



Redcar & Cleveland Borough Council

Local Flood Risk Management Strategy



Revision Schedule

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1. Executive Summary

Vision - To work with our partners in the Borough of Redcar & Cleveland to reduce the risk of flooding to residents and businesses and ensure that flood risk is managed in the most effective and sustainable way.

In England, 5.2 million properties are at risk of flooding. Of these, 1.4 million are risk from rivers or the sea, 2.8 million are at risk from surface water flooding and 1 million are at risk from both.

The Flood and Water Management Act 2010, requires that flood risk will be managed within a framework of national strategies for England and Wales and local strategies for each Lead Local Flood Authority area, of which Redcar & Cleveland Borough Council is one. The national strategy for England, developed by the Environment Agency, sets out principles for how flood risk should be managed, provides strategic information about different types of flood risk, and identifies organisations responsible for their management.

Redcar & Cleveland Borough Council, as a Lead Local Flood Authority, has responsibility for developing a Local Flood Risk Management Strategy (LFRMS) with respect to local sources of flooding – surface water, ground water and ordinary watercourses. Flood risk from the sea, main rivers and reservoirs is addressed by the Environment Agency. The LFRMS sets out the local organisations with responsibility for flood risk in Redcar & Cleveland, partnership arrangements to ensure co-ordination between these, an assessment of the flood risk and plans and actions for managing the risk.

Redcar & Cleveland has been subject to flooding in the last few years but has escaped the most severe episodes suffered in some other areas and by comparison with other local authority areas has a low flood risk. However, numerous residents and businesses suffered damage and disruption from flooding events historically, September 2013 was of the recent events. In all cases these were from surface water run-off and sewer – flooding rather than from rivers. The risk management authority for sewer flooding is

Northumbrian Water and the Council has regular liaison meetings with Northumbrian Water to address flooding issues.

Following these events a great deal of work has been done to reduce flood risk. Work has been done with Northumbrian Water to improve the drainage system where the need has been identified. In a few cases where Northumbrian Water have been unable to make improvements on a cost-benefit case property level defences have been offered to individual residents at risk of flooding. Work has also been done, and is ongoing to understand water run-off characteristics and causes where flooding has arisen from water run-off from farm land. Culverted water courses have been examined and improved. 132 properties affected by flooding in September 2013 have benefited from the Government's Repair and Renew grant fund. Sustainable urban drainage is now a pre-requisite for major planning proposals, which prevents any additional load on existing drainage systems.

Whilst this document does not concern itself with flood risk from main rivers it should be noted that the Environment Agency is undertaking a study into flood risk around Chapel Beck in Guisborough and a wide range of possible mitigation measures are being considered.

Sustainable drainage is critical to achieving effective surface water management and the Authority is developing its policy in this area. The five Tees Valley Authorities (Middlesbrough, Stockton, Darlington, Hartlepool and Redcar and Cleveland Councils) have worked together to produce technical guidance for sustainable drainage systems, which supports the National Standards produced by the Department for Environment, Food and Rural Affairs (DEFRA). All major planning applications now must include proposals on drainage and flood risk reduction. Surface water drainage strategies are a key consideration for major development, where the proposals must not increase the risk of surface water run-off or the risk of flooding to neighbouring sites or downstream of the development.

In the future, maintenance and improvements to flood risk assets and drainage systems will be a critical area in managing flood risk, therefore the Authority has captured asset and condition data on flood risk assets in the borough to enable effective future asset management. A programme of inspection of ordinary watercourses is planned and information is to be sent to riparian owners advising them of their rights and responsibilities under the Flood and Water Management Act 2010. This will hopefully encourage them to undertake maintenance and reduce flood risk.

In order to manage drainage systems cost effectively, it is necessary to have a strategic robust approach to drainage asset management. The approach must be able to support and inform decision making that address the need to deliver highway maintenance in a way that balances growing service demands with reducing resources.

Since the introduction of the Flood and Water Management Act in 2010, all reported flooding to the Authority is logged and has been risk assessed, each incident has then been screened to see if it was a one-off and resolved, such as a blocked gully or whether repetition is likely. Areas at risk have then been prioritised according to whether incidents are causing internal property flooding, this will form the basis for development of schemes and future bids to Government, where essential criteria are met. Successful bids are allocated funding in a given year and will go forward into the flood risk programme of work.

The vision the strategic approach works towards – to work with our partners in the Borough of Redcar & Cleveland to reduce the risk of flooding to residents and businesses and ensure that flood risk is managed in the most effective and sustainable way – is underpinned by five objectives:

1. To reduce flood risk to communities severely affected by recent flooding
2. To reduce the incidence of surface water flooding
3. To ensure that flood risk is managed in new development
4. To keep our highways safe and passable
5. To deliver wider benefits

2. Introduction

2.1 Legislation

2.2 Flood and Water Management Act 2010

Following the 2007 floods Sir Michael Pitt, commissioned by Government, produced the report 'Lessons learned from the 2007 summer floods'. The Government accepted the 92 recommendations made in the report, and in 2010 the recommendations were transposed into UK Law in the form of the Flood and Water Management Act 2010.

Under the Flood and Water management Act county councils and unitary authorities were given new roles and responsibilities for local flood risk management.

A summary of the new duties and responsibilities;

<p>Information Sharing</p>	<p>All flood risk management authorities must co-operate with each other. The act also provides lead local flood authorities and the Environment Agency with a power to request information required in connection with their flood risk management functions</p>
<p>Managing Flood Risk</p>	<p>A Lead Local Flood Authority is responsible for the management of local flood risk in its area.</p> <p><i>The definition of Lead local flood authority in relation to an area in England means</i></p> <p><i>(a) the unitary authority for the area, or</i></p> <p><i>(b) if there is no unitary authority, the county council for the area.</i></p> <p>Local flood risk is from an ordinary watercourse, surface water or groundwater source.</p>

Investigation of Flooding Incidents	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. Section 5.3.1 provides further information on the duty to investigate.
Asset Register	Section 21 of the Flood and Water Management Act, to maintain a register of structures and features which are likely to have a significant effect on flood risk in their area.
Designation of features	<p>A designating authority may designate a structure, or a natural or man-made feature of the environment, if the designating authority thinks the existence or location of the structure or feature affects flood risk, or coastal erosion risk.</p> <p>A person may not alter, remove or replace a designated structure or feature without the consent of the responsible authority. A designation is a local land charge.</p>
Land Drainage Consent	The Flood and Water Management Act amends Section 23 of the Land Drainage Act 1991. The powers for provision of consent on an ordinary watercourse transfer from the Environment Agency to the Lead Local Flood Authority. Consenting powers for main rivers remain with the Environment Agency.
Local Strategy	A lead local flood authority must develop, maintain, apply and monitor a strategy for local flood risk management in its area (a “local flood risk management strategy”).
Statutory Consultee to the Planning Process	<p>In exercising a flood or coastal erosion risk management function, an authority listed in subsection (3) must aim to make a contribution towards the achievement of sustainable development.</p> <p>From April 2015, the Lead Local Flood Authority became a statutory consultee of the planning process.</p>

2.3 Flood Risk Regulations 2009

The EU Floods Directive defines flood risk:

“the temporary covering by water of land not normally covered by water”

Under the Flood Risk Regulations 2009, each Local Authority is required to produce a Preliminary Flood Risk Assessment (PFRA) for their area. The PFRA for Redcar & Cleveland was produced in 2011 and can be found at

<http://www.redcar-cleveland.gov.uk/rcbcweb.nsf/web+full+list/0c6d66ceb03cfada8025705b0035bc9e?opendocument>

2.4 Land Drainage Act 1991

The Land Drainage Act 1991 sets out the powers and responsibilities to different bodies including riparian land owners. Various drainage authorities, such as the Local Authority, Environment Agency and Internal Drainage Boards are granted powers under the Land Drainage Act 1991. There are no Internal Drainage Boards operating in the Borough of Redcar & Cleveland.

The powers under the Land Drainage Act 1991 are permissive and the decision on whether to exercise those powers rests with the relevant authority. The most relevant sections of the Land Drainage Act 1991 to the Local Authority are as follows:

Section 14: The power for a local authority to perform works for the prevention or mitigation of flooding risk other than in connection with a main river.

Section 25: The power to serve notice on persons requiring them to carry out necessary works to maintain the flow of any water course and the power to carry out works in default and recover its reasonable expenses should the riparian owner fail to carry out their responsibility.

2.5 Other Legislation

Flood and coastal risk management is affected by a range of other legislation, policies and non-statutory plans, the most significant of which are listed below:

- The Climate Change Act (2008)
- The Conservation of Habitats and Species Regulations (2001)
- The Civil Contingencies Act (2004)
- The Strategic Environmental Assessment (SEA) Directive (2001)
- The Water Framework Directive (WFD)

2.6 Local Plans

There are a number of other plans relating to flood risk management which have been produced locally either by Redcar & Cleveland Borough Council or the Environment Agency.

- Preliminary Flood Risk Assessment for Redcar & Cleveland (2011)
- Strategic Flood Risk Assessment level 1 and 2 for Redcar & Cleveland (2009 & 2010)
- Catchment Flood Management Plan (Environment Agency)
- Tees Valley Water Cycle Study (2013)
- Tees Valley Investment Plan (Flood Risk Management) (2015)

3. Background

Redcar & Cleveland Watercourses

The major watercourses in the Borough are the River Tees, Chapel Beck which connects via Howl Beck, Tockets Beck and Skelton Ellers Beck to Skelton Beck and Loftus Beck which connects via Whitecliff beck and Kilton Beck to Skinningrove Beck, these watercourses are all classified as Main Rivers. The main risk of flooding in the borough is fluvial from Chapel Beck and Skinningrove Beck and surface water flooding. There are also numerous ordinary watercourses in the Borough, including streams and ditches, both open and culverted.

3.1 Flood Risk in Redcar & Cleveland

There are a number of areas in the Borough, which are at risk of flooding from various sources, but mainly from fluvial, sewer or surface water sources. The plans in Appendix A and B are the Environment Agency's Flood maps; they show the Boroughs risk of fluvial and surface water risk areas respectively. The areas shown on the risk plans may not have a previous history of flooding incidents but are deemed to be at risk due to the topography and their location in relation to water sources.

Some of the key risk areas identified in the Environment Agency's Flood maps are shown below;

Location	Risk	Source	Maps
Redcar, Dormanstown and Kirkleatham	Fluvial Surface water	Fleet Beck / West Dyke Culvert and surface run-off	Appendix C
Guisborough	Fluvial Surface water	Chapel Beck and surface run-off	Appendix D
Eston, South Bank, Grangetown, Teesville & Lazenby	Fluvial Surface water sewer Ground/mine water	Cross Beck, Kettle Beck, Kinkerdale Beck, Middle Gill, Spencer Beck, Knitting Wife Beck	Appendix E

Skelton and North Skelton	Fluvial Surface water	White Cross Beck, Layland Beck, Holme Beck	Appendix F
Loftus and Skinningrove	Fluvial	Loftus Beck, Whitecliff Beck, Skinningrove Beck	Appendix G

3.2 Types of Flooding

3.2.1 Main River flooding

River flooding, also known as fluvial flooding, occurs when levels from the river become so high that they over top or breach their banks or flood defences, if any are installed. Main rivers are usually the larger streams and rivers, but some are small watercourses of local significance, and are shown on the Environment Agencies Main River Map. The Environment Agency are the risk management authority for main rivers and have duties and powers relating to them. In Redcar & Cleveland, River Tees, Chapel Beck which connects via Howl Beck, Tockets Beck and Skelton Ellers Beck to Skelton Beck and Loftus Beck which connects via Whitecliff beck and Kilton Beck to Skinningrove Beck are all classified as main rivers.

