
XDisp Analysis – Installation Movements
XDisp Analysis – Installation & Excavation Movements
XDisp Analysis – Building Damage Assessment Results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70.000
60.000
50.000
40.000
30.000
20.000
10.000
.0
Y [m]
-10.000
10.000
30.000
50.000
70.000
X [m]
-18.000 : -16.000
-16.000 : -14.000
-14.000 : -12.000
-12.000 : -10.000
-10.000 : -8.0000
-8.0000 : -6.0000
-6.0000 : -4.0000
-4.0000 : -2.0000
-2.0000 : 0
0 : 2.0000
Scale x 1:675 y 1:675
Contour Interval: 2mm

Oasys

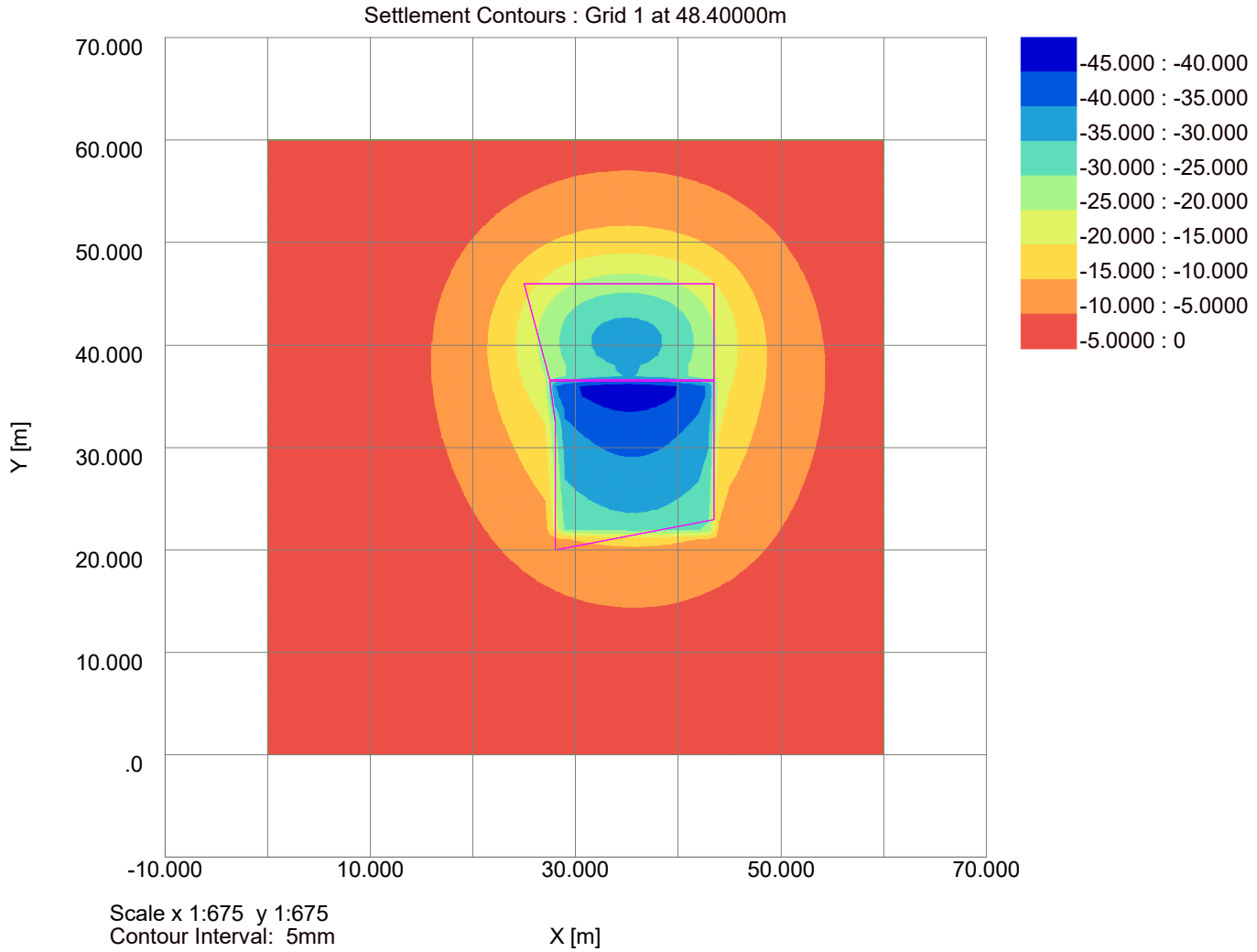
68 Elsworthy Road

GEOTECHNICAL AND ENVIRONMENTALASSOCIATES LTD

Job No.	Sheet No.	Rev.
J23332		

Drg. Ref.

Made by	Date	Checked	Date
AT			



Titles

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Job Title: 68 Elsworthy Road
Sub-title:
Calculation Heading:
Initials: AT
Checker:
Date Saved:
Date Checked:
Notes:
File Name: PDISP - Overall Term.pdd
File Path: G:\Shared\GEA\PROJECTS\2023\J23332 - 68 Elsworthy Road\GMA

History

Date	Time	By	Notes
09-Feb-2024	12:25	Alex Taylor	New
09-Feb-2024	12:34	Alex Taylor	
13-Feb-2024	10:39	Alex Taylor	
21-Feb-2024	13:33	Alex Taylor	Open

Analysis Options

General

Global Poisson's ratio: 0.20
Maximum allowable ratio between values of E: 1.5
Horizontal rigid boundary level: -28.60 [m OD]
Displacements at load centroids: Yes
GSA piled raft data : No

Elastic

