FLOOD INVESTIGATION REPORT

SOVEREIGN GRANGE, WOOD ROAD, KINGS CLiffe

10th AUGUST 2014

Client: Flood & Water Management Team Planning Services
Northamptonshire County Council
County Hall, Room 271,
Northampton NN1 1DN

Prepared by: Richard Jones
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# REVISION SCHEDULE

Northamptonshire County Council  
Flood Investigation Report  
Sovereign Grange, Wood Road, Kings Cliffe  

David Smith Associates Reference : 14/18504

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<tr>
<td>01</td>
<td>05/12/14</td>
<td>Draft Report</td>
<td>Richard Jones (David Smith Associates)</td>
<td>Josie Bateman (Senior Project Manager F&amp;WM)</td>
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<td>02</td>
<td>10/03/15</td>
<td>Draft Report for Stakeholder Consultation</td>
<td>Richard Jones (David Smith Associates)</td>
<td>Josie Bateman (Senior Project Manager F&amp;WM)</td>
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FOREWORD

One of the roles of Northamptonshire County Council as the Lead Local Flood Authority (LLFA) is to carry out investigations into flooding incidents if they meet the set thresholds.

The LFFA will:

- Identify and explain the likely cause/s of flooding;
- Identify which authorities, communities and individuals have relevant flood risk management powers and responsibilities;
- Provide recommendations for each of those authorities, communities and individuals;
- Outline whether those authorities, communities or individuals have or will exercise their powers or responsibilities in response to the flooding incident.

The LLFA cannot:

- Resolve the flooding issues or provide designed solutions;
- Force Authorities to undertake any of the recommended actions.
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EXECUTIVE SUMMARY

This Flood Investigation Report (FIR) has been completed by David Smith Associates on behalf of Northamptonshire County Council under its duties as the Lead Local Flood Authority (LLFA) in accordance with Section 19 of the Flood and Water Management Act 2010 (F&WMA).

Statutory Context

Section 19 of the F&WMA states that on becoming aware of a flood which meets certain pre-determined criteria, the LLFA must undertake a formal flood investigation in order to determine the relevant flood risk management authorities involved and which flood risk management functions have been, or should be taken to mitigate future flood risk. Where an authority carries out an investigation it must publish the results.

Within the Northamptonshire Local Flood Risk Management Strategy the thresholds for undertaking a FIR are:

Northamptonshire LLFA thresholds for formal investigation:

A formal flood investigation will be carried out if one or more of the following occurs:

- Flooding has affected critical infrastructure for a period in excess of 3 hours from the onset of flooding;
- Internal flooding of one property has been experienced on more than one occasion in the last 5 years;
- Internal flooding of five properties in close proximity has been experienced during one single flood incident.

Definition of close proximity: Where it is reasonable to assume that the affected properties were flooded from the same source or interaction of sources.

Definition of internal flooding: Where water crosses the threshold of a commercial or residential building.

Flooding Incident

It was deemed necessary to complete a formal investigation into a flood incident at Kings Cliffe on 10th August 2014. Internal flooding of one property has been experienced on more than one occasion in the last 5 years. This meets the threshold for investigation as set out above.
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Cause of Flooding

The flooding that occurred in Kings Cliffe is a reflection of combinations of continuous rainfall over long periods of time, and high peaks of rainfall in short periods of time. The inability of drainage systems to collect and dispose of rainwater effectively meant excess surface water flowed over ground following natural contours to low points in the village.

Drainage systems on Sovereign Grange Housing Development were unable to cope with the amount of rain water, causing the water to flow out of the on-site drainage systems to off-site areas and drainage systems that are not able to manage the quantity of water experienced.

Main Findings

Our conclusion is that risk management authorities, the local community, and other groups, must continue to work together, sharing information and reports.

Developers should work with the risk management authorities, the local community, and other groups, at all stages of design, construction and operation to ensure there is no increased risk of flooding as a result of development, in accordance with planning policy.

Property owners should be made aware of the flood resistance and resilience measures available, and this information is provided by NCC, the Environment Agency and the National Flood Forum Blue Pages.

- NCC Flood Toolkit, Preparing for a Flood –
  http://www.floodtoolkit.com/emergency/preparation/
- Environment Agency Prepare Your Property for Flooding –
- Flood Forum Blue Pages –
  http://www.bluepages.org.uk/
1.0 INTRODUCTION

1.1 Lead Local Flood Authority Investigation

1.1.1 Section 19 of the Flood and Water Management Act (F&WMA) states:

(1) On becoming aware of a flood in its area, a Lead Local Flood Authority must, to the extent that it considers it necessary or appropriate, investigate—

(a) which risk management authorities have relevant flood risk management functions, and

(b) whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.