3.2.2. Ordinary Watercourse flooding

Ordinary watercourses are every river, stream, ditch, sluice or drain, where water flows but are not main rivers (as described in the previous paragraph). The local authority is the risk management authority for ordinary watercourses and has similar powers to the Environment Agency. Flooding can occur when the flows in the watercourse become too great for its capacity, if the watercourse becomes obstructed or it cannot discharge into a main river because the levels in the main river are too high.

3.2.3. Sewerage flooding

Flooding from sewers can originate from several sources including surface water, foul and combined sewers and rivers flooding into the sewerage network.

The main causes of sewerage flooding are blockages, defects such as collapsed sewers, mechanical failure such as pumping failures or overloaded sewers (flows are too great for the size of the sewer).

Some sewers are designed to discharge into watercourses during heavy rainfall events. These discharges can be from outfalls from surface water only systems or from overflows on combined sewer systems. Sometimes during long periods of wet weather or very heavy rainfall, these outfalls cannot discharge due to the raised level of the receiving watercourse.

3.2.4. Highway drainage

Highway drainage comprises of a network of gullies, pipes and culverts that drain water from roads and footpaths. This system may connect to the sewerage system operated by Northumbrian Water or it may discharge into watercourses or retention facilities such as balancing ponds. Highway drainage can flood from blockages, defects such as collapsed drains, lack of capacity in the system or due to the inability to discharge into a watercourse or balancing pond due to the levels in that body of water being too high.

3.2.5. Culvert issues

A culvert is a covered channel or pipe, and allows the watercourse to flow along its natural path without obstruction by construction of any infrastructure for example a highway. Some culverts have trash screens or 'grids' at either end to prevent obstructions entering the culvert and unauthorised access. These trash screens collect debris and require regular maintenance or in themselves can become a cause of flooding.

3.2.6. Run off

Run off from land or over land flows of water can be a cause of flooding, particularly in situations of prolonged rainfall where ground becomes saturated, or the natural water table is high and also in extreme events where the rainfall is so intense the ground is unable to drain, the water follows the natural topography of the land and will collect at a low point.

3.2.7 Ground water

Groundwater flooding is the emergence of groundwater at the ground surface away from main rivers or ordinary watercourses, or it can also be the rising of groundwater into man-made ground, under conditions where the 'normal' ranges of groundwater level and groundwater flow are exceeded.

3.3 History of Flooding

The records of historic flooding events in Redcar and Cleveland is limited, however the list below gives some of the more recent events and areas that were affected.

5th Jan 2016

Marske, New Marske, North Skelton, Saltburn, Dormanstown

15th September 2015

Grangetown, Redcar,

5th Dec 2013

Saltburn Road, Saltburn and Granville Terrace, The Esplanade, Newcomen Terrace and Majuba Road, Redcar

6th September 2013

Charltons, Dormanstown, Grangetown, Guisborough, Loftus, Marske, New Marske, North Skelton, various areas in Redcar (West Dyke & St Josephs Ct), Saltburn, Skelton, Skinningrove and Yearby

25-27 Nov 2012

A171 Lockwood Beck and Upsall, Moorsholm, Easington, Eston, Redcar, Saltburn, A66, Loftus rail-line and Dam Street, Dormanstown inc A1085, Kirkleatham Village, Carlin How, South Bank,

21 Nov 2012

Guisborough, Skelton, Kirkleatham, Saltburn, Stanghow, Grangetown, Carlin How, Marske,

24/25 Sept 2012

Carlin How, Grangetown, NUR, A66, Guisborough, Dunsdale, Margrove Park, Redcar, Dormanstown, Eston

17 July 2009

Grangetown, South Bank, Eston Redcar, Guisborough, Saltburn, Marske,
Loftus

Guisborough, Redcar

Skelton Green,

2 November 2000

Skinningrove

2 July 2000

Skinningrove



Skinningrove floods in 2000 Credit: ITV News



Skinningrove floods in 2000 Credit: ITV News

3.3.2 River Tees

The River Tees is the largest river flowing through Redcar and Cleveland but has rarely directly caused flooding in the borough, the biggest impact is restricted flow from watercourses that ultimately discharge into the river. Affected watercourses include The Fleet, which then impact on The Mill Race & *Dormanstown / Kirkleatham beck*; Kinkerdale Beck & Knitting Wives Beck.

3.3.4 Localised Surface Water Flooding

Very heavy rain can cause localised surface water flooding to occur almost anywhere in the Borough. When rivers are high this flooding can be more severe as a consequence of the failure of surface water or combined sewers to discharge in to water courses.

4. Local Flood Risk Management Strategy

4.1 Purpose

Local Flood Risk Management Strategies: England

A Lead Local Flood Authority for an area in England must develop, maintain, apply and monitor a strategy for local flood risk management in its area.

Local Flood Risk means flood risk from surface water, groundwater and ordinary watercourses

Redcar & Cleveland Borough Council's Flood Risk Management Strategy assesses local flood risk within the Borough and sets objectives for managing this risk. The strategy will detail mechanisms for achieving the objectives and seeks to reduce the risk of flooding to residential properties, businesses and the highway infrastructure.

4.2 National Flood Risk Management Strategy

The National Flood and Coastal Erosion Risk Management Strategy for England; Understanding the Risks, Empowering Communities, Building Resilience is designed to build on existing approaches to flood and coastal risk management and promote the use of a wide range of measures to manage risk. It states that risk should be managed in a co-ordinated way within catchments and along the coast and balances the needs of communities, the economy and the environment.

It is a framework within which communities have a greater role in local risk management decisions and sets out the Environment Agency's strategic overview role in flood and coastal erosion risk management (FCERM). This approach is aligned with the recommendations made by Sir Michael Pitt in his review of the summer 2007 floods. The strategy encourages more effective risk

management by enabling people, communities, business, infrastructure operators and the public sector to work together to:

- ensure a clear understanding of the risks of flooding and coastal erosion, nationally and locally, so that investment in risk management can be prioritised more effectively;
- set out clear and consistent plans for risk management so that communities and businesses can make informed decisions about the management of the remaining risk;
- manage flood and coastal erosion risks in an appropriate way, taking account of the needs of communities and the environment;
- ensure that emergency plans and responses to flood incidents are effective and that communities are able to respond effectively to flood forecasts, warnings and advice;
- Help communities to recover more quickly and effectively after incidents.

The strategy shows how communities can be more involved in local flood and coastal erosion risk management. It also emphasises the need to balance national and local activities and funding. In setting out future approaches to FCERM, this strategy considers the level of risk and how it might change in the future, the risk management measures that may be used, roles and responsibilities, future funding and the need for supporting information.

4.3 Other Policies and Strategies relating to flood risk

The River Basin Management Plan, (Northumbria River Basin District, December 2009) is the plan for delivery of the Water Framework Directive in the region. Its focus is to improve the ecological qualities of water bodies (sea, rivers, streams, ponds, etc).

Catchment Flood Management Plans are high-level strategic plans through which the Environment Agency, working with key decision-makers within a river catchment, identify and agree policies for sustainable flood risk management.

Shoreline Management Plans are strategic plans for the long-term management of the coast.

Strategic Flood Risk Assessment (SFRA); level 1 was produced in 2009 as part of the strategic planning process and informs the Local Development Frameworks/ Local Plan. A Level 2 SFRA was completed in 2010.

Water Cycle Study

The Tees Valley Water Cycle Study objective is to identify any constraints on housing and employment growth, planned for the area up to 2026, which may be imposed by the water cycle and consider how these can be resolved. The main purpose of water cycle management is to make better use of the water that we have, which aligns well with many fundamental FRM concepts (i.e. delaying run off and holding water where it can be tolerated and used).

Preliminary Flood Risk Assessment

The purpose of the PFRA report is aimed at providing a strategic assessment of flood risk from local sources including surface water, groundwater, ordinary watercourses and canals. The report is a high level screening exercise using readily available data held by Redcar & Cleveland Borough Council and partner organisations. The report looks at historical past flood events and considers the potential future flood events that may have a significant consequence on human health, economic activity and the environment including cultural heritage. The [Flood Risk Regulations 2009](#) which required each Lead Local Flood Authority (LLFA) to complete a Preliminary Flood Risk Assessment and identify [Flood Risk Areas](#) now require all LLFAs to review their risk assessments and Flood Risk Areas by 22 June 2017, whether or not any were identified in 2011.

Tees Valley Investment Plan

The Tees Valley investment Plan was commissioned in 2014 to develop a Flood Mitigation Investment Strategy for the Tees Valley. The purpose of the

plan is to assist the Tees Valley Local Authority's to identify and prioritise locations where efforts should be concentrated when considering surface water flood risk.

The project has involved development, and implementation, of a standardised approach that was applied to each of the five council areas in order to provide each authority with a prioritised list of locations where surface water flood risk is a potential issue.

5. Working together

5.1 Partnership working

Pitt Review – Recommendation 15:

“Local authorities should positively tackle local problems of flooding by working with all relevant parties, establishing ownership and legal responsibility.”

Redcar & Cleveland Borough Council participates in a number of forums along with partners and other Tees Valley Authorities. These forums include;

Tees Valley Strategic Flood Risk Management Partnership

Redcar & Cleveland Borough Council is a member of the Flood Risk Partnership for the Tees Valley. The group is attended by a representative from each Tees Valley Authority, an Elected Member from each Authority, Environment Agency, Northumbrian Water, and the Tees Valley Emergency Planning Unit. The group's terms of reference are to address flood risk at a Tees Valley regional level, emerging legislation, local priorities, cross boundary working and local standards.

NWL Liaison Meetings

Redcar & Cleveland Borough Council has quarterly liaison meetings with Northumbrian Water. The purpose of the liaison meetings is to address any major works programmed by NWL or the Council, any potential major developments within the borough and local sewerage and surface water issues.

Local Resilience Forum, (LRF)

The Cleveland Local Resilience forum (LRF) is responsible for emergency planning and civil contingencies across the Tees Valley (excluding Darlington) area. The LRF undertakes risk assessments and production of the community risk register, one of which is flood risk. The LRF has produced numerous plans that support co-ordinated action to respond to flooding events, including the Multi-Agency Flood Plan.

Northumbria Regional Flood and Coastal Committee, (NRFCC)

An elected member and officer attend the NRFCC to represent Redcar & Cleveland Borough Council. The Group determines funding applications for flood alleviation schemes and oversees those funded schemes.

