



**JNP GROUP**  
CONSULTING ENGINEERS

## **Structural Inspection Report and Appraisal**

**Project:** Linen Street Carpark  
Warwick  
CV34 4DT

**Client:** Warwick District Council

**Reference:** M45320-JNP-XX-XX-RP-S-1001 P01

**Date:** 21/05/2026

## DOCUMENT CONTROL SHEET

Prepared by.....

**Gareth Stephenson**

*BEng (Hons) CEng MStructE MICE CMgr MCMl  
Associate*

Approved by.....

**Gareth Stephenson**

*BEng (Hons) CEng MStructE MICE CMgr MCMl  
Associate*

FOR AND ON BEHALF OF JNP GROUP

Date: **21/05/2026**

### Document Issue Record

Rev	Date	Description	Prepared	Checked	Approved
P01	21-05-2026	First Issue	GS	JS	GS

*This document is for the sole use and reliance of JNP Group's Client and has been prepared in accordance with the scope of the appointment of JNP Group and is subject to the terms of that appointment.*

*JNP Group accepts no liability for any use of this document other than by its Client and only for the purposes for which it has been prepared.*

*No person other than the Client may copy (in whole or in part) or use the contents of this document, without the prior written permission of JNP Group.*

*Any advice, opinions or recommendations within this document should be read and relied upon only in the context of this document as a whole.*

*Any comments given within this document are based on the understanding that the proposed works to be undertaken will be as described in the introduction. The information referred to and provided by others will be assumed to be correct and will not have been checked by JNP Group, JNP Group will not accept any liability or responsibility for any inaccuracy in such information.*

*Any deviation from the recommendations or conclusions contained in this document should be referred to JNP Group in writing for comment and JNP Group reserve the right to reconsider their recommendations and conclusions contained within. JNP Group will not accept any liability or responsibility for any changes or deviations from the recommendations noted in this document without prior consultation and our full approval.*

---

## Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Parties involved in this Report .....	1
1.2	Reliance .....	1
1.3	Background.....	1
1.4	Scope of Appointment.....	1
1.5	Building Description .....	1
1.6	Survey Limitations .....	2
1.7	Copyright .....	2
<b>2</b>	<b>OBSERVATIONS .....</b>	<b>3</b>
2.1	Building Description .....	3
<b>3</b>	<b>DISCUSSION.....</b>	<b>4</b>
<b>4</b>	<b>CONCLUSIONS .....</b>	<b>5</b>
<b>5</b>	<b>RECOMMENDATIONS.....</b>	<b>6</b>
5.1	Short Term.....	6
5.2	Long Term.....	6
5.3	Full Specifications and Details .....	6
<b>6</b>	<b>INITIAL BASEMENT LEVEL PROPOSALS .....</b>	<b>7</b>
6.1	Introduction.....	7
6.2	Option 1 – Segregation of dangerous areas.....	7
6.3	Option 2 – Bonded mesh or netting to soffit .....	7
6.4	Option 3 – Suspended tension netting.....	9
<b>7</b>	<b>INITIAL OUTLINE TESTING PROCEEDURE .....</b>	<b>12</b>
7.1	Introduction.....	12
<b>APPENDIX A:</b>	<b>PHOTOGRAPHS .....</b>	<b>13</b>

## **1 INTRODUCTION**

### **1.1 Parties involved in this Report**

1.1.1 Our Client is Warwick District Council.

### **1.2 Reliance**

1.2.1 The report is required by Warwick District Council (WDC) and a copy of the report may be distributed by Warwick District Council (WDC) to 3<sup>rd</sup> parties involved with actioning/managing the items raised in the report. No other person or 3<sup>rd</sup> party may receive a copy of the report.

1.2.2 This report is not transferable. No other person or organisation may receive a copy or place any reliance on this report without our explicit, written, consent.

### **1.3 Background**

1.2.3 Linen Street Carpark is currently providing residential carparking at levels 1 and 2, with the remaining public carpark levels being left redundant.

1.2.4 It is Warwick District Councils' intention to dismantle the upper carpark area sometime in the near future and retain the lower levels as serviceable carparks. The upper levels are therefore excluded from this structural appraisal.

1.2.5 More recently Warwick District Council (WDC) have carried out a general building survey via Pegasus Group. This has raised concerns with the safety and structural integrity of the carpark areas being used.

1.2.6 Pegasus Group recommended that the resident parking should cease until the concerns have been further investigated and the structure considered safe.