(2) Where an authority carries out an investigation under subsection (1) it must—

(a) publish the results of its investigation, and

(b) notify any relevant risk management authorities.

1.1.2 Within the Northamptonshire Local Flood Risk Management Strategy the thresholds for undertaking a Formal Investigation Report in the County have been determined as:

<table>
<thead>
<tr>
<th>Northamptonshire LLFA thresholds for formal investigation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A formal flood investigation will be carried out if one or more of the following occurs:</td>
</tr>
<tr>
<td>• Flooding has affected critical infrastructure for a period in excess of 3 hours from the onset of flooding;</td>
</tr>
<tr>
<td>• Internal flooding of one property has been experienced on more than one occasion in the last 5 years;</td>
</tr>
<tr>
<td>• Internal flooding of five properties in close proximity has been experienced during one single flood incident.</td>
</tr>
</tbody>
</table>

**Definition of close proximity:** Where it is reasonable to assume that the affected properties were flooded from the same source or interaction of sources.

**Definition of internal flooding:** Where water crosses the threshold of a commercial or residential building.
1.2 Flooding Incident

1.2.1 It was deemed necessary to complete a formal investigation into a flood incident at Kings Cliffe on 10th August 2014. Internal flooding of one property has been experienced on more than one occasion in the last 5 years. This meets the threshold for investigation as set out above.

1.2.2 Rainfall on 10th August 2014 was measured at 30.6mm from 07:30 to 12:45 at Kings Cliffe Station No. T07. Of this, 13mm of rainfall was recorded in the final 45 minutes from 12:00 to 12:45. This is a significantly high amount of rainfall in this period of time. (source: Environment Agency).

1.2.3 David Smith Associates undertook a Flood Incident Investigation on the 16th July 2014. A Highway Authority representative and a Housing Developer representative were in attendance. The affected residents were spoken to regarding the flooding incident on 10th August 2014, and other flooding incidents.

1.3 Site Location

1.3.1 Kings Cliffe is situated in the north of Northamptonshire approximately eight miles northeast of Corby town centre and six miles south of Stamford.

1.3.2 The village forms part of the catchment of Willow Brook which is a tributary of the River Nene. Willow Brook flows west to east immediately south of Kings Cliffe. The land falls naturally from north to south.

1.3.3 Wood Road and West Street are in the approximate centre of the village and run parallel to each other, west to east.

1.3.4 To the north of Wood Road, a housing development of approximately 150 homes is under construction on a new road called Oak Lane (Sovereign Grange Housing Development). Some areas of road, footway, and drainage systems are to be transferred for adoption by local authorities. Other areas and drainage systems are to remain in private ownership, either by individual owners of dwellings or by the housing development company.

1.3.5 The area of reported flooding is immediately south of Sovereign Grange Housing Development and this report is focussed on this area.
1.4 Drainage Systems

1.4.1 Wood Road has a comprehensive system of road gullies draining the public highway, but the drainage system and eventual outfall for these is not recorded.

1.4.2 A public sewer on West Street may receive surface water from private properties and the public highway to discharge to Willow Brook via a sewage treatment works, however this is not confirmed.

1.4.3 Plans of the drainage system for Sovereign Grange Housing Development indicate separate surface water systems for the private housing areas of the development and the adoptable highway.

1.4.4 The two surface water drainage systems serving Sovereign Grange Housing Development are shown to discharge to two separate underground soakaway systems at the southern end of the site near to Wood Road.

1.4.5 The first surface water drainage system, serving private dwellings of Sovereign Grange Housing Development, is proposed to remain as a privately owned sewer. Exact ownership, responsibility, and maintenance regime details for each section of drainage is not known. The soakaway for this system is proposed to be privately owned. Exact ownership, responsibility, and maintenance regime details for the soakaway are not known. The housing development company are responsible owners of this drainage system at the time of writing.

1.4.6 The second surface water drainage system, serving the adoptable highway of Sovereign Grange Housing Development, is proposed to be adopted by the Highway Authority subject to their approval. The soakaway for this system is proposed to be privately owned. Exact ownership, responsibility, and maintenance regime details for the soakaway are not known. It is considered that the housing development company are responsible owners of this drainage system at the time of writing.
2.0 DRAINAGE HISTORY

2.1 Previous Flood Incidents

2.1.1 The following table lists flooding incidents that have been recorded on local authority records, and reported or photographed by residents:
There has been nor reporting of flooding incidents previous to these.