Northumbria Integrated Drainage Partnership

the thirteen lead local flood authorities covering the north east of England, the Environment Agency and Northumbrian Water have come together to form the Northumbria Integrated Drainage Partnership (NIDP). They have jointly developed a strategic level area risk based prioritisation methodology to identify situations where responsibilities for drainage provision and the causes of flooding are shared or overlap. It does not replace any existing arrangements or responsibilities where flood risk from single sources may be present. The integrated collaborative approach championed by the NIDP promotes cost beneficial schemes and the use of sustainable drainage techniques such as natural flood management to deliver multiple benefits alongside flood risk reduction thereby further benefiting the environment, society and the economy. The NIDP now incorporates the **Inland Liaison Meeting** which was previously hosted by the Environment Agency and was attended by Lead Officers from all the North East Local Authorities and Northumbrian Water, the group's remit was emerging legislation, joint training initiatives, regional issues and best practice.

PD Ports

Tees Dock Road is currently the only access in to Teesport and has been subject to frequent flooding, this flooding can restrict vehicular access in to and out of the port. PD Ports have purchase pumps which can be deployed at short notice by PD Ports staff. An agreement is in place between Redcar and Cleveland Borough Council and PD Ports that in the event of flooding on Tees Dock Road, PD Ports will notify the Council and request permission to close the road and start pumping operations in to the pre-agreed discharge points. In the event that it is not possible to make direct contact with the Council it has been agreed that in this instance, in the interest of public safety, permission will be deemed to have been given and the road closure will be put in place by the Harbour Police. PD Port and the Harbour Police will make contact with the council at the earliest opportunity to confirm approval.

5.2 Roles and responsibilities

5.2.1 Lead Local Flood Authority

The Lead Local Flood Authority (LLFA) is the unitary authority or if there is no unitary authority then the County Council for the area. Redcar & Cleveland Borough Council is the Lead Local Flood Authority in its area. The LLFA has powers and responsibilities for flood risk management, which includes investigation of flooding incidents under Section 19 of the Flood and Water Management Act 2010 and powers over ordinary watercourses. The Council is the Highway Authority and as such has a duty to maintain the highway under Section 41 of the Highways Act 1980 and has responsibilities for highway drainage.

5.2.2 Environment Agency

The Environment Agency has powers and responsibilities for flood risk management on the main river network (main rivers are defined in paragraph 4.1) and also the sea. This includes providing a flood warning service. The Environment Agency can carry out flood risk management work, such as installation and operation of flood alleviation measures on main rivers, an example of this are defences constructed at Skinningrove Beck, Skinningrove. The EA maintains flood risk assets such as flood banks to manage water levels and ensure flood water can flow freely. The EA can also carry out work to prevent environmental damage to watercourses or to restore conditions. If a main river becomes blocked by an obstruction then, once notified the EA will remove it.

5.2.3 Northumbrian Water

Northumbrian Water is the water distribution and sewerage company in Redcar & Cleveland. Northumbrian Water is responsible for all combined drainage and sewerage systems and a number of surface water systems. Following sewerage flooding Northumbrian water can arrange for the area to be inspected and if necessary decontaminate.

5.2.4 Highways England

Highways England is responsible for the Trunk Road network and associated drainage which includes culverts under Trunk Roads and balancing ponds.

5.2.5 Riparian Landowners

Riparian landowners are those who own land adjoining a watercourse. As detailed in the EA document 'Living On The Edge', riparian landowners have certain rights and responsibilities, including the following:

- They must maintain the bed and banks of the watercourse, and also the trees and shrubs growing on the banks;
- They must clear any debris, even if it did not originate from their land. This debris may be natural or man-made;
- They must keep any structures that they own clear of debris. These structures include culverts, trash screens, weirs and mill gates;

5.3 Duties and Powers

5.3.1 Investigation of Flooding Incidents

Redcar & Cleveland Borough Council as LLFA has the duty to investigate a flood event when considered necessary or appropriate under Section 19 of the FWMA.

Section 19 Local authorities: investigations

- (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 investigation under subsection (1) it must –
- a) publish the results of its investigation, and
 - b) notify any relevant risk management authorities.

Flood and Water Management Act (2010), S.19, c.29, London: HMSO

The Tees Valley authorities through the Tees Valley Strategic Flood Risk Partnership agreed that an investigation for a flood event, is deemed locally significant and considered appropriate, if one or more of the following is affected by flooding:

- 5 or more residential properties;
- 2 or more businesses;
- 1 or more critical services;
- 1 or more transport links (Impassable for 10 Hours or more).

6. Funding

6.1 Flood Defence Grant in Aid

In 2012/13 a new approach to funding of flood alleviation schemes was introduced, based on the outcomes of proposed schemes. Flood and Coastal Resilience Partnership funding, was designed to allow more schemes to proceed and receive some level funding.

A cost-benefit analysis is carried out on the schemes and outcome measures calculated to ascertain the amount of funding a scheme can receive. Where 100% funding is not the outcome additional funding required must be secured through other sources to enable a scheme to proceed.

Local Authorities have the opportunity to bid for Flood Defence Grant in Aid funding and propose schemes for future years. All proposals are assessed and if successful they are allocated to the Medium Term Plan for funding in a given year.

6.2 Local Levy

An annual levy is charged to each Local Authority based on the numbers of properties in its area, within a Council Tax banding. The total sum raised from all North East Local Authorities is open to bids from the Councils or the Environment Agency and is usually used to match fund Flood Defence Grant in Aid or to fund smaller schemes that would not be eligible for Flood Defence Grant in Aid.

The amount of levy allocated to projects is determined by the Programme and Investment sub group of the RFCC (Regional Flood and Coastal Committee) and endorsed by the full Committee. The Regional Flood and Coastal Committee consists of Elected Members from each Local Authority and attended by Officers from a range of interested organisations.

6.3 Private Funding

Recent changes to Flood Defence Grant in Aid (FDGiA), allows private contributions; private funding enables schemes that are unable to achieve a high cost benefit score, required for full funding from FDGiA, to be delivered. Local businesses, commercial organisations, private individuals, anyone who may benefit from a flood defence scheme may be asked to contribute to make up the shortfall for these schemes.

6.4 S106 Funding – Developer Contributions.

The Town and Country Planning Act 1990, Section 106 allows a local planning authority to enter into an agreement with a landowner/ developer when granting planning permission.

The funding secured through the agreement is used to address issues and support the development through service or infrastructure improvement.

6.5 Community Infrastructure Levy (CIL)

The Community Infrastructure Levy came into force in April 2010. It allows local authorities in England and Wales to raise funds from developers undertaking new building projects in their area. The money can be used to fund a wide range of infrastructure that is needed as a result of development. This includes new or safer road schemes, flood defences, schools, hospitals and other health and social care facilities, park improvements, green spaces and leisure centres.

6.6 Repair and Renew Grant

Following an announcement by the Prime Minister on 12 February 2014, the Repair and Renew Grant (RRG) scheme was established to provide grants of up to £5,000 to homeowners and businesses that have been flooded between 1 April 2013 and 31 March 2014, to implement flood resistance and/ or resilience measures to minimise the impact of any future floods.

132 residential and business premises in the area were successful in applying for the grant scheme delivered by the Council. The scheme has now closed with all work being completed and funding claimed by October 2015.

6.7 Other Funding

The Council actively seeks grant funding for schemes. All opportunities are considered and where appropriate the Council will submit a bid. Sometimes grants are available purely for flood risk but often we look to fund flood risk improvements along-side other proposals such as highways improvements.

7. What do we want to Achieve?

7.1 Objective 1

To reduce flood risk to communities severely affected by recent flooding

How will we do it?

- Support the Environment Agency and our partners on the NRFCC
- Support residents and businesses with advice, and with grant support where available and appropriate
- Investigate flooding incidents.
- Promote and support community resilience and particularly flood warden schemes
- Develop and maintain good working relationships with risk management authorities

7.2 Objective 2

To reduce the incidence of surface water flooding

How will we do it?

- Inspect and maintain trash screens.
- Continue to maintain the asset register of flood risk features
- Inspect on a risk basis ordinary watercourses
- Investigate flooding incidents
- Carry out Incident mapping
- Regulate work on ordinary watercourses
- Designate flood risk features

7.3 Objective 3

To ensure flood risk is managed in new development

How will we do it?

- The Lead Local Flood Authority will be a statutory consultee on major planning applications
- Ensure discharge is appropriately restricted and surface water attenuated on site
- Incorporate sustainable drainage systems into major new development
- Encourage pre-planning discussions with developers
- Promote design standards for sustainable drainage systems.
- Maintain a strong planning policy on avoiding and managing flood risk, based on the role of local authorities in preparing local plans within the National Planning Policy Framework (NPPF)
- Carry out flood risk assessment
- Plan for flood exceedance

7.4 Objective 4

To keep our highways safe and passable

How will we do it?

- Maintain the highway drainage system with a risk based approach.
- Manage the highway verges.
- Highway maintenance
- Flood plan – incident plan for effective deployment of resources
- Maintain stocks of temporary flood protection assets for deployment during flood events including pumps and temporary flood barriers
- Plan diversionary routes
- Manage flow paths
- Carry out drainage improvements works
- Upgrade trash screens

7.5 Objective 5

To deliver wider benefits

How will we do it?

- Promote water sensitive urban design
- Promote water quality
- Incorporate amenity benefits into sustainable urban drainage design
- Contribute to strategic prioritisation of improvements
- Promote partnership working
- Develop community engagement
- Identify, deliver and share innovative projects
- Share best practice

8. Making it Happen

8.1 Current Schemes

The Council have a number of schemes identified on the Environment Agency Medium Term Plan for 2015/2016 to 2020/2021 and studies are in progress for each of them.

- Fleet Beck & Roger's Dyke Inland Flood Alleviation Scheme
- St Joseph's Court Property Level protection - completed
- Tees Dock Road
- Charltons Inland Flood Alleviation Scheme
- Cross Beck Inland Flood Alleviation Scheme
- Hutton Lane Inland Flood Alleviation Scheme
- Whale Hill Ironstone Culvert

The council and Northumbrian Water completed a joint stage 1 study for Marske and New Marske in 2015/2016 which identified 4 candidate sites for further investigation in a stage 2 study. The candidates sites have been submitted for inclusion on the Environment Agency Medium Term Plan for 2021/2022 onwards, the stage 2 study which will be completed in 2017, is a diagnostic study and will identify future opportunities and a 1st stage business case. A joint stage 1 study is being undertaken for Redcar in 2016/2017.

The future programme of NIDP studies for 2017/2018 to 2020/2021 includes:

- Saltburn, Skelton & Brotton
- South Bank and Eston
- Loftus, and
- Guisborough

The studies are joint funded as a partnership between the Council and Northumbrian Water and to-date project managed by Northumbrian

Water, however the Council hope to lead on at least one of the future projects.

8.2 Maintenance

Maintenance: Highway Gullies

Highway gullies need to be maintained to keep the highway drainage system working correctly. There is currently a risk based maintenance regime in place, whereby dependant on risk gullies are cleaned at least on a monthly, 2 monthly, quarterly or annual regime to keep them free from blockage by silt and weed growth. There is a programme of investigations into the gullies that need to be cleaned more frequently and where problems are identified and resolved the frequency of cleansing is gradually reduced as the risk is shown to be reduced.

