



DUMFRIES AND
GALLOWAY COUNCIL

Local Development Plan

Supplementary Guidance

Adopted 1st December 2014



Flooding and Development



DUMFRIES AND GALLOWAY LOCAL DEVELOPMENT PLAN SUPPLEMENTARY GUIDANCE

FLOODING AND DEVELOPMENT

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INTRODUCTION

The purpose of this Supplementary Guidance is to provide practical detail for the application of Local Development Plan Policy IN7: Flooding and Development. The consequences of flooding, wherever it happens, can be devastating and can pose a risk to life. Within the Dumfries & Galloway Council (DGC) area around 6% (approximately 4,000) of properties are at risk of flooding from a variety of sources including watercourses, the sea, groundwater and surface water.

Policy IN7: Flooding and Development

The avoidance principle is the most sustainable form of flood management, in accordance with the first principle of Scottish Planning Policy (this is a reference to the now superseded SPP that was published in 2010. There is different wording in the current SPP, however, the substance of the current SPP is the same as the 2010 version in respect of this reference to flood management) relating to sustainable development and the Flood Risk Management (Scotland) Act 2009. Where proposed development could lead to an unacceptable onsite or off site flood risk (The meaning of 'flood risk' is from SPP. It is 'the combination of the probability of a flood and of the potential adverse consequences, associated with a flood, for human health, the environment, cultural heritage and economic activity), as defined by the Risk Framework in SPP, then it will not be permitted. Where a proposed development could lead to an unacceptable flood risk, it may be that a Flood Risk Assessment (FRA) is able to clarify to the satisfaction of the Council and SEPA that the level of risk both on and off site would be acceptable.

For any site a Drainage Impact Assessment (DIA) may be required to ensure that surface water flows are properly taken into account in the development design. Consideration should be given to pluvial flows (Those which exceed the capacity of any formal drainage system). Design of development must avoid flood risk from exceedance flows. (See also Policy for Surface Water Drainage and SuDS.)

In order to satisfy the Council in respect of FRAs and DIAs, parties will be expected to provide independent verification of their professional competence, unless it is clear that this is not required.

This policy is supported by supplementary guidance.

Flooding is primarily a natural phenomenon which cannot be prevented entirely. Despite this fact, it is not surprising that pressures for development can encourage proposals for land which may be susceptible to flooding, or that could exacerbate existing problems elsewhere. Additionally, global climate change is predicted to increase the likelihood of both coastal and inland flooding. However, if flooding is left un-managed it can have a devastating effect on people, property, businesses and land.

This is a reference to the now superseded SPP that was published in 2010. There is different wording in the current SPP. However, the substance of the current SPP is the same as the 2010 version in respect of this reference to flood management.

Note: The meaning of 'flood risk' is from SPP. It is 'the combination of the probability of a flood and of the potential adverse consequences, associated with a flood, for human health, the environment, cultural heritage and economic activity'.

This Supplementary Guidance also explains the wider context to DGC's flooding policy and the responsibilities of the main parties with particular interests. It intends to encourage an increased interest, understanding and knowledge about flooding and drainage issues for everyone involved in the development process, and thus make Dumfries and Galloway a safer place to live, work and visit.

DGC is committed to working with developers to ensure that appropriate forms of development take place in appropriate locations and so do not generate unacceptable flood risk and are not liable to exacerbate flood risk elsewhere. Flooding and drainage are material planning considerations.



This guidance document is aimed at helping DGC achieve its long term flood management aspirations which include:

- Addressing flood risk issues as early as possible and prior to any development commencement;
- Achieving good-quality and reliable flood risk assessment of proposed development sites;
- Provision of adequate access to bodies of water for maintenance and inspection purposes;
- To reduce flood risk to existing development if possible, without increasing risk elsewhere; and
- Working with the water environment, including support for the principles of sustainable flood management.

DGC has several different responsibilities in respect of flooding. This Supplementary Guidance is focussed on part of one of them, the responsibility that arises from the Council's role as planning authority. The roles and responsibilities of Dumfries & Galloway Council (DGC) in connection with planning and flood risk are significantly influenced by new general duties outlined in Section 1 of the **Flood Risk Management (Scotland) Act 2009** (see *Appendix 1, Document 1*). These require the Scottish Ministers, SEPA and all responsible authorities (including local authorities) to:

- Exercise their flood risk related functions with a view to reducing overall flood risk;
- Act in the way best calculated to manage flood risk in a sustainable way;
- Promote sustainable flood management;
- Act in the way best calculated to contribute to the achievement of sustainable development; and,
- Adopt an integrated approach by co-operating with each other so as to co-ordinate the exercise of their respective functions.

This Supplementary Guidance aims to support the avoidance of flood problems and to improve the design and implementation of developments and their related drainage arrangements. However, the various aspects

of flooding cannot be simply separated out and covered in a single policy. There are important connections with other planning policies and other Council responsibilities. These are:

- The arrangements for surface water treatment, including sustainable drainage systems (SuDS) and avoidance of exceedance flows for developments;
- Waste water arrangements for developments;
- Standards of development construction; and
- The management of development infrastructure.

These connections are recognised and in the context of Flooding and Development this Supplementary Guidance takes them into account.

DGC wants to ensure that the built environment works with the water environment by steering new development away from areas at unacceptable risk of flooding and by requiring developers to consider how their development is likely to impact on flood risk elsewhere.

DGC recognises that managing flood risk and surface water is a material consideration for any development which should be assessed from the outset by an appropriately qualified, competent and experienced professional (*Appendix 3 sets out the Self Certification requirements for Flood Risk Assessment*). The location, layout and design of new developments are the most critical factors determining both the probability and impacts of flooding.

Detailed information on the concept of 'flood risk' i.e. the probability that a particular magnitude of flood will occur sometime in the future coupled with the impact that such a flood is likely to have, is available from publications such as CIRIA C624 (*See Appendix 1, Document 22*) and SEPA's Technical Flood Risk Guidance for Stakeholders document (*See Appendix 1, Document 9*).



Potential sources of flood risk are described in SEPA's Technical Flood Risk Guidance for Stakeholders. They are:

Fluvial – flooding originating from a watercourse either natural or culverted.

Coastal – flooding originating from the sea (open coast or estuary) where water levels exceed the normal tidal range and flood onto the low-lying areas that define the coast line.

Pluvial – urban or rural flooding which results from rainfall-generated overland flow before the runoff enters any watercourse, drainage system or sewer. Note: this can be from within or outwith the site.

Groundwater - flooding due to a significant rise in the water table, normally as a result of prolonged and heavy rainfall over a sustained period of time.

Drainage - flooding as a result of surcharging of man-made drainage systems including combined sewers where the capacity of the system to discharge runoff has been exceeded.

Infrastructure Failure – flooding due to failure of man-made infrastructure including hydro-dams, water supply reservoirs, canals, flood defence structures, underground conduits, water treatment tanks etc.

