



Council Offices, Kiln Road,
Thundersley, Benfleet,
Essex SS7 1TF.
Tel. No: 01268 882200
Fax No: 01268 882455



David Marchant LLB (Hons) BSc (Hons) CEng FICE FCMI
Chief Executive

AGENDA

Committee: **SCRUTINY**

Date and Time: **Monday 3rd November 2014 at 7.30p.m.**

Venue: **Council Chamber**

Membership: **Councillors Blackwell (Chairman), Bayley, E.Egan, Mrs Goodwin, Hart, Ladzrie, Tucker and N.Watson.**

Cabinet Member attending **Councillor Howard**

Officers attending: **David Marchant – Chief Executive
Trudie Bragg - Head of Environment
Ann Horgan – Scrutiny Officer**

Enquiries: **Cheryl Salmon,Ext. 2454 Ann Horgan ,Ext. 2413**

PART I

(Business to be taken in public)

1. Apologies

2. Members' Interests

3. Minutes

Minutes of the meeting held on 21st October 2015 are attached. A note of the evidence taken at the meeting is also appended.

4. Flooding Incidents in Castle Point

Following the recent major flooding incident on 20th July 2014 affecting Castle Point and in particular Canvey Island, the Committee is to receive evidence from the Environment Agency and Anglian Water to assist the Committee's review.

At the last meeting the Chief Executive reported on the report issued by the Government's Chief Scientific Officer. A copy is attached. Members may wish to bring with them a copy of the residents' evidence circulated with the agenda for the last meeting held on 21st October to assist in questioning the Agencies.

Agendas and Minutes can be viewed at www.castlepoint.gov.uk

Copies are available in larger print & audio format upon request

If you would like a copy of this agenda in another language or alternative format:

Phone: 0800 917 6564 or email translations@languageline.co.uk



SCRUTINY COMMITTEE

21st OCTOBER 2014

PRESENT: Councillors Blackwell (Chairman), Bayley, Mrs Goodwin, Hart, Ladzrie, Tucker and N. Watson.

Councillors Anderson, Harvey, Hurrell, May, Palmer, Mrs Payne, Riley, Sheldon, Walter and Mrs G. Watson also attended.

Also present from Essex County Council were Lucy Shepherd, Lead Local Flood Authority Manager; Andrew Cook, Director for Operations: Environment and Economy; Paul Bird, Director for Transport and Infrastructure and Stuart Livingstone, General Highways Maintenance Manager.

An apology for absence was received from Councillor E. Egan.

3. MEMBERS' INTERESTS

There were no disclosures of interest.

4. MINUTES

The Minutes of the meeting held on 15th September 2014 were taken as read and signed as correct.

5. RESIDENTS' EVIDENCE

The Chairman allowed a local resident who had not been able to speak at the previous meeting an opportunity to make a statement. Mrs Fairchild reported that flooding had occurred in Hannett Road on 20th July and again on Monday 13th October 2014 even though it had not rained heavily on that occasion. Following a Freedom of Information request it had become apparent that out of 12 drains in the road 6 were not working. Mrs Fairchild questioned why there was still an issue with the drains and when they were going to be repaired/cleared.

6. FLOODING INCIDENTS IN CASTLE POINT

Following the recent major flooding incident on 20th July 2014 affecting Castle Point and in particular Canvey Island, the Committee received evidence from

Essex County Council (ECC) as the lead flood authority and ECC Highways Authority to assist the Committee in its review.

Since the Scrutiny Committee's last meeting ECC as the Lead Flood Authority had published a Flood Investigation report for Canvey Island under Section 19 of the Flood and Water Management Act 2010. The report had been prepared in consultation with the Environment Agency, Anglian Water, Essex Highways and Castle Point Borough Council. Its purpose was to assess the cause of the event and detail the responses of the various agencies involved in order to identify potential shortcomings and recommend actions to reduce the impact of flooding in the future.