Elastic : Yes

Consolidation

Consolidation : No

Soil ProfilesOverall Term Profile

Layer ref.	Name	Level at top [mOD]	Number of intermediate displacement levels	Youngs Modulus : Top [kN/m²]	Youngs Modulus : Btm. [kN/m²]	Poissons ratio	Non-linear curve
1	Made Ground	48.400	5	10000.	10000.	0.20000	None
2	London Clay	47.400	5	18000.	96000.	0.20000	None

Soil ProfilesShort Term Profile

Layer ref.	Name	Level at top [mOD]	Number of intermediate displacement levels	Youngs Modulus : Top [kN/m²]	Youngs Modulus : Btm. [kN/m²]	Poissons ratio	Non-linear curve
1	Made Ground	48.400	5	10000.	10000.	0.50000	None
2	London Clay	47.400	5	30000.	160000.	0.50000	None

Soil Zones

Zone	Name	X min [m]	X max [m]	Y min [m]	Y max [m]	Profile

Zone	Name	X min [m]	X max [m]	Y min [m]	Y max [m]	Profile
1	Soil Zone 1	0.0	60.000	0.0	60.000	Overall Term Profile

Polygonal Load Data

Load ref.	Name	Position : Level [m]	Position : Polygon : Coords. [m]	Position : Polygon : Rect. tolerance [%]	No. of Rectangles	Value : Normal (local z) [kN/m²]
1	Excavation 1	43.40000	(43.5,36.5) (43.5,23) (28,20) (28,32.5) (27.5,36.5)	10.000	6	-95.000
2	Excavation 2	41.40000	(43.5,36.6) (27.5,36.6) (25,46) (43.5,46)	10.000	1	-130.00
3	Raft Loading 1	43.40000	(43.5,36.5) (43.5,23) (28,20) (28,32.5) (27.5,36.5)	10.000	6	45.000
4	Raft Loading 2	41.40000	(43.5,36.6) (27.5,36.6) (25,46) (43.5,46)	10.000	1	20.000