The main areas of flood risk concern in Dumfries & Galloway have been identified through SEPA's identification and mapping of Potentially Vulnerable Areas (PVAs) as part of its National Flood Risk Assessment under the requirements of the Flood Risk Management (Scotland) Act 2009. These are broad areas. They do not identify all areas of flood risk in the Region. Nor is the whole of each PVA subject to a significant flood risk. The identified areas can be viewed on the SEPA website. (See Appendix 1m Document 8a)

The general extent of areas in Dumfries & Galloway with a flooding probability of 1:200 AEP, or equivalent, are shown on the most recent SEPA flood hazard maps

first published in January 2014. (See Appendix 1, Document 8) These replace the Indicative Map first published in 2006, and are considered to be more accurate by SEPA and DGC. Flood hazard resulting from; river, coastal and pluvial (rainfall) sources is presented on separate maps. In viewing the maps it is important to be aware that they are still 'indicative' and have certain limitations. These include:

- Whilst they provides a high quality and scientifically robust *indication* of areas which may flood, this is for a presentation scale no greater than 1:25,000;
- They have been developed to give an indication of whether a general area, not individual properties, may be affected by flooding;
- The fluvial maps only include the effects of hydraulic structures such as bridges where these have already been specifically modelled;
- They show only flooding from the specified sources. The fluvial maps do not show runoff from fields or explicitly take into account any flood prevention schemes in place, unless this has been modelled and included;
- The fluvial map does not show flooding from very small burns i.e. where the area draining to the river is less than 3km²; and
- This Flood Map cannot replace site specific studies at a local scale.

Allocated sites in the Local Development Plan that were not previously identified by DGC as being subject to medium/high flood risk but are now seen to be under the new Hazard maps are listed with comments in Annex 1. Most of the newly identified flood hazard is as a result of pluvial hazard which had not been modelled in the earlier Indicative Flood Risk mapping. In these cases it is expected that the issue should be capable of being managed in order to avoid flood risk and enable development to take place. In order to assist with effective management it is recommended that Drainage Impact Assessments (as could be required under Policies IN7:



Flooding and Development or IN8: Surface Water Drainage and Sustainable Drainage Systems (SuDS)) be prepared. **PLANNING FRAMEWORK** For the DGC planning response to the issue of flooding, the principal policy references are:

- DGC's planning policy in the Local Development Plan; and
- Scottish Planning Policy (SPP) (see Appendix 1, Document 4).

The application of the policy for Flooding and Development may also be affected by:

- The Building Regulations (see Appendix 1, Document 2); and
- The Water Environment Controlled Activities Regulations 2011 (CAR). (see Appendix 1, Document 3).

Scottish Planning Policy

The Scottish Government approach to flooding is developed from the concept of the 'Functional Flood plain'. This is the area of land adjacent to any watercourse that has an AEP of 1:200 or more. In general, built development should not take place within this demarcated flood plain. The same 1:200 AEP is adopted for coastal flood risk.

SPP covers flooding and related matters in paragraphs 254 - 268. It states in Para 255 that 'The planning system should promote a precautionary approach to flood risk from all sources, including coastal, water course (fluvial), surface water (pluvial), groundwater, reservoirs and drainage systems (sewers and culverts), taking account of the predicted effects of climate change.' It goes on to say in Para 258 that

'Planning authorities should have regard to the probability of flooding from all sources and take flood risk into account when preparing development plans and determining planning applications.

SPP sets out the 'risk framework', within which the level of risk is related to the type of land use. SPP effectively sets a return period of 1:200 AEP as an acceptable minimum standard for many forms of development, including

most types of housing. However, for essential civil infrastructure (such as hospitals, fire stations, emergency depots etc) an AEP of 1:1,000 should generally be the minimum – unless operational reasons dictate otherwise.

The risk framework applies to both greenfield and brownfield areas (see Glossary). For brownfield sites redevelopment may be appropriate but in terms of the risk framework this should not materially increase flood risk.

D&G LDP Planning Policy

The specific DGC planning policy on flooding is **Policy IN7: Flooding and Development**. This takes account of the circumstance of this area, and gives local effect to SPP. It requires avoidance of flood risk areas and specifies that there are circumstances when a developer flood risk assessment (FRA) will be required. The meaning of 'flood risk' is from SPP. It is 'the combination of the probability of a flood and of the potential adverse consequences, associated with a flood, for human health, the environment, cultural heritage and economic activity'. Further guidance on the flood sensitivity of uses is provided by SEPAs Land Use Vulnerability Guidance (see Appendix 1, Document 13.a).

The policy means that:

- Development proposals should avoid areas susceptible to flooding and promote sustainable flood management;
- Development proposals within or bordering medium to high flood risk areas, will need to demonstrate compliance with Scottish Planning Policy through the submission of suitable information which may take the form of a Flood Risk Assessment;
- As stated in the SPP civil infrastructure will generally not be suitable in low to medium flood risk areas. Development proposals outwith indicative medium to high risk flood areas may be acceptable. A Flood Risk Assessment (FRA) or other suitable information which demonstrates compliance with the policy standard will be required where;



- better local flood risk information is available and suggests a higher risk; or
- a sensitive land use (as specified in the risk framework of Scottish Planning Policy) is proposed, and / or;
- the development borders the coast and therefore may be at risk from climate change. Paragraph 88 of the SPP states that new development requiring new defences against coastal erosion or coastal flooding will not be supported.

When considering the possibility of new development of any type or proposals for a new development it is vital that it be located where it will not be prone to flooding. Also, development should be located where it will not reduce flood storage, or where surface water run-off from the development site will not cause problems either upstream or downstream of a receiving watercourse or drainage network. The capacity of a new development's surface water drainage system should be adequate to deal with the required storm events, without causing flooding.

In seeking to achieve the standard set by Policy IN7, the first consideration should be to avoid developing on land, which is naturally, liable to flood. Development in such areas not only puts the new development at risk, but also effectively removes areas of natural water attenuation / storage, as water displaced by development must go somewhere.

Within areas protected by flood prevention measures, development may be acceptable where the measures are properly maintained and offer protection to a level acceptable in accordance with the Risk Framework. Development that would, in terms of the risk framework, materially increase the number of properties or people at risk of flooding would not be appropriate.

Undeveloped and sparsely developed medium to high risk areas are generally not suitable for additional development. Exceptions may arise if a location is essential for operational reasons, e.g. for navigation and water based recreation uses, agriculture, transport or some utilities infrastructure and an alternative lower risk location is not achievable.

Such infrastructure should be designed and constructed to remain operational during floods. These areas may also be suitable for some recreation, sport, amenity and nature conservation uses provided adequate evacuation procedures are in place. Job-related accommodation (e.g. caretakers and operational staff) may be acceptable. New caravan and camping sites should not be located in these areas. If built development is permitted, measures to manage flood risk are likely to be required and the loss of flood storage capacity minimised. Water resistant materials and construction should be used where appropriate.

In general, if any part of a proposed development site lies within a natural flood plain and/or is close to waterbody (such as a burn, stream, river, estuary or open coast) which has a history of over-topping and flooding, or even if there is a concern or a doubt about local incidences of flooding within the vicinity both downstream and immediately upstream of the proposed development, flood risk must be considered. Account should also be taken of the possibility of flood risk from sources such as ground water, reservoirs and dams, cessation of mine-water pumping and the inadequate capacity of culverts, which convey watercourses. No possible source of flooding should be ignored. In these circumstances an appropriate FRA should be submitted. Alternatively, there should be justification if such a FRA is not prepared. A further FRA may be required by a condition attached to an approval of an application in principle.