<table>
<thead>
<tr>
<th>Year</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>23/07/13</td>
<td>Blocked gullies on Wood Road causing highway flooding. Sand from new housing development blocked gullies on Wood Road.</td>
</tr>
<tr>
<td>October 13</td>
<td>Flooding of Wood Road, flowing through private property to areas around two properties on West Street.</td>
</tr>
<tr>
<td>22/05/14</td>
<td>Flooding of Wood Road, flowing through private property to areas around two properties on West Street.</td>
</tr>
<tr>
<td>29/05/14</td>
<td>Flooding of Wood Road, flowing through private property to areas around two properties on West Street.</td>
</tr>
</tbody>
</table>
| 27/06/14   | Flooding of Wood Road, flowing through private property to areas around two properties on West Street.
Internal flooding of one property on West Street. |
| 10/08/14   | Flooding of Wood Road, flowing through private property to areas around two properties on West Street.
Internal flooding of one property on West Street. |
2.2 Rainfall Analysis

2.2.1 The following table summarises rainfall before and during the recorded flood incidents. (Rainfall data source: Environment Agency).

<table>
<thead>
<tr>
<th>Year</th>
<th>Time</th>
<th>Total Time (hours)</th>
<th>Total Rainfall (mm)</th>
<th>Max rainfall in 15 minute period (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>23/07/13</td>
<td>00:45 – 06:15</td>
<td>5:30</td>
<td>25.8</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>07:30 – 08:00</td>
<td>0:30</td>
<td>13.2</td>
<td>10.0</td>
</tr>
<tr>
<td>October 13</td>
<td>00:15 – 09:00</td>
<td>9:00</td>
<td>36.2</td>
<td>4.4</td>
</tr>
<tr>
<td>(Rainfall</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>analysis</td>
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<td>worst</td>
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<tr>
<td>event 28/10/13</td>
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<tr>
<td>22/05/14</td>
<td>00:45 – 06:30</td>
<td>5:45</td>
<td>10.0</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>13:00 – 17:15</td>
<td>4:15</td>
<td>30.0</td>
<td>10.2</td>
</tr>
<tr>
<td>29/05/14</td>
<td>20:00 (27th) – 20:00 (28th)</td>
<td>24:00</td>
<td>21.6</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>13:45 – 15:45</td>
<td>2:00</td>
<td>12.0</td>
<td>4.8</td>
</tr>
<tr>
<td>27/06/14</td>
<td>01:00 – 05:45</td>
<td>4:45</td>
<td>8.2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>12:00 – 12:45</td>
<td>0:45</td>
<td>12.8</td>
<td>8.0</td>
</tr>
<tr>
<td>10/08/14</td>
<td>11:30 (8th) – 01:30 (9th)</td>
<td>14:00</td>
<td>29.4</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>07:30 – 12:45</td>
<td>5:15</td>
<td>30.6</td>
<td>7.8</td>
</tr>
</tbody>
</table>
The rainfall values recorded before and during flood incidents are higher than average when reviewed against typical rainfall through the year from July ’13 to June ’14.

Other heavy rainfall events through the year had lower depth of rain over a longer period of time, with max rainfall in a 15 minute period being <5mm.

For example
- 31/07/13 – 10mm rainfall over 6.25 hours, 3.6mm peak
- 24/08/13 – 20mm rainfall over 12 hours, 3.4mm peak
- 04/01/14 – 11.6mm rainfall over 9 hours, 0.6mm peak.
- 06/02/14 – 10.2mm rainfall over 7.5 hours, 1.0mm peak
- 07/02/14 – 13.8mm rainfall over 9.5 hours, 1.2mm peak
- 01/05/14 – 8.6mm rainfall over 3 hours, 3.8mm peak

Flood incidents appear to have occurred where there are combinations of relatively high peaks in rainfall over a 15 minute period, and ongoing rainfall totalling in excess of 20mm in a 24 hour period.

Since the reported flooding events, no further flood incidents have been recorded.
3.0 SUMMARY OF IMPACTS AND FINDINGS

3.1 Areas of Flooding and Impacts

3.1.1 The verbal accounts and photographic record of the flooding event indicates that water flowed out of road gullies and surface water drainage manhole covers on the estate road of Sovereign Grange Housing Development, immediately north of the junction with Wood Road.

3.1.2 The water flowing out of the drainage system onto Wood Road was mixed with soil and was light brown in colour.

3.1.3 The flow of water was increased by the carriageway of Sovereign Grange Housing Development estate road being unable to drain to the road gullies in the carriageway channels.

3.1.4 The water flowing from Sovereign Grange flowed southeast, across Wood Road and into the rear gardens of two properties on West Street.

3.1.5 At one property on West Street water built up against the walls of the building and increased in depth. The water infiltrated through walls of the building and into internal areas.

