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Mondi Mill Chimney Inspection Report

Project:

Mondi Mill
Chimney Inspection
Ramsbottom,
BL0 0BS

Client:

Eccleston Homes Ltd

Reference:

B23519/R001

Date:

08 August 2019

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DOCUMENT CONTROL SHEET

Project Name: Mondi Mill, Ramsbottom, Chimney Inspection

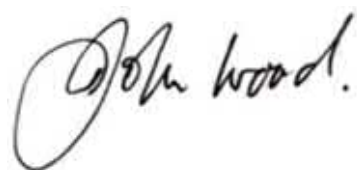
Project Number: B23519

Client: Ecclestone Homes Ltd

Report Title: Chimney Inspection at Mondi Mill, Ramsbottom

Reference: B23519/R001

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FOR AND ON BEHALF OF JNP GROUP

Date: August 19

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Document Issue Record

Rev	Date	Description	Prepared	Reviewed	Approved
	08/08/2019	First Issue	AS	JAW	JAW

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1 INTRODUCTION

1.1 Preamble

- 1.1.1 This report is produced for the private and confidential use by Eccleston Homes Ltd (The Client) for whom the inspection was undertaken. This report should not be reproduced whole, in part or relied upon by third parties without the express permission of JNP Group and the Client.

1.2 Background

- 1.2.1 JNP Group were commissioned by Eccleston Homes Ltd to undertake a non-intrusive visual inspection of the chimney.
- 1.2.2 This inspection report should be read in conjunction with previous JNP Group reports on the chimney from 2012, 2014, 2015 & 2016.
- 1.2.3 The Client is proposing/planning to construct a residential development on the site surround the chimney. JNP Group undertook a non-intrusive visual inspection of the chimney on 24th July 2019.
- 1.2.4 The inspection was undertaken from ground level and at high level via a drone survey undertaken by DronePro Surveying Ltd.
- 1.2.5 During the inspection the weather was clear, sunny and dry.
- 1.2.6 An aerial view of the chimney is shown below;



Aerial View (southwest)

2 SUMMARY

- 2.1.1 The chimney remains in a stable condition, having stood at a reduced height of approximately 35m for over three years.
- 2.1.2 Areas of deterioration are evident to all elevations of the structure, however, these generally appear to be due to the effects of weathering, given that the chimney has remained out of operation for over a decade.
- 2.1.3 Based on this and previous inspections over the last eight years, the level of deterioration appears to have greatly declined, most notably, since the demolition of the top 11m of the chimney in 2016.
- 2.1.4 A general maintenance regime is recommended for the chimney as well as future monitoring and inspections. For ease of comparison, future inspections are recommended in a similar vein to that which has been undertaken for this report.
- 2.1.5 The conclusions given in the JNP Group report dated March 2016 are still relevant and in particular the comments regarding the HSE exclusion zone.

3 INSPECTION

3.1 General Description

- 3.1.1 The chimney is approximately 6m in diameter and 35 metres in height, having been reduced from approximately 46 metres in spring 2016. It is understood that the chimney has remained out of operation since 2008.
- 3.1.2 As part of the works in spring 2016, a concrete capping/haunch was installed over the full thickness of the chimney to the top course and some masonry repairs were undertaken over the remaining 35m. It is noted that the capping/haunch was highlighted at that time to be a temporary measure until a new reducer cone (or similar) was installed. However, the capping was still present during this inspection.
- 3.1.3 It is assumed that no repair works have been undertaken on the chimney since spring 2016.
- 3.1.4 The chimney still possesses steel/iron restraint bands around the circumference of the chimney in discrete locations throughout its height, with 14 in total. For the purposes of this report, where referred to, the bands are numbered Nr.1-14, with Nr.1 being the bottom band and Nr.14 at the top, directly below the haunching.
- 3.1.5 The survey comprised a visual inspection on-site from ground level and the subsequent review of a series of photographs taken by the drone on four elevations. The elevations (N, E, S & W) are approximately correct, however, for clarity, the south elevation was taken as the location where the corner of the adjoining building meets the chimney and the other elevations taken at approx. 90° intervals.

3.2 North Elevation

- 3.2.1 The north elevation appears generally in a satisfactory condition over much of the chimney height. There are large areas of relatively recent pointing present, with few areas of loss noted.
- 3.2.2 A small area of fractured brickwork was noted, three courses high, between restraint band Nr.4 & 5.
- 3.2.3 A previous repair was noted between bands Nr.7 & 8. No further deterioration at this location was noted.
- 3.2.4 Restraint band Nr.11 appears to have dropped at the northeast face (Photograph 1). This is local to the band connections and appears in the order of 60mm maximum.
- 3.2.5 A long, almost vertical, crack was evident from approx. five courses below band Nr.13 up to approx. 5 courses below band Nr.14. This occurred typically through the joints, however, some fractured masonry is present (Photograph 2).
- 3.2.6 Restraint band Nr.13 appears to have dropped at the northwest face (Photograph 3). This is local to the band connections and appears in the order of 80mm maximum.
- 3.2.7 A previously repaired crack was apparent between bands Nr.13 & 14. No deterioration at this location was noted.
- 3.2.8 Minor vegetation was noted growing through a gap between the haunching and the top course of the brickwork.

3.3 West Elevation

- 3.3.1 The west elevation appears typically in a reasonable condition throughout. Recent repointing is present with minimal loss observed. One continuous line of missing/lost mortar was noted from bottom to top, however, this appears to have been on a potential lightning conductor rod route, as small clips (now redundant) were present affixed to the wall through the full height.
- 3.3.2 A vertical fracture in the masonry was noted between bands Nr.4 & 5, approximately seven courses in height (Photograph 4).

- 3.3.3 Vegetation was evident to a discrete area between bands Nr.8 & 9 on the southwest elevation.
- 3.3.4 As noted in section 3.2, restraint band Nr.13 appears to have dropped at the northwest face (Photograph 5). This is local to the band connections and appears in the order of 90mm maximum from inspection on this elevation.
- 3.3.5 Between bands Nr.13 & 14, a large area of missing/lost recent pointing was noted, in the region of 30-40% (Photograph 6).

3.4 South Elevation

- 3.4.1 The south elevation appears in fair condition, however, there are large areas of pointing missing, particularly local to the top third of the chimney. Spalled brickwork was evident in a few discrete locations.
- 3.4.2 Small areas of vegetation were evident growing from weathered joints on the southwest face. This is a repeated observation on this face with several areas noted from band Nr.6 upwards (Photograph 7).
- 3.4.3 Restraint band Nr.12 appears to have dropped at the southwest face (Photograph 7). This is local to the band connections and appears in the order of 30-40mm.
- 3.4.4 A fine, almost vertical, crack was observed between bands Nr.11 & 13. Missing and loose pointing was evident, with fractures also noted through bricks.
- 3.4.5 A previously repointed crack was noted between bands Nr.13 & 14. This appears to have deteriorated with loss of mortar observed across the full height of the crack (Photograph 8).

3.5 East Elevation

- 3.5.1 The east elevation appears in fair condition. Much of the relatively recent pointing appears intact, however, the finish to the pointing appears different in areas to that on other faces. No deterioration was observed in these areas, therefore, it is assumed that this is purely a workmanship issue (Photograph 9).
- 3.5.2 A large area of efflorescence was evident from ground level to band Nr.1 (Photograph 10).
- 3.5.3 Vegetation was noted growing at the southeast face directly above band Nr.1.
- 3.5.4 Two almost vertical cracks were observed between bands Nr.3 & 5. These appear to be pre-existing cracks with subsequent deterioration noted in the form of lost/loose mortar (Photograph 11).
- 3.5.5 A vertical crack was evident next to the cable on the southeast face between bands Nr.8 & 9. This appears approx. eight courses high and mainly runs through the joints.
- 3.5.6 A long vertical crack was observed between bands Nr.9 & 11. This has been noted on previous inspection in 2016 and appears to have deteriorated (Photograph 12).
- 3.5.7 Restraint band Nr.11 appears to have dropped at the northeast face. This correlates with the slip noted in section 3.2.
- 3.5.8 A previous repair was apparent between bands Nr.13 & 14. No further deterioration at this location was noted, however, a hairline crack was observed below this extending midway between bands Nr.13 & 12 (Photograph 13).

3.6 Miscellaneous

- 3.6.1 The concrete haunching appears in reasonable condition, however, gaps were noted between the concrete and masonry below around the perimeter (Photograph 14).
- 3.6.2 Staining was observed to the inside faces of the chimney towards the top.
- 3.6.3 Vegetation was evident around the chimney at the base and it does not appear that the site is regularly maintained.

- 3.6.4 Bird guano was observed in areas around the top of the chimney and the top restraint bands.
- 3.6.5 The adjacent building appears to have been in a continued state of disrepair for several years.

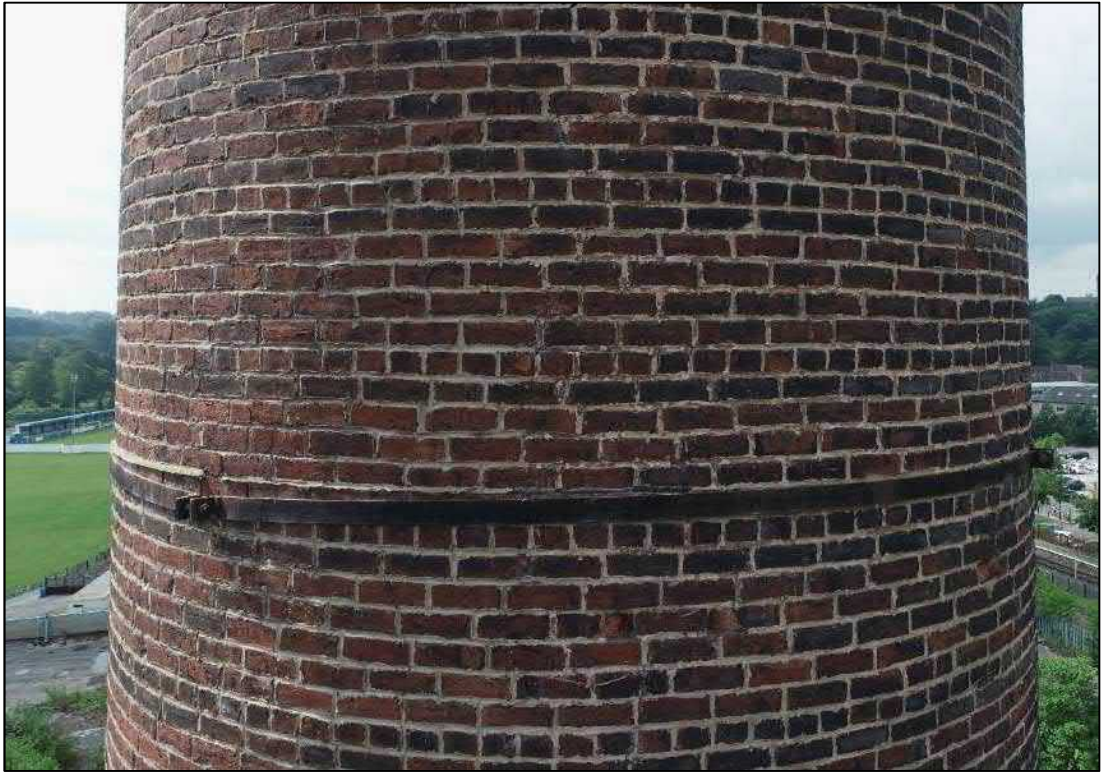
4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions/Recommendations

- 4.1.1 Overall, the chimney appears in a reasonable condition with no apparent significant change in its structural integrity since the last inspection. Indeed, weathered masonry joints, small areas of cracking in the masonry and the growth of minor vegetation appear to be the main defects that have occurred.
- 4.1.2 Areas of loss of mortar were generally observed to be 10-20mm deep which represents less than 10% of the full thickness of the masonry. With reference to the March 2016 report, this degree of deterioration was observed in the now demolished section of the chimney to be weathered joints limited to the outer leaf of masonry only.
- 4.1.3 The restraint bands appear in a reasonable condition, however, a number have slipped to one face. It is not clear whether this is due to a loosening of the bands or the masonry has contracted. It is also uncertain whether the pointing around the edges of the bands were from recent (within the last 3 years) or whether this precedes the decommissioning of the chimney. It is recommended that the bands are re-tensioned and monitored for future movement.
- 4.1.4 Vegetation growth was evident in areas, mainly, to the southwest face. This should be carefully removed and the brickwork repointed to restrict any further potential points of ingress. It is possible that vegetation is sprouting from seeds from adjacent trees and as it is understood that the surrounding site is to be developed for residential use, the removal of vegetation from the area would potentially reduce the likelihood.
- 4.1.5 With regards to future maintenance, the primary recommendation is to set a programme of monitoring and inspections in place to ensure any defects which may occur are observed within a timely manner. Following each inspection, given the exposure and age of the structure, it is likely that repointing, spot replacement of cracked bricks and de-vegetation will be required in select areas. As with most maintenance regimes of this nature, the cost of repair works will typically be inversely proportionate to the frequency of inspections and repairs.
- 4.1.6 It is noted that the concrete haunching was aimed as a temporary capping to the chimney only and it is evident that this is starting to weather and deteriorate. The worsening of this could lead to sections eventually falling and deterioration of the top courses of masonry. As has previously been recommended, a new reducer cone or cap should be installed in place of the haunching, suitably designed, detailed and installed by specialist contractors. It is likely to have negligible impact on the stability of the structure having once been 11m taller, however, due consideration of this should be given.
- 4.1.7 It is noted that the adjacent building has similar conservation status as the chimney itself. Any proposals to either refurbish, demolish or rebuild this should consider the effect on the chimney. It is recommended at the very least that the building is made structurally stable to ensure any potential deterioration and collapse would not affect the chimney.
- 4.1.8 The proposed development of the surrounding site should give due consideration to the stability of the chimney and its foundations. This includes, but is not limited to, the construction of new dwellings, installation of drainage and services and the effects of potential surface water run-off and flood risk.
- 4.1.9 It is understood that the chimney has not functioned in over ten years. Because of this and the apparent causes of defects noted in previous inspections in relation to the cooling of the chimney, it is unlikely that further severe deterioration will occur provided a practical maintenance regime is put in place. This should include the items listed above.