While this Supplementary Guidance is specifically intended to support Policy IN7: Flooding and Development, there are other Local Development Plan policies that are important in the context of flooding as a planning issue. These are:

- OP1(f): Overarching Policy - Sustainability;
- OP1(g): Overarching Policy - Water Environment;
- NE10: Erosion and Coastal Protection;
- NE11: Supporting the Water Environment;



- NE12: Protection of Water Margins;
- IN8: Surface Water Drainage and Sustainable Drainage Systems SuDS;
- IN9: Waste Water Drainage

Building Standards

The Building (Scotland) Regulations 2004, as amended, state under mandatory standards 3.3 Flooding and Groundwater: Every building must be designed and constructed in such a way that there will not be a threat to the building or the health of the occupants as a result of flooding and the accumulation of groundwater.

DGC, as Building Standards authority, must be satisfied that suitable provision has been made for drainage and prevention of flood risk. Any proposed scheme should be designed and constructed to meet the Technical Standards for compliance with the Building (Scotland) Regulations 2004, as amended.

DGC should be given the opportunity to inspect drainage features during and after construction. As-built drawings of drainage features shall, upon completion, be submitted to DGC Infrastructure & Commissioning Services.

Roles and responsibilities:

Many organisations, with different roles and responsibilities, work together to manage flood risk in Dumfries & Galloway. Relevant public organisations are placed under a duty to work together to reduce overall flood risk by the Flood Risk Management (Scotland) Act 2009 (Appendix 1, Document 1). Developers, landowners and householders also have responsibilities.

Developers

- Should provide sufficient information to the relevant authorities to demonstrate that their proposals will not increase flood risk to an unacceptable level at the site of their proposal or elsewhere;
- Should provide details for surface water drainage, including SuDS. A Drainage Impact Assessment (DIA) would generally be helpful and may be required. (See

supplementary guidance for IN8: Surface Water Drainage a sustainable Drainage Systems (SuDS).

Scottish Government

- Setting National Policy on Flood Risk Management and Flood Warning;
- Setting Scottish Planning Policy and providing planning advice in PAN;
- Provision of resources to support authorities in addressing flood risk.

SEPA

- Provide a flood warning service for Scotland and operate 'Floodline' . (See Appendix 1 Reference 13b.) This means that the public and organisations can take action to limit the consequences for homes and other properties. Provide advice to Local Authorities on flood risk and planning;
- SEPA also have an important role in the coordination of flood risk management policy and activities across Scotland which includes the.
 - Development and publication of the National Flood Risk Assessment;
 - Development of Flood Risk Management Strategies;
 - Assessment of flood risk across Scotland including publication of flood risk and hazard maps;
 - Establishment of national and local Flood Risk Advisory Groups;
 - Preparation of maps of artificial structures and natural features.

Dumfries & Galloway Council

- Planning policy and development management, taking flood risk advice from SEPA, in the first instance, and DGC Infrastructure and Commissioning Service;
- Prepare Local Flood Risk Management Plan. This will determine a catchment-based approach to reducing overall flood risk. Opportunities to return bodies of water to their natural drainage capability may be explored e.g. de-culverting watercourses where possible through the planning process,



provided flood risk is not increased elsewhere as a result. It should also be noted that Policy NE11: Supporting the Water Environment provides broad support for Sustainable Flood Management;

- Preparation of maps of relevant bodies of water and SuDS;
- Assessing water bodies for conditions likely to pose a flood risk;
- Undertake maintenance works in water bodies including the clearance of watercourses where the works will significantly reduce flood risk;
- Maintenance of existing flood alleviation schemes;
- Maintain road gullies – these are not designed to cope with extreme weather events but it is still important that they operate efficiently to avoid localised flooding;
- Local Authorities also have discretionary powers to undertake works of flood protection or promote flood protection schemes. There is no statutory duty for a Local Authority to prevent property from flooding;
- Capability may be explored e.g. de-culverting watercourses where possible through the planning process, provided flood risk is not increased elsewhere as a result. It should also be noted that Policy NE11: Supporting the Water Environment provides broad support for Sustainable Flood Management;
- Preparation of maps of relevant bodies of water and SuD;
- Assessing water bodies for conditions likely to pose a flood risk;
- Undertake maintenance works in water bodies including the clearance of watercourses where the works will significantly reduce flood risk;
- Maintenance of existing flood alleviation schemes;
- Maintain road gullies – these are not designed to cope with extreme weather events but it is still important that they operate efficiently to avoid localised flooding;

- Local Authorities also have discretionary powers to undertake works of flood protection or promote flood protection schemes. There is no statutory duty for a Local Authority to prevent property from flooding.

Scottish Water

- Maintaining water supply and drainage infrastructure;
- Managing the discharge of surface water that enters the public drainage system;
- Working in partnership with the local authority and emergency services;
- Dealing with flood damaged mains and any flooding caused by bursts and chokes of the sewer network;
- Responsible for assessing the risk of flooding from surface water and combined (surface and foul) sewers that results from higher than usual rainfall events. Once risks are identified, Scottish Water, working with local authorities and SEPA, will look for opportunities to reduce those risks through its capital investment programme. This will be co-ordinated with other work to address surface water flooding.

Property Owners and Householders

- Responsible to take reasonable care to protect their property from flooding;
- Responsible for acquiring home contents and buildings insurance;
- Responsible for maintaining private drainage.

Property owners are strongly advised to make prior preparations for protecting their own property as flood incidents can occur with little warning and can be widespread. Further advice can be sought on protecting against flood risk at:

- Dumfries & Galloway Council: <http://www.dumgal.gov.uk/flooding>
- Scottish Environmental Protection Agency: <http://www.sepa.org.uk/flooding>
- Scottish Flood Forum: <http://www.scottishfloodforum.org/>



Landowners

- Landowners are primarily responsible for the maintenance of watercourses and other water bodies on their land including repairs and clearing;
- Landowners are responsible for private flood defences on their land and maintenance of private drainage systems.

Matters to Consider for Planning Proposals

Before a planning application is lodged the following flood risk and drainage matters should be considered:

- Is the development site at risk of flooding from any source;
- Would development of the site lead to increased flood risk elsewhere?;
- Would safe access and egress to and from the development be possible during flood events?;
- Is the development likely to prevent safe access to and maintenance of bodies of water and/or flood defence measures?;
- Is the development design employing SuDS?;
- How is natural water emanating from the site being dealt with and managed? This should include consideration of surface or ground water that will not be part of the storm water treatment;
- How is extraneous water, viz. uphill surface or ground water, being dealt with? Note: In dealing with this question flood risk issues should not simply be shifted to another location;
- What is to be done during construction phases to control water contamination and limit flow rates?;
- Will future users of the development be faced with difficulty obtaining insurance or mortgage finance?;
- Who will be responsible for maintenance?

Flood Risk Assessment (FRA)

In the past, flood risk has been calculated from historic data and expressed in terms of the

expected frequency of a flood of given magnitude: Floods of greater scale are expected to occur less often than floods of a smaller scale. The assumption was that historical flood records represent a reasonably unbiased sample and the conditions (e.g. climate and land use) have been basically constant over the period of the record. Thus, the calculation of standards for flooding and development are based on the idea of the return period. There are now two weaknesses with this approach. Climate change means that:

- Evidence of flooding in the past is not necessarily a good guide to what may happen in the future; and
- Any particular level of flood risk at the present time may not stay at that level for future years.