Redcar & Cleveland Borough Council are using data capture to develop strategies to manage and control future flood risk, two main areas being developed are:-

- Maintenance of Highway drainage assets
- Managing and improving the authorities Flood Risk Asset register

In order to manage drainage systems cost effectively, it is necessary to have a robust drainage asset management strategy. The strategy must be able to support and inform decision making that address the need to deliver highway maintenance in a way that balances growing service demands with reducing resources.

A drainage asset management system allows the Council to quantify the condition of its drainage assets, prioritise maintenance and assess the suitability of those assets to deal with present and future flood and contamination risks. Decisions based on asset management planning principles take wider organisational goals and practises into account and have a greater chance of a successful delivery

The efficiency of a gully cleaning operation can be measured by the number of gullies a team can clean in one day. The effectiveness of the work can be measured by how many of those gullies needed cleaning.

The location, type, depth of gully pot and height of invert to the outlet of all highway gullies currently maintained by the Authority has been recorded; the silt levels in each gully have been measured prior to cleansing for the last five years. The silt level data has been analysed, 200 high risk gullies identified from silt levels, previous flood events and flood zones identified by the Strategic Flood Risk Assessment are subject to monthly cleansing and 320 are subject to quarterly cleansing. 7,500 gullies on Classified & Principal roads are on an annual cleanse carried out alongside other maintenance activities such as inspection and cleaning of lighting, signs, safety fence and repair of non-emergency defects. The last full years' silt level data showed that 3018 (16.2%) had silt levels of 50% or more, starting in 2017 it is proposed that the remaining 13,550 are to be inspected annually, those with silt levels of 50% or more will be cleansed. Based on these figures the new regime will enable one gully cleansing vehicle to clean all gullies in one year, it will also assist in meeting the challenge of increasing numbers of gullies to be cleaned due to the number of new developments.

The new regime will release resources to investigate problem gullies and drainage issues such as those currently requiring monthly or quarterly cleansing it will also identify existing highway assets that require upgrading.

Trash Screens

Trash screens (also known as grids) are frequently used on the inlets and outlets of culverts, for the purpose of catching debris to prevent it from travelling into the culvert and causing blockage, and also to prevent unauthorised access into a culvert which can become a dangerous place where children might decide to play.

Trash screens are inspected monthly and when flood alerts and warnings are received, where trash screens are identified as contributing to flooding issues

they will be assessed to see if a scheme can be developed to reduce the risk of flooding on that particular culvert.

Other screens may be assessed to see if they are required for safety reasons, following a risk assessment the screen may be removed to reduce flood risk. On occasions screens on new developments, may also be subject to the same risk assessment.

8.3 Asset Register

Redcar & Cleveland Borough Council has a flood risk asset register that accurately records its flood risk assets, including Culverts, Bridges, Floodwalls and any other feature designed to reduce flood risk. (these are mainly culvert inlet and outlet trash screens), the register records the exact location and condition of the asset. All of the assets have been assessed for flood risk, based on the probability of the culvert blocking and the extent of the damage caused if the culvert was to block all of the grids will be classified Red, Amber or Green based on the risk . This information will form the maintenance / inspection regime for all of our flood risk assets, all trash screens classified Red will be inspected on receipt of a weather warning, during an adverse weather event and after the extreme event has subsided. The Asset Register is an on-going project with watercourse inspections being carried out when conditions are appropriate.

8.4 Development Management

The National Planning Policy Framework (NPPF) sets out the Government's policy that planning should proactively help mitigation of, and adaptation to climate change including the management of water and flood risk. The NPPF states that when determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere and gives priority to the use of sustainable drainage systems.

On the 15th April 2015, Lead Local Flood Authorities became statutory consultees of the planning process, with the commencement of the final part of

the Flood and Water Management Act 2010. This means the LLFA is now consulted on all major planning applications (10 or more properties). The Act changes the previous right of a developer to connect surface water discharge to the public sewerage system and makes it conditional on meeting new standards, as follows;

Surface water not collected for use must be discharged to one or more of the following, listed in order of priority:

- 1. Discharge into the ground (infiltration); or where not reasonably practicable,*
- 2. Discharge to a surface water body; or where not reasonably practicable,*
- 3. Discharge to a surface water sewer, highway drain or another drainage system; or where not reasonably practicable,*
- 4. Discharge to a combined sewer.*

Discharge into a water body will also need to be attenuated to prevent a risk of flooding. The attenuation can take many different forms from ponds, swales and basins to oversized pipes and attenuation tanks.

The Department of the Environment Flood and Rural Affairs (DEFRA) has developed national standards in order to manage surface water run-off in accordance with the Act. The National Standards are a very high level guide to design, construction and maintenance of sustainable drainage systems.

To assist developers in the local area the five Tees Valley Authorities have produced a design guide of local standards for the design, construction and maintenance of SUD's, although occasional slight variations between authorities may occur, where local policy dictates.

Pre-Application Advice

Engagement with a developer at an early stage is preferred, as this can address a lot of the potential problems and the developer will be able to design the site with reference to the blue/green corridors. This is especially important where a natural SUDs design is proposed.

Information for Assessment

When assessing major planning applications, the information detailed below is considered. The more information submitted at an earlier stage, the more efficient the approval process. It is possible to condition some information but key information such as discharge points and rates must always be agreed, prior to approval;

- a. Flood risk assessment and drainage strategy
- b. Detailed site layout at an appropriate scale, with North point
- c. Topographical survey of the site, including water course cross-sections and proposed discharge points and rate. It is helpful to highlight the blue corridors.
- d. Plan of drainage system and catchment areas, including impermeable areas and phasing.
- e. Full design calculations and design parameters. The design must demonstrate conformance with the local standards.
- f. Provision of Micro Drainage/ WinDes (mdx) files to assess the proposed drainage design.
- g. Long-sections and cross sections for the proposed drainage systems, at an appropriate scale
- h. Construction details.
- i. Details of connections (including flow control devices) to watercourses, sewers, highway drains and SUD's
- j. Details of off-site works and any necessary consents.
- k. Operational characteristics of any mechanical or electrical components, including maintenance and energy requirements.
- l. Plan demonstrating flooded areas for the 1 in 100 year event plus climate change (30%), if system is at capacity and flow paths for exceedance.
- m. Access arrangements for maintenance.
- n. Landscape planting scheme.
- o. Proposals for pollution control
- p. Plan for management of construction and programme
- q. Health and Safety Plan
- r. Maintenance plan and costs.
- s. Agreement for the long-term maintenance of the system

8.5 Northumbria Integrated Drainage Partnership

Northumbria Integrated Drainage Partnerships is a partnership project between Northumbrian Water and local authorities. The purpose of this project is to establish a proactive cross party process and procedure in order to:

- Create a template of how we can work together in our communities to understand current and future sewerage issues.
- Establish and implement data share and communication protocols.
- Produce and apply a methodology that can be used to risk rank locations for more detailed studies.
- Promote integrated sustainable drainage solutions.
- Promote 'best possible' service to both customer and the environment.
- Provide risk based evidence to inform future business planning requirements.

NWL Drainage Areas (DA) are ranked at a strategic level, where necessary and appropriate the partners engage in studies of those high ranking drainage areas, which will form a basis for future investment.

8.6 Flood Risk Programme

Since the Flood and Water Management Act commenced in 2010, Redcar & Cleveland Borough Council has kept records of all reported flooding within the Borough. The flooding incidents have been assessed and any unresolved incidents have been prioritised. High priority incidents will be investigated in more detail for potential schemes. When a scheme is identified this will be flagged up to the Environment Agency with a funding bid and entered onto the medium term plan.

Incidents are prioritised according to where the flooding occurs, the frequency and disruption caused; high risk areas are also assessed. High priority is always given to frequent internal property flooding, where bids for funding stand a greater chance of success. It is not possible to bid for funding for external

flooding, though the incidents are recorded for monitoring purposes and advice can be given to residents who are affected.

Incidents are also compared against Northumbrian Water's drainage areas to check if there are any opportunities for a joint study.

8.7 Flood Plan

A Multi- Agency Flood Plan outlines the combined response on the part of relevant agencies to flooding incidents within the Tees Valley. The plan provides a mechanism for co-ordinating the multi-agency response. It is regularly reviewed and exercised to ensure that it remains relevant.

8.8 Innovation

The Council is committed to looking at alternative means of reducing flood risk. Natural flood risk management is the alteration, restoration or use of landscape features to reduce the risk of flooding.

The aim is to reduce the amount of water travelling downstream at the peak of the event and allowing it to be released more slowly by restricting the progress of water through a catchment. They rely on either one, or a combination, of the following techniques:

- **Storing water** - using ponds, ditches, channels, reservoirs or flooding land.
- **Slowing the progress of water through the catchment** – this can be done by planting in the channel or on flood plain land.
- **Infiltration** – free draining soils will allow infiltration and potentially reduce surface water run-off.
- **Interrupting the flow of water** – through natural dams, ponds, introducing meanders or planting.

The Environment Agency has used this natural flood risk management strategy for a scheme in Belford, Northumberland where the rural village was hit by severe flooding. A similar approach has recently been successfully implemented in Alwinton, Northumberland, click [here](#) to view a presentation on the scheme by Fraser et al.

Many flooding incidents are caused when the amount of rainfall exceeds the capacity of a drainage system, this is more apparent in extreme events, where a drainage system is working properly however cannot take the amount of rainfall, causing flooding. It isn't possible to design a drainage system that can meet demand for all extreme events; therefore it is important to look at other ways of reducing the amount of water going into a system. One method of this is to engage the community in water usage, for example a large number of properties installing water butts and the residents using the water on their gardens. For this method to be successful it needs the participation of a number of residents in a particular area. This approach has been trialled in the Gresham area of Middlesbrough and recently through Project Downpour in Darlington; to date there is not enough information to confirm the success of the projects however any number of residents taking part is seen as a positive contribution however small.

9. Sustainability

9.1 Sustainable Drainage

Sustainable drainage systems are now the preferred approach to managing rainfall from hard surfaces and can be used on any site. There are many different SUDS features available to suit the constraints of a site. These features include green roofs, and more natural features such as ponds, wetlands and shallow ditches called swales. Hard engineered elements are often used in high density, commercial and industrial developments. These include permeable paving, canals, treatment channels, attenuation storage and soakaways. In well-designed SUDS a number of different features are provided in sequence, which is known as the management train.

The primary purpose of SUDS is to mimic the natural drainage of the site prior to development. This is achieved by capturing rainfall, allowing as much as possible to evaporate or soak into the ground close to where it fell, then conveying the rest to the nearest watercourse to be released at the same rate and volumes as prior to development. Along the way any pollutants, such as metals and hydrocarbons from roads and car parks, are reduced. Water entering a local watercourse is therefore cleaner and does not harm wildlife habitats. SUDS generally replace traditional underground, piped systems that use grates or storm water drains at street level. If the water is kept on the surface as much as possible the SUDS can provide valuable amenity asset for local residents and create new habitats for wildlife. This also means that any problems with the system are quicker and easier to identify than with a conventional system and are generally cheaper and more straightforward to rectify. SUDS will become increasingly important to control surface water as rainfall increases because of climate change. They can also provide other benefits in developments such as passive cooling, which will again help mitigate any increase in temperatures due to climate change.