Appendix A

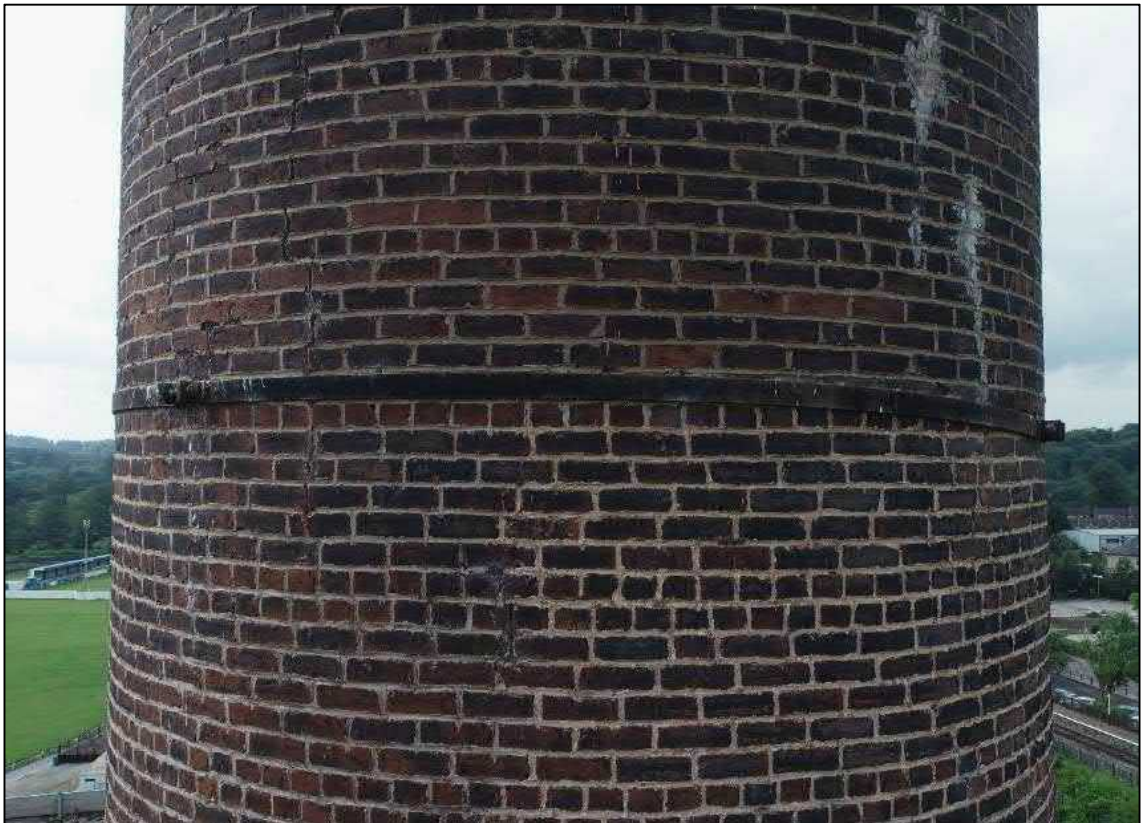
Photographs



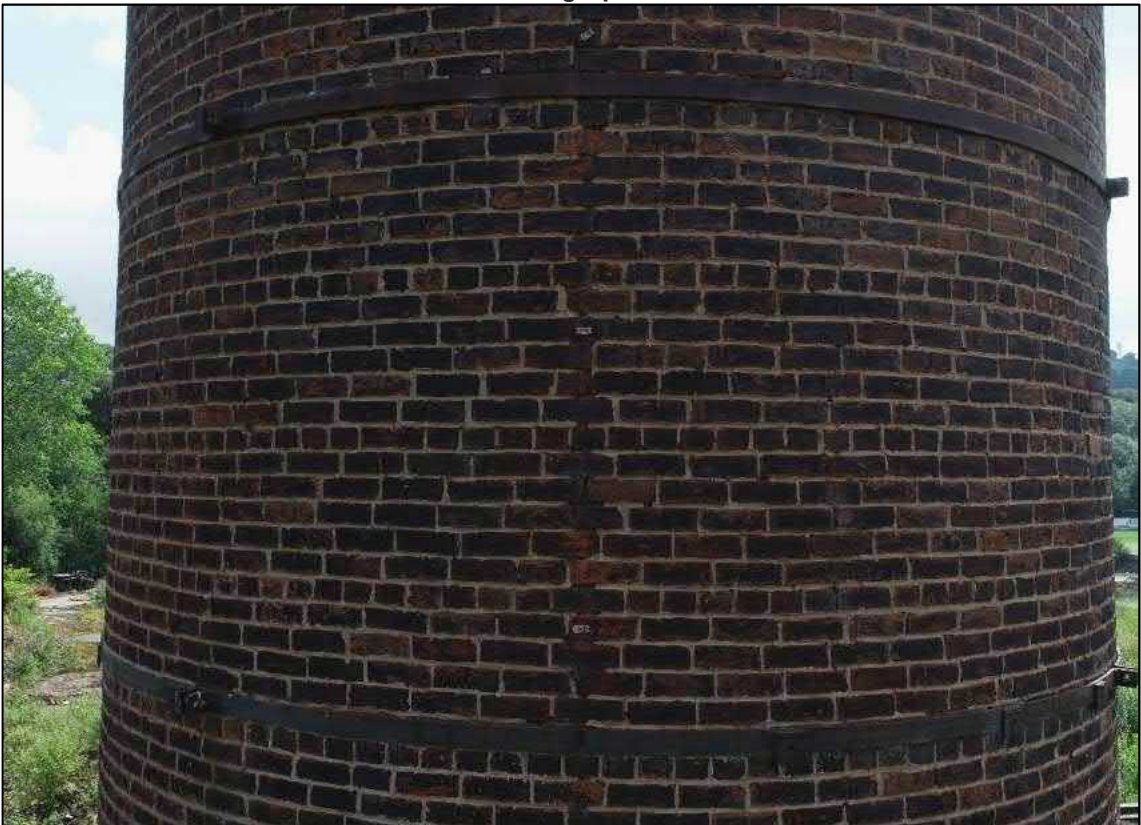
Photograph 1



Photograph 2



Photograph 3



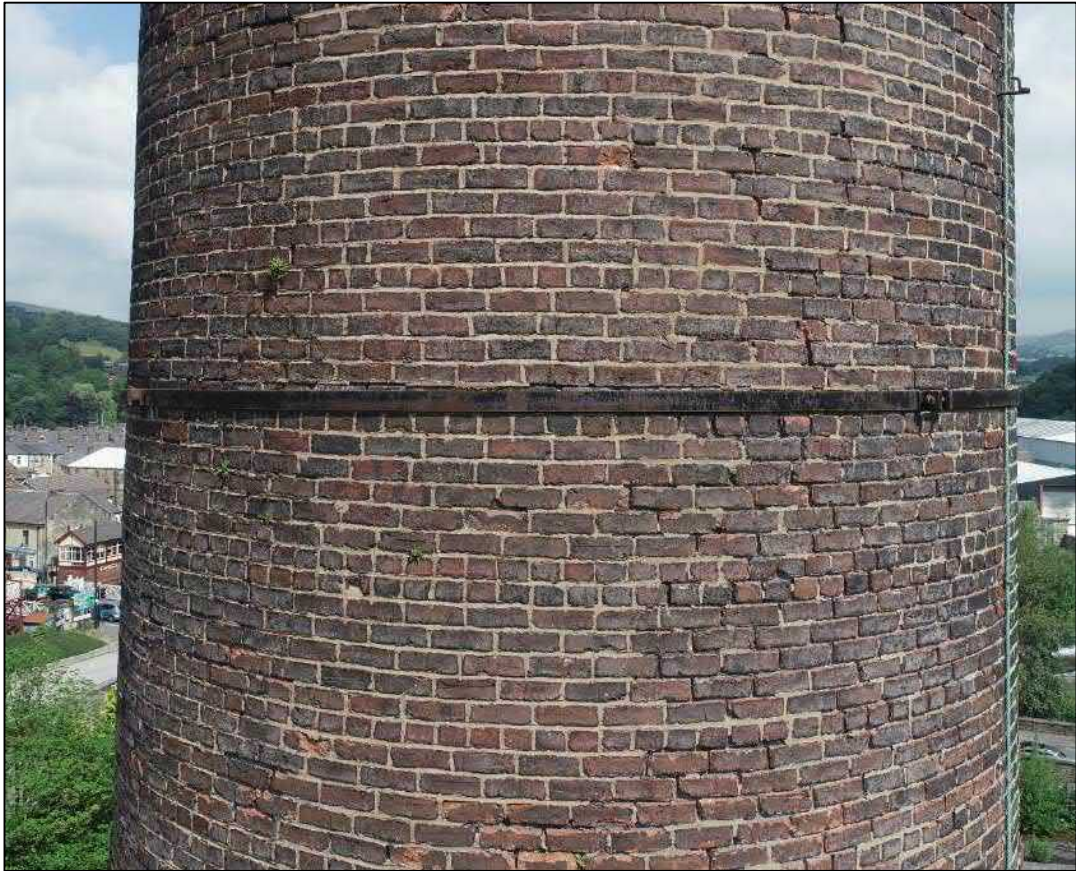
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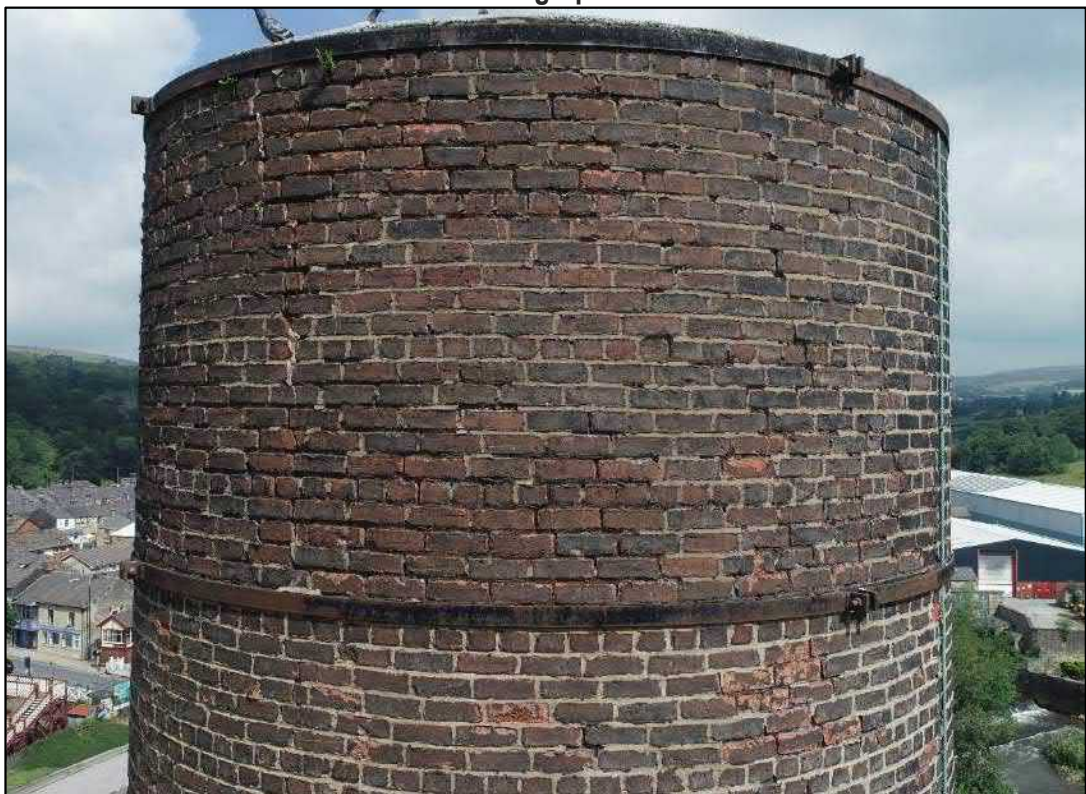
Photograph 5



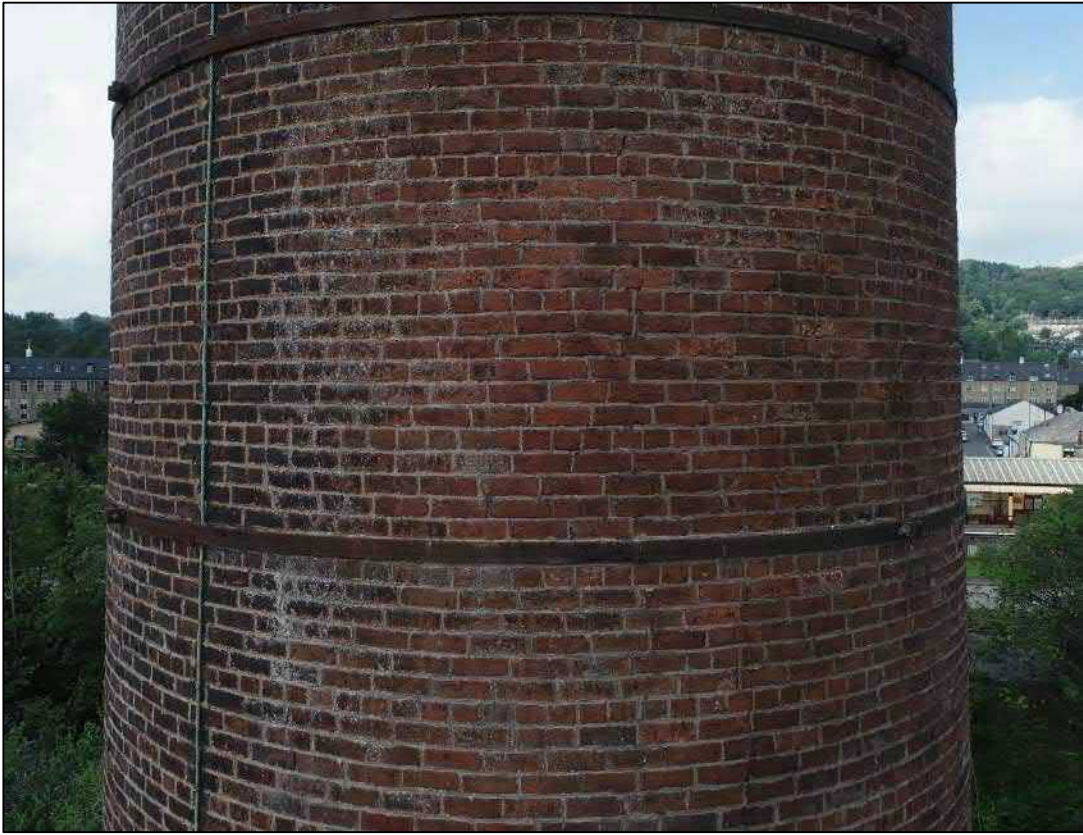
Photograph 6



Photograph 7



Photograph 8



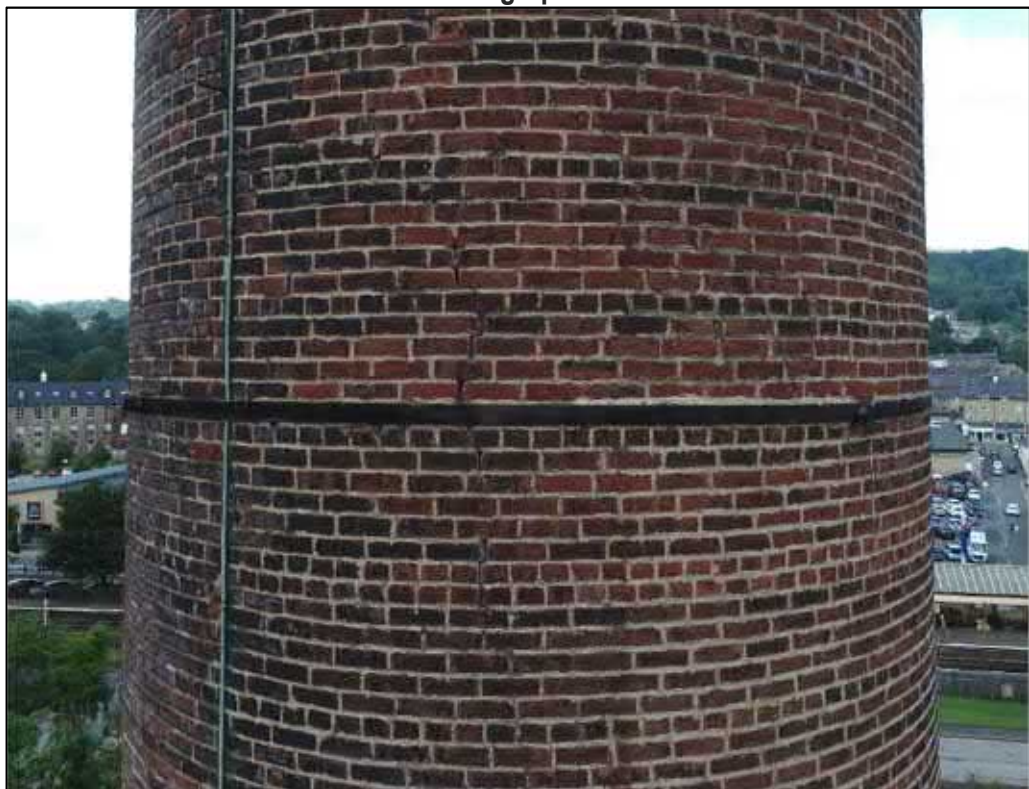
Photograph 9



Photograph 10



Photograph 11



Photograph 12



Photograph 13



Photograph 14

Appendix B

Previous JNP Group Inspection Reports



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Consulting Engineers

Report on

**Chimney Inspection
Mondi Mill
Ramsbottom**

For

REOC 3 Limited

Prepared by

Neil D Taylor
BSc (Hons) CEng MICE MStructE

Approved by

Stuart W Evans
BEng (Hons) CEng MICE MStructE

Date

26 November 2014

Ref.

NG8034/RAM/REOC 3 Rev. A

Chesham
Brighouse
Midlands
Sheffield
Teesside

Job Number: NG8034/RAM
Project Name: Mondri Mill Chimney, Ramsbottom
Client: REOC 3 Limited
Report Title: Chimney Inspection
Reference: NG8034/RAM/REOC 3

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Project Name: Mondri Mill Chimney, Ramsbottom
Project Number: NG8034/RAM
Client: REOC 3 LIMITED
Report Title: CHIMNEY INSPECTION
Reference: NG8034/RAM/REOC 3/A

Signed by.....
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FOR AND ON BEHALF OF JNP GROUP

Date: 26 November 2014

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Document Issue Record

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Job Number: NG8034/RAM
Project Name: Mondi Mill Chimney, Ramsbottom
Client: REOC 3 Limited
Report Title: Chimney Inspection
Reference: NG8304/RAM/REOC 3



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NG8034-02 Elevations indicating defects and changes since last inspection

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Appendix A Photographs
Appendix B Report by JNP Group on 20 September 2012

1 INSPECTION REPORT

1.1 Introduction

JNP Group was commissioned by REOC 3 Limited in August 2014 to carry out a follow up inspection of the existing chimney at Mondi Mill in Ramsbottom. The scope of the report is to determine whether there has been any significant deterioration of the chimney to that recorded in 2012. A copy of the original report is appended (Appendix B).

There is still a Prohibition Notice in place for the site served by the HSE.

Access was granted on 5th November 2014. An inspection was carried out by Mr Neil Taylor and Mr Luke Masters of JNP Group.

This report is based on observations from ground level and reference to the previous report from 2012.

1.2 Summary

-  The chimney is still in a dangerous state of repair although there does not appear to have been significant deterioration since 2012 other than accelerated weathering of the south and east faces;
-  The recommendations given in the 2012 report should be revisited and actioned;
-  The chimney height should be reduced by at least a third (15m) initially and the remaining structure assessed once the top has been removed to determine any additional demolition/remedial works.

1.3 General Description

The chimney and surrounding site have not significantly altered since the observations made in 2012 other than the increased security measures put in place to prevent access.

The chimney has now been unused for approximately 6 years.