The Chief Executive took opportunity to update the Committee on action since it last meeting. As well as the Section 19 report there had been an investigation by the Government Office for Science which had conducted a Peer Review of the Section 19 Investigation Report. He gave a brief description of the report and the recommendations contained therein which included that a single person should have the authority and accountability to manage and co-ordinate effective flooding responses in vulnerable locations.

The Chief Executive also reported that following multi-agency meetings it had been agreed that all agencies could do more to share information and inform the public about what action was planned both in the short term and in the future. He therefore reported that Anglian Water and Public Sewer Services planned to undertake works in various roads on Canvey Island in the week commencing 20th October 2014.

Lucy Shepherd, Lead Local Flood Authority Manager, then gave a presentation to the Committee describing ECC's duties and responsibilities as the Lead Local Flood Authority and details of the Canvey Island Flood Investigation Report as a result of the flooding on 20th July 2014. It was stated that the primary cause of the flooding was the exceptional intensity and volume of rainfall (1 million cubic metres in just over 4 hours) and there was no evidence to suggest that any widespread failure of the drainage system had occurred. However, it was recognised that during the event there had been insufficient communication between agencies and the public and that there was a need to bid for national support to fund additional schemes to mitigate flood risk.

Following the presentation the Committee took opportunity to put questions to both Lucy Shepherd and Andrew Cook, Director for Operations: Environment and Economy. In their responses they set out the reasons for carrying out a S.19 investigation on this occasion and not in August 2013, gave details of the work that would be undertaken following the report and potential funding opportunities that could be available.

Following the responses by the Lead Flood Authority the ECC Highways Authority were invited to give evidence regarding the events on 20th July and answer questions put by the Committee.

Paul Bird, Director for Transport and Infrastructure, made a statement in which it was acknowledged that there were issues with the current drainage system on Canvey Island and that the previous maintenance programme had not been sufficient, although these issues had not been responsible for the flood event in July. He further went on to explain the problems that had been identified as a result of work since the flood, the funding that would be allocated to resolve issues and the work that was due to be undertaken, which included mapping of the whole drainage system on Canvey Island to provide base evidence so that future problems could be identified quickly.

Following the statement Members thanked Paul Bird for his very detailed explanation and put a couple of further questions to him. In his response it was recognised that ECC's call-out arrangements for weekends needed to be reviewed and that street lightening would only be switched on at night if it was requested by the emergency services.

A Member also commented that the staff who were working to clear the drains were doing an excellent job and requested that the Committee's thanks be passed on to them.

The Chairman thanked ECC and the ECC Highways Authority for their attendance and detailed explanation surrounding the flooding event on 20th July 2014.

Chairman

SCRUTINY COMMITTEE

21ST OCTOBER 2014

ECC LEAD LOCAL FLOOD AUTHORITY EVIDENCE

Presentation

Lucy Shepherd, Lead Local Flood Authority Manager, gave a presentation to the Committee describing ECC's duties and responsibilities under the Flood and Water Management Act 2010 (the Act) as the Lead Local Flood Authority (LLFA). The following points were made:

- ECC has responsibility for surface water runoff, groundwater and ordinary watercourses.
- Under the Act 'a lead flood authority must develop maintain, apply and monitor a strategy in its area (a "local flood risk management strategy"). The Essex Partnership for Flood Management provides an important forum for elected representatives to discuss the strategy and flood risk matters.
- On becoming aware of a flood in its area, a LLFA must, to the extent that it considers it necessary or appropriate, investigate which risk management authorities have relevant flood risk management functions, and whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.
- Where an authority carries out an investigation it must publish the results of its investigation, and notify any relevant risk management authorities.
- Current Essex Local Criteria for Flood Investigation:
 - Where there is ambiguity surrounding the source of responsibility of a flood incident; and
 - Internal flooding of one property on more than one occasion; or
 - Internal flooding of five properties during one flood incident; or
 - Where there is a risk to life as a result of flooding.
- On Canvey Island on the 20th July there was 1 million cubic metres of rainfall in just over 4 hours (enough water to fill Wembley Stadium) which was an unprecedented level of rainfall.
- The cause of the flooding in July was the exceptional intensity and volume of the rainfall. There was no evidence to suggest that the operation of the pumps contributed to the flooding or that any widespread failure of the drainage system occurred due to insufficient maintenance or poor condition.
- There was evidence of incorrect and mixed messages given to the public during the event and of insufficient avenues of communication between agencies.

