



Our Ref: JKK8600

Date: 5 April 2019

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Dear Jason,

VISUAL STRUCTURAL ENGINEERS INSPECTIONS BUCKLAND LODGE, NETHERFIELD, MILTON KEYNES, MK6 4JR

RPS were instructed by Jason Grace to inspect Buckland Lodge, Netherfield to update the Survey Reports that RPS have previously carried out on the building following reports of concerns over further and increased structural movement. A Visit to carry out a visual only inspection of the external areas of the property was carried out by RPS on 21st February 2019. A further visual only inspection of internal areas of two of the flats and the “decommissioned” areas of the building was carried out by RPS on 28th March 2019. The March 28th 2019 visit was carried in the company of Colin Ayre, Mr Ayre has carried out numerous previous visual surveys and instigated most of the other previous intrusive investigations and completed most of the Structural Assessments of the building that RPS have carried out.

RPS have completed a level survey of the DPC around the external perimeters of the building at the end of January 2019.

We comment as follows regarding our inspection, descriptions of left and right and front and back are described as viewing the approximately north facing elevation of the property i.e. viewing the face of the building from the car parking area adjacent to the main entrance of the building off Buckland Drive.

Description of Property and General Surroundings:

Buckland Lodge, Netherfield is a two storey stand alone “care home” building. It is believed the property was built around the late 1970’s.

The building consists of three distinct parts. To the front left hand side is a glazed roof and wall steel framed, single storey, pitched roof entrance structure. The main section of the building is an approximately square in plan two storey masonry building. To the front left hand side of the building, adjacent to the glazed entrance area, is a projecting two storey attached masonry structure that contains a lift.

The four sides of the main section of the building surround an approximately square garden/courtyard area. These four sides generally contain ground and first floor self-contained flats accessed from corridors. At three of the four corners there are stairwells, the fourth corner contains a wardens flat. At ground floor along the front side there is a common room, kitchen, laundry and boiler areas.

The external facades of the building are brickwork, believed to be cavity wall masonry. The four sides of the main section of the building have tiled mono pitched roofs above the first floor, meeting at valley intersections at the corners. The lower edges of the mono-pitched roofs are to the courtyard side, thus

when viewing the elevations of the building from outside of its footprint no roof slope is visible from ground level. Therefore the “street frontage” elevations appear to have 3 storey heights of masonry. The elevations of the building are predominately penetrated by matching pairs of aligning ground and first floor windows.

The elevations of masonry to both the street frontage and courtyard sides are split into sections by straight vertical joints to the brickwork. These joints effectively split the external masonry walls of the building into a number of sections, the corners section separated from the straight side lengths, the side lengths themselves split into sections. Between these section of masonry are “soft” vertical movement joints.

To the right hand and right hand rear sides of the building the ground level immediately outside of the building is lower than the general ground level, there are small slope There are a number of large mature trees to the front right hand corner of the property and rear of the property within open grassed “green space” areas.

There are two areas of the building no longer in use; these being the wardens flat over the ground and first floor that is located to the front left corner of the building and a number of flats again at ground and first floor levels to the rear left hand corner, externally the street frontages to these sealed off areas have shutters or boarding over their windows.

Summary of External Inspection:

Courtyard Elevations

To the second windows along from the left hand side of the front wing section elevation as viewed from the court yard, there is stepped cracking, up from DPC level through mortar joints, around 3 to 4mm wide extending to the brick course above the base of the ground floor level window sill. Extending up from the top left of the solid course detail above this ground floor window, stepping up to the left through mortar joints, to adjacent the right hand side of the masonry under the first floor window is a around 1 to 2mm, becoming around 2 to 3mm crack.

To the around the mid-point vertical movement in this front section wall there is a clear “step” in level between the bed joint level to one side of the joint than the other, from around mid height to the top of the wall, i.e. the joints do not run horizontally across the joint.

To the second windows along from the front end of the right side wing section elevation, to the top front corner of the ground floor window, in and just above the solid course detail, there appeared to have been some repointing of joints previously carried out, some of this repointing is falling out of the joints. From the top of the falling out mortar joints there is an around 1mm wide crack stepping up and to the rear, extending up to the underside of the midpoint of the first floor window above.