When choosing which type of SUDs system to install the developer must consider the ground conditions and the maintenance liabilities. In Redcar & Cleveland the vast majority of the area is covered by dense clay soils which do not lend themselves to infiltration methods. Due to this and the potential difficulties in maintaining soakaways, leading to an increase in flood risk in

future years the Council does not generally support this as a suitable method of drainage within the Borough. It is recommended that the developer considers low maintenance SUDs. All major proposals in the Borough when submitted for planning approval are expected to be accompanied by a SUDs proposal including a maintenance plan or a condition will be imposed requiring this.

A number of options are available for maintaining SUDs schemes. These include the maintenance to be carried out by the local authority, water and sewerage company or the developer (including a management company on their behalf). Due to financial constraints and a lack of clarity regarding funding arrangements, the Authority do not accept maintenance responsibility for SUDs.

To provide more information and technical guidance on SUDs techniques, the five Tees Valley Authorities (Middlesbrough Council, Stockton Borough Council, Darlington Borough Council, Redcar and Cleveland Council and Hartlepool Borough Council) have jointly produced a Design Guide and Specification for use by developers.

9.2 Water Framework Directive (WFD)

The European Water Framework Directive came into force in December 2000 and became part of UK law in December 2003. WFD establishes a strategic framework for managing the water environment. It requires a management plan for each river basin to be developed every 6 years. WFD offers a unique opportunity to integrate flood risk management with other aspects of river/watercourse management. WFD however does include some derogation for flood risk management but stringent assessments must be carried out to ensure that there are no better environmental alternatives to the proposed scheme.

As part of WFD all water bodies need to reach either Good Ecological Status (GES) or Good Ecological Potential (GEP) in the case of artificial or heavily modified water bodies by 2027. Local authorities and other public bodies are required to provide information and “such assistance as the Environment Agency may reasonably seek in connection with its WFD functions”.

Additionally, Local Authorities, along with other public bodies, have a general responsibility not to compromise the achievement of UK compliance with EU Directives, including the WFD.

10. Review of the Local Strategy

It is anticipated that the local flood risk strategy will be reviewed every five years and the objectives will be reviewed on an annual basis.

If the Borough is subject to any severe flooding incidents, the incident will be investigated under section 19 of the Flood and Water Management Act. If the outcome of that investigation has any bearing on the contents of the local strategy, then the strategy will be reviewed based on recommendations from the investigation.

11. Glossary of terms

	Definition
Catchment	The catchment is the total area of land draining into a watercourse or other drainage system
Climate Change	This is a long term change to weather patterns, it is predicted that climate change will produce more frequent and severe weather events, such as heavy rainfall leading to flooding. This is why drainage calculations include a factor for climate change.
Critical Infrastructure	This is infrastructure which is vital to the communities it serves, critical infrastructure includes a range of buildings such as hospitals and schools, major transport links and utility services such as electricity substations and water treatment works.
Environment Agency (EA)	An executive non-departmental public body, sponsored by the Department for the Environment, Food and Rural Affairs (DEFRA). Working to create better places for people and wildlife, and support sustainable development. The EA has a strategic overview role in flood risk management.
Exceedance Flow Routes	Excess water that appears on the surface when all the capacity in the drainage systems have been exceeded. It is important to understand where this water will flow to in an extreme event.
Flood Defence Grant in Aid (FDGiA)	Central Government funding stream for flood alleviation schemes. Local Authorities and the Environment Agency can bid for FDGiA funding.
Flood Map for Surface Water (FMfSW)	Flood maps produced by the Environment Agency which give a broad indication of areas that may be at risk from surface water flooding. Based on topography the maps show where water would be likely to flow or pond.

Flood Risk Regulations	Legislation that transposed the European Floods Directive (2009)
Flood and Water Management Act 2010 (FWMA)	Following the 2007 floods Sir Michael Pitt, commissioned by Government, produced the 'Lessons learned from the 2007 summer floods'. The Government accepted the 92 recommendations made in the report, and in 2010 the recommendations were transposed into UK Law in the form of the Flood and Water Management Act 2010.
Fluvial	Referring to rivers, fluvial flooding is excess water leaving a river channel and flooding adjacent land.
Highways England	Highways England is responsible for the Trunk Road network and associated drainage which includes culverts under Trunk Roads and balancing ponds.
Lead local Flood Authority (LLFA)	LLFAs are county councils and unitary authorities, who have a number of duties and responsibilities for flood risk management, under the Flood and Water Management Act 2010.
Local Flood Risk	Flood risk from surface water, groundwater and ordinary watercourses.
Local Levy	A levy on local authorities which is collected regionally and pooled, it is used to fund flood alleviation measures.
Local Resilience Forum (LRF)	The Cleveland Local Resilience forum (LRF) is responsible for emergency planning and civil contingencies across the Tees Valley (excluding Darlington).
Main River	Watercourses that are designated as such on the main river map. Generally the larger watercourses, for which the Environment Agency has flood risk management responsibilities.
National Planning Policy Framework (NPPF)	National Planning Policy Framework (NPPF) maintains strong planning policy on avoiding and managing flood risk, based on the role of local authorities in preparing local plans

Ordinary Watercourse	Ordinary watercourses are every river, stream, ditch, sluice or drain, where water flows but are not main rivers
Pioneer Maintenance	Extensive maintenance over and above the normal requirements of routine maintenance
Pitt Review	An independent review of the summer flooding in 2007, which affected large parts of the UK.
Pluvial Flooding	Flooding caused by surface water run-off or overland flows.
Preliminary Flood Risk Assessment (PFRA)	A strategic assessment of flood risk from local sources including surface water, groundwater, ordinary watercourses and canals.
Property Level Protection (PLP)	Flood protection measures on a property, examples include; Flood doors, gates, one-way air brick covers, waterproofing etc.
Riparian Owner	Riparian landowners are those who own land adjoining a watercourse. As detailed with the EA document 'living on the Edge', riparian landowners have certain rights and responsibilities
Risk Management Authority (RMA)	An Authority with powers and responsibilities for managing flood risk, the Environment Agency, Lead Local Flood Authorities and Water and Sewerage Companies are all risk management authorities.
Strategic Flood Risk Assessment (SFRA)	Part of the strategic planning process and informs the Local Development Frameworks/ Local Plan.
Sustainable Drainage System (SUDs)	A drainage system designed to mimic natural drainage and reduce the potential impact from new or existing developments, with respect to surface water drainage discharges.
Trash Screen	The screen fixed to the inlets and outlets of culverts to prevent large objects or persons from entering them.
Water Cycle Study	Study objective of the WCS is to identify any constraints on housing and employment growth, planned for the area up to 2026, which may be imposed by the water cycle and how these can be resolved.

Water Framework Directive (WFD)	The European Water Framework Directive came into force in December 2000 and became part of UK law in December 2003. WFD establishes a strategic framework for managing the water environment
Water and Sewerage Company (WaSC)	The private companies responsible for water distribution and sewerage operations within a given area. In Redcar & Cleveland this is Northumbrian Water.

12. Useful Links

FloodLine 0845 988 1188

<https://fwd.environment-agency.gov.uk/app/olr/home>

River Levels <http://www.environmentagency.gov.uk/homeandleisure/floods>

Flood Warnings

<http://www.environment-agency.gov.uk/homeandleisure/floods/31618.aspx>

Warning Areas

<http://maps.environment->

[agency.gov.uk/wiyby/mapFromCMSCodes?topic=fwa&lang=e&codes=121WAF925&layer](http://maps.environment-agency.gov.uk/wiyby/mapFromCMSCodes?topic=fwa&lang=e&codes=121WAF925&layer)

[Group=2](#)

Redcar & Cleveland Borough Council

<http://www.redcar->

[cleveland.gov.uk/rcbcweb.nsf/web+full+list/0c6d66ceb03cfada8025705b0035bc9e?opendocument](http://www.redcar-cleveland.gov.uk/rcbcweb.nsf/web+full+list/0c6d66ceb03cfada8025705b0035bc9e?opendocument)

[cument](#)

Environment Agency

<https://www.gov.uk/government/organisations/environment-agency/services-information>

Northumbrian Water

<https://www.nwl.co.uk/>

The National Flood Forum

<http://www.nationalfloodforum.org.uk/>

Tees Valley Authorities Local Standards for Sustainable Drainage

<http://www.middlesbrough.gov.uk/index.aspx?articleid=1668>

CIRIA

<http://www.ciria.org/>

SusDrain

<http://www.susdrain.org/>

13. References

National Flood and Coastal Erosion Risk Management Strategy – *Environment Agency*

Preliminary Flood Risk Assessment – *Redcar & Cleveland Borough Council*

Strategic Flood Risk Assessment L1 & 2 - *Redcar & Cleveland Borough Council*

Living on the Edge – *Environment Agency*

Thank you to the Environment Agency for use of the flood maps

14. Contacts

Redcar & Cleveland Borough Council

Highways & Engineering **01287 612594 (Office hours)** (For more information on this strategy or other information on Flood Risk Management)

Customer Contact Centre **01642 774774** (To report flooding in your area)

<http://www.redcar-cleveland.gov.uk>

Environment Agency

Flood Line **0845 988 1188** (To sign up to receive flood alerts and warnings in your area)