- As a result of the investigation there had been multi-agency meetings which included all eight partner agencies, an open and transparent sharing of information, public announcements on funding/activity and joint commitment to partnership working.
- The Flood Investigation Report set out 13 recommendations which included a multi-agency task and finish group to be led by the LLFA, support for the Canvey Island Integrated Urban Drainage (IUD) Study, resilience advice/guidance for the public and a collective bid for national funding.

Questions and Answers

Following the presentation the Committee put questions to the Local Lead Flood Authority as follows:

1. ***Since ECC have taken over as the Local Lead Flood Authority have there been any inspections or studies of the drainage systems in Castle Point?***

ECC became the LLFA in 2010 under the Flood and Water Management Act 2010. Since that time strategic flood mapping, known as Surface Water Management Plans, has been undertaken. These set out the flood risk from rainfall on Canvey Island. However it is known that the output of that model is not entirely accurate as there are gaps in terms of the asset database. The IUD study is important to fill those gaps so that ECC can create, through other modelling exercises, a better representation of the real flood risk that might be apparent on the island. The IUD study will be carried out in partnership with other agencies.

The LLFA does not have responsibility for any assets, so it has not undertaken any asset inspections but it has produced mapping which would inform communities and other agencies about assets which might require maintenance.

2. ***This situation has been looked at in 2010/2011 and the LLFA were aware there was a problem with Canvey Island, has anything been done since 2011 to the present day? Why was a flood investigation report not carried out following the floods on 24th August 2013? Hadleigh was affected more than Canvey Island on that occasion and Benfleet as well.***

The flooding incident in August 2013 was a very extreme rainfall event and at a multi-agency meeting at that time it had been agreed that it was not necessary to carry out a formal S.19 investigation on that occasion. Whilst ECC had the power to carry out such an investigation in 2013 there had been very little use of this power across the country at that time and it was still a very uncertain area of the legislation. Also it was clear that the S.19 power should only be used when there was uncertainty or ambiguity around

the reasons for the flooding, on the 24th August it had been clear that the incident had occurred due to extreme rainfall. However the LLFA did produce a debrief note for all the agencies involved which was circulated at the time. There had also been conversations with all agencies about improved engagement with residents of Canvey Island, in particular engaging with landowners where it was known there were issues.

Clearly the action that it was hoped would happen after the August 2013 event had not occurred so a different approach has been tried this time. Again a multi-agency meeting was held in the aftermath of the 20th July event where it was determined that as more was understood about the S.19 process a more formal route would be taken. It should also be highlighted that the current S.19 investigation report goes far beyond the remit of a normal S.19 report however it appears to have been endorsed by the Government and their Chief Scientific Officer as the right approach. Therefore it would seem for the first time that we have the government's attention and now is the real opportunity to try and get some funding to solve these problems and help with the long term solution for Castle Point and in particular Canvey Island.

3. *It is understood funding has been requested from the Government but what about applying to Europe for funding?*

We are in the process of preparing a business case with colleagues at Castle Point for making a bid for funding to the Government. It has also been asked to consider what measures it might be able to release in terms of directly assisting residents with protecting their properties since the event.

We are actively engaged in conversations about potential European funding however the current cycle for funding is coming to an end and the next cycle of projects has not yet begun. There may be an opportunity for further funding but until more is understood about how Europe are going to deal with the next “wave” of funding for projects we will not know if there is an opportunity or not. The possibility will certainly be explored as and when those opportunities arise as we start to go into 2015.