1.4 Defects

Reference should be made to the previous defects identified in the report prepared by JNP Group in 2012. These defects are still evident from observations made in the recent inspection. Any deterioration has been recorded on the drawing attached to this report (NG8034 – 02).

There appears to have been further deterioration of the mortar to the upper section of the south elevation due to weathering affects.

There are large areas of efflorescence staining to the mid and lower sections of the east elevation.

There has been a partial collapse of the concrete slab adjacent to the ground level access to the chimney. This may be due to a local failure of the supporting wall.

A comparison has been made of the large cracking of the top of the north elevation which does not appear to have significantly deteriorated since 2012.

A comparison has been made of the cracking at the base of the east elevation and this does not appear to have significantly deteriorated.

1.5 Conclusions and Recommendations

There does not appear to be a significant change in the structural integrity of the chimney since the inspection in 2012. There has been some accelerated weathering of the south and east elevations which will continue to deteriorate if not maintained.

There has been a localised failure of the slab adjacent to the ground level entrance into the chimney but this is not affecting the chimney at present.

The conclusions and recommendations made in the previous report should be given consideration in future development of the site.

There has been continuous degradation of the mortar over time and loss of adhesion to the masonry units. There is also significant cracking of sections of the masonry structure. There is a slight lean of the chimney and areas of bowing along its length. The structure has stood for many years, however the original structural integrity of the chimney is being affected and it is now in a dangerous state of repair.

It has previously been noted (and stated in section 5.11.1 of the previous report) that the height of the chimney should be reduced by at least a third. It is recommended that this is carried out as part of the initial works for the site and the state of the remaining structure is assessed once removed.

In order to conserve as much of the chimney structure as is reasonably practical the following process should be followed:-

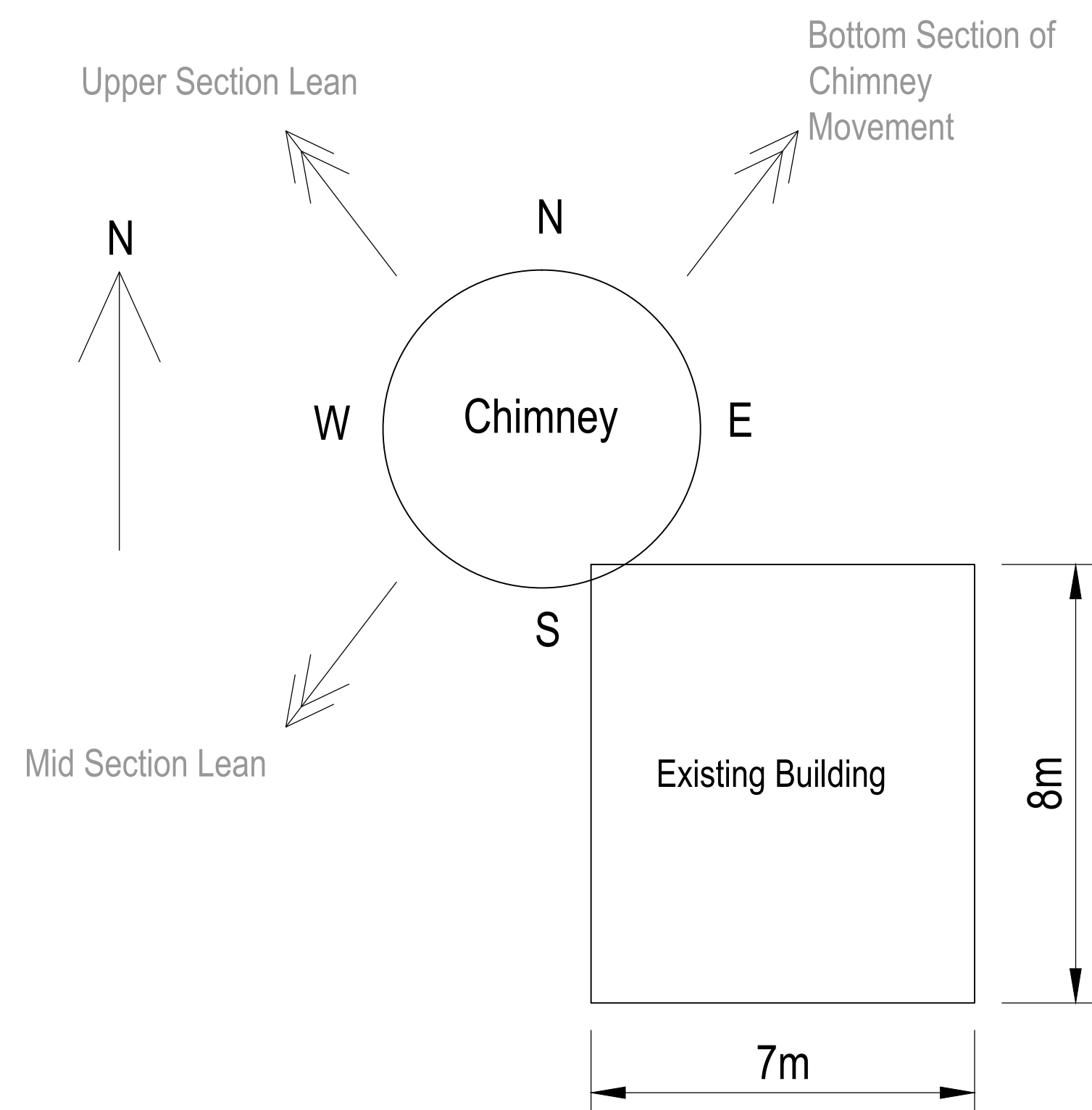
1. Specialist demolition contractor to prepare method statement and risk assessment for safe removal of the top 15m of the structure giving due consideration to conserving the remaining section below.
2. Consultation with appropriate parties; HSE, LA Planning Officer and Building Control, H&S Consultants, Engineers.
3. Specialist demolition contractor to install any necessary precautionary measures prior to works.
4. Specialist demolition contractor to remove top 15m of the structure in accordance with approved method statement. Any issues identified to be notified to Client immediately.
5. Once top 15m of chimney has been removed, the remaining structure is to be made safe by specialist demolition contractor in order for an inspection to be made by Engineer to determine whether further demolition is required, surveys or investigative testing is required or chimney is in an acceptable state of repair.
6. If further demolition is necessary then specialist demolition contractor to do so. Agreement with LA to be reached if practical to do so.
7. If testing is necessary then works to be ceased until results and recommendations are agreed.
8. Further recommendations to be agreed with LA and actioned by specialist demolition contractor.
9. Once remaining chimney structure is taken down to a level for which it is reasonably practical to carry out repairs to conserve the structure then specialist demolition contractor to make the structure safe and a scheme for the works is to be drawn up and agreed with the LA.
10. Repair works to be carried out in accordance with agreed scheme.
11. Remaining structure to be monitored during the development works and as part of maintenance contract for the completed development.

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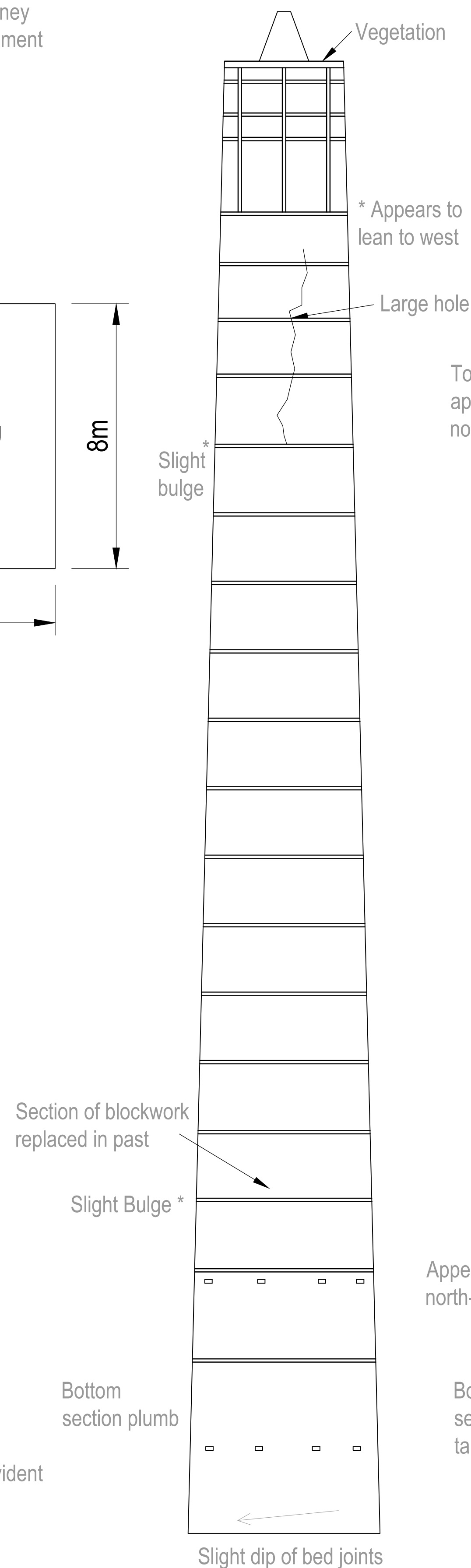
Figures / Drawings



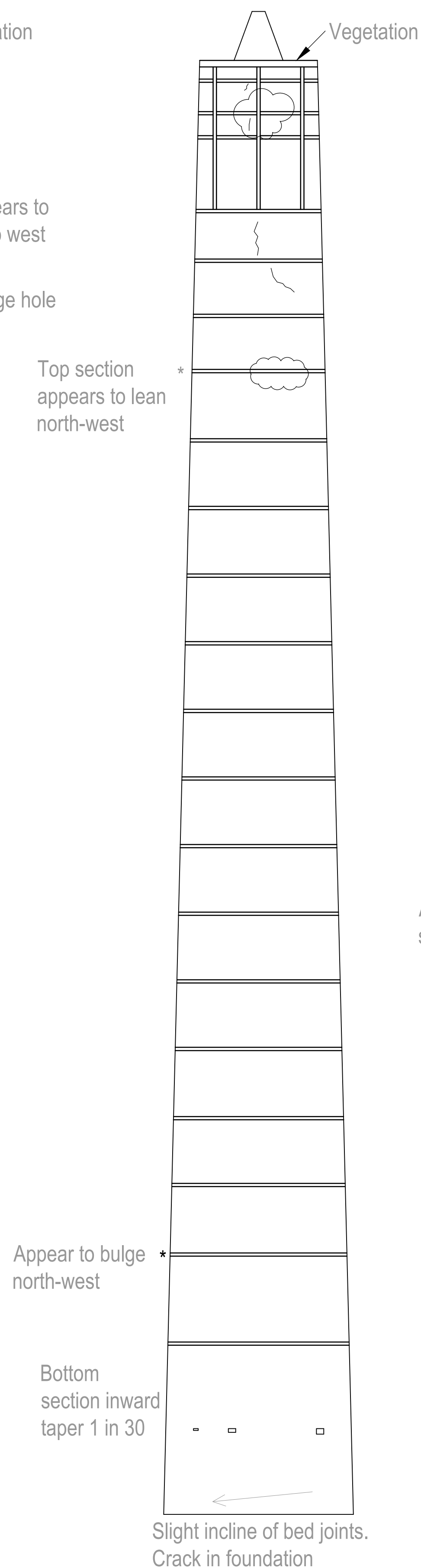


PLAN

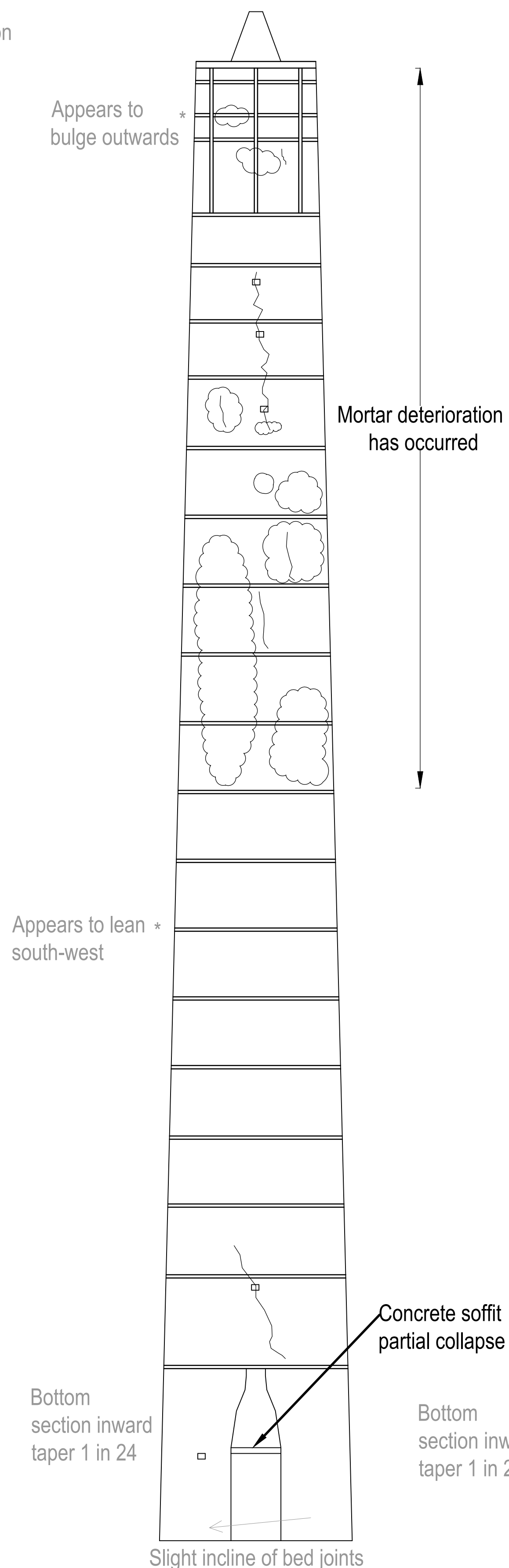
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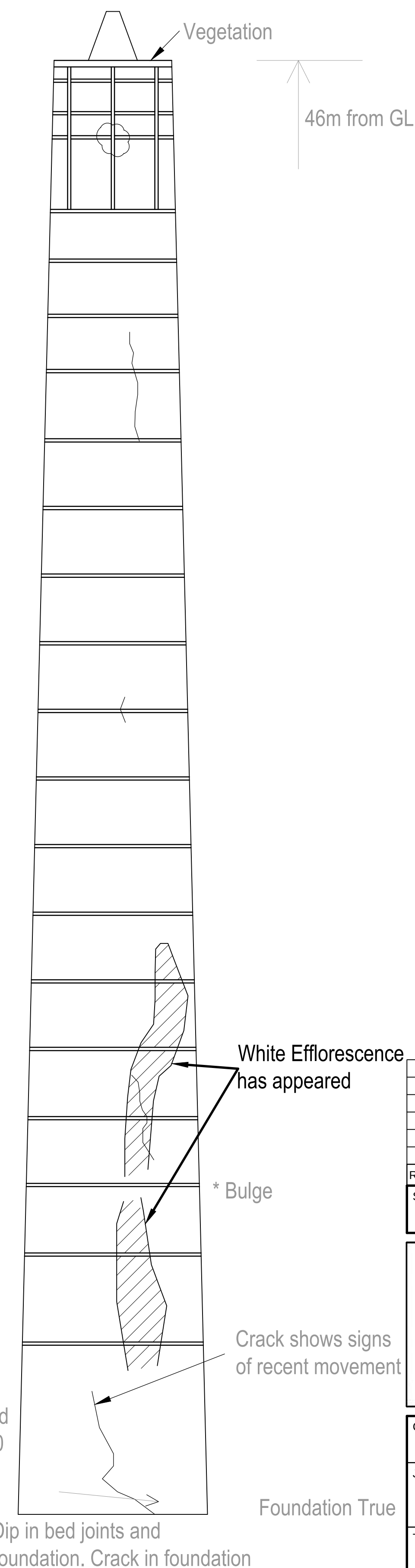
NORTH ELEVATION



WEST ELEVATION



SOUTH ELEVATION



EAST ELEVATION

Notes:-

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Health and Safety Note:

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HAZARD IDENTIFICATION BOX		
This table is provided to assist the Principal Contractor to fulfil their obligations under the CDM Regulations 2007		
Construction Hazard	Maintenance / Cleaning Hazard	Demolition / Adapt Hazard

Key

$$\} = \text{Cracks Identified from ground level}$$

 = Severe Weathering of mortar / masonry

Notes in faint = 2012 Observation

Notes in hold = 2014 Observation

Rev.	Date	Amendment	By	Ch
Status				

Information

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Client	REOC 3 LIMITED
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Job	HOLCOMBE MILL CHIMNEY RAMSBOTTOM
-----	-------------------------------------

Title	ELEVATIONS INDICATING DEFECTS AND CHANGES SINCE LAST INSPECTION
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Scale	AS SHOWN	⊗ A1	Date	NOVEMBER 2014
Drawn By	LM	Eng. Check	NDT	Tech. Check

Drawn By	LM	Eng. Check	NDT	Tech. Check
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Drawing No.	Rev
NG8034-02	

ELEVATIONS

Scale 1:100

0026
DA Ref: QD0190 Rev B

Job Number: NG8034/RAM
Project Name: Mondi Mill Chimney, Ramsbottom
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Appendix A

PHOTOGRAPHS



Job Number: NG8034/RAM
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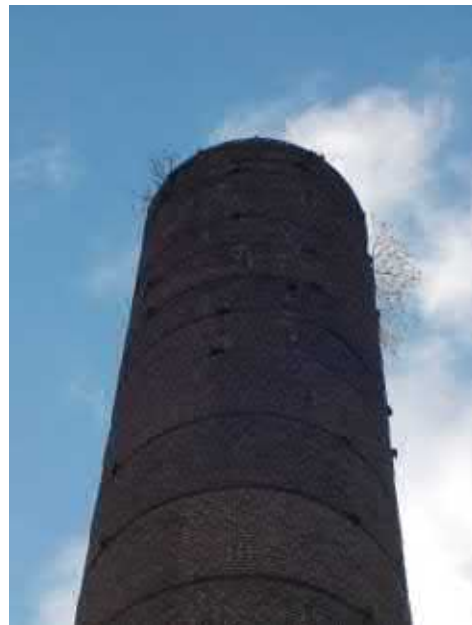
Efflorescence to East Elevation



Mortar deterioration to South Elevation



Concrete soffit to entrance partially collapsed



Cracking to top of North Elevation

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Cracking to base of East Elevation

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Appendix B

REPORT BY JNP GROUP ON 20 SEPTEMBER 2012





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Consulting Engineers

Report on

**Mill Chimney
Mondi Mill
Bridge Street
Ramsbottom**

For

Yorkshire Plant & Demolition Ltd

Prepared by

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BSc CEng MICE MStructE
Associate

Approved by

John A Wood
BSc CEng MStructE
Partner

Date

20th September 2012

Ref.