1.2.7 Further intrusive testing is to be carried out to help inform the work required to extend the lifespan of the structure. This will result in a more detailed report which will assist WDC with their development strategy.

### **1.4 Scope of Appointment**

1.4.1 The purpose of this report is to review the structural condition of the carpark as a whole and advise on the ability to safely reopen the residential parking at lower levels.

1.4.2 We have provided within this report recommendations focusing on maintaining a safe area for the resident parking.

### **1.5 Building Description**

1.5.1 The carpark was constructed circa 1970's. It comprises a reinforced concrete frame with cast in situ waffle decks.

1.5.2 The frame is clad with masonry infill walls. The floor slabs on level 1 and 2 along with the access stair area are traditional reinforced concrete.

## **1.6 Survey Limitations**

- 1.6.1 All observations were carried out at floor level with no additional access provided.
- 1.6.2 This report does not comprise a full structural survey or any other form of survey of the property but is a specialist structural report on the items listed therein. Therefore, no responsibility can be accepted for any other defects which are found in the property.
- 1.6.3 We have not inspected parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.
- 1.6.4 We have not inspected any boundary walls or outbuildings and we are therefore unable to report that any such part of the property is free from defect.
- 1.6.5 The survey is visual and non-intrusive. Unless expressly stated above, we have not allowed for the removal of finishes, moving furniture, clearance of areas used for storage, or excavation.
- 1.6.6 The report and recommendations will be limited to the accessible areas of the property/building(s).
- 1.6.7 Where the works involve surveying, inspecting, or investigating existing structures, we will use our best endeavours to give an indication of the structural condition via visual inspection, and/or targeted intrusive investigations where possible. Given the discrete nature of sampling and limited ability to fully inspect hidden structural elements, no survey or investigation technique is capable of identifying all conditions in all areas. We cannot guarantee all defects present will be detected and accept no responsibility for defects that are not identified.
- 1.6.8 We will rely on all third-party information provided by the Client or Client's representatives in all aspects of the services and will not carry out checks on the accuracy of the supplied information. Should the information which is supplied not be correct this information may affect the outcome of the services provided by JNP Group. We cannot accept any responsibility or liability due to the consequences of the supplied information being incorrect.

## **1.7 Copyright**

- 1.7.1 The copyright at all times remains with **JNP Group**.

## 2 OBSERVATIONS

### 2.1 Building Description

- 2.1.1 At levels 1 and 2 the floor slab and walls have no signs of significant deterioration.
- 2.1.2 All of the upper levels of floor comprising cast in situ reinforced waffle slabs are exhibiting similar defects throughout. This also extends to some of the ramp sections and the walls.
- 2.1.3 Concrete repairs have previously been carried out (before 2014). We understand that these repairs were carried out by a professional repair company using specialist repair materials.
- 2.1.4 The typical defects in floors at levels 3 and 4 observed during our recent visits are:
- Deterioration and spalling to the top and soffit of the floor slabs.
  - Deterioration and spalling *of repairs* to the top and soffit of the floor slabs.
  - Localised corrosion of reinforcement resulting in staining and expansion of surface finishes.
  - Localised spalling of reinforced concrete walls.

### **3 DISCUSSION**

- 3.1.1 Comparison of the previous 2014 report by JNP Group against the current condition of the carpark structure indicates that the structure, as a whole has not significantly deteriorated further.
- 3.1.2 There are isolated issues relating to corrosion throughout the floors. These appear to reflect water ingress through joints and leaks from the slab above.
- 3.1.3 Previous repairs have been carried out but have subsequently failed in some areas.
- 3.1.4 Some new areas of deterioration have been identified.
- 3.1.5 The extent of all deterioration and defects is isolated and not deemed a structural risk to the overall stability of the building.

## **4 CONCLUSIONS**

- 4.1.1 The building as a whole is not at risk of imminent collapse.
- 4.1.2 There are numerous local defects which need to be remediated to levels 3 and 4 to make good the concrete structure for continued safe use of levels 1 and 2.
- 4.1.3 There is a risk of concrete spalling from the soffit of the slabs locally. This risk is greater where defects are identified.
- 4.1.4 Testing of the concrete will advise on the long-term strategy for increasing the lifespan of the structure.