Thus, the flooding history of a site will not form as reliable a guide to its future flood risk as formerly was the case.

The likelihood of a flood is now more usefully expressed in terms of the probability that it will occur within any particular year. This is known as the Annual Exceedance Probability (AEP). For the location of most new housing development a current AEP of 1:200, (or 0.5% annual probability) is the minimum standard.

It should be noted that the surface water drainage systems of many older developments are designed for basic peak flows from a 1:1 AEP (100% annual probability) storm event. Rarer events, up to a 1:30 AEP (3.3% annual probability) storm event (Sewers for Scotland), are dealt with by "surcharging" the drainage system. This surcharge is contained within the drains. It follows that pluvial events with an AEP of between 1:30 and 1:200 could produce exceedance flows and may contribute to overall flood risk.

When a FRA is Required

Where the DGC as Planning Authority, in consultation with its Infrastructure & Commissioning Service and SEPA, considers that there might be a risk of flooding to a proposed development or as a result of the development, it will indicate that a Flood Risk



Assessment (FRA) should be submitted in support of any planning application.

The possible requirement of further information about a planning application is enabled by Regulation 24 of the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008)

It should be noted that:

- The requirement of a FRA does not have any significance relative to any of the other planning issues that may affect the ultimate decision on a planning application that it intends to support; and
- The conclusion of a properly prepared FRA may be that the flood risk is such that development of the site should be limited or even prohibited.

Consultations with relevant parties, including SEPA, DGC's Planning & Building Standards Service, and Scottish Water are considered to be a vital element in establishing the flood history of a site. The location, nature and size of development coupled with the perceived flood source, probability and history will guide the complexity and technical requirements of a FRA.

A key requirement for a FRA is that it must consider all sources of flooding (with the specific exclusion of internal sewer flooding as defined in the Flood Risk Management (Scotland) Act 2009 Act). In certain circumstances it may need to demonstrate how flood mitigation methods will be managed. The FRA will be required to certify that any flood risk associated with the development can be managed now and for the lifetime of the development, taking into account the potential effects of climate change. It should also demonstrate that the development will not increase the risk of flooding elsewhere.

It is important to note that adoption of flood mitigation measures could only be suitable in particularly constrained circumstances (such as for certain brownfield areas) and that DGC will otherwise insist on the avoidance of flood risk as the first principle.

In line with SPP most forms of new development need to be free from unacceptable flood risk for all flood events up to 1:200 AEP, including an allowance for climate change and also freeboard.

The long D&G coastline with many associated settlements means that coastal flood risk is a notable issue in the area. Climate change is expected to increase coastal flood risk over the years, and should be factored into calculations of flood risk. Account should be taken of the intended design life of the proposed development. The extent of coastal flood risk along the Solway coast varies in relation to location.

DGC may require a higher level of protection, typically 1 in 1000 AEP, for potentially vulnerable developments such as care homes, schools, critical infrastructure etc. Prior to the preparation of schemes for these types of development, reference should be made to SEPA's Land Use Vulnerability guidance, first published, v1.0, in July 2012. (See Appendix 1, Document 13.a.). Any required clarification on the position should be sought from DGC Planning & Building Standards Services. .

Proportionality of FRA

The detail and technical complexity of a FRA should reflect the scale, and potential social and economic value of the proposed development. A summary of the FRA requirements set out in the Table below. A longer description of the requirements is provided in *Appendix 3*.

In line with Section 5.3 of CIRIA publication C624 'Development and flood risk – guidance for the construction industry (2004)' (See Appendix 1, Document 22), an 'appropriate level of FRA' should be carried out as soon as a site is considered for development. C624 states that '*an initial FRA can be extremely useful in identifying the viability of a potential development site and guiding development proposals at an early stage, and it is strongly recommended that this is undertaken before purchasing any site.*



As development proposals progress, additional FRAs can be undertaken to inform the master planning and outline design process.

DGC considers that flood risk assessments should be proportionate to the development (including location) proposed.

These will be at increasing levels of detail, as appropriate'.

DGC may require one of the three levels of FRA as set out in Table 1 below. These have been extracted from C624.

Table 1: FRA Levels

FRA Level	Description
1	Screening Study – to identify whether there are any flooding issues related to the development of the site which may warrant further consideration.
2	Scoping Study – to be undertaken if the Level 1 study indicates that the site may lie within an area which is at risk of flooding or that the site may increase flood risk due to increased runoff, to confirm the possible sources of flooding which may affect the site. The study should include the following objectives: Assessment of the availability and adequacy of existing information. Qualitative assessment of the flood risk of the site, and the impact of the site on flood risk elsewhere Assessment of the possible scope for appropriate development design and to scope additional work required.
3	Detailed Study – to be undertaken if the level 2 study concludes that quantitative analysis is required to assess flood risk issues related to the development of the site. The study should include: Quantitative assessment of the potential flood risk to the development Quantitative assessment of the potential impact of the development site on flood risk elsewhere. Quantitative demonstration of the effectiveness of any proposed mitigation measures.

Table 2: FRA Content Summary

Level of Assessment:	Completed by:	Applicable to:	Requirements (refer to main text for requirements):
Level 1 Flood Risk Statement	Level 1 Flood Risk Statement	<ul style="list-style-type: none"> Requested at the discretion of Planning Authority / where developer seeks to assure planning Authority of no risk. Small scale developments where FR not expected / known 	<ul style="list-style-type: none"> Brief statement/ screening General description of the development, its size, location and surrounding topography. FR from all sources considered / commented on (based on authors' knowledge/ observations/ experience). Consultation with DGC Flood Team for historic flooding incidences and comment Reference to SEPA flood maps where applicable.



<p>Level 2 Flood Risk Assessment</p>	<p>Civil Engineer / Hydrologist or equivalent member of professional institution e.g. ICE, CIWEM, ISTRUCTE</p>	<ul style="list-style-type: none"> • Whenever FR is known (e.g. within SEPA 200yr flood extents). • Larger scale developments > 5 no. properties (offsite risk of flooding may increase) 	<ul style="list-style-type: none"> • General FRA requirements as Level 1 but providing a full report including drawings/ calcs/ figures • FR from all sources qualified in detail. • Desk study approach • Consultation with DGC Flood Team for historic flooding incidences / guidance • Consultation with SEPA & Scottish Water • Recommendations on appropriate development design / possible mitigation • Assessment as to whether further modelling is required to fully assess impact of flooding
<p>Level 3 Flood Risk Assessment</p>	<p>Civil Engineer/ Hydrologist or equivalent member of professional institution e.g. ICE, CIWEM, ISTRUCTE</p>	<ul style="list-style-type: none"> • Whenever FR is known (e.g. within SEPA 200yr flood extents). • Larger scale developments > 5 no. properties (offsite risk of flooding may increase) 	<ul style="list-style-type: none"> • As Level 2 but with flood risk on and off site quantified by hydraulic / hydrological model results. • Detailed development drawings / elevations to be provided. • Detailed proposals of mitigation methods. • Detailed proposals of flood resilient materials • Topographic site survey to be provided and used to assess flood routing / depths • Calculations provided for provision of compensatory storage.

Exemptions: A FRA is not required for extensions to single dwellings; garages / conservatories, above ground structures or Permitted Development.