Polygonal Loads' Rectangles

No.	Centre : Centre : Angle of local x from global X	Width x	Depth y
	x [m] / y [m] / [Degrees]	[m]	[m]
Load 1 : Excavation 1			
(Edge 3 optimal)			
1	35.75000 29.00000 -180.00	15.500	15.000
2	27.95000 34.70000 -180.00	0.10000	3.6000
3	27.85000 35.10000 -180.00	0.10000	2.8000
4	27.75000 35.50000 -180.00	0.10000	2.0000
5	27.65000 35.90000 -180.00	0.10000	1.2000
6	27.55000 36.30000 -180.00	0.10000	0.40000
Load 2 : Excavation 2			
(Edge 3 optimal)			
1	34.87500 41.30000 90.000	9.4000	17.250
Load 3 : Raft Loading 1			
(Edge 3 optimal)			
1	35.75000 29.00000 -180.00	15.500	15.000
2	27.95000 34.70000 -180.00	0.10000	3.6000
3	27.85000 35.10000 -180.00	0.10000	2.8000
4	27.75000 35.50000 -180.00	0.10000	2.0000
5	27.65000 35.90000 -180.00	0.10000	1.2000
6	27.55000 36.30000 -180.00	0.10000	0.40000
Load 4 : Raft Loading 2			
(Edge 3 optimal)			
1	34.87500 41.30000 90.000	9.4000	17.250

Displacement Grids

Name	Extrusion: Direction	X1 [m]	Y1 [m]	Z1 [m]	X2 [m]	Y2 [m]	Z2 [m]	Intervals Along Line [No.]	Extrusion: Distance [m]	Extrusion: Intervals Along [No.]	Calculate Detailed Results
Grid 1	Global X	0.00000	0.00000	48.40000	-	60.00000	48.40000	60	60.00000	60	Yes Yes

Results : Immediate : Load Centres : Polygonal

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	Excavation 1	35.45887	29.00152	43.40000	-28.12914	36.471	-40.191	-58.593	-0.0012752
2	Excavation 2	34.85990	41.41353	41.40000	-43.84460	34.797	-77.659	-92.791	-0.0024523

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
3	Raft Loading 1	35.45887	29.00152	43.40000	-28.12914	36.471	-40.191	-58.593	-0.0012752
4	Raft Loading 2	34.85990	41.41353	41.40000	-43.84460	34.797	-77.659	-92.791	-0.0024523