3.1.6 At a second property on West Street areas of the rear garden were submerged in water.

3.1.7 The flow of water left behind deposits of fine silt.

3.1.8 Water eventually flowed around the internally flooded property on West Street to the southeast and into the carriageway of West Street to be collected by drainage systems in the highway.

3.2 Observations during Flood Incident Investigation

3.2.1 Surface water drainage manhole covers were lifted for inspection in the estate road of Sovereign Grange Housing Development. The channels had a significant build-up of very fine particle silt.

3.2.2 Manhole covers for catchpits forming part of the soakaway systems for private and adoptable highway surface water drainage were lifted for inspection. The sumps of the chambers had a significant build-up of very fine particle silt. There was evidence that the silt had reached the soffit level of connecting pipework.

3.2.3 The source of the fine particle silt was not identified. It is possible that it is washed down from higher areas of the site, or soil that has entered the pipe and soakaway systems and has washed back into the drainage system.

3.2.4 The build-up of fine particle silt observed in the drainage system on Sovereign Grange would reduce its capacity. The extent of the silt build up in the pipework and soakaways is not known, but the reduction in capacity would contribute to failure of the drainage system.
3.2.5 Planning documents were perused to develop an understanding of the drainage systems for the housing development, though this was not an exhaustive review. Documents filed under the following reference were reviewed: 10/01277/REM | Reserved Matters: Erection of 145 homes, roads, infrastructure and associated landscaping pursuant to outline planning permission EN/05/00620/OUT dated 14.08.2008 | Land Between Willow Lane And Fineshade Close Wood Road Kings Cliffe, Northamptonshire.

3.2.6 Drainage calculations within the planning documents do not state the impermeable areas contributing to the soakaways, and the soakaways appear to fail in certain storm durations.

3.2.7 It is not clear whether the Environment Agencies planning consultation responses were completely resolved.

3.2.8 The levels and gradient of the adoptable highway on Sovereign Grange Housing Development presents challenges in the collection of surface water from the carriageway channel due to its velocity.

3.2.9 The levels and gradients of the surface water drainage pipework at the south of Sovereign Grange Housing Development provide a high level of head and an increase in the velocity of water within the drainage system. This increases the tendency for water within the drainage system to surcharge.

3.2.10 Controlling high velocity water flows through sharp bends and changes in gradient in the drainage system at the south of the site, and the method of entry and distribution through the soakaway systems are particularly challenging areas where surcharging of the drainage system could occur.

3.2.11 Geological plans of the housing development were inspected which showed areas of the Upper Lincolnshire Limestone Member at the south of site, overlain with Rutland Formation - Argillaceous Rocks With Subordinate Sandstone And Limestone.

3.2.12 The geology beneath Sovereign Grange Housing Development could present challenges to an underground soakaway system as the final means of surface water disposal.
4.0 CONCLUSION

4.1.1 The flooding that occurred in Kings Cliffe is a combination of continuous rainfall over long periods of time, and high peaks of rainfall in short periods of time.

4.1.2 Drainage systems on Sovereign Grange Housing Development were unable to cope with the amount of rain water, causing the water to flow out of the on-site drainage systems to off-site areas and into older drainage systems that are not able to manage the additional quantity of water experienced.

4.1.3 The failure of the drainage system on Sovereign Grange Housing Development is considered to be the primary source of flood water contributing to the flood incident.

4.1.4 A geological assessment, design audit and investigation into the condition of as-built drainage will help to confirm the causes of failure in the drainage system for Sovereign Grange. This will also provide the information required to consider options for the rectification or replacement of the drainage system to ensure it does not contribute to flood risk in Kings Cliffe in the future.

4.1.5 Properties at risk of flooding can take steps to protect themselves and their properties.
5.0 RIGHTS AND RESPONSIBILITIES

5.1 Lead Local Flood Authority (LLFA)

5.1.1 As stated within the introduction section, NCC as the LLFA has a responsibility to investigate flood incidents under Section 19 of the F&WMA.

5.1.2 The LLFA also has a responsibility to maintain a register of assets which have a significant effect on flooding from surface runoff, groundwater or ordinary watercourses (non-Main River) as detailed within Section 21 of the F&WMA. The register must contain a record about each structure or feature, including the ownership and state of repair. NCC is also required to keep a record of flooding hotspots across the county.

5.1.3 NCC’s practices relating to third party assets is to notify third party owners of their asset forming part of a flood risk system, and assist by advising third party owners on their condition and their responsibility to maintain the assets.

5.1.4 As Lead Local Flood Authority, NCC will therefore be looking for support from other authorities, communities and individual home owners to ensure flood incidents are reported, and any assets which have a significant effect on flood risk are recorded on the asset register.