Above the right hand side corner of the first pair of windows along from the rear wing, there is some around 1mm wide cracking above the top of the window in the solid course detail.

To the second set of windows from the right of the rear wing, through what appeared to be previously repointed joints there is an around 1 to 2mm wide crack, stepping up from above the top rear corner of the ground floor window to around midpoint of the underside of the first floor window.

To the fifth first floor windows along from the right of the rear wing there is some around 1mm wide cracking extending down and to the left for around seven courses below the sill.

To the last ground floor window to the rear elevation i.e. adjacent to the left hand side wing there are 10 to 25mm wide gaps in “perp end” joints to the right the base of the sill. The top of the window framing to the right hand side of this opening has a clear gap of around 10mm at the top, the gap narrowing as it goes

down the frame height. There is a clear visual dip to the left hand side of the masonry above the ground floor opening and stepped cracking of around 3 to 5mm extending up and to the right. To the right hand side of the ground floor opening there is a wide mortar joint with around 3mm cracking to the last vertical joint to the soldier course and six course down from the top of the window horizontal around 2mm wide cracks in two bed joints. The vertical movement joint in this corner appears to be wider at around mid height of the wall than it is at the base and top of the wall. This is to the rear left hand “decommissioned” area.

To the first set of windows along from the left hand side elevation there is hairline cracking running up from the top rear of the ground floor window up and to the front through mortar joints that appear to have previously been repointed.

To both the sixth and seventh sets of windows along from the rear to the left hand side wing, through what appeared to be repointed joints there is stepped up and to the front hairline cracking. To the seventh window in some small lengths of the repointing has fallen out of the joints.

Above the top front corner of the last windows along the left hand side elevation there is some around 1mm wide cracking in the soldier course and first couple of courses of masonry above the ground floor window.

Road Frontage Elevations

To the 5th windows along from the front of the right hand side wing, the wing that faces onto Farthing Grove, there is cracking and falling out of small lengths of mortar through a stepped run of repointed joints, that runs from the top rear corner of the ground floor window to around three quarters the way along the width, from the rear, of the first floor window.

To the 7th windows along from the front of the right hand side wing there is some minor cracking extending up and to the rear for a few courses above the top front corner of the ground floor window.

To the 4th windows from the end of the right hand side wing there is around 2 to 3mm wide stepped cracking extending up from the top front corner of the ground floor window to the bottom rear corner of the first floor window.

To the 2nd windows along from the right hand end of the rear wing there is around 1 to 2mm wide stepped crack running up from the top left hand corner of the ground floor window to around midway along the underside of the first floor window.

To the 3rd windows along from the right hand end of the rear wing there is around 3 to 4mm wide cracking running in a zig zag fashion down through mortar joints from the bottom left hand corner of the first floor window. As this crack extends further down it then becomes near vertical and around 2mm wide, running both through mortar joints and whole bricks, to the top of the ground floor soldier course detail.

To the 6th windows along from the right hand end of the rear wing the soldier course detail and brickwork around the side of the top of the ground floor window appears to have been recently rebuilt, appearing have new bricks and mortar joints. Running up from the top right hand corner of the ground floor window near vertically up through both mortar joints and whole bricks is an around 2mm wide crack, this crack extends up to the underside of the first floor window.

To the 8th windows along from the right hand end of the rear wing there is around 1 to 2mm wide cracking above the middle of the ground floor window extending up to the underside of the middle of the first floor window.

The last two vertical movement joints to the left hand side of have clearly widened. The last but one joint is partly covered over by vertical “cover timber” so cannot be seen for most of its height. The joint closest to the left hand corner is over 50mm wide, the “mastic” sealant is no longer present and the blockwork inner leaf can be clearly seen through the joint. Colin Ayre noted that it was the uncovering of these widened movement joints that had highlighted the significant movements that had occurred to the building when he had first made his visits.

To the 1st windows from the rear of the left hand side wing, for a few courses above the top rear corner of the ground floor window to around 2 to 3mm wide cracking through mortar joints.