More detailed requirements for the three levels of FRA are indicated in Appendix 2 and discussed in detail in Sections 5.3.3 to 5.3.5 of CIRIA C624 (See Appendix 1, Document 22). It is essential that a FRA is completed to a highly proficient standard, contain only relevant information, and cover all site specific issues. When completing a FRA the methodology followed should be in line with industry standards and best practice. However, the detail and technical complexity of a FRA will be determined by the level of assessment required.

In all cases of a FRA being undertaken for any location, the resulting report should ideally conform to the structure set out in Appendix 2.

There are a number of professional guidelines produced by recognised bodies which are designed as a reference for the implementation of good practice in the assessment of flood risk (See Appendix 1).

When numeric modelling is carried out in support of a FRA an electronic copy of the model used must be supplied to DGC.

Developers commissioning FRAs must accept that data used in support of their application may also be adopted and made public by DGC and SEPA.



Certification and Checklists

Level 1 Flood Risk Statements may be completed and submitted by the applicant, architect or agent acting for the client. Level 2 and 3 Flood Risk Impact Assessments should be undertaken by a competent professional. It is recommended that assessments should be carried out under the direction of a chartered member of a relevant professional institution, with experience of flood risk / drainage assessment and management.

DGC support SEPA's flood risk assessment checklist procedure which involves the requirement to complete and attach a checklist to the front cover of a FRA to provide a summary of key information in relation to the FRA (See Appendix 1, Document 10).

In addition, DGC requires Levels 2 and 3 FRAs to be accompanied by a signed-off Compliance Certificate (See Appendix 3) to certify that the assessment has been carried out in accordance with this guidance, relevant documents and legislation. (See Appendix 3) An individual Compliance Certificate must be submitted for each assessment.

DGC also requires that the signatory holds Professional Indemnity Insurance which is maintained at a level that is at least appropriate for the development proposed. Evidence will take the form of a copy of the insurance policy, certificate of insurance and evidence that all premiums are paid and up to date for a minimum of ten years.

It is the responsibility of the author(s) to ensure that all detailed calculations and computations are technically accurate. DGC is reliant on the accuracy, completeness and timeliness of information submitted.

APPENDIX 1: FRA Reference Documents

1. Flood Risk Management (Scotland) Act 2009
<http://www.legislation.gov.uk/asp/2009/6/contents>
2. The Building (Scotland) Regulations 2004
<http://www.legislation.gov.uk/ssi/2004/406/contents/made>
3. Water Environment (Controlled Activities) (Scotland) Regulations 2010 (CAR) <http://www.legislation.gov.uk/ssi/2011/209/made>
4. Scottish Planning Policy, Scottish Government, June 2014
<http://www.scotland.gov.uk/Resource/0045/00453827.pdf>
5. Planning Advice Note 51: Planning, Environmental Protection and Regulation <http://www.scotland.gov.uk/Resource/Doc/152228/0040973.pdf>
6. Planning Advice Note 69: Planning and Building Standards Advice on Flooding <http://www.scotland.gov.uk/Resource/Doc/17002/0026290.pdf>
7. Planning Advice Note 79: Water and Drainage; <http://www.scotland.gov.uk/Resource/Doc/149784/0039881.pdf>
8. SEPA Flood Maps (Scotland)
http://www.sepa.org.uk/flooding/flood_maps.aspx
- 8.a SEPA National Flood Risk Assessment - Map
<http://map.sepa.org.uk/nfra/map.htm>
9. SEPA Technical Flood Risk Guidance for Stakeholders;
http://www.sepa.org.uk/flooding/flood_risk/idoc.ashx?docid=e1a44fed-2c31-4324-9ddb-a558d53fdc89&version=-1
10. SEPA Flood Risk Assessment checklist;
http://www.sepa.org.uk/flooding/planning__flooding/fra_checklist.aspx
11. SEPA Policy No 22: Flood Risk Assessment Strategy
http://www.sepa.org.uk/about_us/policies.aspx



12. SEPA Position Statement on Culverting of Watercourses is available from its site at; http://www.sepa.org.uk/water/water_regulation/guidance/engineering.aspx
13. SEPA Policy No 41: Development at Risk of Flooding: Advice and Consultation; http://www.sepa.org.uk/about_us/policies.aspx
- 13.a SEPA Land Use Vulnerability Guidance (v 1.0 July 2012) http://www.sepa.org.uk/planning/flood_risk/policies_and_guidance.aspx
- 13.b SEPA Floodline <http://www.floodlinescotland.org.uk/>
14. Environment Agency: Coastal flood boundary conditions for UK mainland and islands- Project: SC060064/TR4: 'Practical guidance design sea levels' <http://cdn.environment-agency.gov.uk/scho0111btkk-e-e.pdf>
15. Environment Agency: Technical Report W.187 'Fluvial Freeboard Guidance Note' (2000) <http://evidence.environment-agency.gov.uk/FCERM/en/FluvialDesignGuide/Chapter9.aspx?pagenum=14>
<http://publications.environment-agency.gov.uk/pdf/STRW187-e-e.pdf>
16. Dumfries & Galloway Shoreline Management Plan: June 2005 <http://www.dumgal.gov.uk/index.aspx?articleid=4694>
17. Dumfries & Galloway Strategic Flood Risk Appraisal: August 2007 <http://www.dumgal.gov.uk/index.aspx?articleid=8939>
18. CEH IH124: Flood Estimation for small catchments <http://www.ceh.ac.uk/products/publications/documents/IH124FLOODESTIMATIONS SMALLCATCHMENTS.PDF>
19. CEH Wallingford: Flood Estimation Handbook, <http://www.ceh.ac.uk/feh2/fehintro.html>
20. CIRIA C697: The SuDS Manual; http://www.ciria.org/service/AM/ContentManagerNet/Default.aspx?template=/TaggedPage/TaggedPageDisplay.cfm&TPLID=66&ContentID=16011&PPID=5891&AspNetFlag=1&Section=free_publications&ThisPage=2
21. CIRIA C698: Site Handbook for the Construction of SuDS; As for CIRIA 697
22. CIRIA C624: Development and Flood Risk Guidance for the Construction Industry; <http://www.ciria.org/Search?SearchTerms=CIRIA%20publication%20C624>
23. CIRIA C689: Culvert design and operations guide <http://www.ciria.org/service/AM/ContentManagerNet/ContentDisplay.aspx?Sec=knowledgebase&ContentID=16202>
24. NERC, London: Flood Studies Report, <http://nora.nerc.ac.uk/15358/1/N015358CR.pdf>
25. SEPA Technical Flood Risk Guidance Revision Note 1 – Estimation of Coastal Sea Levels (Refers to Coastal Flood Boundary publications on Environment Agency website. Please note that this new information shows present day conditions only. It does not include the effects of future sea level rise which needs to be considered separately.) http://www.sepa.org.uk/system_pages/search.aspx?q=coastal%20flood%20boundary
26. UKCP09 sea level change estimates http://www.ukcip.org.uk/wordpress/wp-content/PDFs/UKCIP_sea-level.pdf