NG8034RAM/NDT

Chesham
Brighouse
Midlands
Sheffield
Teesside

Mill Chimney at Mondi Mill
Bridge Street, Ramsbottom

1. Introduction

- 1.1. JNP Group was commissioned by Yorkshire Plant & Demolition Ltd on 1st September 2012 to provide structural advice on the existing chimney at Mondi Mill, Ramsbottom.
- 1.2. Yorkshire Plant & Demolition Ltd is completing a demolition contract on the site, which had been started by another company.
- 1.3. The site currently has a Prohibition Notice served on it by the HSE. There is a 60m exclusion zone around the chimney which is to remain in place until agreements about the future of the chimney have been agreed with the appropriate parties. Works have ceased on site and an adjacent car park opposite the railway station has been closed. Correspondence from the HSE is provided in Appendix A.
- 1.4. Parts of the site are within a conservation area. A review of the current border of the conservation area show that the chimney itself appears to be just outside the border of the designated area however the Local Authority Planning Officer considers it holds historic value. The chimney is not a listed structure. Refer to Appendix B for details. This situation should be clarified with the Local Authority.
- 1.5. A report was prepared in April 2008 by Rafferty Chimneys Engineering Ltd on behalf of Mondi Packaging Holcombe Ltd. This recommends removal of the top 20m of the chimney to allow further investigation of the lower section to assess the condition. A copy of the report is provided in Appendix E.
- 1.6. A report was prepared in August 2012 by Warburton's Steeplejacks & Co. Ltd on behalf of Yorkshire Plant & Demolition Ltd. This recommends that the chimney should be demolished without delay. A copy of the report is provided in Appendix F.
- 1.7. The Local Authority has requested a further report from a Consulting Engineer advising on the condition of the chimney in addition to the two previous reports due to the historic value of the chimney and doubts over the severity of the defects.
- 1.8. There has been no detailed inspection of the inside of the chimney.
- 1.9. An inspection was carried out on site on Tuesday 4th September 2012 with Mr M Berry of Yorkshire Plant & Demolition Ltd and Mr N Taylor of JNP Group to discuss the condition of the chimney and the attendant risks.
- 1.10. This report is based on observations from ground level, correspondence from the HSE, discussions with Yorkshire Plant & Demolition Ltd, the Local Authority Planning Officer and the Local Authority Building Control Officer. Reference is made to the two previous reports and a discussion with Mr J Warburton, the author of the report from August 2012. A specialist masonry repair company has also been consulted.

2. Summary

- 2.1. It is acknowledged that the chimney should be considered as a dangerous structure and that remedial works/demolition works should be undertaken as soon as possible.
- 2.2. The immediate hazards are the risk of components falling from the chimney.
- 2.3. The risk of collapse of a significant part of the chimney is currently considered to be low to moderate but if remedial works are not undertaken deterioration of the chimney will continue; leading to a substantial increase in the risk of larger sections of the chimney becoming unstable.
- 2.4. Further investigations are required once the chimney is made safe to determine the extent of remedial measures necessary to prevent demolition of the entire structure.
- 2.5. Any defects that are remedied may re occur in the future if the foundations are inadequate.
- 2.6. The feasibility of keeping the lower sections should be assessed against the value of investigations and remedial measures necessary.
- 2.7. A review of this report and the condition of the chimney should be undertaken in the near future.
- 2.8. It is our considered opinion that the most economic way forward would be to demolish the chimney as it has no further use except as a monument to our industrial past.

Mill Chimney at Mondri Mill
Bridge Street, Ramsbottom

3. General description

- 3.1. Mondri Mill chimney is located towards the western edge of the site. Many of the surrounding structures have been demolished and there are stockpiles of demolition rubble located on the site.
- 3.2. The chimney is no longer in operation and has been dormant for approximately 4 years.
- 3.3. The chimney is reported to be approximately 46 metres high. It is a circular brick shaft built on a circular concrete plinth. The shaft tapers inwards towards the top and is capped with a fibreglass ventura.
- 3.4. The base diameter is reported as 5.8m tapering to 3.6m diameter at the top.
- 3.5. The thickness of the walls at the top is approximately 450mm. The bottom thickness has not been measured however the walls are significantly thicker for the lower 5 to 6m due to an inner core being present. It is not known how this is connected to the outer shaft.
- 3.6. There are brick ends evident externally at regular courses suggesting that the outer skin of bricks is bonded to at least 225mm and not tied with steel wall ties. It is unknown if the entire 450mm wall thickness has been constructed in a similar way.
- 3.7. The chimney has been fitted with iron or steel banding over the entire length. This banding comprises twenty two horizontal bands around the perimeter at various levels with vertical straps present to the top section. These are held in place under tension.
- 3.8. There is an attached two storey stone structure that we are informed is to be demolished. This is in a poor state of repair and in danger of collapse. The sequencing of any demolition or remedial works must consider the impact on the adjoining structure.
- 3.9. Examination of the British Geological Survey map of the area, Sheet 76 Drift Edition at 1:50,000 scale, indicates the site to be underlain with alluvium over boulder clays.
- 3.10. The site lies in a valley bottom and there is a watercourse adjacent to the site approximately 20m from the chimney.

4. Defects

A number of defects have been identified in the reports from 2008 and 2012. These have been included with the observations made during the inspection where appropriate. The defects visible from ground level are the degradation of the mortar and brickwork, cracking of the joints and brickwork, outward movement of the chimney walls, horizontal movement and the growth of vegetation at the crown of the chimney. Consideration must also be given to the condition of the steel straps although this can only be made from the close up photographs in the reports.

4.1. Degradation of the mortar and brickwork.

- 4.1.1. The previous reports state that repointing works were carried out in 2004. It is not clear if this has been repeated since that time. There are many areas of pointing in good condition, particularly in the lower sections of the chimney. However, the condition has deteriorated between the writing of the reports in 2008 and 2012. The author of the 2012 report has stated that this chimney is in particularly bad condition compared to similar structures he has surveyed and that deterioration is rapid once they have been decommissioned.
- 4.1.2. A visual inspection of the pointing mortar showed evidence of erosion at various locations but it was not possible to see whether any of the masonry units were loose as a result of this. An indication of the more severely affected areas is shown on the sketch in Appendix C. Reference should also be made to the photographs in Appendix D.
- 4.1.3. It is clear from the previous reports that the mortar between bricks in the upper sections has severely eroded or been washed out leaving the outer bricks loose with little or no bond. Further discussion with the surveyor from August 2012 confirmed that it was possible to remove them by hand.
- 4.1.4. The south elevation appears to be in a more advanced state of disrepair than the other elevations with more areas of pointing mortar missing. There appears to be sections of the masonry that have become discoloured from erosion or from damp.
- 4.1.5. Measurement of the repointing to the lower sections of the chimney showed it to be as little as 5mm thick.
- 4.1.6. The original mortar appears to be dark grey/black in colour. It may be black ash mortar which is prone to attracting moisture.

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- 4.1.7. The report from 2008 states a green acidic residue within the mortar. Without testing of these areas it is not known how the integrity of the mortar bonding has been affected.
 - 4.1.8. Both reports indicate swelling of the mortar joints. This is caused by the affects of sulphates on the mortar.
 - 4.1.9. The chimney is located in an area formerly heavy in industry which will have affected the condition of the mortar and required regular maintenance to prevent deterioration.
 - 4.1.10. There is evidence of impact damage around the base to the north elevation. Sections of the brickwork have been damaged to approximately 30mm depth. These do not appear to be affecting the integrity at present.
- 4.2. Cracking of the joints and brickwork
- 4.2.1. A number of cracks have been identified as shown on the sketch in Appendix C.
 - 4.2.2. The cracks visible from ground level are generally vertical. The cracks are a consequence of the high temperatures within the chimney leading to expansion of the inner section which is resisted by the outer. Any rapid cooling during shutdown periods will have increased these affects through reversal of the internal stresses. These effects may be more apparent on the south elevation due to the increased exposure providing a weakness. The opening up will have caused a hinge about the opposite side of the circle hence the cracks on the north elevation.
 - 4.2.3. It is apparent from the two previous reports that there are smaller cracks that are not easily identifiable from the ground but become apparent on closer inspection. It is unclear how serious these affects are. Further investigation is required to determine whether the cracks in the middle section of the chimney have suffered similar affects to those in 4.2.2.
 - 4.2.4. Some cracks are recorded in the reports as being in excess of 60mm and run through the entire skin of the chimney. These appear to be in the upper section on the north and south faces. This leaves the upper section of the chimney effectively split in half and held together by the steel bands. The integrity of the top section of the chimney is therefore reliant on these bands. Neither report has made a full inspection of the bands.
 - 4.2.5. These cracks also leave the inner elements of the chimney exposed to the elements. The previously protected inner section has been exposed to the affects of the weather. The affects cannot be determined without closer inspection.
 - 4.2.6. There are hairline cracks near the bottom of the chimney on the east elevation propagating from a historic crack in the foundation. This has recently opened up further during the demolition works, either through vibrations affecting the foundations or from the impact damage. This gives serious cause for concern and should be monitored to ensure there is no further ongoing movement. An ongoing issue with the foundations could render the entire structure unstable. We also note that the underlying soils are prone to settlement and it should be determined what the chimney foundation is founded on.
 - 4.2.7. The reports indicate cracking and lifting of the bed joints. It is not known whether this is a full depth crack. The sections above this may be held in place through their self weight alone.
- 4.3. Outward movement of the chimney walls
- 4.3.1. There is an appearance visually of localised outward bulging of the masonry past the steel straps in the upper section of the chimney. This becomes more apparent on closer inspection of the photographs in the 2012 report. This is caused by restriction from the straps to expansion of the brickwork caused by the effects of sulphates on the mortar and the effects of varying temperature.
- 4.4. Horizontal movement
- 4.4.1. The chimney has moved in the past. This is indicated on the sketch in Appendix C.
 - 4.4.2. The bottom section indicates movement to the north east. It is considered likely that there has been settlement of the foundations along the north east edge. It is suspected that a combination of inadequate bearing strata and increased bearing pressures caused by the south westerly prevailing wind has caused this settlement in the past. The increase in pressures could be up to 30% of the static condition. This weakness may have been further affected by the recent demolition works causing the recent cracking stated in 4.2.5.
 - 4.4.3. There is evidence of remedial works to the chimney on the north and west elevations with an extra course of bricks being inserted. The writer of the 2012 report suggested this may have been an attempt to straighten the chimney in the past and had been carried out over 25 years ago. He also noted that he was

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aware the height had also been reduced in the past. The remedial works are likely to have reduced the integrity of the structure at this level. This will, however, have reduced the maximum applied bearing pressure on the foundation.

4.4.4. The middle section indicates movement to the south west. This may be an impression created by the movement at foundation level and subsequent remedial works. This can be confirmed by a line and level survey.

4.4.5. The upper section indicates movement to the north west. This is a consequence of the significant cracking and deterioration of the structure at this level.

4.5. Growth of vegetation

4.5.1. The growth of vegetation at the crown of the chimney has caused disturbance to the brickwork and masonry where the roots have become embedded in the joints.

4.5.2. There have been no reports of any bricks having fallen from the chimney.

4.6. Steel straps

4.6.1. The steel straps appear to be in reasonable condition although there are signs of corrosion. A full assessment has not been made of these straps due to access restrictions.

5. Conclusion and Recommendations.

5.1. From the information currently available it is acknowledged that the chimney should be considered as a dangerous structure and that remedial works/demolition works should be undertaken as soon as possible.

5.2. The immediate hazards are the risk of components falling from the chimney onto the area immediately surrounding the chimney. There are loose bricks and sections of mortar that could dislodge easily. A risk assessment could be carried out to determine the affected zone around the base of the chimney affected by falling debris that is likely to be less than the current 60m imposed by the HSE.

5.3. The risk of collapse of a significant part of the chimney is currently considered to be low to moderate but if remedial works are not undertaken deterioration of the chimney will continue; leading to an increase in the risk of larger sections of the chimney becoming unstable. This condition could change significantly should site clearance work recommence causing vibrations in the ground.

5.4. The chimney has not been adequately maintained and has reached a point where the upper section is beyond sensible repair. The previous reports both confirm the upper section should be demolished and this should be carried out before repairs are undertaken that may further affect the integrity of the chimney. The situation has deteriorated in the past 4 years. This may be why the 2012 report recommends demolition.

5.5. An assessment needs to be made on the foundation to determine whether settlement is occurring. This should also include for a consideration of the affects of clay heave once the weight of the structure is significantly reduced. This will require site investigation once the chimney has been made safe. It must be noted that if there is an issue with the foundations then any remedial measures made to the structure may re occur in the future in any case.

5.6. An assessment needs to be made of the affects of the visible cracks in the middle and lower sections of the chimney to determine whether they have also reached a point beyond sensible repair.

5.7. An assessment of the mortar needs to be made to determine whether it is deteriorating and affecting the integrity of the structure.

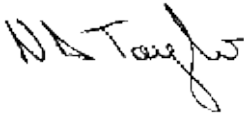
5.8. The previous repairs/straightening works should be monitored to ensure this is not a point of weakness.

5.9. Consideration needs to be given on how the works can sensibly be achieved. Yorkshire Plant & Demolition Ltd is concerned with erecting a scaffold around the chimney due to the poor condition of the upper section. They have stated that removal of the top section would be carried out using a large crane with personnel suspended from a basket taking the top down by hand. It was suggested that the bricks could be dropped down the inside of the chimney however this would render the materials unfit for re-use. There would be internal pressures imposed on the chimney walls at the base that give cause for concern and a build up of rubble cannot be allowed. This would also increase the risk of movement at the base from vibration. Consideration needs to be given to removing the materials remotely.

5.10. The condition of the adjoining structure should be determined and monitored to ensure it does not impact on the stability of the chimney.

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- 5.11. A number of issues have presented themselves that have serious implications on the site. Consideration should be given on the feasibility and value of keeping the structure given the chimney has exceeded its useful life for the purpose it was originally constructed.
- 5.11.1. The height of the chimney will be reduced by at least a third. Is there still a benefit in keeping a smaller chimney.
- 5.11.2. In order to make the chimney safe to enable further investigations the method of removal of the top section will involve significant expense. Notwithstanding this there is still a risk of failure of the structure during these works.
- 5.11.3. The investigations will require specialist testing and reports before further recommendations can be made. There will be expense associated with these investigations.
- 5.11.4. Further strengthening and repair works are likely to be expensive.
- 5.11.5. The remaining chimney will require regular maintenance and inspections involving further costs.
- 5.11.6. The feasibility of the future redevelopment of the site will need to be considered.
- 5.12. This report refers to the condition and risks from the chimney over a short period, and it is recommended that a regular review should be undertaken to establish whether any change in the condition of the chimney can be detected.



Signed

N D Taylor
BSc(Hons) CEng MICE MStructE
Associate

FOR AND ON BEHALF OF JNP GROUP

Date: 20 September 2012

Mill Chimney at Mondi Mill
Bridge Street, Ramsbottom

APPENDIX A

HSE Correspondence

Neil Taylor

From: Grayam.Barnes@hse.gsi.gov.uk
Sent: 10 September 2012 17:38
To: Neil Taylor
Subject: RE: Chimney at Mondi Mills, Ramsbottom [Filed 11 Sep 2012 08:46]
Attachments: PN-120730-GPB1.pdf

Good Afternoon Neil,

It was brought to the attention of HSE that the chimney at the Ex-Mondi paper mill site at Peel Bridge Mill, Ramsbottom, BL0 0BS may be unsafe. This information came from a demolition contractor (Yorkshire Demolition) who had a copy of a chimney inspection report that had been done whilst the mill as 'active' and the chimney was 'in service'. That report was done by 'Rafferty's' of Stoke on Trent, and it condemned the top section of the chimney.