5.1.5 While NCC can suggest possible causes of flooding in Kings Cliffe and make recommendations to ensure flood risk is mitigated as far as possible, the F&WMA does not provide NCC with the mandate or funding to tackle all identified causes of flooding or force Authorities to undertake any recommended actions.

5.2 Developers

5.2.1 Developers must work with local authorities to demonstrate that the objectives of planning policy, and requirements of Approved Documents, are met at all stages of the development.

5.2.2 This development was assessed for accordance with Planning Policy Statement 25: Development and Flood Risk, and Approved Document H - Drainage and Waste Disposal (2002 edition incorporating 2010 amendments).
5.2.3 Relevant Key Planning Objectives from Planning Policy Statement 25: Development and Flood Risk are:

- Reducing flood risk to and from new development through location, layout and design, incorporating sustainable drainage systems (SuDS).

- Using opportunities offered by new developments to reduce the causes and impacts of flooding eg surface water management plans; making the most of the benefits of green infrastructure for flood storage, conveyance and SuDS; re-creating functional flood plain; and setting back defences.

- Working effectively with the Environment Agency, other operating authorities and other stakeholders to ensure that best use is made of their expertise and information so that plans are effective and decisions on planning applications can be delivered expeditiously.

5.2.4 The relevant requirements for Rainwater drainage in Approved Document H - Drainage and Waste Disposal is H3:

1) Adequate provision shall be made for rainwater to be carried from the roof of the building.

2) Paved areas around the building shall be so constructed as to be adequately drained.

3) Rainwater from a system provided pursuant to sub-paragraphs 1) or 2) shall discharge to one of the following, listed in order of priority:

   a) An adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable,

   b) A watercourse; or, where that is not reasonably practicable,

   c) A sewer

5.2.5 Site investigations, design methodology and construction procedures for drainage detailed in the above documents should be carried out and full records maintained for perusal by local authorities.

5.2.6 Full records of the Planning Permission granted and resolution of any reserved matters should be maintained for perusal by local authorities.

5.2.7 In the event of site conditions preventing the Planning Policies or Approved Document Requirements being met, the developer must work with local authorities to resolve matters.
5.3 **East Northamptonshire Council (ENC)**

5.3.1 ENC have powers under Section 14 of the Land Drainage Act 1991 (LDA) to undertake flood risk management works on ordinary watercourses (non-Main River) where deemed necessary.

5.3.2 Under Section 20 of the LDA, ENC have the powers to (by agreement of any person and at their expense) undertake drainage work which that person/organisation is entitled to carry out and maintain.

5.3.3 ENC are the Planning Authority and have a role in Building Control and the Building Regulations. They must work with other local authorities and developers to ensure the objectives of planning policy, and requirements of Approved Documents, are met at all stages of the development.

5.4 **Environment Agency (EA)**

5.4.1 The EA has a strategic overview responsibility under the F&WMA as well as permissive powers to carry out maintenance work on Main Rivers under Section 165 of the Water Resources Act 1991 (WRA). Willow Brook is a Main River, but this is situated approximately 200 metres to the south and is not considered a factor in the flood incident.

5.4.2 The EA are statutory consultees of the Local Planning Authority.

5.5 **Highway Authority (HA)**

5.5.1 NCC Highways have a duty to maintain the highway under Section 41 of the Highway Act 1980 but subject to the special defence in Section 58.

5.5.2 Highway drainage systems are designed to the Highways Agency Design Manual for Roads and Bridges (Volume 4, Section 2). They are only required to be constructed to drain surface water run-off from within the highway catchment rather than from the wider catchment.

5.6 **Water Authority (Anglian Water Services) (AWS)**

5.6.1 Water and sewerage companies are responsible for managing the risks of flooding from surface water, foul water or combined sewer systems. Public sewers are designed to protect properties from the risk of flooding in normal wet weather conditions. However, in extreme weather conditions there is a risk that sewer systems can become overwhelmed and result in sewer flooding.

5.6.2 Since October 2011, under the ‘Private Sewer Transfer’, AWS will adopt piped systems on private land that serve more than one curtilage and were connected to a public sewer on 1st July 2011. Sewerage Undertakers have a duty under Section 94 of the Water Industry Act 1991, to provide sewers for the drainage of buildings and associated paved areas within property boundaries.
5.6.3 Sewerage Undertakers are responsible for public sewers and lateral drains. A public sewer is a conduit, normally a pipe that is vested in a Water and Sewerage Company, or predecessor, that drains two or more properties and conveys foul, surface water or combined sewage from one point to another point and discharges via a positive outfall.