4. *The Surface Water Management Plan and the Strategic Flood Risk Assessment are out of date, when will they be updated? Is this supposed to be annually?*

The Surface Water Management Plan for South Essex was completed in 2012. It is accepted that mapping and output on Canvey Island has not been recorded accurately. At the moment it predicts that approximately 242 properties are at risk of flooding at greater than 0.1metres (10cms) depth and we know that it's probably more than that. The purpose of undertaking the IUD study is to fill in these gaps in the asset database so that the model could be informed with more accuracy. There was no requirement to update

the Surface Water Management Plan on an annual basis but a periodic review would be undertaken.

The Strategic Flood Risk Assessment, which is a separate document, is the responsibility of Castle Point Borough Council to update. We would encourage the Surface Water Management Plans to be incorporated into that document.

5. *Is the ECC Preliminary Flood Risk Assessment up to date?*

The Preliminary Flood Risk Assessment was completed prior to the 2011 deadline. This was a very first look at surface water flood risk across the County and there would have been a lot learnt since it was first published. The suggested cycle for publication under flood risk regulations was 6 years so it would be updated by December 2017.

6. *In the Surface Water Management Plan Canvey Island is clearly defined as a ‘critical drainage area’ and therefore an application was made for a Flood Defence Grant for £112,000 to alleviate surface water problems in that area, what has happened to the money?*

The process to obtain government funding would require better evidence and a better business case to obtain funding. The IUD study should provide the necessary data and evidence to assure the government that the money will be spent in the best possible way and in the best places.

With regard to the £112,000 it was probably not taken through the Project Appraisal Board process because there were still gaps in the bid. It is identified as a critical drainage area in the Surface Water Management Plan and there would be an indicative figure of money set out that should be invested in the area. It is acknowledged that £112,000 is not enough and the IUD study will probably come back with a much higher figure.

7. *It is unacceptable that the events have been described as “one-off” events as last year there were 3 incidents of surface water flooding in the borough where the drains could not cope with the amount of water. These events should not be described as ‘1 in 35 year’ events etc, different terminology should be used.*

It is agreed that the terminology used when describing such events should be different and it is a point that has been highlighted by the Government’s Chief Scientific Officer. That terminology is given by the Environment Agency when they classify a rainfall event. All the way through the production of the S.19 report we came up with the same kind of issues, that language does not mean much to people about how much risk there is. We should start using better terminology to describe these events e.g. there is a 3% probability this year of such a rainfall event.

8. *What is the timescale for fixing problems/areas that have been identified? Is it as soon as possible or is funding required?*

There is a lot of work going on the ground at the moment and problems are being assessed as they are found. Anglian Water have photographs which demonstrate where the capacity they have in the network is being destroyed this includes other utilities being driven through the drainage pipes, developers having blocked off sewage pipes when building, tree roots through pipes etc. Where small deficiencies are found they are being tackled straight away as they go through the inspection process.

ECC Highways and Anglian Water have committed several hundred thousand pounds from each authority to do that work now. However, once that process is finished a fundamental decision will need to be made regarding the standard the network on the Island will need to be to be resilient in terms of surface water flooding. Following that, further work will need to be undertaken to prepare a business case so that an application can be made to the Government for funding. Although agencies can divert some money to tackle problems now ultimately the solution will cost many millions. It will require a programme of works over the next 2-3 years in order to deliver that type of solution.

9. *In the S.19 Report it states that there was no issue with the drainage system yet Anglian Water are finding problems daily with the drains? Can you explain how you came to that conclusion?*

The report is directly in relation to the event on the 20th July 2014 only. This was a '1 in 316 years' event. It would not have mattered if the drainage system had been in 'tip top' condition it could not have dealt with the quantity of water that fell in such a short duration, there would have been flooding. That is not to detract from the fact that there is work to be done by every agency to improve the situation on the Island. There is also bigger concern that the area is now experiencing flooding from ordinary rainfall events not just extreme events. That is why the work currently being undertaken by the various agencies is vital to get to the underlying cause of issues.