The demolition company also expressed concerns that they thought some of the cracks in the chimney structure may have grown since they had operated their crushing plant on the site.

The HSE is not the appropriate organisation to specify whether or not the chimney should be demolished. The site has been purchased for re-development and parts of it are subject to a conservation order. I understand some work at that site has already breached terms of that order, but you would have to discuss such matters with the local authority (Bury MBC).

Having been informed of of potential risk it was necessary to secure reasonable practicable measures to negate that risk. As such a Prohibition Notice was served on the owners of that site, being the persons in control of any work activity at that site, to prevent any work in the vicinity of the chimney, other than work necessary to inspect the chimney or make it safe. However any such inspection work or remediation work will of course be subject to an appropriate risk assessment and would require appropriate control measures.

A further statement relating to the condition of the tower has been produced, via a steeplejack, but this may not have had the appropriate detail to satisfy the local authorities, or other relevant bodies, in terms of making a decision about the future of the chimney. This will be the reason why your company has been approached to make a more detailed assessment.

The Prohibition Notice is still in force on that site, so the 60 meter exclusion zone should remain in place until agreements about the future of the chimney have been agreed with the appropriate parties.

I have attached a copy of the Prohibition Notice for your information.

I trust that may assist you. I am currently working on an 'Inspection Blitz' and it would be difficult to contact me by phone over the next two weeks, but I will check my e-mails over that period should you have any concerns, or would like to discuss matters further..

Regards

Grayam P Barnes - HM Inspector
Construction Division

(Manchester & Cheshire)
Redgrave Court,
Merton Road

Bootle
Merseyside
L20 7HS

Tel - 0151-951 4000
Direct Dial - 0151-951 4870

VPN - 523 - 4870

From: Neil Taylor [mailto:Neil.Taylor@jnpgroup.co.uk]
Sent: 10 September 2012 17:01
To: Grayam Barnes
Cc: Demolition Yorkshire
Subject: Chimney at Mondi Mills, Ramsbottom

Grayam

I am preparing a report on the structural integrity of the existing chimney at the above and would appreciate your input. I understand you have imposed restrictions on the site.

Would you give me a call when convenient please.

Regards

Neil D Taylor
BSc(Hons) CEng MICE MStructE
Associate

www.**jnp**group.co.uk Consulting Engineers
Chesham • **Brighouse** • Leamington Spa • Sheffield • Teesside



Woodvale House, Woodvale Road, Brighouse, West Yorkshire. HD6 4AB
Tel: 01484 400691 Fax: 01484 400696

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Health and Safety at Work etc Act 1974 Sections 22, 23 and 24

Serial Number

P 120730-GPB1

Prohibition Notice

Name

MAS (ign) 1 LTD ~~REGISTRATION 22935~~

Address

25 ATHOL STREET, DOUGLAS, ISLE OF MAN
IM1 1LB

Trading as

I, (Inspector's full name)

GRAYAIN PAUL BARNES

one of Her Majesty's Inspectors of (Inspector's official designation)

HEALTH & SAFETY

Being an Inspector appointed by an instrument in writing made pursuant to section 19 of the said Act and entitled to issue the notice of (Official address)

HSE, REDGRAVE COURT, MERTON ROAD,
BARTLE, INCHESIDE. L20 7HS

Telephone number

0151 951 4000

hereby give you notice that I am of the opinion that the following activities namely:

ACCESS INTO, OR ANY WORK IN A 60 METRE RADIUS OF THE EXISTING
MILL CHIMNEY APART FROM THAT WHICH NECESSARY TO INSPECT
THE CHIMNEY AND MAKE IT SAFE

which are being carried on* / likely to be carried on*

by you* / under your control* at: (Location of premises or place of activity)

PEEL BRIDGE MILL,
RAMSBOTTOM, NEAR BURY, LANCASHIRE. BLO OBS

involve* / or will involve*, a risk of serious personal injury, and that the matters which give rise* / will give rise* to the said risks are:

PERSONS ARE LIABLE TO BE INJURED BECAUSE THE CHIMNEY STRUCTURE
MAY BE UNSTABLE OR IN A STATE OF WEAKNESS AND THEREBY
LIABLE TO COLLAPSE DUE TO THE CARRYING OUT OF DEMOLITION
OR CONSTRUCTION WORK

and that the said matters involve* / will involve* contravention of the following statutory provisions:

HEALTH & SAFETY AT WORK ETC ACT 1974, SECTIONS 2(1) & 3(1)
CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2007 -
REGULATION 22(1) STABILITY OF STRUCTURES

because

YOU HAVE FAILED TO MAKE ARRANGEMENTS TO ADEQUATELY ASSESS
THE STRUCTURAL INTEGRITY OF THE EXISTING MILL CHIMNEY, NOR
HAVE MADE SUITABLE ARRANGEMENTS TO ENSURE DEMOLITION OR
CONSTRUCTION WORK IS CARRIED OUT IN SUCH A WAY TO PREVENT
DANGERS TO PERSONS FROM STRUCTURAL COLLAPSE. THIS IS A MATTER UNDER
YOUR CONTROL
and I hereby direct that the said activities shall not be carried on by you or under your control immediately
unless the said contraventions and matters have been remedied.

I further direct that the measures specified in the schedule which forms part of this notice shall be taken to remedy the said
contraventions or matters.

Signature

G P Barnes

Date

31/07/12

A Prohibition Notice is also being served on*

related to the matters contained in this notice.

This is a relevant notice for the purposes of the Environment and Safety Information Act 1988

This page only will form the register entry.

Signature

G P Barnes

Date

31/07/12

1. Failure to comply with this Prohibition Notice is an offence as provided by section 33(1)(g) of the Health and Safety at Work etc Act 1974 and section 33(2) and Schedule 3A of this Act renders the offender liable on summary conviction to imprisonment for a term not exceeding 6 months in England and Wales and 12 months in Scotland, or to a fine not exceeding £20,000, or both, or, on conviction on indictment, to imprisonment for a term not exceeding 2 years, or a fine, or both

2. Except for an immediate Prohibition Notice, an Inspector has power to withdraw a notice or extend the period specified in the notice, before the end of the period specified in it. If you wish this to be considered you should apply to the Inspector who issued the notice, but you must do so before the end of the period given in it. Such an application is not an appeal against this notice

3. The issue of this notice does not relieve you of any legal liability for failing to comply with any statutory provisions referred to in the notice or to perform any other statutory or common law duty resting on you

4. You can appeal against this notice to an Employment Tribunal. Details of the method of making an appeal and a form to use are contained in the ETS19 booklet which will be provided by the Inspector with this notice

Time limit for appeal

A notice of appeal must be sent to the Employment Tribunal within 21 days from the date of service on the appellant of the notice, or notices, appealed against, or within such further period as the tribunal considers reasonable in a case where it is satisfied that it is not reasonably practicable for the notice of appeal to be presented within the period of 21 days. If posted, the appeal should be sent by recorded delivery

The entering of an appeal does not have the effect of suspending this notice. Application can be made for the suspension of this notice to the Employment Tribunal, but the notice continues in force until a tribunal otherwise directs.

An application for suspension of the notice must be in writing and must set out

- (a) the case number of the appeal, if known, or particulars sufficient to identify it; and
- (b) the grounds on which the application is made. (It may accompany the appeal)

The rules for the hearing of an appeal are given in The Employment Tribunal's (Constitution and Rules of Procedure) Regulations 2004 (SI 2004 No 1861).

PUBLIC AVAILABILITY OF INFORMATION ON ALL ENFORCEMENT NOTICES

1. The Health and Safety Executive (HSE), for its own purposes, records and monitors trends in the enforcement action it takes, and in the convictions and penalties imposed by the Courts. It is HSE's policy that this information should be brought to the public's attention. HSE also has a statutory obligation under the Environment and Safety Information Act 1988 to maintain a public register of certain notices. Details from this notice will therefore be stored on an electronic database, which is available on HSE's Website (www.hse.gov.uk).

2. Information on a notice will not be entered onto the database until after the right of appeal against the notice has expired. Where a notice is withdrawn or cancelled on appeal no entry will be made. Entries relating to notices served on individuals will be kept on the register for a period of 5 years from the date of issue. Notices served on individuals under the age of 18 will be removed sooner.

3. Information will be withheld where, in HSE's belief, its disclosure would:

- cause harm or prejudice; or
- be in breach of the law

4. Personal information is dealt with in accordance with the Data Protection Act 1998. Where disclosure of personal information would be incompatible with the Act it will not be included on the database.

5. If you are not satisfied with the information contained in the entry you have a further right to appeal to the HSE in the first instance.

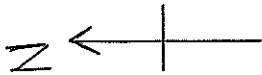
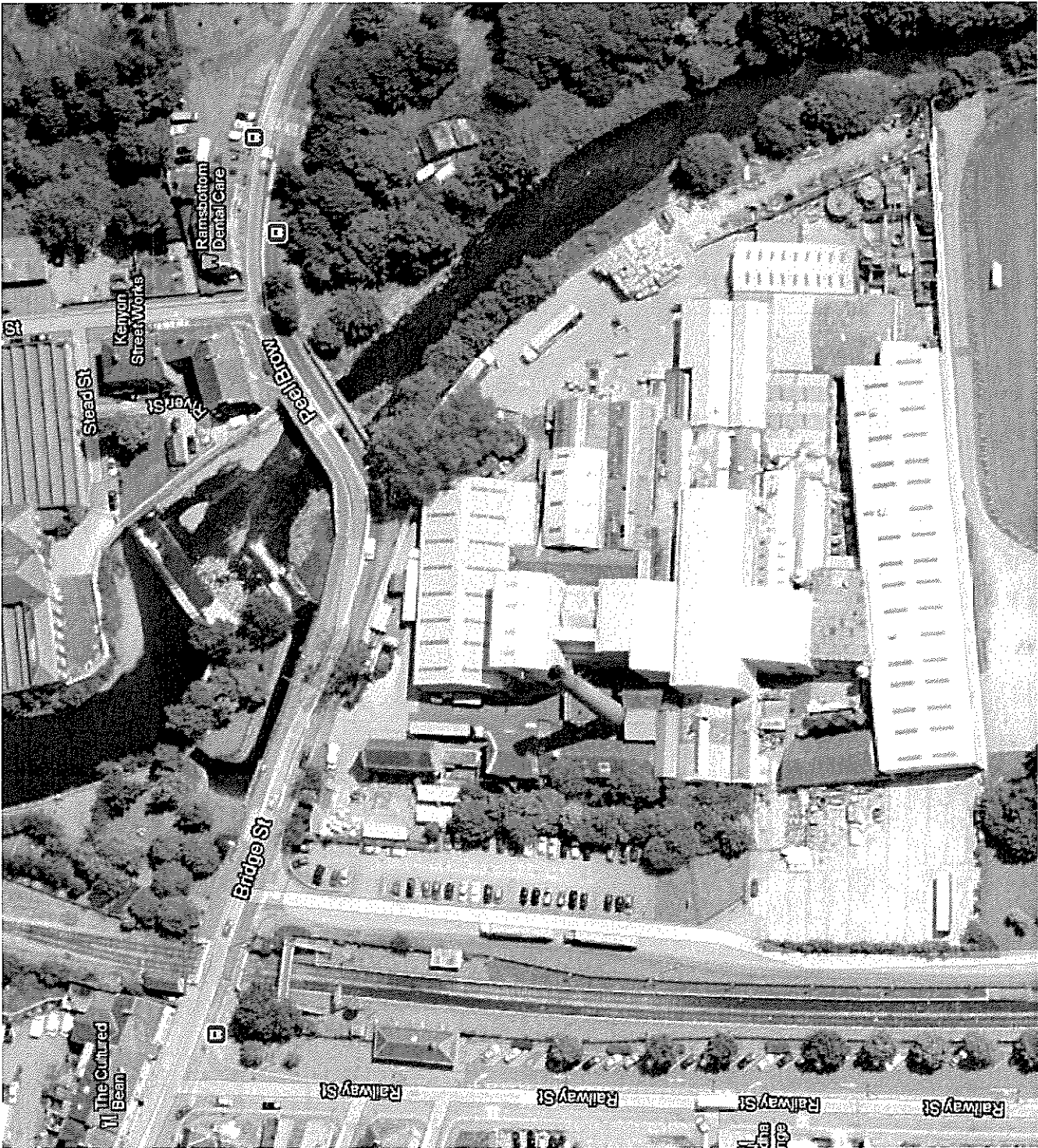
Mill Chimney at Mondi Mill
Bridge Street, Ramsbottom

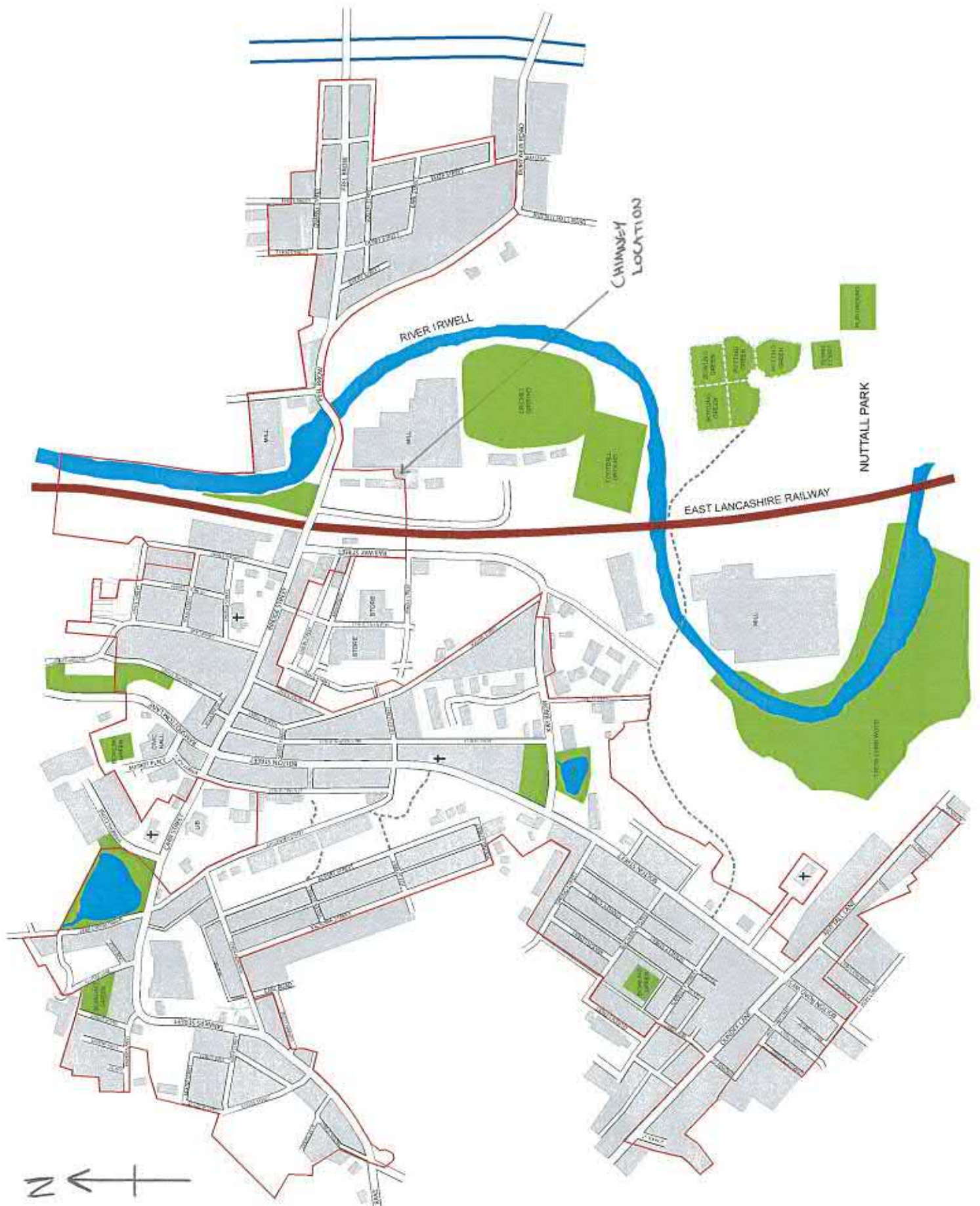
APPENDIX B

Location / Conservation Area Details

SITE LOCATION GOOGLE IMAGE .