5.6.4 There is no automatic right of connection for other sources of drainage to the public sewer network. Connection is therefore discretionary following an application to connect.

5.7 **Communities and Residents**

5.7.1 Communities may consist of the Town or Parish Council, Flood Forum, Community Group and affected residents, amongst others.

5.7.2 Kings Cliffe residents who are aware that they are at risk of flooding should take action to ensure that they and their properties are protected.

5.7.3 Community resilience is important in providing information and support to each other if flooding is anticipated. Actions taken can include signing up to Flood Warning Direct (if available), nominating a Community Flood Warden, producing a community flood plan, implementing property level protection and moving valuable items to higher ground.

5.7.4 Permanent measures such as installing floodgates, raising electrical sockets and fitting non-return valves on pipes can also be considered. NCC and the EA can provide advice on these matters and more information can be found at:

- NCC Flood Toolkit, Preparing for a Flood –
  

- Environment Agency Prepare Your Property for Flooding –
  

- Flood Forum Blue Pages –
  
5.7.5 NCC holds a library of Flood Guides covering various subjects, some of which relate to the Flood Incident. This is available at the following location:

http://www.floodtoolkit.com/pdf-library/

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5.7.6 Anyone affected by flooding should try to document as much information about the incident as possible using the Flood Incident Report Form, which can be found at:

https://www.floodtoolkit.com/emergency/report-flood/
5.8 Land Owners

5.8.1 Land owners are responsible for the drainage of their land and controlling any movement of sediment from their land. Legally, owners of lower-level ground have to accept natural land drainage from adjacent land at a higher level. The exception to this is where the owner of the higher level land has carried out “improvements” such that the run-off from the land cannot be considered “natural”.

5.8.2 Agricultural practices by land owners can be considered as “improvements” to the land, so that cultivation of crops or other land uses can take place. Altering the land to increase the impermeable area is also “improvement”. Mitigation works are required on improved land to account for the change in natural land drainage and changes to surface water run-off this can create.
6.0 RECOMMENDATIONS

6.1.1 Listed below are the recommended course of actions emanating from this formal Flood Investigation Report.

6.1.2 It is important to note that it is for the relevant responsible body or persons to assess each recommendation in terms of the legal obligation, resource implications, priority and cost/benefit analysis of undertaking such action.

6.1.3 The recommendations may be included within the Action Plan linked to the Local Flood Risk Management Strategy or in the relevant risk management authority’s future work programmes, as appropriate.

1) Housing Developer of Sovereign Grange Housing Development to:

- Take action to prevent the contribution to surface water flooding in Kings Cliffe, and ensure planning policies, Approved Document requirements, and adopting authorities’ requirements are met. This will require all actions necessary to investigate, redesign, renovate or replace existing drainage so that it collects, conveys and disposes of surface water without adding to flood risk in Kings Cliffe. Timescales for resolving matters in relation to flood risk should be agreed with all relevant local authorities.

The above should include, but not be limited to:

- A review of the means of collection of surface water from the development, particularly steep sections of carriageway and footway. If unsuitable, provide alternative means of surface water collection.

- A review of the likelihood of high velocity, high volume water flow within the drainage system leading to overtopping of manholes and road gullies. If unsuitable, provide alternative arrangements/diversions that could avoid or accommodate this.

- Carry out works on Wood Road to contain the residual risk of surface water flooding from the development and prevent it flowing to other properties. These works should not cause flooding elsewhere or compromise drainage systems on Wood Road. Consult with the Highway Authority in relation to these works as appropriate.
- Review the suitability of a soakaway arrangement for disposal of surface water both in design and construction. If unsuitable, provide alternative means of surface water disposal. The review would include, but not be limited to, clarifying the following:

  - Ground conditions/geology,
  - Whole life ownership, inspection and maintenance arrangements,
  - Type of soakaway structure,
  - Site Investigations and Design carried out before, during and after construction,
  - Method of construction and materials used,
  - Current condition of structure as a result of numerous surcharges and evidence of fine particle silt in the drainage systems,
  - Overflow arrangements,
  - Current condition of structure having been operational whilst construction works continue on the wider site,

- Review any alternatives to below ground soakaway structures that could provide greater capacity, easier inspection and maintenance, observable trigger points and managed overflow. Implement these if considered beneficial.

- In relation to adoptable drainage systems and their discharge arrangements, all investigations and technical audits must be to the satisfaction of the relevant adopting authority.

- All actions to investigate, redesign, renovate or replace existing drainage must be agreed with the Lead Local Flood Authority, Planning Authority, Highway Authority and Environment Agency.