To both the vertical movement joints along the left hand side wing that faces The Hide, the width of the joint was distinctly wider at the top than at the base. At the first floor window adjacent to the vertical joint nearest the front to this elevation, there is a horizontal and vertical running crack through the mortar joints of around 10mm in width, that appeared to have been previously repointed, but some of this repointing may have fallen away.

Summary of Internal Inspection:

Corridor in area around Flat 25

To the inner face of the external wall that bounds the courtyard area there is a stepped crack through mortar joints, extending up from right to left, in the face brickwork masonry panel under the window. Colin Ayre noted that this crack has been present throughout the time he had carried out investigations on the building. At the base of the crack there are two crack width survey makers either side of the crack. The width of the vertical width of the crack in the “perpend” joints was simply measured by a ruler during the 21st February 2019 visit at mid-height of the under window panel as 12mm and at just under the corner of the bottom of the window as 4mm.

Adjacent to this corner to the flat side wall of the corridor to the right hand side wing, to the wall of Flat 27 there is an around 3 to 4mm wide crack running through mortar joints adjacent to the top of stairs opening. This crack has three survey markers to the sides of it at one point.

Flat 25

Flat 25 is the last right hand end flat to the first floor to the rear wing. During the RPS visit on 21st February 2019 it was noted by the Warden that the tenant of this flat had reported cracking to the walls of the flat. Below the left hand side corner of the bedroom window, the rear room to the right hand side of the flat, there is a near vertical line of sealant running down the wall to the skirting board level. The flat occupant thought this crack was filled around the middle of 2018. Running along the junction of the left hand side wall of the Lounge and Kitchen of the flat and the flat ceiling is a near horizontal, around hairline to 1mm crack, the tenant noted that he believed this crack had appeared at around Christmas time 2018. The tenant noted that he has reported incidents of the front door into the flat, from the landing corridor, “sticking”.

Flat 9

Flat 9 is the last but one right hand end floor to the ground floor to the rear wing. The tenant of No. 25 had noted that the resident of this flat had indicated some cracking, the tenant was present in the communal areas at the time of the RPS visit, thus the opportunity view the flat was taken.

Around the top and left hand side junctions of the architrave and the wall, to the inner side of the “front” door of the flat into the corridor there is around 2 to 3mm wide cracking. Above the tops of the windows of the flat in the rear wall there were hairline vertical cracks up from the corners of the opening to the ceiling level.

Flat 8

The tenant of Flat 9 noted during our visit that this flat was empty and unused but was accessible. This is ground floor flat adjacent to the closed off section of the rear wing section. Adjacent to the wall to ceiling and wall to wall junctions of bathroom to the wall that separates the flat from the closed off area there are near vertical and horizontal cracks of around 2mm in width. Additionally there are near vertical cracks of similar width extending down from the underside of the bathroom window in the rear wall.

Closed off area

The rear right hand areas of the building is now closed off from other areas of the building by permanent “wall” barriers to both the ground and first floor corridors. This area of the building was viewed to allow Colin Ayre to note any significant changes in the condition of the structure, rather carry out a full visual only inspection of the area. This area has a number of locations that have been subject to intrusive investigation in the past, by opening up of walls and ceiling finishes. Thus some damage seen to walls and floors is not due to historic structural movements only.

Mr Ayre noted that he believed that there were no significant increases in structural damage due to historic movements in this closed off area. He noted that he believed that previously there were a number of horizontal cracks to the walls that divide the rear corner flats, due to a curvature of the wall caused by the uplift heave forces, these crack appeared to be no longer as distinct.

Background information from Colin Ayre discussed during 28th March 2019 visit:

Mr Ayre noted the following outline timeline regarding the work that RPS carried out for their Structural Engineer’s brief for the project:

1. Visual Inspection of reported cracking to walls of the building in May 2005.
2. Given the findings of wide cracks to external wall movement joints and that this may result inadequate bearings for first floor structural elements onto walls, residents of directly affected flats were immediately moved out.
3. Further intrusive investigations showed large gaps between differing spans of floors, bowing of loadbearing walls and possible issues with services integrity due to large movements of structural elements that the services were attached to.
4. Due to movement affecting the first floor corridor and stair areas, the rear left hand stair well was deemed not usable for use, this required, following advice from the Fire Officer, believed due to travel distances to external escape exits, the closing of further ground and first floor flats.