## **5 RECOMMENDATIONS**

### **5.1 Short Term**

- 5.1.1 Restrict the areas of parking to where there are no evident defects present. This includes all previously repaired areas, and areas where there is increased risk of local concrete failure due to staining, deformation or other visual indicators.
- 5.1.2 Defects exist in the trafficked areas, between the car parking spaces. These areas will remain a higher risk, however, the likelihood of a pedestrian or vehicle being present should concrete fall from the soffit of the slab is considered low.
- 5.1.3 It may be possible to reduce the risk further by creating a physical method of catching/controlling any falling debris. This would be considered a short-term fix and will need to be developed by WDC alongside JNP Group before consideration.

Suggestions for controlling any falling debris are contained in Section 6.

### **5.2 Long Term**

- 5.2.1 Carry out concrete testing to inform the extent of remediation required to prolong the lifespan of the building.
- 5.2.2 Replace or remediate levels 3 and 4 to provide a permanent safe and low maintenance solution.

### **5.3 Full Specifications and Details**

- 5.3.1 The above recommendations are hereby given in principle only. Before any works are carried out full specifications and details should be provided by JNP Group or other suitably qualified and experienced Engineer.

## **6 INITIAL BASEMENT LEVEL PROPOSALS**

### **6.1 Introduction**

6.1.1 WDC intend to develop the carpark in the short to medium term but are obliged to provide residential carparking to basement floors levels as part of an ongoing commitment.

6.1.2 In order to fulfil this commitment, WDC need to provide a safe environment where there is minimal risk of concrete spalling from the soffit of floors 3 and 4 above.

6.1.3 WDC have requested options for a solution based on the following criteria, listed in order of importance.

- Providing a safe area for residents.
- Maintaining a headroom which does not restrict vehicles.
- Providing a robust solution with at least a 3 year lifespan and minimal maintenance.
- Providing a solution which is immediate, practical and minimises disruption during installation.
- Providing an economical solution.

6.1.4 Options have been explored below for consideration by WDC and for initial pricing. Most of the solutions are bespoke, so will require testing on site to verify that they meet the performance and installation criteria.

6.1.5 We have considered the risk of harm being as a result of debris falling from the slab. Observations on site indicate that the largest detached concrete will be no greater than the size of a concrete block. These are approximately 25kg. This should be the benchmark design loading.

6.1.6 A mesh size of 25mm should provide adequate protection from falling debris, however, a closer spacing is preferable, and this has been considered where practical below.

6.1.7 We envisage three principal options being developed by other trades, with the input from JNP Group.

### **6.2 Option 1 – Segregation of dangerous areas**

6.2.1 Although considered the quickest and cheapest solution, the option to fence off and restrict access to the areas where known defects are present was not considered a desirable solution at this stage.

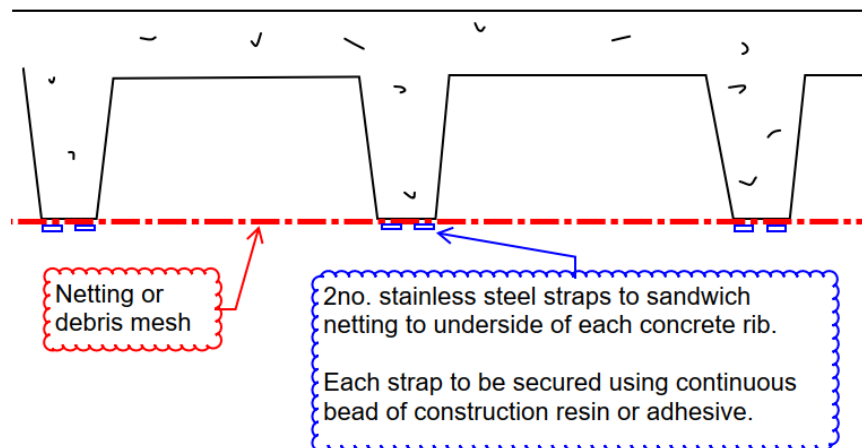
6.2.2 Any solution requiring segregation would involve utilising both levels 1 and 2 in order to provide sufficient parking spaces.