APPENDIX 2: FRA REQUIREMENTS

Table 2: FRA Methodologies

FRA Level			A Background Information	
1	2	3		
√	√	√	A1	Study area description
√	√	√	A2	Outline of development proposal
√	√	√	A3	Geo-referenced location and site plans showing all bodies of water or sources of flood risk which may have an influence on the site
	√	√	A4	Plan of site illustrating pre and post development ordnance datum levels to a recognised scale
	√	√	A5	A plan and description of any structures that may influence local hydraulics. This will include bridges and pipes/ducts crossing the watercourses together with culverts, screens, embankments or walls, overgrown or collapsing channels and their likelihood of choking with debris
√	√	√	A6	Good use of photographs illustrating important features such as culverts etc
√	√	√	A7	Catchment description
	√	√	A8	If appropriate, information on current flood alleviation measures including the level of protection and condition
	√	√	A9	Identification on the ownership of any water related structures and assessment of their condition
	√	√	A10	Information of historic flood events, photographs, levels, trends in the vicinity of the development
	√	√	A11	Clear drawings, plans and maps to a recognised scale relevant to the site
	√	√	A12	Information on consultations undertaken with others



Table 2: FRA Methodologies

FRA Level			B Methodologies	
1	2	3		
√	√	√	B1	Description of the type or source of any present flooding risk
		√	B2	In the event that hydrological and/or hydraulic modelling is required it is important to ensure that the appropriate method has been chosen and explained in the FRA, justifying how the chosen model will accurately reflect the complexity of the hydrological processes
		√	B3	Appropriate model calibration and verification should be carried out where possible. Un-calibrated models should be accompanied by appropriate sensitivity analysis.
		√	B4	For fluvial assessments all technical records and data sets derived from the Flood Estimation Handbook (FEH) or other (if appropriate)
		√	B5	For coastal assessments all technical records and data sets derived by following the industry accepted methodology (See Appendix 1, Document 14)
		√	B6	All modelling should be completed using recognised industry software to determine design water levels and a sensitivity analysis undertaken to determine the sensitivity of design water levels with regards to the key model parameters such as design flow, boundary conditions and roughness. (See Appendix 1, Document 9)
			B7	It is considered best practise to include an additional allowance for climate change, preferably utilising latest estimates from UKCIP. In general a 20% increase in peak fluvial flows should be adopted to assess the potential long term impacts of climate change on future flood risk.



Table 3: FRA Results

FRA Levels			C Results	
1	2	3		
√	√	√	C1	Comment and recommendations on application of appropriate design to suit flood risk.
		√	C2	To ensure a complete FRA, the reporting of any modelling study is compulsory and should address important issues to an appropriate level of detail.
		√	C3	If the FRA is underpinned by hydraulic modelling the results should be summarised in a tabular format, including results for appropriate sensitivity analysis.
		√	C4	If applicable pre- and post development flood levels should be compared for a range of return periods up to 1 in 200 years.
		√	C5	If the proposal is likely to result in a loss of flood plain storage then a quantitative assessment should be made of the anticipated loss on a level-for-level and volume-for-volume basis. Proposals to compensate for such loss should also be included.
		√	C6	Should site flood levels be influenced by downstream hydraulic features such as culverts, an assessment should be made of the potential impact various blockage scenarios may have on expected flood levels.
		√	C7	An appropriate freeboard (Indicative freeboard for access and egress and to property ground floor levels is 600mm minimum. "The appropriate level of freeboard will take account of the flow and turbulence of the flood water, the speed, direction and duration of the wind, plus the extent of the water over which the wind blows. It is therefore not possible to give a universal figure for freeboard, but it should be determined through a consistent approach ..." The Environment Agency has produced a Technical Report W.187 'Fluvial Freeboard Guidance Note' (2000) which should be used to determine the appropriate freeboard allowance. http://evidence.environment-agency.gov.uk/FCERM/en/FluvialDesignGuide/Chapter9.aspx?pagenum=14 http://publications.environment-agency.gov.uk/pdf/STRW187-e-e.pdf), to mitigate uncertainty in relation to flood estimation and exacerbating factors such as wave action - in line with industry standard principles and available guidance, will be required.
		√	C8	An assessment of the impact of the design flood on access to and egress from the development will be required.



Table 3: FRA Results

FRA Levels			D Conclusions	
1	2	3		
√	√	√	D1	The conclusions should include a summary of the findings detailing any recommendations that have been made.
√	√	√	D2	The report should also indicate how all flood risks have been identified and appropriately mitigated or managed. The plans of the development should clearly take cognisance of these conclusions.
√	√	√	D3	A statement outlining how, in the author(s) opinion, the development proposal complies with current flood legislation and policy should be provided
	√	√	D4	A summary of residual risk after any proposed flood mitigation measures have been suggested and recommendations for further study/ risk reduction



APPENDIX 3: Self Certification

FRA Guidance Assessment Compliance Certificate	
I certify that all reasonable skill, care and attention to be expected of a qualified and experienced professional in this field have been exercised in carrying out the attached Assessment. I also confirm that I maintain the required Professional Indemnity Insurance (Please attach appropriate evidence of Professional indemnity Insurance). The report has been prepared in support of the below named development in accordance with the reporting requirements issued by Dumfries & Galloway Council.	
Assessment type: FRA	
Additional Information	
Assessment Ref No:	
Assessment Date:	
Name of Proposed Development:	
Address:	
Name of Prospective Developer:	
Name and Address of Organisation preparing this Assessment:	
Name of Approver:	
Signed:	
Date:	
Position Held:	
Qualification of person responsible for signing off this Assessment (A Chartered member of a relevant professional institution):	



ANNEX 1: SEPA Hazard Maps and LDP Allocated Sites:

Additional flood guidance in the light of the additional information in the SEPA Flood Hazard Maps published January 2014.

A DIA should identify if a FRA is needed, if this has not already been required in site guidance. If a FRA is needed the DIA may be able to help set the level.

A FRA should consider DIA issues and whether preparation of a DIA is advised, if one has not already been prepared.

1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Annan	ANN.H1	Land to North of Windermere Road	100		No additional issues identified	
	ANN.H2	Land South of Windermere Road	100		No additional issues identified	
	ANN.H3	Land Between Turnberry Road & Turnberry Crescent	30		No additional issues identified	
	ANN.H4	Solway Street	15		Preparation of a DIA advised	Pluvial issues
	ANN.H5	Land Between Scott Street & Seaforth Park	25		preparation of a DIA advised	Pluvial issues



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Annan	ANN.H6	Land at Watchall Road	56		Preparation of a DIA advised	Pluvial issues
	ANN.H7	Land Adjoining Elm Road & Lovers Walk		72	Preparation of a DIA advised	Pluvial Issues
	ANN.H8	Land Between Hallmeadow Place & Elm Road		108	Preparation of a DIA advised	Pluvial Issues
	ANN.B&I1	Stapleton Road	5.5ha		No additional issues identified	
Auchencairn	AUC.H1	Rear of Main Street	10		No additional issues identified	Site guidance states flood risk should be investigated
	AUC.H2	Church Road	5		No additional issues identified	
Canonbie	CAN.H1	Riverside Park	85		No additional issues identified	Site guidance states that Masterplan should deal with flood risk to the satisfaction of the Council