10. *One of the issues referred to in the S.19 report is that by converting dykes to culverts it has restricted the capacity to take flood water and this leads to issues with maintenance. You also say that the potential problems with culverts should be publicised what do you mean by that?*

This is a nationwide and local issue where traditional drainage made up of open ditches is being lost. They have much greater capacity, much easier maintenance regimes and are less likely to block until they are converted to culverts. This exacerbates the problem and leads to more flooding than would have normally taken place. It is being found across the County that

there is flooding where there was none before because of this type of activity.

11. Canvey Island *has a history of surface water flooding on many occasions, what is the difference in funding for a flooding hotspot, how is money calculated?*

It is regulated by regional Flood and Coastal Committees in terms of bids to the Government. Essentially it relates to the number of properties being protected versus the cost of the scheme and the strength of the bid. There must be confidence that the proposed scheme is deliverable, that it is protecting the number of properties that is being promised and it is a good investment for the area.

12. *Why are there historical records of flooding on the mainland but there are none on Canvey Island, why was there not an assessment of the whole borough? There is no record of drainage hotspots on the Island and therefore no funding has been received.*

The Surface Water Management Plan for Essex covers Castle Point and it identifies Canvey Island as a critical drainage area but there are 10-15 other critical drainage areas e.g. Hockley, New Thundersley etc. also identified. As part of the Surface Water Management Plan production there was a data request of all authorities to provide information so that it could be included in the Plan. It is recognised there is gaps, particularly regarding Canvey Island, but the IUD study should go some way to providing more information regarding assets on the island.

13. *It has been stated that the dykes/drains have not been used properly, is it planned to make those responsible put them back to the way they were?*

Anglian Water and the Highway Authority are identifying small breaches whilst carrying out the current work and compiling a list so that enforcement action can be investigated. In the longer term, the IUD study will determine where the improvements are needed and if that points to reversing situations because private individuals have carried out works i.e. culverting or blocked parts of the system, in those circumstances, once the overall strategy of necessary works has been completed, then enforcement action will be taken. An own approach to enforcement is being formulated so that it can be agreed across the various partners/agencies.

ECC HIGHWAY AUTHORITY EVIDENCE

Paul Bird, Director of Transport and Infrastructure, gave an introductory statement in which he made the following points:

- The previous maintenance programme was clearly not sufficient.
- The whole drainage system will now be assessed and will be fixed where necessary. The system will also be mapped to create base evidence.
- The gullies across Essex are cleared once a year but it is now felt that this programme is not sufficient for Canvey Island. On clearing drains some of the debris found was years old. Vulnerable areas will need to be cleared more often.
- The Highway Authority needs to respond more quickly in a flood event.
- There are approximately 6,000 gullies on the island, and 700 to 1,000 of those need quick fixes.
- Vehicles are on the island sucking out debris to clear the drains but some will need to be physically dug out.
- £600,000 has been committed for more gangs on the road between now and March 2015. It is planned to cover the entire drainage system in that time.
- CPBC has already identified some areas that need work i.e. 50-60 gullies along the seafront need replacing. There will be capital investment to fix these problems and discussions will take place about increasing the budget in future.
- Surface Water Flooding is occurring more frequently and in some places it is now happening after normal rainfall.
- Need to understand the situation on Canvey Island over the next couple of months and understand what is needed to make it better for the future. The drainage system cannot be rebuilt if there is a blockage further along in the process.
- Even if the drains are clear they will not be able to cope if there is another episode of extreme rainfall. Need to examine where the water runs to, is pumped out etc.
- It is estimated that an extra, £1½ million will be invested into Canvey Island in the next financial year.
- When there is a storm the front line/emergency services are the most important i.e. fire, police and ambulance. ECC's role is to support them it is not a front line service.

- Agencies are working together and not arguing about who is at fault. In daily contact with Anglian Water so ask residents to report any problems they are experiencing as soon as possible and someone will be sent on site within a day.

Following the statement the Chairman reported that there was an ongoing issue which needed to be resolving regarding the closure of flooded roads and whether this was the responsibility of the Police or the Highway Authority.