5. Initial causes of structural damage were considered to be a large number of existing trees around the outer perimeter and within the courtyard area of the building, due to clay subsoil, and/or issues with inadequate rainwater guttering causing problems with the wetting of the subsoil.
6. Arboricultural, Geotechnical and Drainage Surveys revealed to assumed causes of the foundation movements and structural damage to be:
 - a. The previous growth and removal of a hedgerow running diagonally across the footprint of the building to the rear left hand corner. The hedge removal was believed to have been carried out long before construction, with the foundation bearing onto a clay subsoil not built to suit such vegetation.
 - b. Foundations on clay subsoil not suitably built to allow for current and potential further growth of trees that were located around the building and within the courtyard.
 - c. The removal of the hedgerow causing damage to underground drainage pipes softening the ground locally to the damage.
7. Along with the closing of areas of the building, the remedial measures have included the removal of trees within the courtyard and around the perimeter of the building, remedial detailing of the rainwater guttering and repairs to damaged underground drainage.
8. Crack width and level survey monitoring had been carried out over a number of years to assess the assumed recovery of building from tree related movements.

Findings of January 2019 DPC Level Survey

The survey carried out by RPS is a relative level survey, i.e. it indicates the level of the Damp Proof Course (DPC) at any point, in reference to other points along it, rather than relating the levels to an absolute datum. This survey data has been used to produce drawings JKK8600_01_BUCKL and JKK8600_02_BUCKL and are attached to this report. This survey shows the rise in DPC level in the area around the wide cracks to the rear left hand corner. Additionally it shows a drop in DPC level along the central part of the external elevation along Farthing Grove compared to the ends and appears to show an external rotation downward compared to the DPC level taken to the courtyard elevation of this wing.

Discussions and Recommendations:

The variation in DPC level to the external elevation along Farthing Grove, Elevation 1, shown in the RPS January 2019 survey appears to suggest a settlement or subsidence along this line. In 2005 along this boundary there was a line of Lime trees, which have now been removed. These Lime trees were noted in the contemporaneous RPS Arboricultural report as being as around 7 to 10 metres tall. The foundation along this elevation noted in the Listers soils investigation report as extending to around 1 metre below ground level. Thus based current NHBC Standards assuming the Lime trees were removed at the height noted, then an around 1.3 to 1.5metre deep foundation would be required. The level surveys carried out between 2007 to 2018 show a level recovery of around 5 to 15mm has occurred to points along this elevation. It is noted that in the Listers Trial pit Logs that the trial pit to the middle of this elevation shows the DPC level at Ground Level rather than at around 200mm above ground level at the ends of the elevation. From the visual inspection the level of cracking seen to this elevation is not consistent with the dipping in level that the DPC Level Survey appears to show.

The level of structural damage in reference to the closed of area i.e. the wide movement joints, opening up gap of the first floor and the bowing and cracking to the walls does not appear to have greatly increased since the Structural Surveys carried out by RPS in 2005 to 2007.

The RPS Interim Report dated September 2007 noted that “ *We therefore consider that the movement of the building due to long term heave to the south east corner, and shrinkage settlement on the west side has stabilised and we can no move onto the design of remedial works*”. This report noted “*A further conclusion of the reports was that the foundations as constructed were shallower that would be recommended in 2005 and that after the building has stabilised the building would be subject to seasonal ground movements*”

RPS have carried out Monitoring Reviews based on ongoing level surveying that was carried out at frequencies between two to four times a year from 2010 to 2018. These reviews noted in 2014 “*Over the last 12 months the movement outside has been within the range of 2mm..*” and in 2018 “*The monitoring has continued in its previous trends. Monitoring points within the courtyards have generally stabilised...The external monitoring points have generally continued to show a gentle recovery with some seasonal movement.*”

Excluding the area to the rear left hand corner that has been closed off, the cracking seen to the internal and external walls of Buckland Lodge, based on the author’s 2019 visual only inspection, appear to be from minor structural movements due to ground movement from shallow foundations on a clay subsoil. The structural damage seen to the walls was generally no greater than Category 2 in reference to Table 1 of BRE Digest 251 “Assessment of damage in low-rise buildings”. Thus the damage to areas of the building that are not closed off are “aesthetic” damage in reference to BRE Digest 251.