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Canonbie	CAN.CF1	Land due East of School	School Expansion		Preparation of a DIA advised	Pluvial issues, site guidance states that flood risk Assessment may be required
Carsphairn	CPH.H1	Land to North of McAdams Way	10		Preparation of a DIA advised	Pluvial issues
Castle Douglas	CSD.H1	Land to North of Garden Hill Drive	15		No additional issues identified	
	CSD.H2	Land to West of Garden Hill Drive	30		Preparation of a DIA advised	Pluvial issues, site guidance states flood risk should be investigated
	CSD.H3	Land to East of Ernespie Road	130		Preparation of a DIA advised	Pluvial issues
	CSD.H4	Cotton Street	16		Preparation of a DIA advised	Pluvial issues
	CSD.H5	Land to West of Torrs Road	133		Preparation of a DIA advised	Pluvial issues, site guidance states that flood risk will need to be investigated



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Castle Douglas	CSD.H6	Land to South of Jennys Loaning		190	Preparation of a DIA advised	Pluvial issues, site guidance states that FRA is required
	CSD.H7	Academy Street / Queen Street	10		Preparation of a DIA advised	Pluvial issues
	CSD.H8	Land to Rear of Douglas Terrace / Trinity Lane	6		No Additional Issues Identified	
	CSD.H8	Abercromby Place	5		Preparation of a DIA advised	Pluvial issues
	CSD.H10	Land to South of Ernespie Lodge	125		Preparation of a DIA advised	Pluvial issues in southwest corner
	CSD.H11	Land to South of Kilmichael, Abercromby Road	35		Preparation of a DIA advised	Pluvial issues, small area at west end of site & on A713 at access
	CSD.B&I1	Land at Oakwell Road	1.4ha		Preparation of a DIA advised	Pluvial issues, site guidance states that flood risk will need to be Investigated



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Closeburn	CLS.H1	Woodland Way	33		No additional issues identified	
Creetown	CRE.H1	Land at Barholm Mains	50		Preparation of a DIA advised	Pluvial issues, small area within site
	CRE.H2	Barholm Croft	16		No issues identified	
	CRE.H3	Minnipool Place	5		Preparation of a DIA advised	
Crossmichael	CSD.H10	Land at Templand	5		Preparation of a DIA advised	Pluvial issues, site guidance states that flood risk may need to be investigated, fluvial risk for site not now identified
Dalbeattie	DBT.H1	Sunnyside / Barhill Road	12		No additional issues Identified	Site guidance states FRA accepted by SEPA
	DBT.H2	128—140 High Street	11		Preparation of a DIA Advised	Pluvial issues



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Dalbeattie	DBT.H3	Bruce Road / Port Road	12		No additional issues identified	Pluvial issues, site guidance states that FRA is required
	DBT.H4	New Road / Haugh Road	21		Preparation of a DIA advised	Pluvial issues
	DBT.H5	Station Road	20		Preparation of a DIA advised	
	DBT.H6	John Street / Barhill Road	20		Preparation of a DIA advised	Pluvial issues, site guidance states that FRA is Required
	DBT.H6	John Street / Barhill Road	20		Preparation of a DIA advised	Pluvial Issues, Site Guidance States that FRA is Required
	DBT.CF1	Craignair Road			Preparation of a FRA is advised	Pluvial issues
	DBT.CF2	Medical Centre, Port Road				Under construction, February 2014
	DBT.B&I1	Land at Edingham Business Park	1.25ha		Preparation of a DIA Advised	Pluvial Issues



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Drummore	DRM.H1	Land off Ward Place	50		No additional issues identified	
Dumfries	DFS.H1	Barnhill	304		Preparation of a DIA advised	Pluvial issues, site guidance states that flood risk should be investigated
	DFS.H2	Marchfield	745		Preparation of a DIA advised	Pluvial issues, site guidance states that flood risk should be investigated
	DFS.H3	Noblehill	176		Preparation of a Flood Risk Assessment is Advised	Significant pluvial & ground water issues, site guidance states that flood risk should be investigated



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Dumfries	DFS.H4	Heathhall College	192		Preparation of a DIA advised	Pluvial issues
	DFS.H5	Ladyfield		557	Preparation of a DIA advised	Pluvial issues
	DFS.H6	Lincluden Depot	32		Preparation of a DIA advised	Pluvial issues
	DFS.H7	Brownrigg Loaning		713	Preparation of a DIA & FRA advised	Pluvial & ground water issues
	DFS.H8	Catherinefield Farm		279	Preparation of a DIA advised	Pluvial issues
	DFS.B&I1	Heathhall, North of Aviation Museum	9.3ha		Preparation of a DIA advised	Pluvial issues
	DFS.B&I2	Cargenbridge	12.3 ha		Preparation of a DIA advised	Pluvial issues
	DFS.B&I3	Garroch Loaning	18.97ha		Preparation of a DIA advised for detailed application	Pluvial issues
	DFS.B&I4	Heathhall Airfield	7.1 ha		No additional issues identified	Pluvial issues
	DFS.B&I5	Land South of Dumfries Enterprise Park	5.1 ha		Preparation of a DIA advised	Pluvial issues



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Dumfries	DFS.B&I6	Brasswell	8.42ha		Preparation of a DIA advised	Fluvial & pluvial issues, site guidance states flood risk should be investigated
	DFS.B&I7	Clumpton Hill	4.5ha		Preparation of a DIA advised	Pluvial issues, peat ground, site guidance states that flood risk should be investigated
	DFS.TC1	Brooms Road	1.6ha		Preparation of a DIA advised	Pluvial issues
Eaglesfield	EGL.H1	Former Roads Depot, Burnswark	30		Preparation of a DIA advised	Pluvial issues
	EGL.H2	Land Between Ashyards Crescent & Sunnybrae	78		Preparation of a DIA advised	Pluvial issues
Eastriggs	ERL.H1	Gillwood Road	10		No additional issues identified	
	ERL.H2	Victoria Gardens	11		No additional issues identified	



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Eastriggs	ERL.H3	Land Northwest of Stanfield Farm	27		Preparation of a DIA advised	Pluvial issues
	ERL.MU1	Stanfield Farm	200 + Flexible Business Units		Preparation of a DIA advised	Pluvial issues, site guidance states that FRA required
Ecclefechan	ECC.H1	Land Adjacent to Tiree	6		Preparation of a FRA advised	Fluvial risk identified
	ECC.H2	Land South of Buccleuch Cottage	18		No additional issues identified	Site guidance states that FRA required
	ECC.H3	Ibrak Farm	100		No additional issues identified	Site guidance states that FRA required
	ECC.B&I1	Land Adjoining B7076, Jct. 9 A74(M)	11ha		No Additional Issues Identified	
Garlieston	GRL.H1	Mill Road	14		Preparation of a FRA Advised	Fluvial risk identified, a consequent modification to the site guidance is to be considered at the LDP examination



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Gatehouse of Fleet	GOF.H1	Memory Lane	6		No additional issues identified	
	ERL.H3	Land Northwest of Stanfield Farm	27		Preparation of a DIA advised	Pluvial issues
	ERL.MU1	Stanfield Farm	200 + Flexible Business Units		Preparation of a DIA advised	Pluvial issues, site guidance states that FRA required
Glencaple	GCP.H1	Shore Road	24		No additional issues identified	
	GCP.H2	Wardlaw Drive	34		Preparation of a DIA advised	Downstream pluvial issues
Glenluce	GLU.H1	Glenjorrie Avenue	37		If detailed planning permission lapses—preparation of a DIA advised	Pluvial issues
	GLU.H2	Bankfield Farm	46		No additional issues identified	
	GLU.H3	Bankfield Farm East	12		No additional issues identified	