NG8034

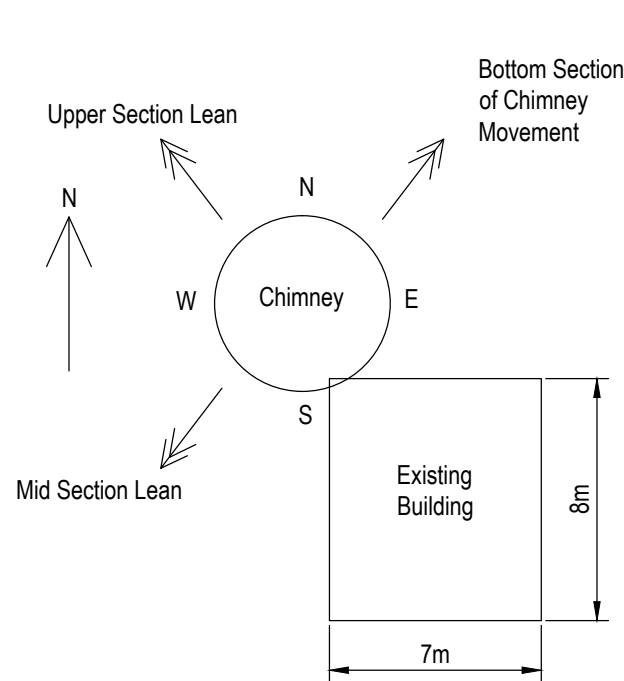




Mill Chimney at Mondi Mill
Bridge Street, Ramsbottom

APPENDIX C

Sketches



PLAN

Scale 1:250

Impact Damage Evident

Section of blockwork replaced in past

Slight Bulge *

Bottom section plumb

Slight dip of bed joints

NORTH ELEVATION

Slight bulge *

* Appears to lean to west

Top section appears to lean north-west *

Appear to bulge north-west *

Bottom section inward taper 1 in 30

Slight incline of bed joints. Crack in foundation

WEST ELEVATION

Appears to bulge outwards *

Appears to lean * south-west

Bottom section inward taper 1 in 24

Slight incline of bed joints

SOUTH ELEVATION

Bottom section inward taper 1 in 240

Dip in bed joints and foundation. Crack in foundation

EAST ELEVATION

* Bulge

Crack shows signs of recent movement

Foundation True

46m from GL

Notes:-

1. All working dimensions to be checked on site.
2. Do not scale except for planning purposes.
3. Any discrepancies between drawings of different scales, and between drawings and specification where appropriate to be notified to The Engineer for decision.
4. Copyright reserved. This drawing may only be used for The Client and location specified in the title block. It may not be copied or disclosed to any third party without the prior written consent of jnpgroup.
5. Prior to any work being commenced on site, The Engineer should be contacted regarding the current status or regulatory technical approval of this drawing.

Health and Safety Note:
The details on this drawing have been prepared on the assumption that a Competent Contractor will be carrying out the works. If the Contractor(s) considers that there is insufficient Health and Safety information on this drawing, this should immediately be brought to the attention of the Designer.

KEY

- = Cracks Identified From Ground Level
- = Severe weathering of mortar / masonry

Rev.	Date	Amendment	By	Chk.
Status				
INFORMATION				
 Consulting Engineers				
Client YORKSHIRE PLANT & DEMOLITION LTD				
Job CHIMNEY AT MONDI MILL RAMSBOTTOM				
Title EXISTING ELEVATIONS INDICATING DEFECTS				
Scale AS SHOWN @ A3		Date SEPTEMBER 2012		
Drawn By NE	Eng. Check NDT	Tech. Check		
 ISO 9001:2008				
 Accredited Contractor				
 Constructionline				
 Logo				
Drawing No. NG8034-01				Rev.

ELEVATIONS

Scale 1:200

Mill Chimney at Mondi Mill
Bridge Street, Ramsbottom

APPENDIX D

Photographs

Mill Chimney at Mondi Mill
Bridge Street, Ramsbottom



Elevation from NW showing lean to South West



South elevation showing masonry re-pointing
erosion and cracking



West elevation showing previous repair at
approximately 10m.



West elevation showing outwards movement of walls

Mill Chimney at Mondi Mill
Bridge Street, Ramsbottom



North elevation showing recent impact damage and evidence of base movement in past



North elevation showing previous repair at approximately 10m



North elevation showing cracks to top



Indication of previous repointing

Mill Chimney at Mondri Mill
Bridge Street, Ramsbottom



Historic crack of foundation to east elevation
with recent movement apparent



Crack recently propagated in east elevation



View of chimney from east



South elevation showing extremely unstable building
connected to bottom of chimney

Mill Chimney at Mondri Mill
Bridge Street, Ramsbottom



South elevation showing previous repairs near bottom



South elevation showing weathering of masonry and mortar

Mill Chimney at Mondi Mill
Bridge Street, Ramsbottom

APPENDIX E

Rafferty Chimneys Engineering Ltd
Report dated April 2008

Mondi Packaging Holcombe Ltd
Holcombe Paper Mill,
Bridge Street,
Ramsbottom
Bury
Lancashire
BL0 0BS

Nash Peake Works
Tunstall
Stoke-on-Trent
ST6 5BT
ENGLAND

tel +44 (0)1782 834567
tel +44 (0)1782 813929
tel +44 (0)1782 810810
fax +44 (0)1782 575720

email: enquiries@rafferty-chimneys.com
web: <http://www.rafferty-chimneys.com>

23rd April 2008

FOR THE ATTENTION OF
RE:
TITLE:
STATUS:
DATE OF INSPECTION:
NEXT INSPECTION DUE:
INSPECTION ENGINEER:
INSPECTION DIRECTOR:
REFERENCE:

Mr Darren Hoyle
50m High Circular Brick Chimney
External Inspection
Condition Report
8th and 9th April 2008
April 2009
Mr S. Whitehurst - Advanced Steeplejack
Mr. C. Woodroffe
RC15439

Dear Sirs,

Having recently completed the external inspection of the 50m High Circular Brick Chimney, we are now pleased to submit for your consideration our written report and our recommendations as follows:

1:0:0 EXTERNAL INSPECTION

1:1:0 PERIOD OF WORK

1:1:1 The duration of the inspection work from commencement to its completion was two working days being the 8th and 9th April 2008.

1:2:0 CHIMNEY LOCATION

1:2:1 50m high boiler house brick chimney.

1:3:0 TYPE OF INSPECTION

1:3:1 Erection of traditional steeplejack ladders on one elevation followed by an external visual inspection on one elevation.

1:4:0 LIMIT OF INSPECTION

1:4:1 Visual inspection of chimney brickwork, retaining bands and testing of lightning conductor system.

Continued...



1:5:0 PHOTOGRAPHS AND VIDEO

1:5:1 Colour photographs and video were taken during the course of the inspection and are enclosed with this report as evidence of defective areas or for identification purposes.

1:6:0 MEASUREMENTS

1:6:1 Due to the nature of our works any measurements expressed in this Report may be approximate only unless otherwise stated.

1:7:0 DISCLAIMER

1:7:1 This report is submitted based on the condition of the chimney at the time of the inspection and is to the best of our knowledge and experience a true representation of the current situation. Rafferty Chimneys Engineering Ltd accepts no liability in respect of any loss as a result of any inaccuracies in this report.

1:8:0 COPYRIGHT

1:8:1 Copyright in this report remains vested in Rafferty Chimneys Engineering Ltd. The information contained in this report is confidential and is provided on the understanding that it will be used only by the client/customer for the purpose of evaluating this report. In particular, the contents of this report may not be disclosed, in whole or in part, to any other party, unless required, in the interests of health and safety. No copies may be made without the prior written consent of an authorised Director of Rafferty Chimneys Engineering Ltd.

1:9:0 OUTCOME OF INSPECTION

1:9:1 During the course of the inspection, our Inspecting Engineer will have commented on various sections of the chimney and their condition and these are identified as follows

2:0:0 CONDITION REPORT

2:1:0 CHIMNEY CONSTRUCTION

2:1:1 This chimney stands at an overall height of approximately 50m above ground level and is constructed of standard chimney brickwork and is circular in construction.

2:2:0 CHIMNEY SHAFT BRICKWORK

2:2:1 The external condition of this chimney on the ladder elevation was found to be very poor structurally within the top 20m. In the interests of health and safety the extent of the serious defects located prevented our carrying out a full visual external inspection. Therefore, this inspection report is limited to approximately 30% of the surface area of this chimney on one elevation being the ladder elevation from ground level to the termination point. A visual inspection on the opposite elevation to the ladders was carried out from ground level and it was observed that similar defects exist in the brickwork as on the elevation inspected but to what extent is unknown. We are informed that this chimney has undergone an extensive re-pointing of the brickwork joints and fractures about 3/4 years ago. These pointing repairs have done very little to restore this chimney to an acceptable condition or making it fit for purpose. On the contrary these repairs have only assisted in concealing the underlying problems thus giving

Continued...

an appearance that does not reflect the present very poor structural condition of this chimney. This brick chimney when built, more than likely serviced coal fired Lancashire boilers. Since then the chimney has probably serviced other type's boilers using heavy fuel oil/light fuel oil etc down to the present day where gas is the fuel being used. We are informed that the present boilers occasionally have loose tubes which cause moisture to enter the stack; we are told that this situation is present at the moment, which is the likely cause of the extensive saturation of the brickwork located at the time of our inspection. Other causes of saturation are the reaching of water dew point during operation, intermittent use, using the boilers separately or when the chimney shuts down for boiler/chimney maintenance. We are told that this chimney is used 24/7 for 355 days a year with a 10 day shutdown. In addition to the aforementioned the chimney has been fitted with a fibreglass reducer cone at the termination point which if sized correctly would increase the efflux of the gases as they vent in to atmosphere to meet current environmental requirements. At the time of inspection gases were seen coming from underneath the cone base and through the fractures. This indicates that the cone is not sized correctly and is restricting the natural flow of the gases causing positive pressure within the stack. The gases escaping through the fractures in the brickwork have at least confirmed that the existing fractures penetrate the full depth of the brickwork. We have requested from you information on your boilers which will confirm the correct outlet size of the cone. The present structurally poor condition of this chimney is of a direct result of the way it has been used during its life time. It is also apparent that the specialist chimney contractors used in the past must not have considered the effects that the past and present operating conditions have had on this chimney, which has resulted in the ineffective repairs carried out. The results of our inspection are as follows:

- 2:2:2: Mortar joints.** A visual inspection of the mortar joints on the laddered elevation and from ground level revealed that this chimney has undergone a full external re-pointing repair. Some of the pointing was found to have been carried out to be of a reasonable and neat standard. However, large areas were found to be of sub standard in application. The pointing in the top 10m of the stack was found to be failing due to moisture penetration from the interior. A small area of the mortar was removed at Fan Deck level which revealed the joints had been cut back 10mm to 15mm prior to the application of the mortar. As stated in 2:2:1 of this report, these pointing repairs have done very little to restore this chimney to an acceptable condition or making it fit for purpose. On the contrary these repairs have only assisted in concealing the underlying problems thus giving an appearance that does not reflect the present very poor structural condition of this chimney. (See also photographic and video evidence).
- 2:2:3 Fractures.** New and previous vertical fractures were located on the laddered elevation generally within the top 38m of this chimney. These fractures vary in width from 4mm in the lower areas of the chimney to approximately 60mm wide within the top 20m of the chimney. The fractures within the top 20m of the chimney are of a more serious nature as internal gases can be clearly seen escaping through the fracture which clearly identifies that these fractures penetrate the full depth of the brickwork. Sections of loose mortar were removed at the time of inspection which revealed a green acidic residue also the open fractures were found to be very wet, which was also identified when the measuring ruler was inserted condensation quickly formed on its face. The mortar in the fractures was found

Continued....

to be severely perished. Tell -Tales were not fitted to the fractures on the elevation inspected although it was noticed from ground level that Tell -Tales are fitted to the fractures on the rear elevation, these fractures were not inspected for reasons stated in 2:2:1 of this report. There is clear evidence even without the fitting of Tell-Tales that further movement has occurred in the fractures inspected. From the inspection carried out and when considering the entire contents of this report and visual evidence we are in no doubt that the top 20m of this chimney should be demolished without delay. (See also photographic and video evidence).

2:2:4 **Loose and bulging brickwork.** The majority of the loose and bulging brickwork was located in the top 8m of the chimney on the elevation inspected. Isolated areas of loose bricks were located below this level down to the 20m level below the termination point, generally around the wide fractures. In addition to the aforementioned a 10mm wide horizontal bed lift was located approximately 4m below the termination point, we could not confirm if this bed lift runs for the full circumference of the chimney. Small areas of loose bricks were removed at the time of the inspection which revealed that the mortar behind the bricks was severely perished. This situation causes serious concern as it identifies little or no bond between the bricks. From the inspection carried out and when considering the entire contents of this report and visual evidence we are in no doubt that the top 20m of this chimney should be demolished without delay. (See also photographic and video evidence).

2:2:5 **Reducer cone.** There is a fibreglass reducer cone fitted to the termination point of this chimney. Reducer cones are fitted to chimneys to increase the efflux of the gases as they vent in to atmosphere to meet current environmental requirements. At the time of inspection gases were seen coming from underneath the cone base. This indicates that the cone is not sized correctly see 2:2:1 of this report. Moisture was also seen to be dripping from underneath the cone. We could not fully inspect the integrity of the cone and the securing hanger retaining band at the time of inspection for safety reasons. (See also photographic and video evidence).

2:3:0 RETAINING BANDS

2:3:1 There are 22No retaining bands fitted at various levels throughout the full height of this chimney. 2No are 150 x 12mm with triple lug and 24mm bolt arrangement, 12No 75 x 8mm single lug and 20mm bolt arrangement and 8No 75 x 10mm with single lug and 20mm bolt arrangement. There are a series of vertical straps welded to the outside of the top 4No retaining bands within the top 4m of this chimney along with a series of short vertical straps fitted to the underside of the top 2No retaining bands.

2:3:2 The general condition of the retaining bands and securing bolts where seen from the access ladder were found to be in a reasonable condition and under adequate tension at the time of inspection. For safety reasons a full inspection of the full circumference of each retaining band was prevented. The main defects recorded to the band steelwork were failing paint work and corrosion attack where the gases/moisture were escaping through the brickwork corroding the steelwork at these locations. The vertical straps welded to the outside of the top 4No retaining band were performing no function whatsoever. For these vertical straps to be considered effective they would need to be installed underneath the retaining bands directly onto the brickwork.

Continued.....

2:4:0 LIGHTNING CONDUCTOR SYSTEM

- 2:4:1 This chimney has a lightning conductor system fitted. The general installation is as per the attached engineers report.
- 2:4:2 The present lightning conductor system was inspected to BS6651:1999 'The Protection of Structures Against Lightning'. We have had to fail the system for the reasons stated in 2:4:3 of this report
- 2:4:3 There is only one air terminal rod fitted to this chimney which is secured to the fibreglass cone. This chimney would benefit from two air terminals secured to the brickwork which should be install were the vertical conductors run to earth. The holdfasts that secure the existing down conductor tape are at 1.2m centres, these should be at 1m centres bottom 20m of the chimney and 500mm centres above the 20m level. Only three of the 22No retaining bands are bonded to the down conductors. All 22No retaining bands should be bonded to the lightning conductor down tape/rope. There is no test clamp fitted to the rope down conductor which is required to allow an earth test to be taken.

END OF REPORT

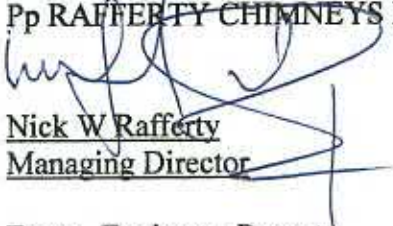
CONCLUSION

The external inspection carried out revealed that this chimney was found to be in a structurally poor and unsafe condition. From the extent of the defects located within the top 20m of this chimney it is our professional opinion that this section of the chimney is structurally unsafe and has gone beyond repair. We must advise as a minimum that the top 20m of this chimney is demolished without delay in the interests of health and safety. We cannot confirm how perished the mortar is within the bottom 30m of this chimney, but when considering the extent of condensation present we would expect the mortar to be in poor and perished condition. We have not provided with this report any recommendations for this work as we are told that this chimney maybe subject to a preservation order. A meeting has been arranged for the 1st may 2008 when all options available to your good selves will be discussed subject to confirmation of the preservation order. After this meeting quotations will be submitted on the options agreed.