Given the aesthetic only nature of the damage seen to the non-closed off areas of the structure, as noted in BRE Digest 251 “unless there are clear indications that damage is progressing to a higher level it may be expensive and inappropriate to carry our extensive work for what amounts to aesthetic damage”.

Based on this, for areas of the property away from the rear left hand corner that is closed off, hand repointing of any weathered and cracked brickwork mortar joints and cosmetic repair of internal brittle finishes by redecoration and localised filling would be appropriate.

The current level of damage seen the left hand rear corner is such that the four flats noted previously as being structural unsound for use as habitable accommodation remain so. However given the propping that has been installed and that the level of damage does not appear to have increased such that demolition of the affected areas is imminently required to prevent a catastrophic collapse of the structure. Along with the four flats and stair and link corridors that have been subject to severe structural damage to the left hand rear corner, six other flats, a guest room and a bathroom area are not usable due to restrictions due to the requirements of the Fire Office, assumed to be due to travel distances to external means of escape.

Thus it appears there are the following options for the severely damaged area to the rear left hand corner:

1. Maintain the status quo, allowing that periodic visual inspections of the damage areas are carried out by a suitably qualified Structural Engineer to assess the ongoing structural stability of these areas. It is recommended that such visit are carried out on a yearly basis.
2. Full Remedial Works Scheme to bring all the rooms back into use. RPS holds on file the scope of remedial works and budget estimate for such work completed by the NTN Partnership dated August 2011. From discussions we have had with a Quantity Survey regarding updating this budget estimate to “current” 2019 prices they have noted that for such a relatively small size of project it is

not typical to update costs in line with standard pricing indexes as this would not take into account a suitable variation in costs. We request clarification if a “more detailed” update of the costs should be carried out on the scope of remedial works, or is it satisfactory for a simpler multiplier effect to the costs be carried out?

3. Demolition of severely structurally damaged areas, this would be assumed to be the completion of the demolition plus the closing off the structure to the ends of the rear and left hand side wings that would become external walls. This would not bring back into use the six flats that are no longer used due to the restrictions from the Fire Officer.
4. Demolition of Severely Structural Damage areas plus the addition of new escape access to the ends of the rear and left hand side wings. This may enable the bringing back into use of some, if not all of the six flats that are no longer used due to restriction from the Fire Officer. It is assumed that liaison with an Architect would be made to advise further on the escape requirements and on initial design impacts for Building Regulations and Planning for such a scheme.

Regardless of the scheme chosen to limit the ongoing risk of structural damage from clay tree foundation related structural movements, it is recommended that the current trees are subject to an updated Arboriculturist’s survey with the recommendations of the accompanying report carried out.

Whilst outside our brief it was noted on site that there is a pipe leaking water from a tank to the roof area of Flat 21, i.e. to the out of use, first floor, rear left hand corner flat, it is recommended that this pipe is fully capped off to remove the risk of the leak causing damage to the structure.

We trust the foregoing is sufficient for your needs at this time, however should you have any further queries please do not hesitate to contact the author at this office. We would be pleased to provide additional Structural Engineer’s advice regarding any of the above should you require.

Yours sincerely,
for RPS Consulting Services Ltd



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cc: Stephen Young, Milton Keynes Council

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This report is limited to elements of structure only. Services, timber decay, and contamination are specialist items and are not covered by this report. Should any of these items be mentioned in this report specialist advice should be sought.

We also confirm that any parts of the structure that were hidden or otherwise inaccessible have not been inspected and therefore cannot be guaranteed to be free from defect.

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The opinions and interpretations presented in this report represent our best technical interpretation of the data made available to us.

However, due to the uncertainty inherent in the estimation of all parameters, we cannot, and do not guarantee the accuracy or correctness of any interpretation and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, cost damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees.