The Committee took opportunity to ask questions as follows:

1. *Can you confirm when the highways issues identified on the mainland will be fixed?*

Works are being prioritised as there are insufficient resources to do everything straight away. More money has been committed this year not just to Canvey Island but across Essex and the capital budget has been increased. Residents are asked to keep with us and keep informing us of issues. There have been areas around Rayleigh and Hadleigh that we are starting to get on top of but if there are still areas of concern then let us know.

2. *There is a lot of confusion about contact arrangements. What are the arrangements for contacting ECC Highways?*

During the week the standard ECC number should be used and the call will be directed to a call centre. Minor issues can be reported via the website. It is recognised that there might be an issue with the weekend service. At weekends a call-out system operates, where an ECC employee, who could be from any professional background, receives the call and then it is passed on to the Ringwood Jacob call centre and then passed on to call-out gangs.

There is not a full complement of staff at the weekends, however when there are weather warnings then staff on-call/standby crews are increased. On the last couple of occasions vehicles have been based on Canvey Island to prevent them getting caught up with incidents of flooding at Rayleigh Weir trying to get to the Island. It is recognised that the call-out arrangements need to be reviewed so that regimes are improved and a local response can be given.

3. *If there is a flood risk is there provision to keep the street lights on at night i.e. if there is a red warning?*

If there is ever a red warning it would trigger 'Gold Command' which is lead by the Chief Fire Officer and through that process ECC would be asked to keep the street lights on if it was deemed necessary. ECC work through the emergency services and would need to be informed by them that there was a threat to life and the street lights needed to remain on.



Government
Office for Science

Canvey Island: Section 19 investigation report

Peer review

Government Office for Science

Background

In response to the Canvey Island flooding incident in July 2014, the Secretary of State for Defra asked the Government's Chief Scientific Adviser to provide a review of the draft Essex County Council section 19 investigation report into the circumstances surrounding the flooding, dated 22 September 2014.

The report sets out in some detail the nature of the event.

Canvey Island is an area that has historical susceptibility to flooding and following the severe 1953 coastal surge, has considerable sea wall defences. As a very low lying area, over thick layers of clay surrounded by sea defence walls the importance of the drainage and associated systems is fundamental to managing the rainfall that the area receives.

The rainfall recorded on Canvey Island on 20 July 2014 was an extreme weather event. 100mm of rain fell in four hours, with 80mm of that falling in one hour. While not unprecedented in the UK, this was a very rare and highly unusual event. The impact of the event is still being assessed but it seems that hundreds of homes may have suffered internal flooding.

The coincident nature of the extreme rainfall, problems with the performance of the drainage system, a power cut, and pumps tripping out were foreseeable, albeit unusual, interacting factors.

The alerting system used during the event seems to have operated effectively and to have been appropriate given the convective nature of the storm, which makes it particularly difficult to predict exactly where and when it will rain.

It is clear that Canvey Island needs to be adequately protected from tidal and surface water flooding.

Immediate local recommendations

We have taken a 'systems engineering' approach to analysing the complex picture of the vulnerability of Canvey Island to flooding.

We are content that the review provides a reasonable assessment of the Canvey Island flooding incident in July 2014, and agree with the set of locally focussed recommendations outlined on p18.

The report highlights a significant problem with local flooding accountability, as a result of the fragmentation of the responsible organisations. Specifically, while Essex County Council may have accountability for flooding, they do not have the authority to effectively manage and coordinate a response.

Recommendation 1 - A single person should have the authority and accountability to manage and coordinate effective flooding responses in vulnerable localities.

Despite the foreseeable if extreme nature of the event, insufficient account was taken of the likelihood that the various coincident events might occur. Specifically we were surprised that little account had been taken of i) the problems of gaining access to pumps due to the difficulties of anyone moving around the Island by vehicle during a flooding incident; ii) the likelihood that the surge protection mechanism for the pumps would cause the pumps to fail during an electric storm; iii) the likelihood of a more widespread power failure; or iv) potential concurrency of all of the above.