Results : Consolidation : Load Centres : Polygonal

None

Results : Total : Load Centres : Polygonal

None

Results : Immediate : Displacement Data : Grids

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	Grid 1	0.00000	0.00000	48.40000	-0.43173	48.317	0.0	0.0	0.0
1	Grid 1	1.00000	0.00000	48.40000	-0.45351	48.317	0.0	0.0	0.0
1	Grid 1	2.00000	0.00000	48.40000	-0.47614	48.317	0.0	0.0	0.0
1	Grid 1	3.00000	0.00000	48.40000	-0.49962	48.317	0.0	0.0	0.0
1	Grid 1	4.00000	0.00000	48.40000	-0.52394	48.317	0.0	0.0	0.0
1	Grid 1	5.00000	0.00000	48.40000	-0.54911	48.317	0.0	0.0	0.0
1	Grid 1	6.00000	0.00000	48.40000	-0.57512	48.317	0.0	0.0	0.0
1	Grid 1	7.00000	0.00000	48.40000	-0.60196	48.317	0.0	0.0	0.0
1	Grid 1	8.00000	0.00000	48.40000	-0.62960	48.317	0.0	0.0	0.0
1	Grid 1	9.00000	0.00000	48.40000	-0.65802	48.317	0.0	0.0	0.0
1	Grid 1	10.00000	0.00000	48.40000	-0.68717	48.317	0.0	0.0	0.0
1	Grid 1	11.00000	0.00000	48.40000	-0.71702	48.317	0.0	0.0	0.0
1	Grid 1	12.00000	0.00000	48.40000	-0.74751	48.317	0.0	0.0	0.0
1	Grid 1	13.00000	0.00000	48.40000	-0.77856	48.317	0.0	0.0	0.0
1	Grid 1	14.00000	0.00000	48.40000	-0.81011	48.317	0.0	0.0	0.0
1	Grid 1	15.00000	0.00000	48.40000	-0.84205	48.317	0.0	0.0	0.0
1	Grid 1	16.00000	0.00000	48.40000	-0.87428	48.317	0.0	0.0	0.0
1	Grid 1	17.00000	0.00000	48.40000	-0.90667	48.317	0.0	0.0	0.0
1	Grid 1	18.00000	0.00000	48.40000	-0.93909	48.317	0.0	0.0	0.0
1	Grid 1	19.00000	0.00000	48.40000	-0.97139	48.317	0.0	0.0	0.0
1	Grid 1	20.00000	0.00000	48.40000	-1.00339	48.317	0.0	0.0	0.0
1	Grid 1	21.00000	0.00000	48.40000	-1.03492	48.317	0.0	0.0	0.0
1	Grid 1	22.00000	0.00000	48.40000	-1.06578	48.317	0.0	0.0	0.0
1	Grid 1	23.00000	0.00000	48.40000	-1.09576	48.317	0.0	0.0	0.0
1	Grid 1	24.00000	0.00000	48.40000	-1.12465	48.317	0.0	0.0	0.0
1	Grid 1	25.00000	0.00000	48.40000	-1.15221	48.317	0.0	0.0	0.0
1	Grid 1	26.00000	0.00000	48.40000	-1.17823	48.317	0.0	0.0	0.0
1	Grid 1	27.00000	0.00000	48.40000	-1.20247	48.317	0.0	0.0	0.0
1	Grid 1	28.00000	0.00000	48.40000	-1.22470	48.317	0.0	0.0	0.0
1	Grid 1	29.00000	0.00000	48.40000	-1.24471	48.317	0.0	0.0	0.0
1	Grid 1	30.00000	0.00000	48.40000	-1.26230	48.317	0.0	0.0	0.0
1	Grid 1	31.00000	0.00000	48.40000	-1.27729	48.317	0.0	0.0	0.0
1	Grid 1	32.00000	0.00000	48.40000	-1.28950	48.317	0.0	0.0	0.0
1	Grid 1	33.00000	0.00000	48.40000	-1.29881	48.317	0.0	0.0	0.0
1	Grid 1	34.00000	0.00000	48.40000	-1.30511	48.317	0.0	0.0	0.0
1	Grid 1	35.00000	0.00000	48.40000	-1.30832	48.317	0.0	0.0	0.0
1	Grid 1	36.00000	0.00000	48.40000	-1.30840	48.317	0.0	0.0	0.0
1	Grid 1	37.00000	0.00000	48.40000	-1.30535	48.317	0.0	0.0	0.0
1	Grid 1	38.00000	0.00000	48.40000	-1.29920	48.317	0.0	0.0	0.0
1	Grid 1	39.00000	0.00000	48.40000	-1.29002	48.317	0.0	0.0	0.0
1	Grid 1	40.00000	0.00000	48.40000	-1.27791	48.317	0.0	0.0	0.0
1	Grid 1	41.00000	0.00000	48.40000	-1.26300	48.317	0.0	0.0	0.0
1	Grid 1	42.00000	0.00000	48.40000	-1.24544	48.317	0.0	0.0	0.0
1	Grid 1	43.00000	0.00000	48.40000	-1.22542	48.317	0.0	0.0	0.0
1	Grid 1	44.00000	0.00000	48.40000	-1.20313	48.317	0.0	0.0	0.0
1	Grid 1	45.00000	0.00000	48.40000	-1.17881	48.317	0.0	0.0	0.0
1	Grid 1	46.00000	0.00000	48.40000	-1.15266	48.317	0.0	0.0	0.0
1	Grid 1	47.00000	0.00000	48.40000	-1.12492	48.317	0.0	0.0	0.0
1	Grid 1	48.00000	0.00000	48.40000	-1.09583	48.317	0.0	0.0	0.0