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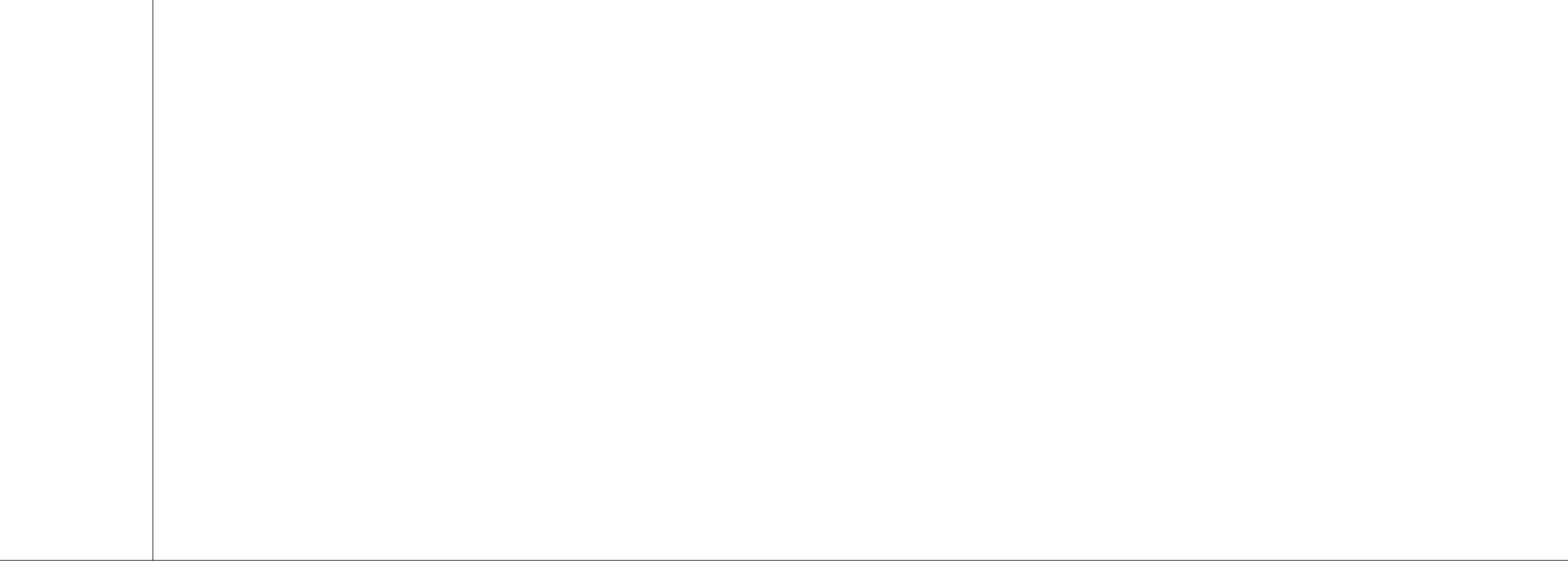


RPS DRAWINGS JKK8600_01_BUCKL and JKK8600_02_BUCKL

Notes

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1. SURVEY BASED UPON AN ARBITRARY GRID AND DATUM.



Rev	Description	By	CB	Date
A	ORIGINAL DRAWING ISSUE			IMS AHP 01.02.19



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Client MILTON KEYNES COUNCIL

Project BUCKLAND LODGE,
 BUCKLAND DRIVE,
 MILTON KEYNES.

Title DAMP PROOF COURSE
 SURVEY

Status FINAL Drawn By IMS PM/Checked by AHP

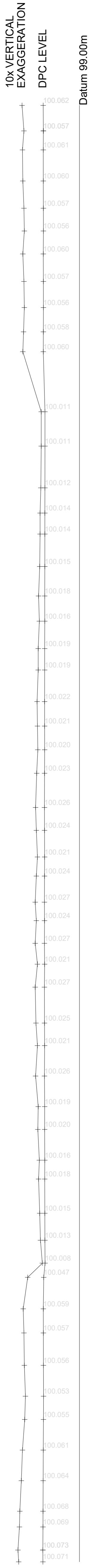
Project Number JKK6600_BL Scale 1:100 @A1 Date Created 01.02.2019