Incident Hotline **0800 80 70 60 (24 hours)**

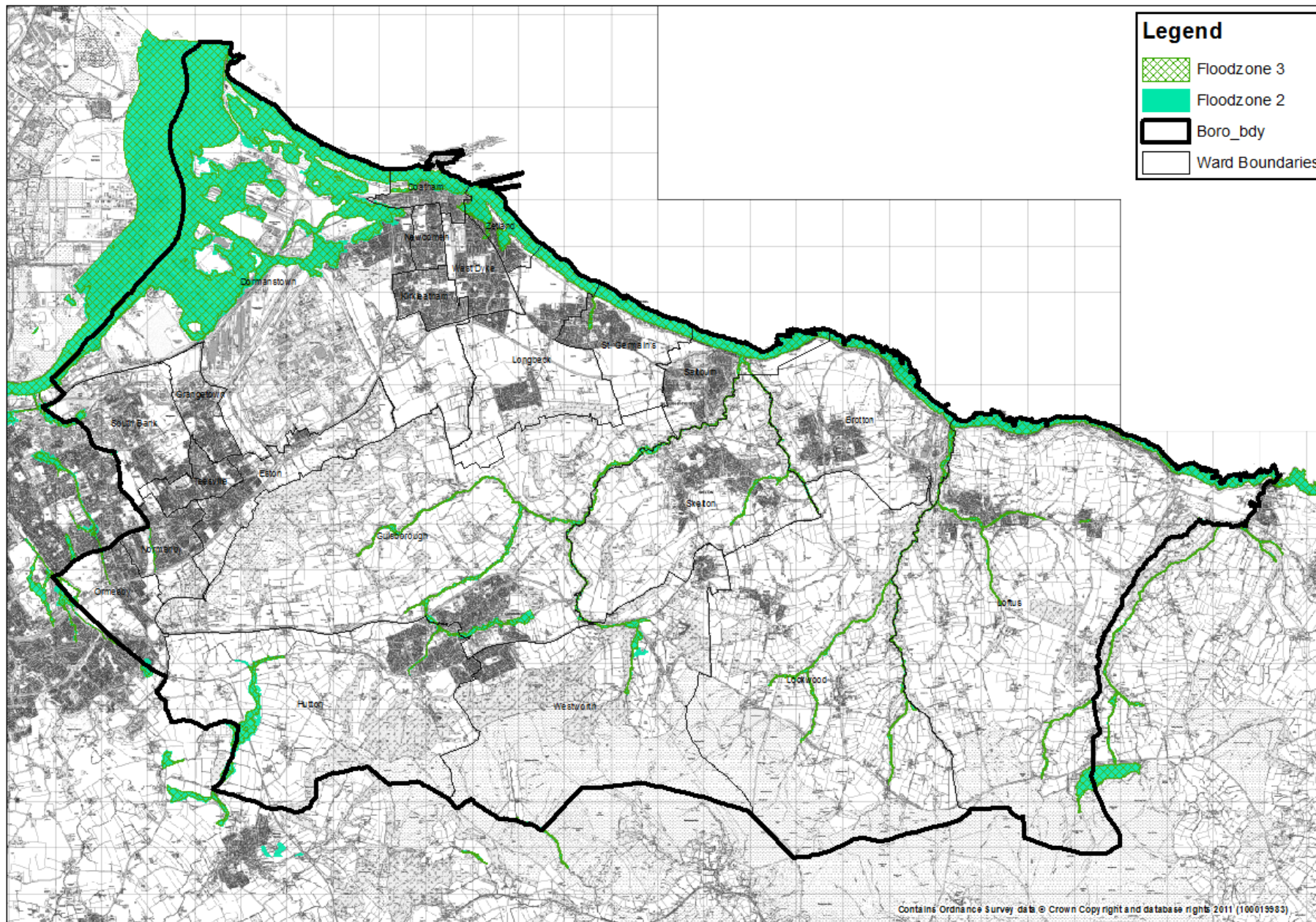
<http://www.environment-agency.gov.uk>

Northumbrian Water

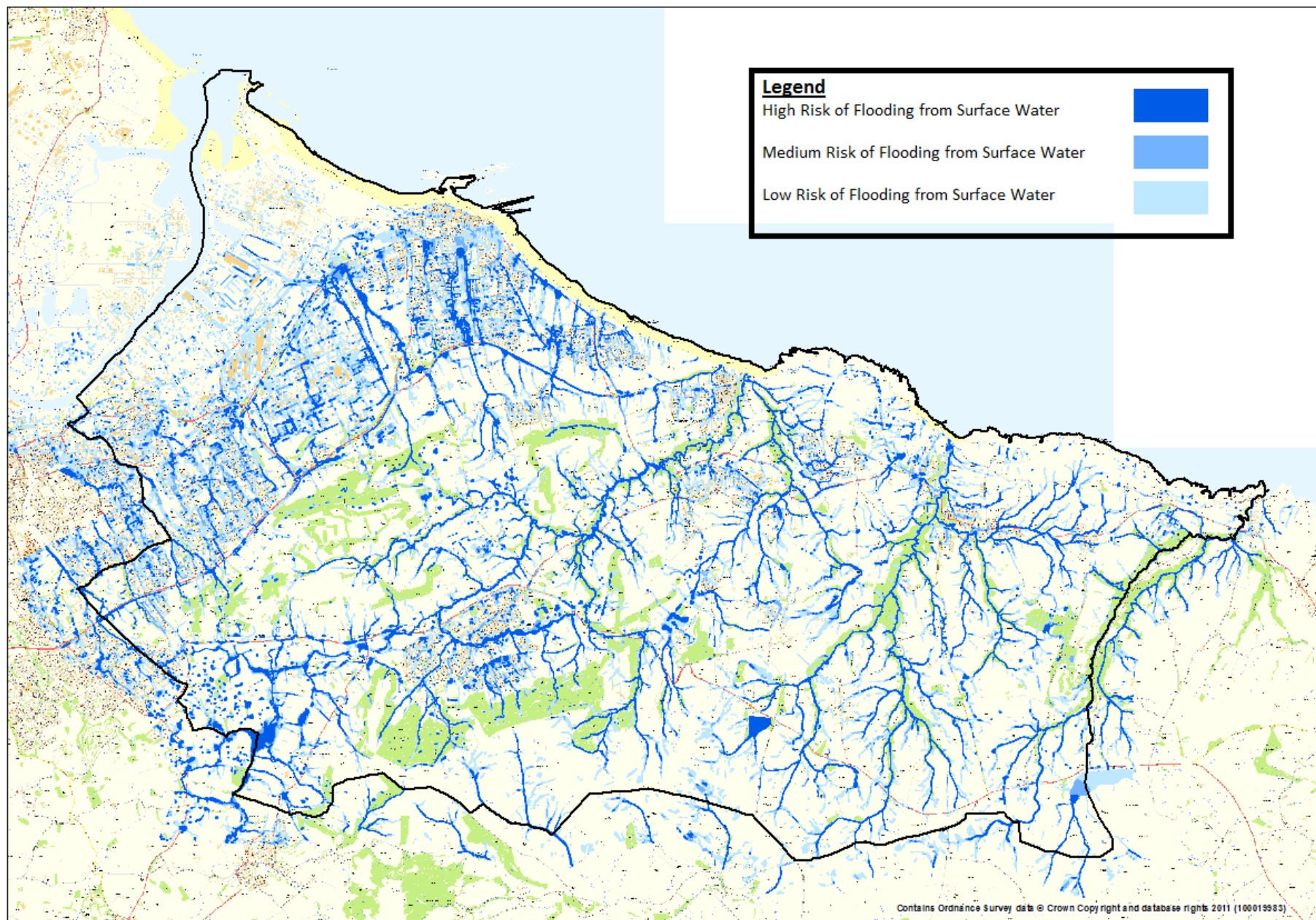
Customer Contact Centre **0800 328 7648 (24 hours)**

<http://nwl.co.uk/your-home/your-services/sewer-flooding.aspx>

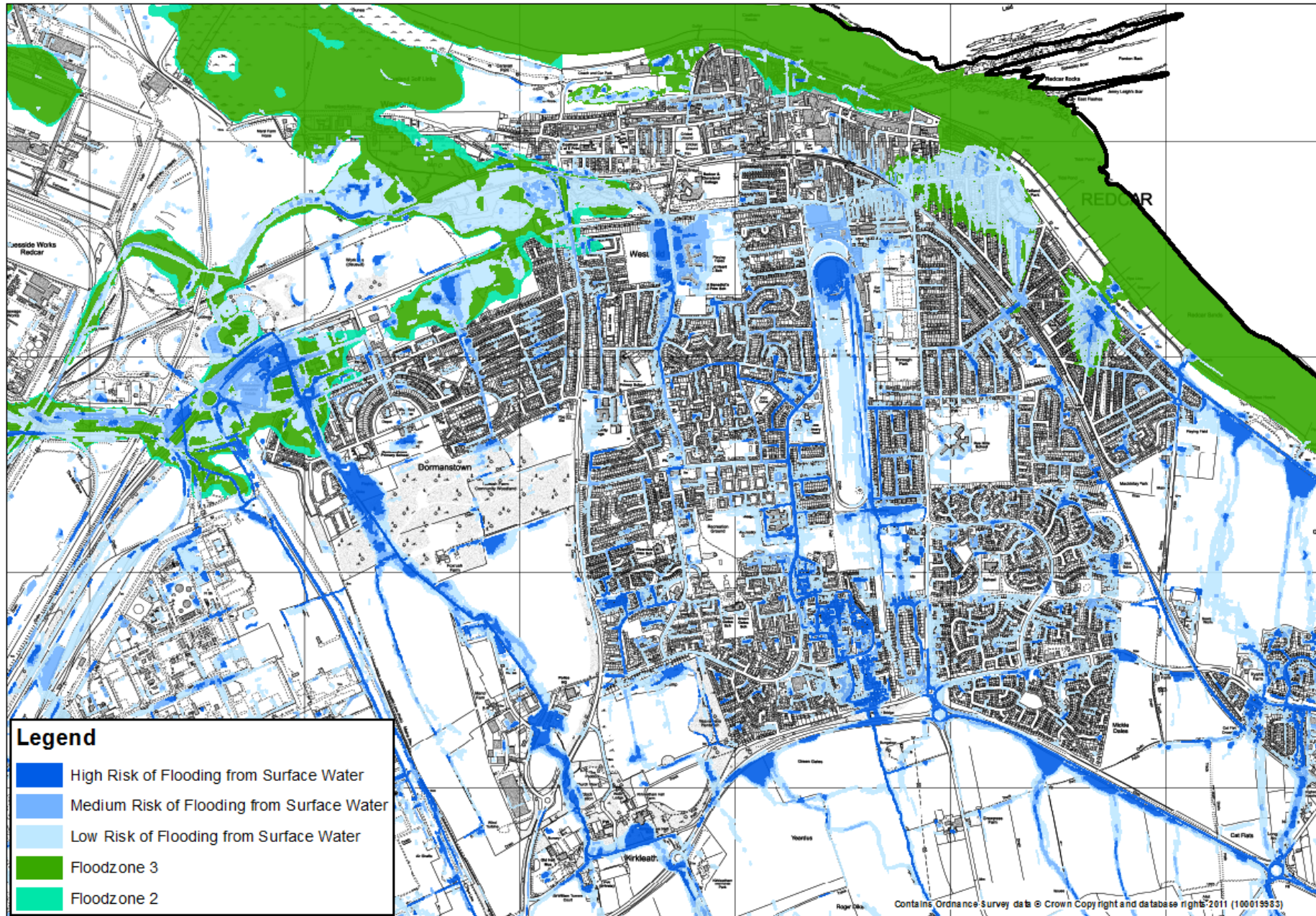
Appendix A - Redcar & Cleveland Borough Flood Zones