- At the time of writing, it is understood that the Developer has undertaken a review and assessment of the drainage system, and the results of this are awaited by the relevant Flood Risk Management Authorities.
2) The Community (e.g. Town/Parish Council, Flood Forum, Community Group, Land owners and affected residents) to:

- Nominate a Community Flood Warden to help coordinate the following work:

  - Produce an overall plan of Kings Cliffe, with the cooperation of all drainage system owners, which can be used to plan a community-wide strategy of ownership, maintenance and improvements of existing drainage systems. This should form the basis of the Community Flood Plan. This plan should include as a minimum:

  - Identification of any historic routes of drainage from the various catchment areas of the village, which could be reinstated or improved. Clear existing historic ditches and culverts.

  - Identification of riparian ownership and responsibilities for field drainage systems such as ditches, culverted watercourses, and open watercourse sections.

  - Identify any land uses within the catchment that may unduly affect the normal flow of surface water.

  - Identify vulnerable properties.

- Explore options for property level protection and implement any recommendations;

- Explore community wide solutions (e.g. attenuation areas, tree planting).

- Review the library of information on the NCC Flood Toolkit, detailed in 4.6.5 above.
3) The LLFA to:

- Work with NCC Emergency Planning and the Environment Agency to support the community in the instatement and training of a community based Flood Warden.

- Work with NCC Emergency Planning, the Environment Agency and other flood management authorities to support the community in the production of a village/community flood plan and provide advice to residents on how to explore options for property level protection.

- Inform owners of the drainage systems and watercourses within the overall surface water catchment area of their legal responsibilities, and provide assistance in preparing maintenance regimes.

- Work with the Sovereign Grange Developer and other local authorities to ensure all actions to investigate, redesign, renovate or replace drainage on Sovereign Grange are agreed beforehand and carried out satisfactorily.

4) NCC Highways to:

- Undertake regular highway drainage cleansing throughout Kings Cliffe. Identify and develop a detailed plan of their assets to share with the LLFA and the Community;

- Assess the capacity of their assets and identify any areas with insufficient capacity for draining runoff from the highway. Where this leads to flood risk to properties improvement works should be considered.

- Investigate and record the existing main drainage arrangement serving road gullies on Wood Road between Blatherwyke Road and Forest Approach, also encompassing Willow Lane and King’s Forest.

- Work with the Sovereign Grange Developer and other local authorities to ensure all actions to investigate, redesign, renovate or replace drainage on Sovereign Grange are agreed beforehand and carried out satisfactorily.
5) Anglian Water Services to:

- Assess the sources of water entering the public sewerage system,
- Assess the capacity of their assets and identify any areas of insufficient capacity. Where this leads to flood risk to properties improvement work should be considered;
- Develop a detailed plan of their assets to share with the LLFA and the Community.
- If any drainage renovation or replacement proposals affect the public sewerage system, work with the Sovereign Grange Developer and other local authorities to ensure all actions to investigate, redesign, renovate or replace drainage on Sovereign Grange are agreed before work is carried out and to ensure the work is carried out to an adoptable standard.

6) East Northamptonshire Council to:

- Continue to consult with the Environment Agency and Lead Local Flood Authority in respect of planning applications for new developments to reduce flood risk.
- Review the planning permission and reserved matters, and consultee responses for Sovereign Grange Housing Development. This is to confirm that any measures required or recommended to reduce the risk of flooding have been satisfactorily designed, and implemented in accordance with the planning policy.
- Review the records for design checks, testing, and inspection of building work for Sovereign Grange Housing Development to ensure these meet with the requirements of the Building Regulations.
- Undertake to utilise powers under Section 20 of the Land Drainage Act 1991 with agreement.
- Endeavour to assist other flood management authorities in the preparation of a detailed plan of assets relating to drainage and flood risk, to share with the LLFA and the Community.
- Work with the Sovereign Grange Developer and other local authorities to ensure all actions to investigate, redesign, renovate or replace drainage on Sovereign Grange are agreed before work is carried out and to ensure the work is carried out to an adoptable standard.
7.0 DISCLAIMER

This report has been prepared as part of Northamptonshire County Council’s responsibilities under the Flood and Water Management Act 2010. It is intended to provide context and information to support the delivery of the local flood risk management strategy and should not be used for any other purpose.

The findings of the report are based on a subjective assessment of the information available by those undertaking the investigation and therefore may not include all relevant information. As such it should not be considered as a definitive assessment of all factors that may have triggered or contributed to the flood event.

Any recommended actions outlined in this FIR will be for the relevant responsible body or persons to assess in terms of resource implications, priority and cost/benefit analysis of the proposal. Moving forward, these may be included in the Action Plan linked to the Local Flood Risk Management Strategy or in the relevant risk management authority’s future work programmes as appropriate.