The report describes the extreme complexity of the drainage system in Canvey Island, and in particular highlights the non-integrated nature of the complex ownership and responsibilities for the different parts of the system, and thus the challenges that this has for its management. The pumps were only required to operate at maximum capacity for a short period of time, which suggests that the water was not flowing to the pumps sufficiently quickly to prevent flooding taking place. There may be a number of reasons for this, but we determine that there is insufficient data or knowledge of this lag between rainfall and water reaching the pumps to be able to recommend mitigating steps.

We support the steps taken by Essex County Council, Anglian Water, and the Environment Agency to commission the Canvey Island Urban Drainage (IUD) study as an important step to understand the complex infrastructure and their interactions and vulnerabilities, and the development of a suitable integrated model. If this is effectively concluded, a better understanding of water flow will lead to appropriate steps being taken.

Recommendation 2 - An action plan should be drawn up to provide access to pumps during flooding to help ensure continuous pumping when required.
Recommendation 3 - A peer review of the drainage and pumping infrastructure needs to take place.

This should have two components:

1. A peer review of the model being produced and the data being collected as part of the Canvey Island Urban Drainage study. This is to ensure that:
 - it effectively represents the whole drainage environment (both natural and man-made),
 - it is sufficient in providing appropriate evidence for determining how to upgrade, where necessary, the drainage and pumping required to manage likely future rainfall in the context of climate change.
2. A peer review of the drainage and pumping assets and equipment with respect to: maintaining and ensuring clear channels, culverts, sewers and drains, appropriate specifications for the pumping equipment with respect to power failures, electromagnetic compatibility to cope with electric storms, and the ability to pump continuously without overheating.

Recommendation 4 - An assessment should be made of the resilience of the local population to flooding. This will ensure that there are effective local area public alerts to potential incidents, and the local population understands how to respond in the immediate event of flooding before emergency response arrives. This should include which other local interventions could assist in providing public confidence, such as training local flood wardens.

Longer term and strategic recommendations

We noticed language throughout the report in the form of return periods (such as “one in thirty year” events). It is commonly used in risk related documentation generally but is not a form that is generally understood by the public. This approach takes account of the historic record of previous similar events, rather than capturing how that likelihood changes over time; specifically it does not capture how the future effects of climate change will impact on severe weather events.

Recommendation 5 - The Met Office and the Centre for Ecology and Hydrology should review the likelihood and impact of extreme weather events looking into the future, and provide a clear approach to understanding the probabilities of specific types of events taking place and communicating that to the public.

It is clear that Canvey Island is not the only part of the country that is likely to be susceptible to flooding of this kind, specifically after a short but very intense period of rain. Lessons can be learned not only for local implementation, but potentially applied where necessary around the country.

Recommendation 6 - The Environment Agency along with relevant agencies should provide an overview of areas where extreme rainfall events may result in significant local impact, in order to review safeguards in those places.

Recommendation 7 -The Natural Hazards Partnership should use the Canvey Island event as a case study in the surface water Hazard Impact Modelling initiative to enhance the development of more effective future alerting.

Review

The Government Office for Science convened the following group of experts to provide comment on the section 19 investigation report and to develop this review.

Andrew J Brown	HR Wallingford
Prof Hannah Cloke	University of Reading
Prof Jim Hall	University of Oxford
Dr Helen Reeves	British Geological Survey
Dr Nick Reynard	Centre for Ecology and Hydrology
Prof Jeremy Watson	University College London

© Crown copyright 2014

You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/ or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or e-mail: psi@nationalarchives.gsi.gov.uk.

This publication is also available on our website at www.gov.uk/go-science

Any enquiries regarding this publication should be sent to:

Department for Business, Innovation and Skills
1 Victoria Street
London SW1H 0ET
Tel: 020 7215 5000

If you require this publication in an alternative format, email go-science@bis.gsi.gov.uk, or call 020 7215 5000.

URN GS/14/1143