RPS Drawing Figure Number JKK6600 _01_BUCKL Rev A

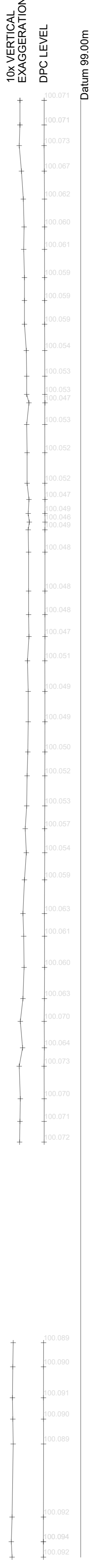
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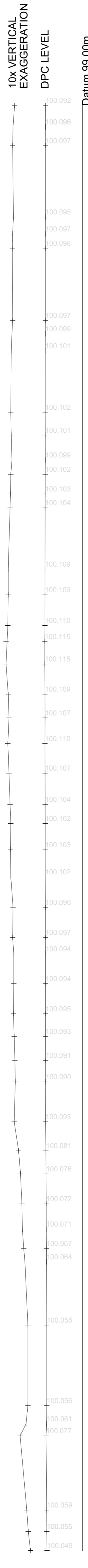
SURVEY GRID ELEVATIONS ARE ARBITRARY.



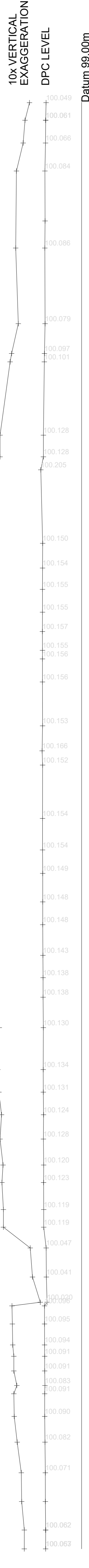
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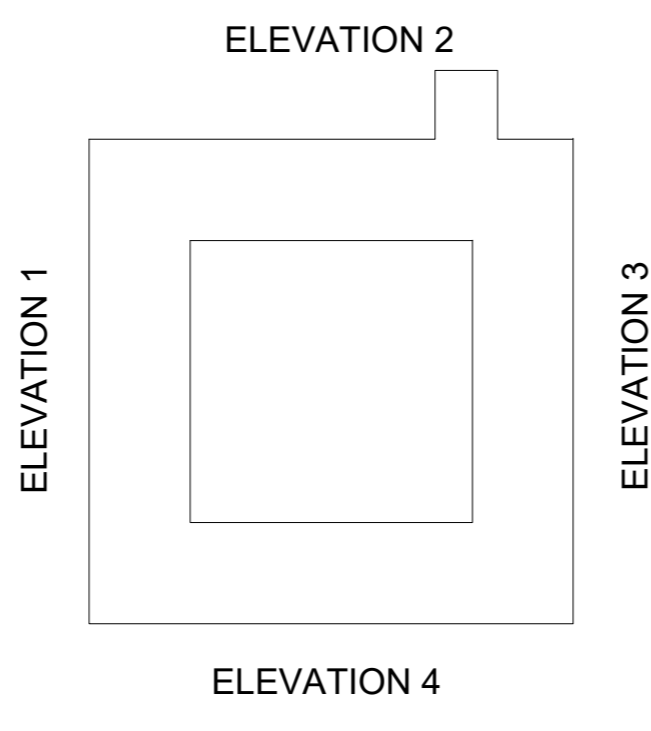
ELEVATION 2



ELEVATION 3



ELEVATION 4



Rev	Description	By	CB	Date
A	ORIGINAL DRAWING ISSUE			AHP DJR 12.03.19



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Client: MILTON KEYNES COUNCIL

Project: BUCKLAND LODGE, NETHERFIELD, MILTON KEYNES.

Title: ELEVATIONAL REPRESENTATION OF DPC SURVEY

Status: FINAL
Drawn By: AHP
PM/Checked by: DJR

Project Number: JKK6600
Scale: 1:75 @A1
Date Created: 12.03.19

RPS Drawing Figure Number: JKK6600 _02_BUCKL
Rev: A