6.2.3 Furthermore, control of debris along the access road area between carparking spaces will still be required.

### **6.3 Option 2 – Bonded mesh or netting to soffit**

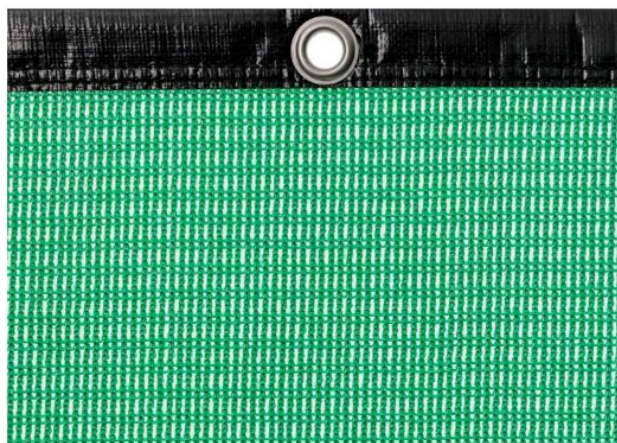
6.3.1 This option involves bonding a debris net or more robust steel wire mesh to the underside of level 3 and 4 slabs.

6.3.2 Bonding of the mesh will be bespoke and reliant on the adhesive used. It is envisaged that a building adhesive will be applied to the lower surface of the troughs along the ribs of the floor. The mesh will be placed into the adhesive and a continuous strip pressed against the mesh and adhesive to force the adhesive around the mesh and form a good bond.



- 6.3.3 The concrete may require preparation with grit blasting to roughen up the surface.
- 6.3.4 This solution will need to be verified by a series of tests in a number of places. Testing will involve load testing the mesh, measuring deflection and checking for detachment of the mesh. An initial testing period will be required before wholesale installation can be justified.
- 6.3.5 Polypropylene mesh will have an expected guaranteed lifespan of 3-5 years and this is normally extended with regular (annual) material testing. Close mesh arrangements will reduce visibility of the underside of the slab which will limit the ability to inspect the soffit.
- 6.3.6 Polypropylene debris mesh with close spaced fibres will retain almost all significant debris, however, it will obscure the underside of the slab. Deflection will be controlled but reasonably high due to elasticity of the materials.

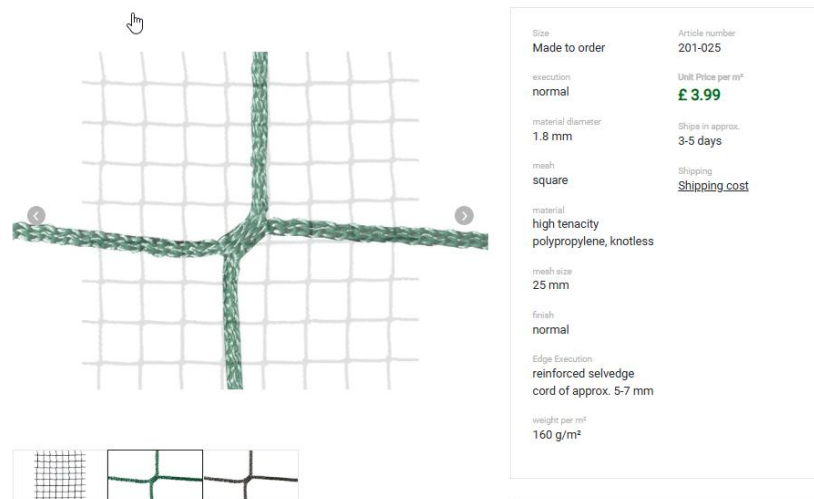
Air-permeable sheet, PP, 550 g/m<sup>2</sup> - Made to Order



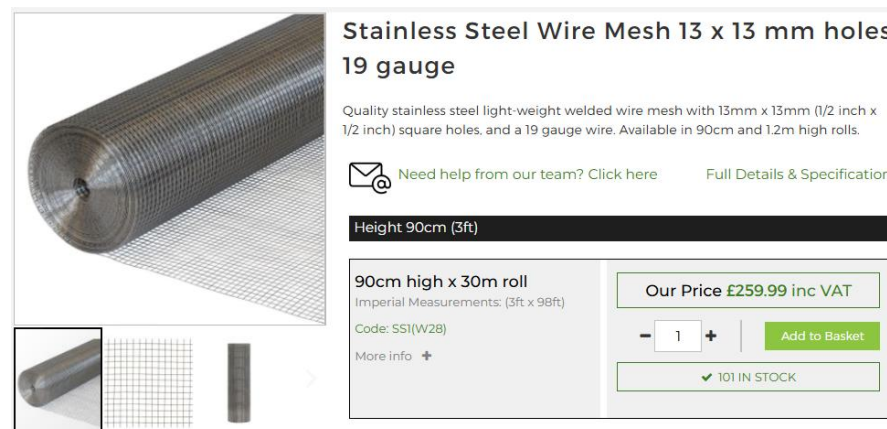
Size	Article number
Made to order	785
execution	Unit Price per m <sup>2</sup>
without shock cord	<b>£ 8.00</b>
finish	Shipping
normal	<a href="#">Shipping cost</a>
weight per m <sup>2</sup>	
550 g/m <sup>2</sup>	
material	
high tenacity polypropylene	
mesh size	
2 x 6 mm	
Shading	
50%	
Edge Execution	
with reinforced and stitched edges all	