We trust you find the aforementioned to your entire satisfaction and we await your further instructions. Meanwhile, we respectfully remain,

Yours faithfully

Pp RAFFERTY CHIMNEYS ENGINEERING LTD


Nick W Rafferty
Managing Director

Encs: Engineers Report
Photographs
DVD

LIGHTNING CONDUCTORS SYSTEM - ENGINEERS REPORT

Customer	MONDI PACKAGING HOLECOMBE LTD		
Address	HOLECOMBE PAPER MILL, BRIDGE ST, RAMSBOTTOM, LANCS BL0 OBS		
Inspection carried out by	S. Whitehurst -Adv Steeplejack	Date	9 th April 2008
Chimney Identification	50m High brick boiler house chimney.		
Next Inspection Due	March 2009		

Air Terminals - Number	ONE	Size	1.2m
Air Terminals - Fixing Type	Steel saddle	Condition	Heavily corroded
Coronal Band - Size	None	Condition	
Coronal Band - Condition	N/A	Size	N/A
Horizontal Tapes - Number	None	Size	N/A
Horizontal Tapes - Position	N/A		
Horizontal Tapes - Condition	N/A		
Holdfasts - Condition	Reasonable		
Holdfasts - Centres	1.2m		
Downtapes - Number	TWO	Size:	25 x 3mm tape/16mm rope
Downtapes - Condition	Reasonable		

Test Clamp - Position	Base on tape only	Condition:	Reasonable
Tests - Earth Ⓢ	Tape - 14.1 ohms	Tests - Earth Ⓢ	
Tests - Earth Ⓢ	Rope - None taken	Tests - Earth Ⓢ	
Tests - Earth Ⓢ		Tests - Earth Ⓢ	
Tests - Earth Ⓢ		Tests - Earth Ⓢ	

Combined Earth Resistance Reading

Continuity Reading 2.3 ohms

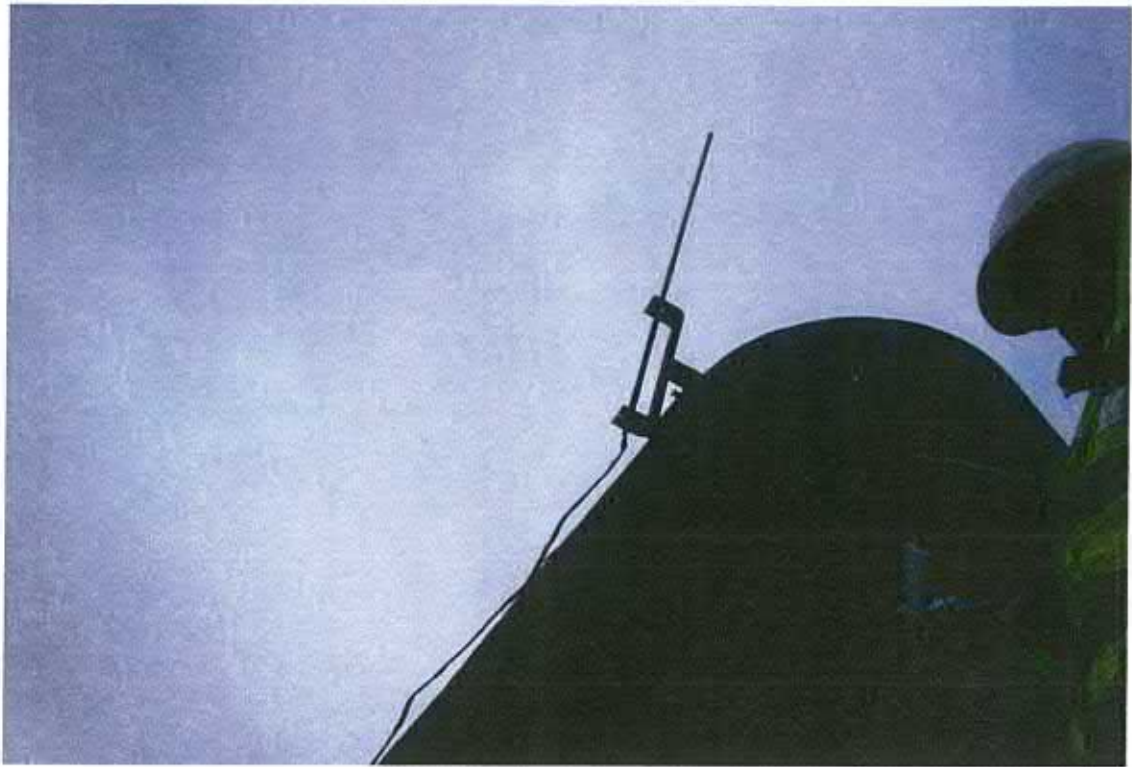
3No retaining bands bonded to the down conductors at 5m, 20m and 43m above ground level.

SEE REPORT (REF RC15439) FOR REASONS OF FAILURE

TEST CERTIFICATE

FAILED

Authorised Signature

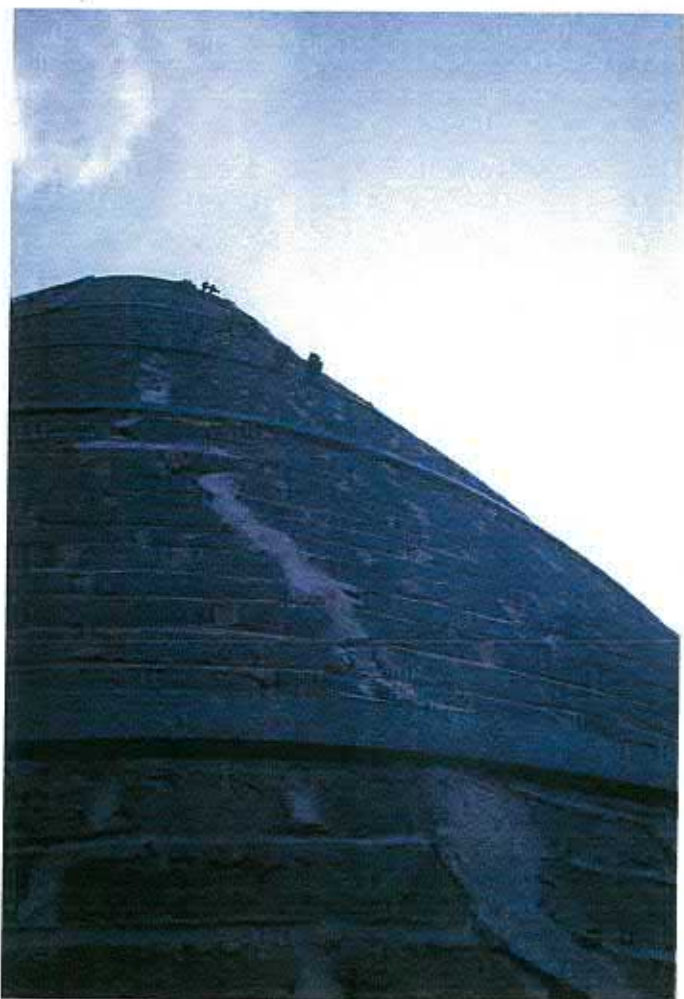




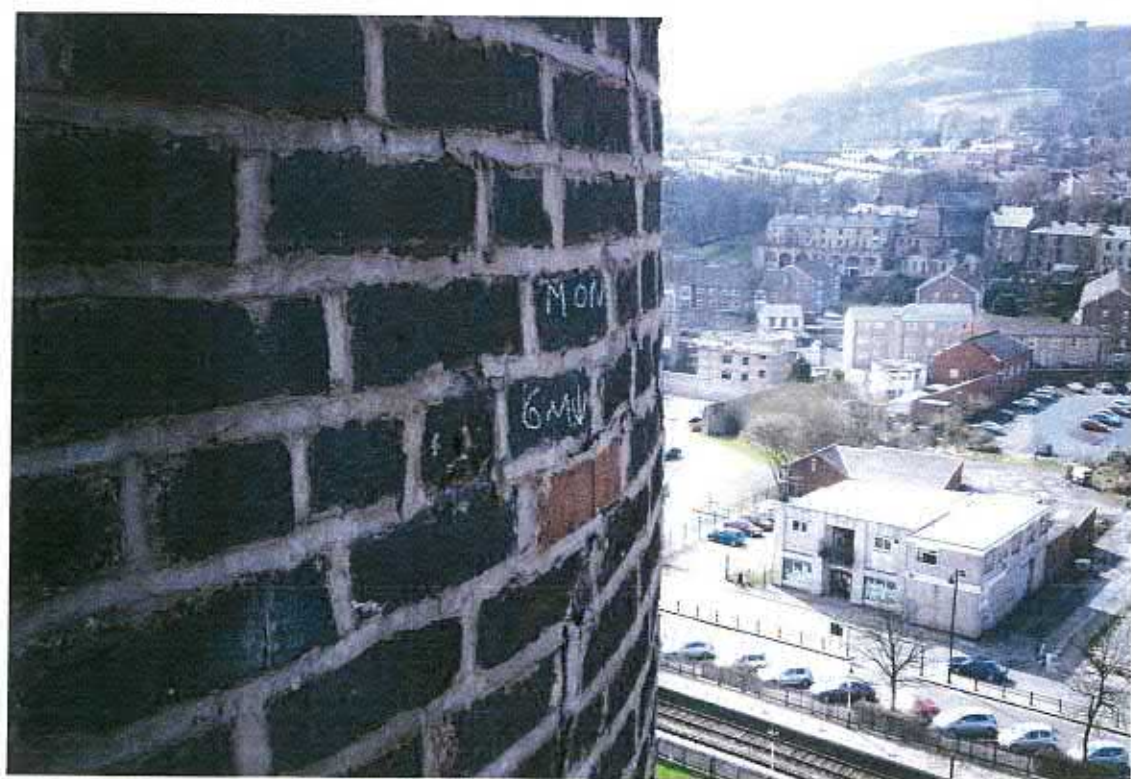


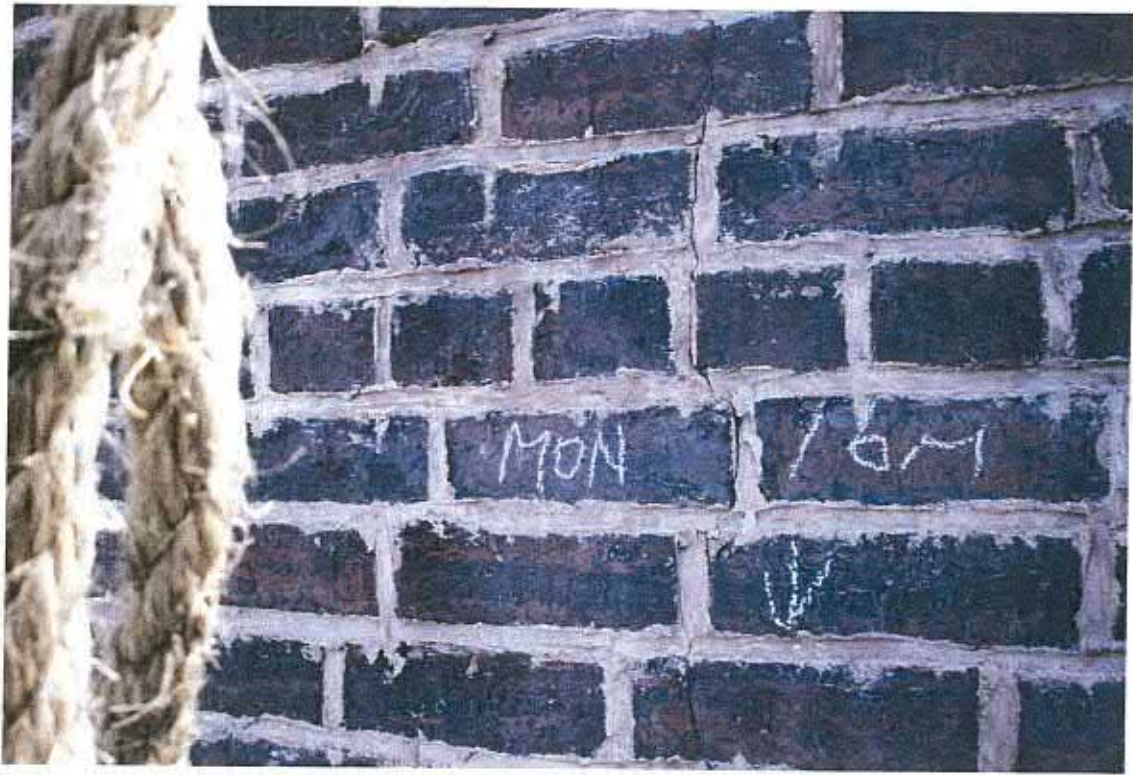








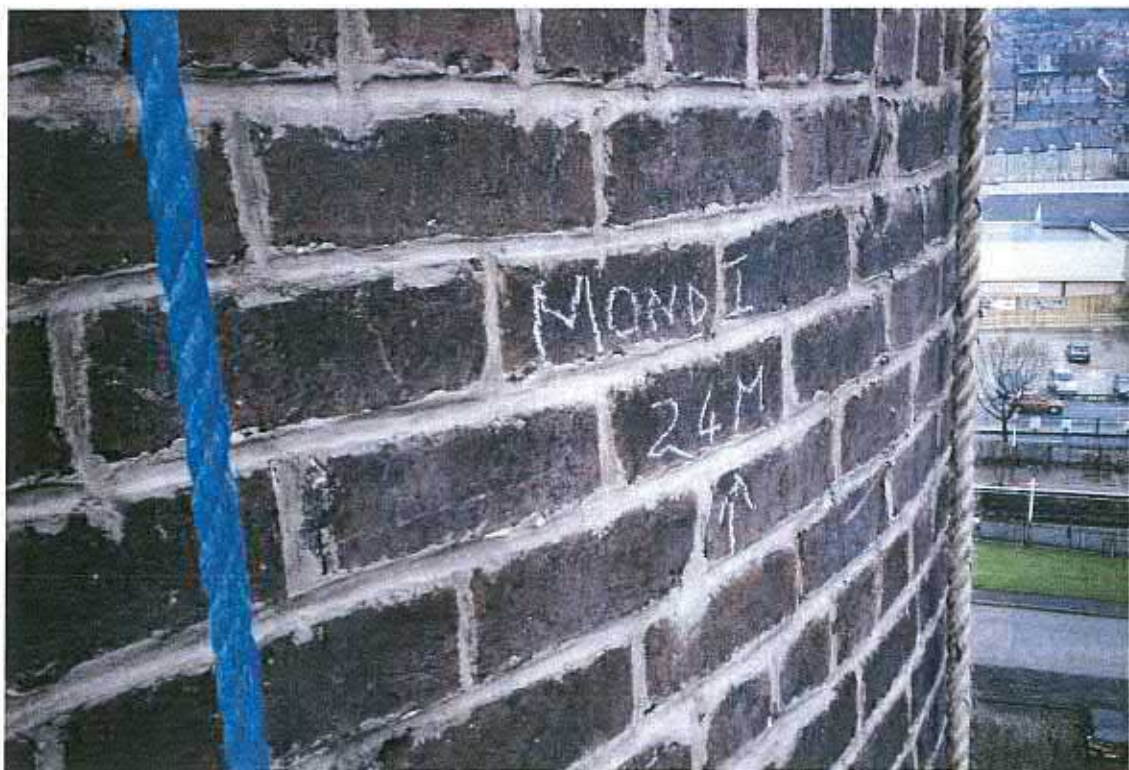








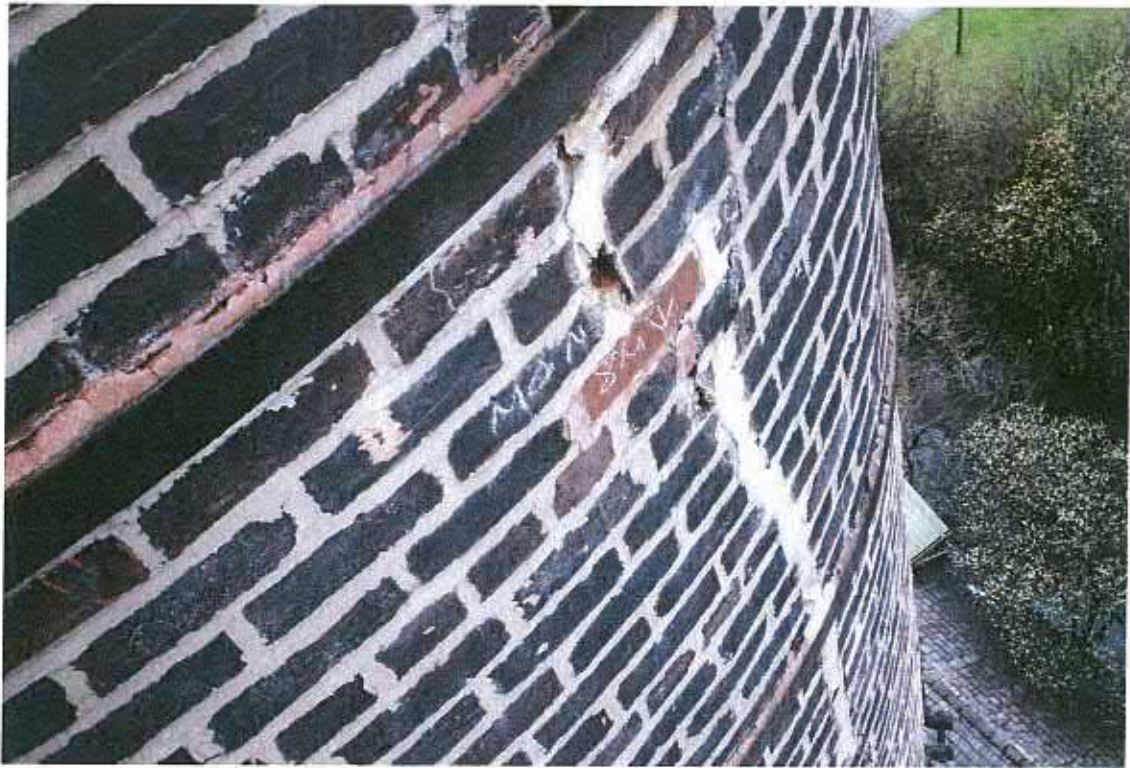


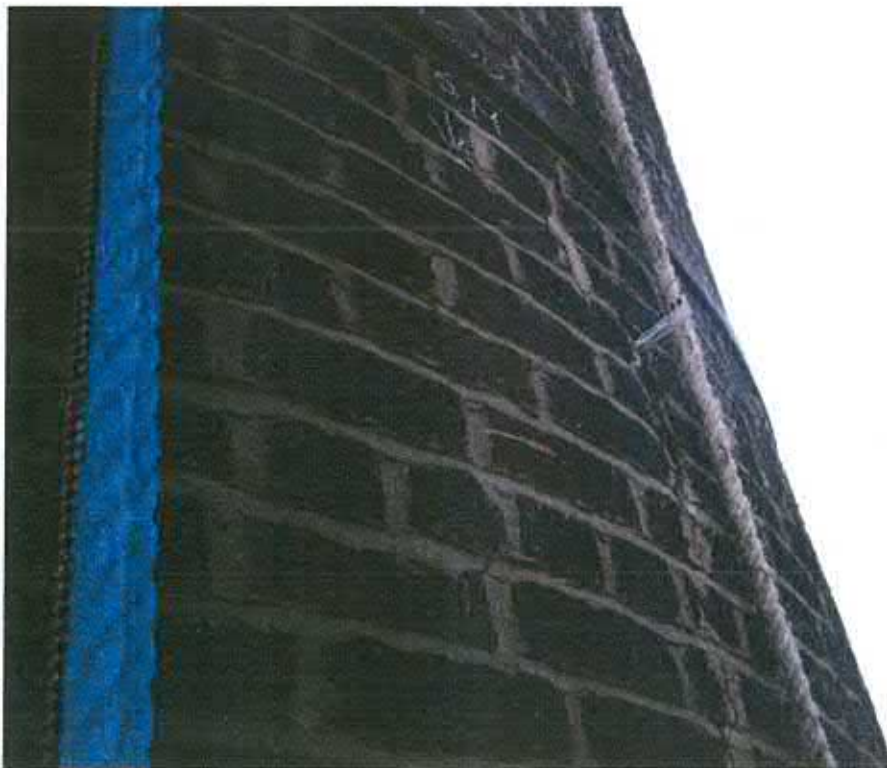














Mill Chimney at Mondi Mill
Bridge Street, Ramsbottom

APPENDIX F

Warburtons Steeplejacks & Co Ltd
Report dated August 2012

WARBURTONS STEEPLEJACKS & CO. LTD



OUR REF:
YOUR REF:

462 PRESTON OLD ROAD
CHERRY TREE
BLACKBURN
LANCASHIRE BB2 5LY

ESTABLISHED 1946
STEEPLEJACKS & LIGHTNING CONDUCTOR ENGINEERS
ROOFING CONTRACTORS
CONTRACTORS TO THE MINISTRY OF DEFENCE
AND LOCAL AUTHORITIES

Telephone:
(01254) 209593
Fax:
(01254) 207734

**Demolition Yorkshire,
Unit 3,
Emley Business park,
Emley,
Huddersfield HD8 9QY**

21st August 2012

For the attention of Mr. Matthew Berry

Dear Sir,

Re: Chimney Inspection - Mondi Mill (Trinity Paper Mill) - Ramsbottom

Further to receipt of your order dated the 3.8.2012, we now confirm having visited the site for the purpose of carrying out a detailed laddered inspection of the above chimney stack.

Attached please find our report, together with photographs taken during the inspection.

We trust you will find the attached satisfactory, but should there be any points you wish to discuss further please do not hesitate to contact the undersigned.

Yours faithfully

John Warburton
Director

Mondi Mill - Ramsbottom.

Chimney Specification.

The chimney which is circular on a plane rises to a height of approximately 150' above ground level.

The overall diameter at the termination is 12' and the overall diameter at the base is 19'

The stack was built throughout in second quality wire cut common brick laid in a lime mortar.

The thickness of brickwork at the chimney termination is 18".

There are 22 no bands fitted throughout the stack.

A fibreglass ventura fitted to the chimney termination is 8' in height.

Lightning Conductor Specification.

The lightning conductor air network comprises of 1 no 5' long $\frac{3}{4}$ " diameter solid copper air terminal.

This is mounted to the fibreglass ventura.

Two number separate down tapes in copper. One tape runs to ground level. One has been stolen.

Mondi Mill - Ramsbottom.

Report.

1. Working from the summit down using a boson's chair, we found that the external face of the stack approximately 6' below the termination, severe bulging of the brickwork is evident.
2. Evidence of further cracking running down through the brickwork from this position.
3. Jointing material throughout this area was particularly heavily corroded, the situation being worse on the weathered side of the stack.
4. There was some sign of previous somewhat unsatisfactory pointing works, although this has almost totally fallen away. Please refer to photographs No's 1-20
5. At a point 30' below the summit of the chimney large cracks are evident, please refer to photographs No's 21-26.
6. At the base of the chimney stack there are air line cracks that has appeared after previous pointing carried out, please refer to photographs No's 27-28.

Mondi Mill - Ramsbottom.

Conclusions

As already indicated the condition of the upper section of the stack gave some cause for concern.

Basically it would appear that the major defects in particular the bulging brickwork in the upper section of the stack has been caused by swelling of the jointing material.

The situation has almost certainly been aggravated by the fact that the upper section of the stack is in an extremely damp condition.

It must also be borne in mind that deterioration has been taking place to the upper section of the stack for some considerable time, as many of the bulges, cracks and defects have been previously re-pointed. This not being really a remedial solution to the problem.

It is therefore in our opinion that the chimney stack be demolished without delay, before the brickwork at the top section collapses.

We strongly recommend that the area below the chimney should be fenced off without delay.

Mondi Mill - Trinity Paper Mill

No 1



No 2



№3



№4



Nº 5



Nº 6



No 7



No 8



No 9



No 10



No 13



No 14



No 11



No 12



No 15



No 16



No 17



No 18



No 19



No 20



No 21



No 22



No 23



No 24



No 25



No 26



No 27



No 28





john newton & partners

jnp group

Consulting Engineers

Report on

**Chimney Inspection
Mondi Mill
Ramsbottom**

For

REOC 3 Limited

Prepared by

**Derek Smith
BEng CEng MICE MStructE**

Approved by

**Derek Smith
BEng CEng MICE MStructE**

Date

23 March 2016

Ref.

NG8034/RAM/REOC 3

**Chesham
Brighouse
Midlands
Sheffield
Teesside**

Job Number: NG8034/RAM
Project Name: Mondi Mill Chimney, Ramsbottom
Client: REOC 3 Limited
Report Title: Chimney Inspection
Reference: NG8034/RAM/REOC 3



DOCUMENT CONTROL SHEET

Project Name: Mondi Mill Chimney, Ramsbottom
Project Number: NG8304/RAM
Client: REOC 3 LIMITED
Report Title: CHIMNEY INSPECTION
Reference: NG8034/RAM/REOC 3/C

A handwritten signature in black ink, appearing to read "D. Smith".

Signed by.....
D.Smith BEng CEng MICE MStructE
Partner

FOR AND ON BEHALF OF JNP GROUP

Date: 23 March 2016

NB: The copyright at all times remains with JNP Group

Document Issue Record

Rev	Date	Description	Prepared	Reviewed	Approved
A	11/12/14	Amended following LA comments	NDT	SWE	SWE
B	18/08/15	Amended following inspection on 5 August 2015			
C	23/03/16	Amended following inspection on 19 February 2016	DS	DS	DS

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Job Number: NG8034/RAM
Project Name: Mondi Mill Chimney, Ramsbottom
Client: REOC 3 Limited
Report Title: Chimney Inspection
Reference: NG8034/RAM/REOC 3



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1.1	INTRODUCTION	3
1.2	SUMMARY	3
1.3	GENERAL DESCRIPTION	3
1.4	DEFECTS	3
1.5	DEMOLITION	3
1.6	CONCLUSIONS AND RECOMMENDATIONS	4

List of Figures / Drawings

NG8034-02B	Elevations indicating defects and changes since last inspection
NG8034-04B	Elevations indicating proposal for reduction in height stage 1
NG8034-5A	Approximate section through chimney

List of Appendices

Appendix A	Photographs
Appendix B	Report by JNP Group on 20 September 2012
Appendix C	Report by JNP Group on 26 November 2014
Appendix D	Report by JNP Group on 18 August 2015

Job Number: NG8034/RAM
Project Name: Mondi Mill Chimney, Ramsbottom
Client: REOC 3 Limited
Report Title: Chimney Inspection
Reference: NG8034/RAM/REOC 3



1 INSPECTION REPORT

1.1 Introduction

JNP Group was commissioned by REOC3 Ltd on 11 February 2016 to inspect the remains of the existing chimney at Mondi Mill in Ramsbottom, Greater Manchester. This is following previous reports recommending partial demolition of the chimney by removing the top 15 metres or so to ensure the structural integrity/performance going forward with the proposed re-development of the site.

The scope of the report therefore is intended to inform the Local Planning Authority and the Health and Safety Executive that the partial demolition has resulted in a situation where we believe the Planning Condition No.5 may now be discharged and the exclusion zone imposed by the HSE may now be removed.

Partial Demolition commenced on 10 February 2016 and the top 11 metres approximately of brickwork was taken down. An inspection was carried out on Friday 19 February 2016 by Derek Smith, a chartered civil and structural engineer with over 37 years experience and a Partner of JNP Group.

The report is based on observations from a mobile extended working platform (MEWP) provided by the Client and operated by the demolition contractor.

1.2 Summary

1.2.1 The chimney now remains in a stable condition for the current reduced height of 35 metres.

1.2.2 Some of the recommendations in the reports dated 5 September 2012 and November 2014 have been implemented.

1.2.3 The chimney height has been reduced by approximately 11 metres and the remaining structure assessed. In my opinion the risk of catastrophic collapse is considered very low in the medium to long term providing the chimney is maintained regularly.

1.3 General Description

The chimney has now been reduced in height by approximately 11 metres to 35 metres.

1.4 Defects

Reference should be made to the previous defects identified in the reports prepared by JNP Group in 2016, 2012 and 2015. These defects are still evident from observations made in the recent inspection. Any deterioration has been recorded on the drawing attached to this report (NG8034 – 02B).

There are large areas of efflorescence staining to the mid and lower sections of the east elevation.

1.5 Demolition

1.5.1 Demolition of the top 11 metres was undertaken with the agreement of the HSE by the use of hand held power tools working from a MEWP

1.5.2 From our observations it was apparent that the brickwork was in quite sound condition and required considerable effort to break it down. In some areas the mortar was stronger than the bricks and consequently the hammer caused the bricks to break.

1.5.3 The cracking observed externally was more accurately assessed as weathered vertical staggered joints in the outer leaf of brickwork. The observed gaps did not penetrate the wall of the chimney inside.

Job Number: NG8034/RAM
Project Name: Mondi Mill Chimney, Ramsbottom
Client: REOC 3 Limited
Report Title: Chimney Inspection
Reference: NG8034/RAM/REOC 3



1.6 Conclusions and Recommendations

The chimney has been reduced in height which now significantly reduces the risk of failure. It has a temporary concrete haunch applied to the top of the brickwork to help deflect the potential for water/ice build up within the joints. At the present time the top of the chimney is open to the elements and there is no guard to prevent bird or water ingress.

In my opinion the chimney is no longer at risk of catastrophic collapse and may be regarded as safe enough to allow the exclusion zone imposed by the HSE to be removed.

Notwithstanding the above the chimney will still require to be maintained and all defects, previously identified should be repaired.

Such repairs should be undertaken by suitably qualified persons.

Loose mortar should be removed and the deep pointing with cement/lime/sand repair mortar should be used. Stainless steel ties should be inserted across the vertical cracks at intervals not exceeding 225mm (three courses).

A replacement cap should be considered as part of any proposed development and its form and construction should be agreed with the LPA. Its primary function is to prevent water/bird ingress.

Job Number: NG8034/RAM
Project Name: Mondi Mill Chimney, Ramsbottom
Client: REOC 3 Limited
Report Title: Chimney Inspection
Reference: NG8034/RAM/REOC 3



Appendix A

PHOTOGRAPHS



Job Number: NG8034/RAM
Project Name: Mondi Mill Chimney, Ramsbottom
Client: REOC 3 Limited
Report Title: Chimney Inspection
Reference: NG8034/RAM/REOC 3



Picture 1 – General view of chimney



Picture 2 – Vie of concrete Haunch

Job Number: NG8034/RAM
Project Name: Mondi Mill Chimney, Ramsbottom
Client: REOC 3 Limited
Report Title: Chimney Inspection
Reference: NG8034/RAM/REOC 3



Picture 3 – Crack repairs to southern elevation

Our Ref: NG8034/L005/DS/sjw

Your Ref:

Chkd: DS

Date: 20 December 2016

Clive Wilding
REOC 3 Limited
2nd Floor
Clarendon House
Victoria Street
Douglas
Isle of Man
IM1 2LN

FAO Mr C Wilding

Dear Mr Wilding,

Re: Chimney Inspection, Mondri Mill, Ramsbottom

I refer to recent email correspondence between ourselves and David Collins of Collins Consulting.

It has been brought to our attention that works to the site at Mondri Mill are still the subject of the Prohibition Order issued by the HSE on 31 July 2012. This is despite works to reduce the height of the chimney undertaken in February 2016 and our subsequent report stating that in our opinion the Prohibition Order may be removed subject to certain conditions. It is understood that the HSE have minded to allow certain works to improve general site security as indicated in their letter dated 26th October 2016. A copy of this letter is attached.

This supplementary report should be read in conjunction with the report dated March 2016. I have reviewed the previous reports and my conclusion remains unaltered.

The Prohibition Notice was served following an inspection made on 30 July 2012 and a review of a report prepared by Messrs Rafferty Chimney Engineering Ltd in April 2008. In 2008 the main concerns centred around the presence of fractures and the condition of the mortar and brickwork whilst at that time it was operational.

Shortly after the 2008 inspection the mill was closed and the boiler ceased to operate. The chimney was therefore no longer required to perform in service.

The most recent inspection earlier this year took place at the time of removal of the upper 11 metres of brickwork. The very nature of the work required handheld power tools to demolish the brickwork and contrary to the assertion of the Rafferty report, the mortar was found to be sound within the body of the brickwork. In some areas this was harder than

the bricks. Externally it is apparent that the mortar joints have weathered and deteriorated but not to a significant penetration depth.

Indeed, the external fractures observed from ground level previously and again from a mobile extended working platform revealed that the cracks only penetrated the outer leaf of brickwork. This represented less than 25% of the thickness of the upper section of brickwork.

It is noted that when the chimney was operational there was evidence of gases escaping through the brickwork at high level at the base of the former fibreglass reducer cone. During the removal of the upper section of brickwork there were apparent lines of weakness that would give rise to concern over the overall integrity of the chimney walls. However, as the chimney has not been operational for the past 7 years or so the brickwork now has to withstand the normal effects of the weather.

The situation that now arises on site is that the chimney has been reduced in height by some 11 metres. It remains at a height of approximately 35 metres from its original 46 metre height. Since we were able to gain access to the inside of the chimney, something denied to the Chimney Engineers and the demolition contractor in 2008 and 2012 respectively, we have established that the chimney walls are constructed using three different thicknesses. Prior to the height reduction, the lower 16 metres is 1.5 metres thick, the next 15 metres is 1.0 metres thick and the upper 15 metres is 450mm thick. Thus, we have estimated that the total weight of the chimney is approximately 730 tonnes (7300KN). Under normal circumstances the design wind load in this region would produce an overturning moment of approximately 6715 kNm and the self-weight of the chimney produces a moment capacity at the base of approximately 21,190 kNm. This results in a factor of safety against overturning of approximately 3.2.

Reducing the height by 11 metres to 35 metres results in a 15% lower total weight to 617 tonnes (6170KN). The overturning moment is reduced to approximately 3900 kNm and the moment capacity becomes approximately 17900 kNm. This results in a factor of safety of approximately 4.6 representing an increase of some 40%.

The modest reduction in the self-weight of the chimney means that in our view the effect on the performance of the foundation is unlikely to be noticeable. It is expected that the base of the chimney will be founded on sound rock equivalent to the bed of the adjacent river.

The risk of catastrophic collapse has therefore been significantly reduced by the removal of the upper section of the brickwork.

There remains a very low risk to persons wishing to undertake further works on the site as part of the re-development. This is mainly due to falling mortar due to the most recent re-pointing exercise undertaken about 14 years ago.

It is acknowledged therefore that suitable personal protective clothing should be worn by persons working in the vicinity of the chimney. Hard hats are considered essential. The aim of the most recent work was to satisfy the Health and Safety Executive that the Prohibition Order established on 31 July 2012 may be removed to allow future development works on the site.

We believe that the height reduction and crack repairs that have now been undertaken reduce the risks significantly and to the point where the order may be rescinded.

The recommendations in connection with repointing and the provision of a new reducer cone to prevent water/bird ingress should be undertaken in consultation with the Local Authority.

At the very least it is expected that a full deep repointing exercise will be put in place as part of any re-development of the site.

Yours sincerely

D.Smith
Partner
B Eng C Eng MStructE MICE

Enc: Letter HSE – N & B Property Services dated 26 October 2016