The opinions, conclusions and any recommendations in this Report are based on assumptions made by David Smith Associates and Northamptonshire County Council when preparing this report, including, but not limited to those key assumptions noted in the Report, including reliance on information provided by others.

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The implications for producing Flood Investigation Reports and any consequences of blight have been considered. The process of gaining insurance for a property and/or purchasing/selling a property and any flooding issues identified are considered a separate and legally binding process placed upon property owners and this is independent of and does not relate to the County Council highlighting flooding to properties at a street level.

David Smith Associates and Northamptonshire County Council do not accept any liability for the use of this report or its contents by any third party.
ACRONYMS

EA  Environment Agency
NCC  Northamptonshire County Council
ENC  East Northamptonshire Council
FIR  Flood Investigation Report
F&WMA  Flood and Water Management Act 2010
LDA  Land Drainage Act 1991
LLFA  Lead Local Flood Authority
WRA  Water Resources Act 1991
LIDAR  Light Detection and Ranging

USEFUL LINKS

Highways Act 1980:

Water Resources Act 1991:

Land Drainage Act 1991:

EA - ‘Living on the Edge’ a guide to the rights and responsibilities of riverside occupation:

EA - Prepare your Property for Flooding:
How to reduce flood damage Flood protection products and services
https://www.gov.uk/government/publications/prepare-your-property-for-flooding

Northamptonshire County Council Flood and Water Management Web Pages:
http://www.floodtoolkit.com/

Northamptonshire County Council Local Flood Risk Management Strategy:
USEFUL CONTACTS

Northamptonshire County Council

Highways:
Tel: Street Doctor (Highways) 0300 126 1000 (24hrs)

Website: http://www.northamptonshire.gov.uk/en/councilservices/Transport/roads/streetdoctor/Pages/Step1.aspx
Email: highways@northamptonshire.gov.uk

Emergency Planning:
Tel: 0300 1261012
Email: emergencyplanning1@northamptonshire.gov.uk

Flood and Water Management Team:
Tel: 01604 366014 (Mon-Fri, 9am - 5pm)
Email: floodandwater@northamptonshire.gov.uk

Environment Agency

General Tel: 08708 506 506 (Mon-Fri 8-6) Call charges apply.
Incident Hotline: 0800 807060 (24 hrs)
Floodline: 0845 988 1188
Email: enquiries@environment-agency.gov.uk
Website: www.environment-agency.gov.uk
14/18504
Flood Incident Report
Sovereign Grange, Wood Road, Kings Cliffe

**Anglian Water**

Emergency Tel: 08457 145145

Website: [http://www.anglianwater.co.uk/household/water-recycling-services/sewers-and-drains/](http://www.anglianwater.co.uk/household/water-recycling-services/sewers-and-drains/)

**East Northamptonshire Council**

Environmental Health

Tel: 01832 742056 (office hours)

Tel: 01832 733530 (out of hours)

Email: customerservices@east-northamptonshire.gov.uk

**Kings Cliffe Parish Council**

Email: KCPCClerk@aol.com
APPENDIX A

Site Location Plan
APPENDIX B

Catchment Plan
APPENDIX C

Incident Plan
APPENDIX D

EA Map of Flood Risk from Rivers
APPENDIX E

EA Map of Flood Risk from Surface Water
APPENDIX F

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Contact: enquiries@environment-agency.gov.uk 03708 506506
APPENDIX G

Residents photographs of flood incidents

2nd October 2013
22nd May 2014
29th May 2014
27th June 2014
10th August 2014
22nd May 2014 – Oak Lane, Wood Road junction

22nd May 2014 – Oak Lane, Wood Road junction
29th May 2014 – Wood Road, south side footway

29th May 2014 – Oak Lane, Wood Road junction
29th May 2014 – Oak Lane, Wood Road junction
27th June 2014 – Property on West Street

27th June 2014 – Property on West Street
27th June 2014 – Oak Lane, Wood Road junction

27th June 2014 – Oak Lane, Wood Road junction
27th June 2014 – Oak Lane, Wood Road junction
27th June 2014 – Oak Lane, Wood Road junction

27th June 2014 – Wood Road, south side footway
27th June 2014 – Oak Lane, Wood Road junction
APPENDIX H

Northamptonshire Highways Site Drainage Inspection 30/05/14
Road gully

Surface water manhole
Surface water manhole

Soakaway catchpit
APPENDIX J

Photographs from flood incident investigation 16th July 2014
Soakaway catchpit

Surface water manhole
Surface water manhole

Oak Lane/Wood Road junction
Oak Lane/Wood Road junction – public open space.

Public open space, location of existing soakaways.