- 6.3.7 25mm polypropylene mesh is larger spaced which results in a more economical solution and increased visibility of the underside of the slab. Deflection will be controlled but reasonably high due to elasticity of the materials.

25mm Mesh Knotless Polypropylene Netting (1.8mm Diameter)



- 6.3.8 Stainless steel mesh 13mm x 13mm will give a longer lifespan and is provides more visibility to the underside of the slab. Deflection of the mesh is expected to be low due to its stiffness.

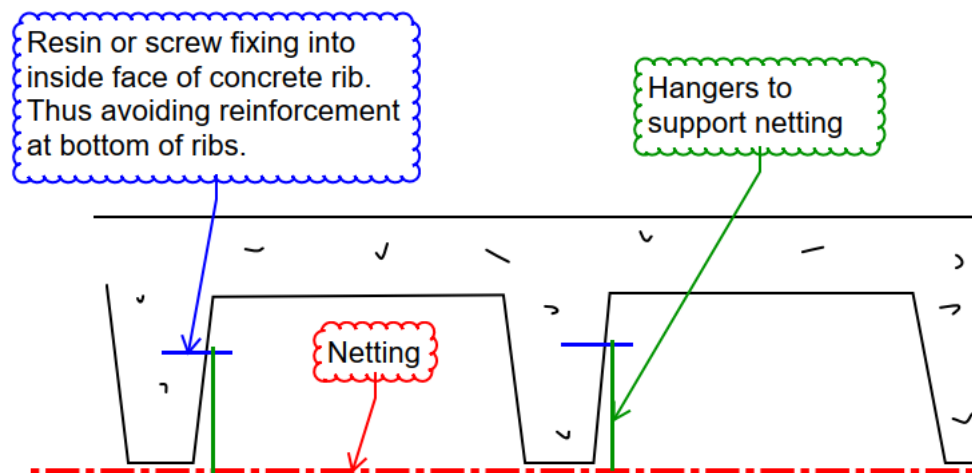


- 6.3.9 Grout/resin products to consider – Fosroc Lockfix P25 or Sika AnchorFix.
- 6.3.10 Alternatively, grab adhesives such as Soudal Fix ALL X-treme Power or Sika Sikadur®-33 could be used.
- 6.3.11 Note that the use of these products for the proposed solution is unlikely to be tested or certified by the manufacturer since we are looking at a bespoke and unusual solution. As such, reliance will be on the load testing carried out.
- 6.3.12 It is possible that this solution cannot be proved suitable for the intended use.

#### 6.4 Option 3 – Suspended tension netting

- 6.4.1 This option comprises the support of polypropylene or steel netting supported via a system of tensioned chords which are fixed back to the underside of the slab.

- 6.4.2 This solution is similar to a fall arrest solution and has been recently adapted by JNP Group to provide protection against the risk of RAAC concrete falling once collapsed. Usually the design of this type of installation is by the supplier with the assistance of a structural engineer.
- 6.4.3 In this situation, eyelets are to be installed into the sides of the waffle slab ribs. The chosen netting is then interlinked with the tensioning chords and then the chord is fed through the eyelets or suspended using hanging ties.
- 6.4.4 This solution will usually require a primary coarse netting with a secondary debris netting above.



- 6.4.5 Polypropylene netting and tension chords are stretchable, therefore there is a high level of deflection when elements are supported in the net. However, the weight and distance which debris is expected to fall will be limited.



- 6.4.6 A steel product will be stiffer. The cost of the steel product is significantly greater, however, the expected lifespan 15 years to 25 years depending on the product specification.



- 6.4.7 Testing of the netting and installation will be provided by the netting supplier with the assistance of JNP Group.
- 6.4.8 Load testing and material testing is likely to be required at regular intervals once installed for polypropylene netting but is not normally needed for steel solutions.