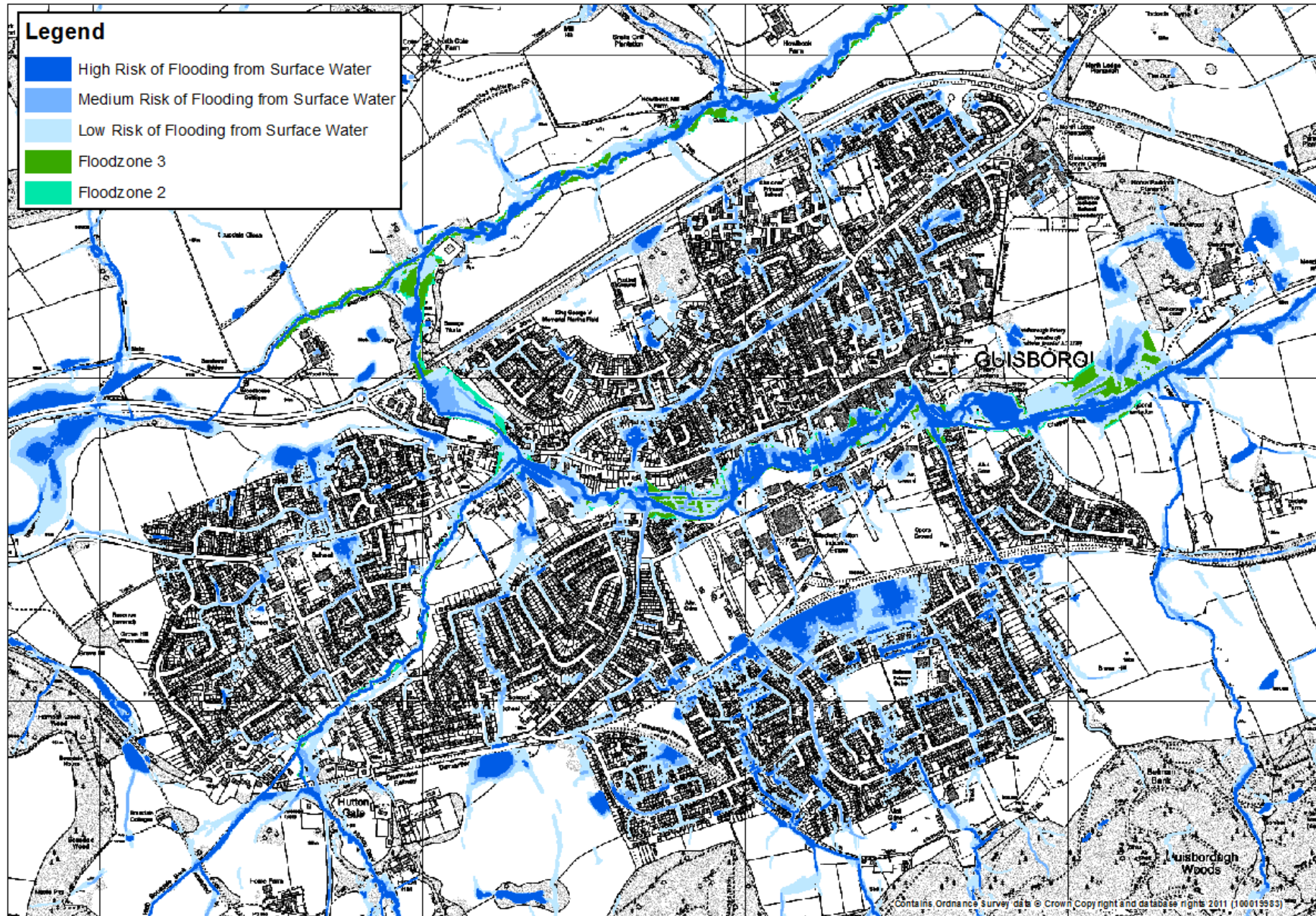
Appendix B – Redcar & Cleveland Surface Water Flood Risk Map



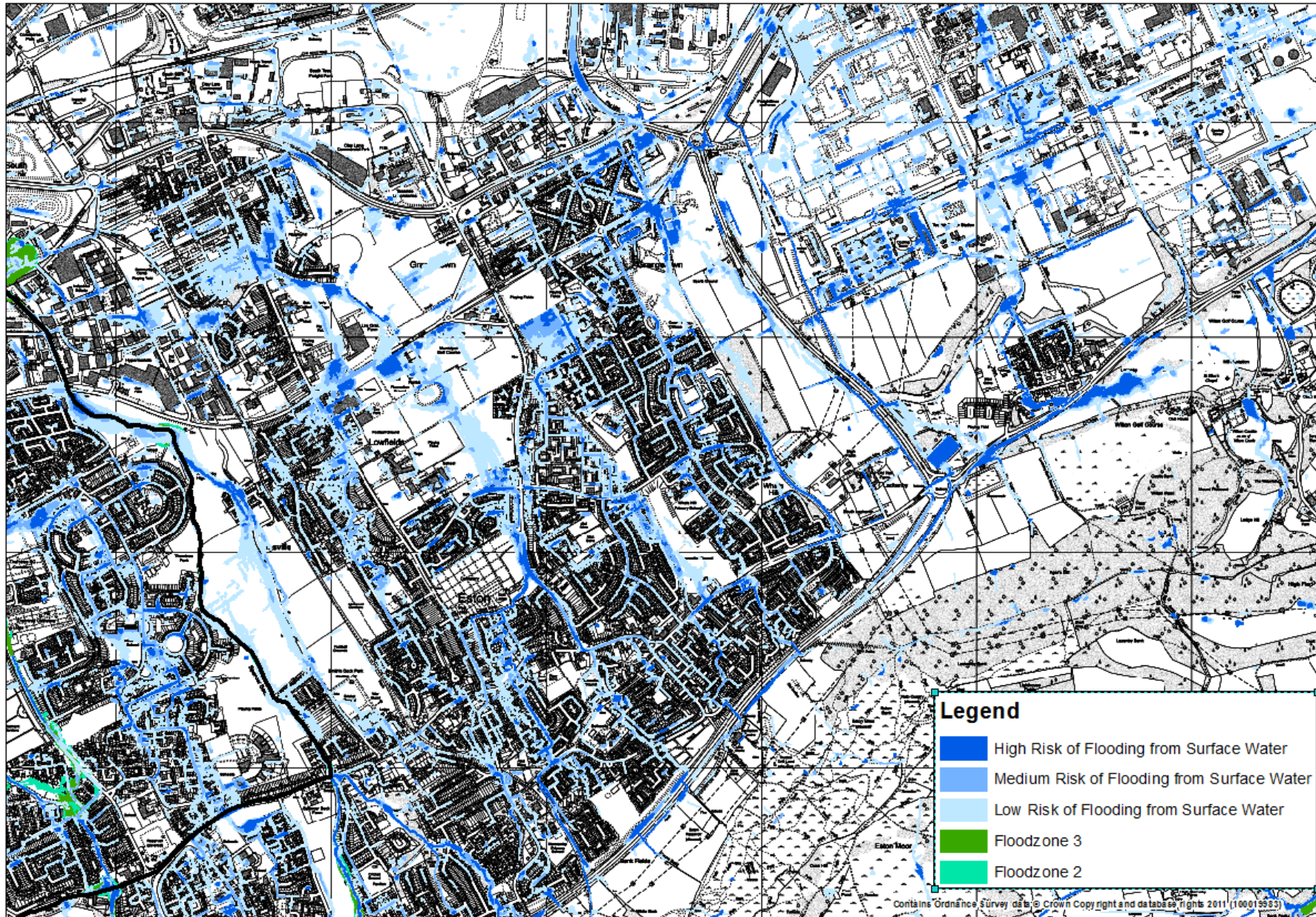
Appendix C – Redcar, Dormanstown and Kirkleatham