---

## 7 INITIAL OUTLINE TESTING PROCEEDURE

### 7.1 Introduction

- 7.1.1 The installation of netting for retaining debris is a particularly unconventional solution particularly if adhesives (Option 2) are used as the primary form of support.
- 7.1.2 A series of testing areas for the proposed systems will be required to verify that the solution is capable of supporting the falling debris.
- 7.1.3 Based on past observations, the largest piece of spalled concrete expected to detach in one piece would be a previous repair to the rib of the waffle slab. This appears to be no greater than 400mm x 250mm x 100mm thick. This would weigh approximately 25kg.
- 7.1.4 In the absence of any netting specific guidance for on site proof test loading, guidance has been interpreted from the CFA Guidance Notes – Procedure for Site Testing Construction Fixings 2024 and BS8539 the Code of Practice for the safe selection, installation and testing of post-installed anchors in concrete and masonry.
- 7.1.5 Based on the CFA Guidance and BS8539, a safety factor of 3.3 has been considered appropriate.
- 7.1.6 This safety factor has been omitted for the dynamic portion of the testing (i.e dropping the load from height) but will be added gradually following the dynamic load test.
- 7.1.7 Suggested methods of load testing the netting system could be as below:
- 7.1.8 Serviceability case – determine the deflection of the netting based on 25kg load.
- Fully install a sample area of the desired netting system across say 2 x 2 waffle slab bays.
  - Rig the 25kg load such that it can be suspended from the underside of the soffit netting via 4no. suspension points. E.g. a steel restraint cable at each corner. Clip the restraint cables to the soffit netting in approximately a 450mm x 450mm square formation.
  - Hold the load 300mm above the point of the cables going into tension.
  - Drop the load 300mm, allowing the cables to go into tension.
  - Leave to hang and determine the deflection.
- 7.1.9 Failure load case – Confirm the system is capable of supporting 25kg with an applied safety factor of 3.3.
- Carry out the same test as above, but utilise a 80kg load.
  - Hang for a longer duration of time before removing load and suspension rig.
- 7.1.10 The above testing method should be undertaken at least 5no. locations on each car park level prior to installation of the full system.
- 7.1.11 Testing should also be repeated annually using the above method.

## **APPENDIX A: PHOTOGRAPHS**



**Photograph 01: Previous repairs**



**Photograph 02: local staining from corroding reinforcement**



# JNP GROUP

## CONSULTING ENGINEERS

### **Amersham**

Sycamore House  
1 Woodside Road  
Amersham  
Buckinghamshire  
HP6 6AA

#### **telephone**

01494 771221

#### **more info**

[www.jnpgroup.co.uk/contact](http://www.jnpgroup.co.uk/contact)

### **Hartlepool**

The Innovation Centre  
Venture Court (Hub2)  
Queens Meadow Business Park  
Hartlepool  
TS25 5TG

#### **telephone**

01429 800711

#### **more info**

[www.jnpgroup.co.uk/contact](http://www.jnpgroup.co.uk/contact)

### **Belfast**

Arthur House  
41 Arthur Street  
Belfast

BT1 4GB

#### **telephone**

02890 027270

#### **more info**

[www.jnpgroup.co.uk/contact](http://www.jnpgroup.co.uk/contact)

### **Sheffield**

MBP2 Meadowhall Business Park  
Carbrook Hall Road  
Sheffield  
South Yorkshire

S9 2EQ

#### **telephone**

0114 244 3500

#### **more info**

[www.jnpgroup.co.uk/contact](http://www.jnpgroup.co.uk/contact)

### **Brighouse**

Woodvale House  
Woodvale Road  
Brighouse  
West Yorkshire

HD6 4AB

#### **telephone**

01484 400691

#### **more info**

[www.jnpgroup.co.uk/contact](http://www.jnpgroup.co.uk/contact)

### **Warwick**

Portobello House  
Portobello Way  
Warwick  
Warwickshire

CV34 5GJ

#### **telephone**

01926 889955

#### **more info**

[www.jnpgroup.co.uk/contact](http://www.jnpgroup.co.uk/contact)

### **Bristol**

Whitefriars,  
Lewins Mead,  
Bristol

BS1 2NT

#### **telephone**

01174 721705

#### **more info**

[www.jnpgroup.co.uk/contact](http://www.jnpgroup.co.uk/contact)