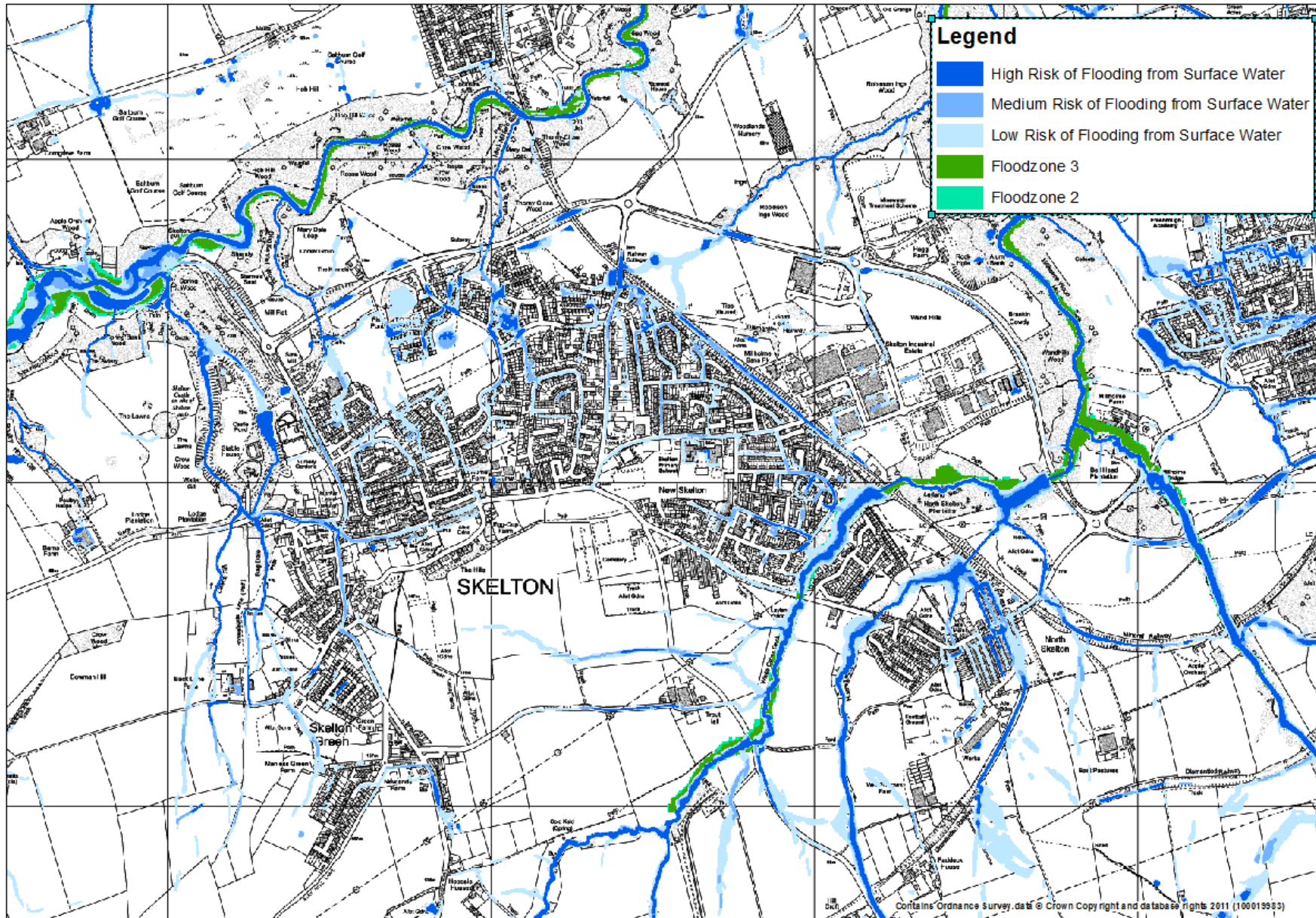
Appendix D – Guisborough



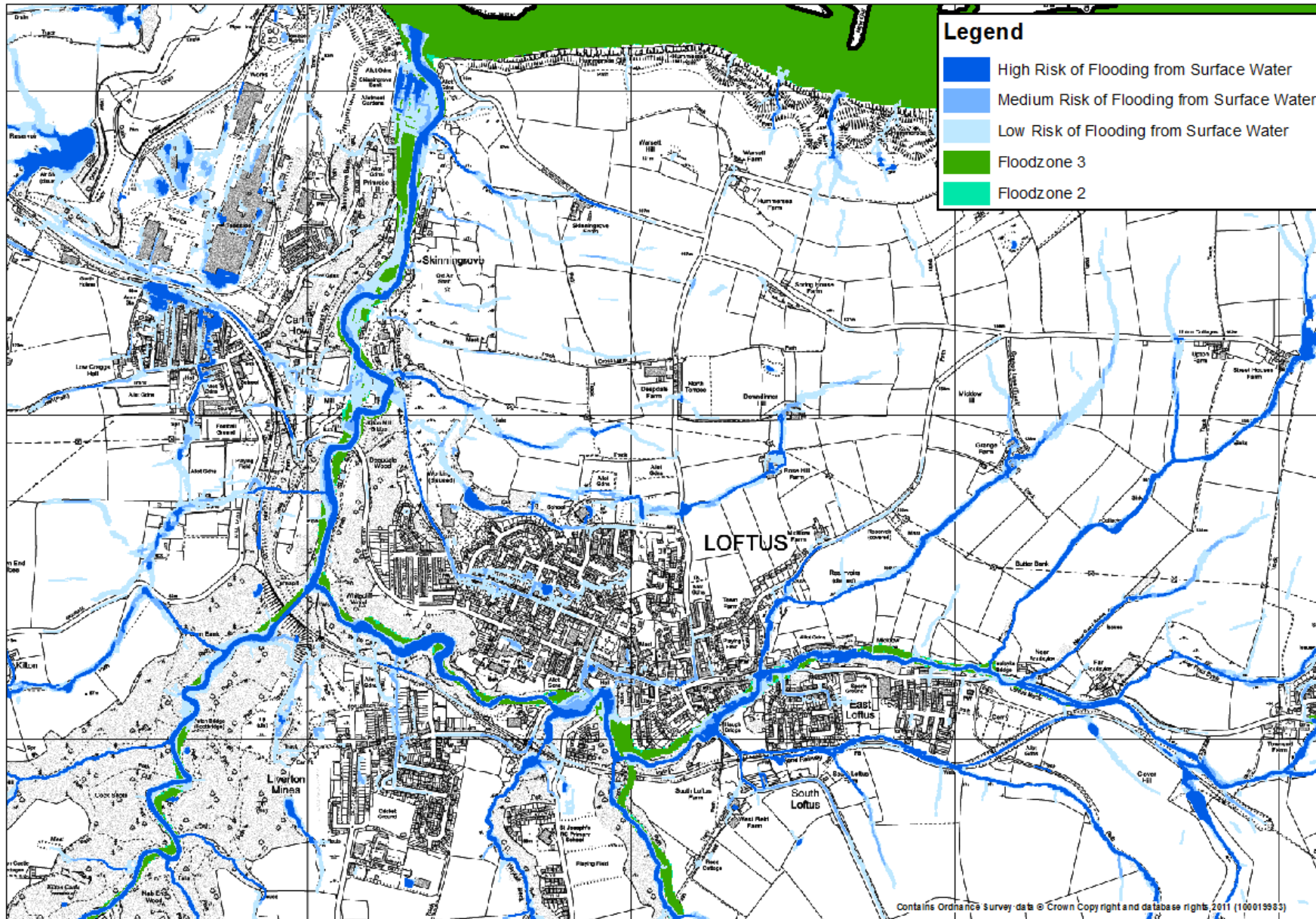
Appendix E – Eston, South Bank, Grangetown, Teesville & Lazenby



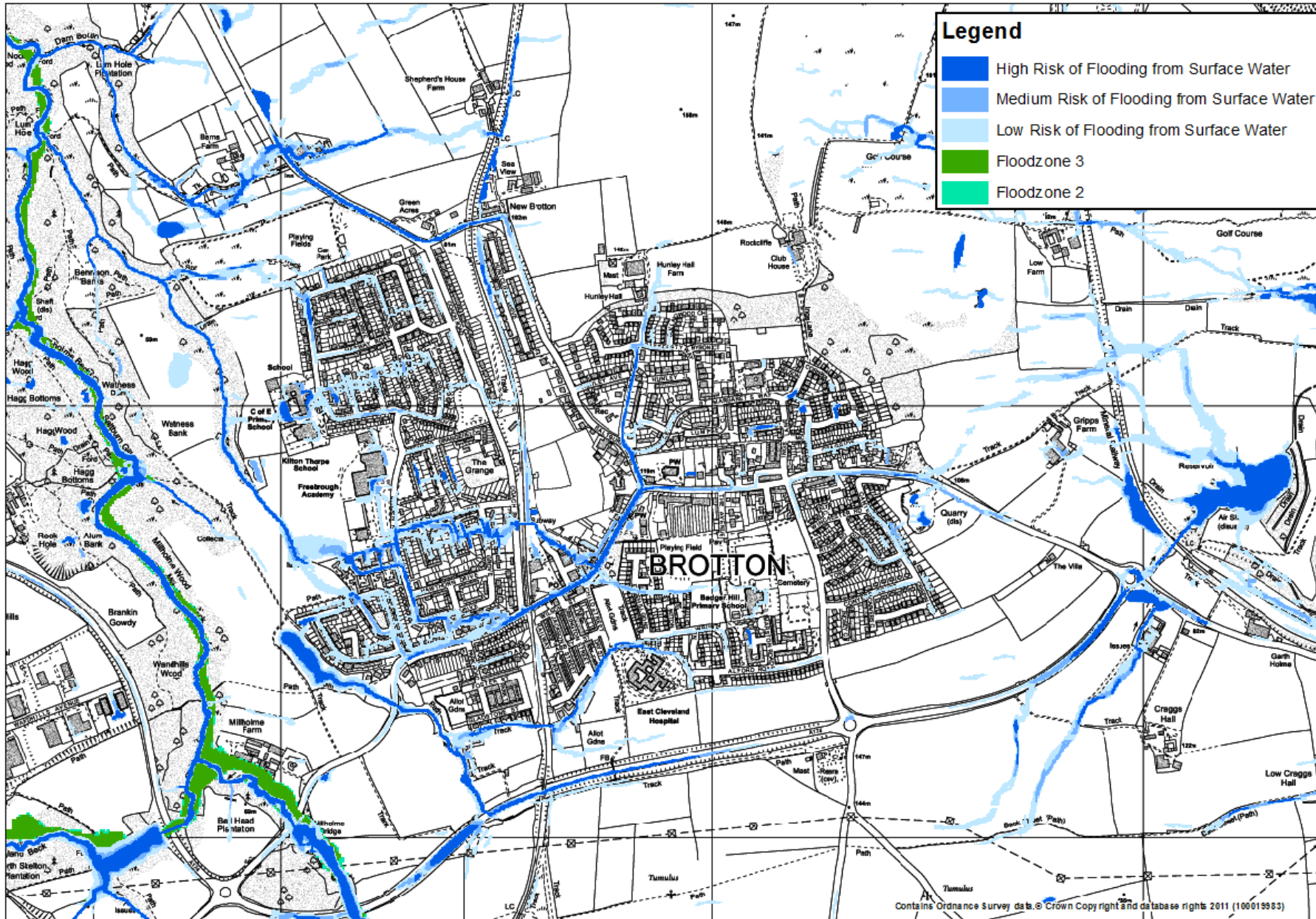
Appendix F – Skelton and North Skelton



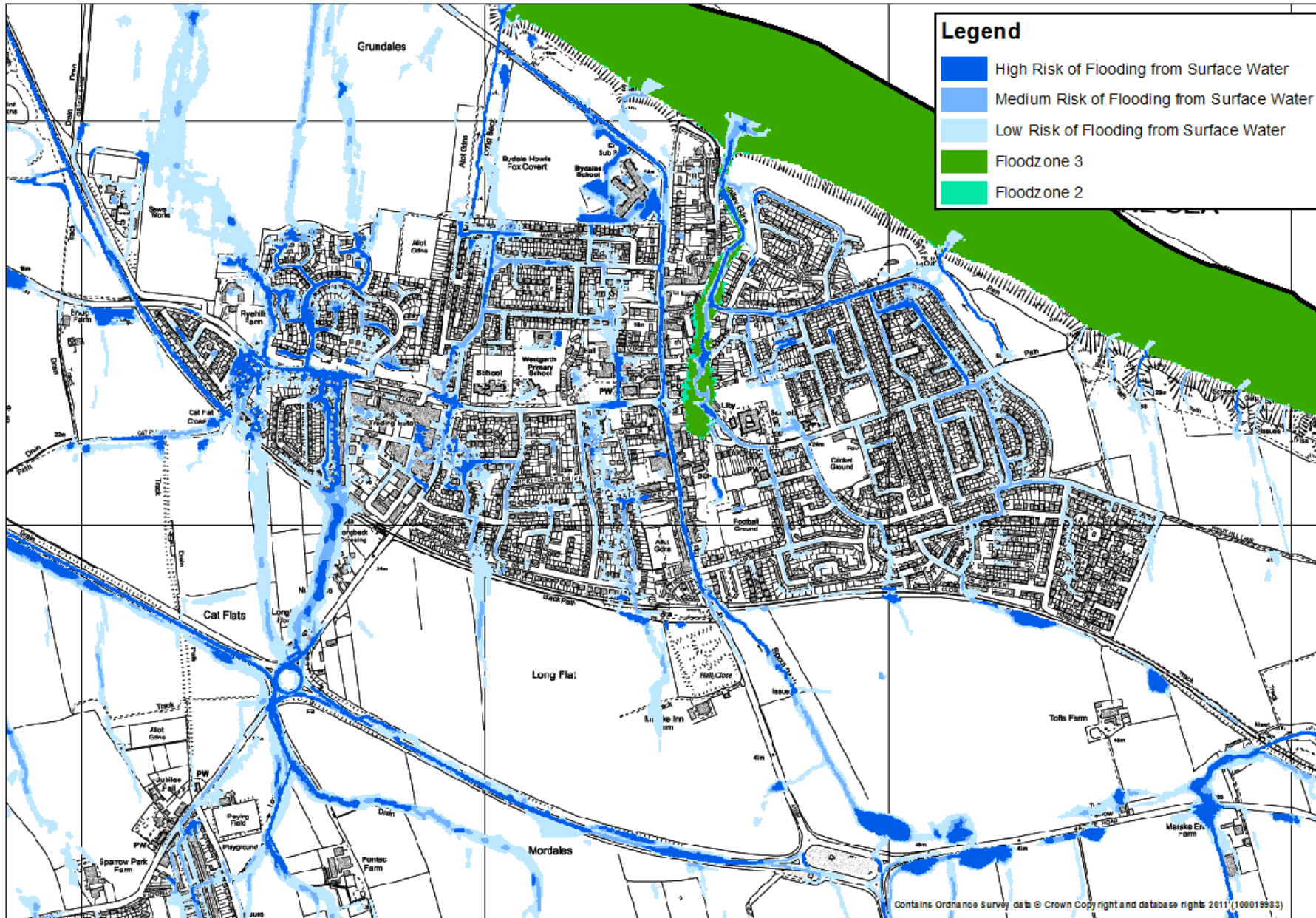
Appendix G – Loftus & Skinningrove



Appendix H – Brotton



Appendix I – Marske



Appendix J – New Marske