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Gretna Border	GTN.H1	Adjacent to Hazeldene	36		No additional issues identified	
	GTN.H2	Land to North of Victory Avenue (Phase 1)	104		Preparation of a DIA advised	Pluvial issues
	GTN.H3	The Hawthorns	55		Preparation of a DIA advised	Pluvial issues
	GTN.H4	Halcrow Stadium	85		No additional issues identified	FRA Has been prepared
	GTN.H5	Land to North of Old Graitney Road	45		No additional issues identified	FRA has been prepared
	GTN.H6	Land to South of Old Graitney Road	20		No additional issues identified	Site guidance states that FRA required
	GTN.H7	Land to North of Victory Avenue (Phase 2)			160	Preparation of DIA advised
	GTN.MU1	Former Golf Course	200 + 1ha for flexible business units		Preparation of DIA advised	DIA should pick up issues in FRA
Hollywood	HLW.H1	Kirkland	35		Preparation of DIA Advised	Pluvial issues



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Johnstone-bridge	JSB.H1	Land to North of MacLean Drive	39		Preparation of a DIA advised	Pluvial issues from reports of local flooding
	JSB.H2	Land to West of School	90		No Additional Issues Identified	FRA should be used to inform the Masterplan
	JSB.CF1	Land adjoining School	Community facilities		No Additional Issues Identified	
Kirkcolm	KCM.H1	Church Street	20		Preparation of a DIA advised	Note the culvert to the south of the site
Kirkconnel / Kelloholm	KCN.H1	Glenaber Avenue	90		Preparation of a DIA advised	Pluvial issues, a drain runs across the site
	KCN.B&I1	Greystone Avenue	0.7ha		No additional issues identified	
Kirkcowan	KCW.H1	St. Couan's Crescent	37		No additional issues identified	
kirkcudbright	KBT.H1	Mersehouse / Mersecroft	70		Preparation of DIA advised	Site guidance states FRA required



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Kirkcudbright	KBT.H2	Land to East of Tongland Road / Burnside Loaning	8		Preparation of a DIA advised	Pluvial issues
	KBT.H3	Land at Parkhouse		76	Preparation of a DIA advised	Pluvial issues, site guidance states FRA required
	KBT.H4	Former Creamery, Merse Road	35		No additional issues identified	
	Kirkinner / Braehead	KBH.H1	St. Kennera Terrace	46		No additional issues identified
	KBH.H2	Smith's Croft	10		Preparation of DIA advised	Pluvial issues, site guidance states investigation of flood risk required
Langholm	LHM.H1	Holmwood Crescent	5		Preparation of DIA advised	Site guidance states FRA required
	LHM.H2	Meikleholm Cottage	5		Preparation of DIA advised	Pluvial issues (DGC)



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Langholm	LHM.H3	Land to South of Meikleholm	5		Preparation of a DIA advised	Pluvial issues (DGC), site guidance states FRA required
	LHM.H4	Murtholm Farm	200		Preparation of a DIA advised, The Masterplan required for this site should take into account a review of the FRA based on SEPA 2014 outline	Site almost divided by the 2014 outline, but overall flood area considerably less than 2006 outline
Leswalt	LSW.H1	Challoch	56		No additional issues identified	
Lochmaben	LMB.H1	Former Railway Station	15		Preparation of DIA advised	Pluvial issues
	LMB.H2	Laverockhall	40		Preparation of DIA advised	Pluvial issues
Lockerbie	LRB.H1	Former Academy	30		Preparation of DIA advised	Pluvial issues



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Lockerbie	LRB.H3	Park Place	15		No additional issues identified	
	LRB.H4	Netherplace Farm	200		Preparation of DIA advised	Pluvial issues, site guidance states FRA required.
	LRB.MU1	Land to West of Ice Rink	80 + flexible business units		Preparation of DIA advised	Pluvial issues, site guidance states FRA required.
	LRB.B&I1	Dryfe Road	3.32ha		Preparation of DIA advised	Pluvial issues, site guidance states FRA required.
	LRB.B&I2	Broomhouses	2.8ha		Preparation of DIA advised	Pluvial issues
	LRB.B&I3	Former Primary School	2ha		Preparation of DIA advised	Pluvial issues
Moffat	MOF.H1	Dickson's Well	6		If the permission in the proposed LDP lapses, FRA covering site should be reviewed	New SEPA maps note uncertainty over flood remodelling for the Bimock Water in Moffat



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Moffat	MOF.H2	Greenacres	15		Preparation of DIA advised along with a FRA	Pluvial & fluvial issues identified
	MOF.H3	Old Carlisle Road	34		Preparation of DIA advised along with a FRA	Pluvial & fluvial issues identified
	Mof.H4	Selkirk Road	200		Preparation of DIA advised along with the final phase of the FRA	Site guidance states final phase of FRA required
	MOF.MU1	Former Academy	10 + flexible business units		Preparation of DIA advised	Site guidance refers to the need to manage water courses
	MOF.MU2	Former Woollen Mill	2.8ha		Preparation of DIA advised	Pluvial issues
	LRB.B&I3	Former Primary School	Retail & tourism		Preparation of DIA advised	Site guidance states FRA required
Moniaive	MOV.H1	Chapel Street	50		No additional issues identified	Site guidance states FRA required



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New Abbey	NAB.H2	Kindar Road	10		Preparation of DIA advised	Site guidance states flood risk to be investigated
Penpont	PNT.H1	Land to West of Bogg Road	8		Preparation of DIA advised	
	PNT.H2	27	200		No additional issues	
Port William	PWL.H1	South Street	7		Should be a review of coastal flood risk if planning application submitted	It is understood that the permission noted in the proposed LDP has lapsed (February 2014)
	PWL.H2	Dourie Farm	54		Preparation of DIA advised	Small area of pluvial hazard identified on western boundary of site
	LRB.B&I3	Former Primary School	Retail & tourism		Preparation of DIA advised	
Portpatrick	PPK.H1	Hill Street	7		No additional issues	



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Portpatrick	PPK.H2	Land to East of Heugh Road	7		Preparation of DIA advised	Pluvial issues, site development has possible impact on local surface water hazards
	PPK.H3	High Merrick	120		Preparation of DIA advised	Pluvial issues, site development has possible impact on local surface water hazards
	PPK.H4	Sunnymeade North	57		Preparation of DIA advised	Pluvial issues, site development has possible impact on local surface water hazards
Sanquhar	SNQ.H1	Church Road	20		No additional issues	
	SNQ.H2	Queens Road	125		Preparation of DIA advised	Plan site guidance notes drainage issues within the site



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Sanquhar	SNQ.H3	Queensberry Square	10		No additional issues	
	SNQ.H4	High Street	19		No additional issues	
	SNQ.B&I1	Glasgow Road	3.62ha		Preparation of DIA advised	Plan site guidance requires a FRA
Springholm	SPR.H1	Land off Ewart Place	40		Preparation of DIA advised	Plan site guidance requires investigation of flood hazard to determine if this will have an impact on development of the site
St. John's Town of Dalry	DLR.H1	Whinnymuir	35		Site under construction	
	DLR.H2	Land to South of Whinnymuir	25		Preparation of DIA advised	Plan site guidance requires a FRA



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Stranraer	STR.H1	Thornecroft West	10		Preparation of DIA advised	Pluvial issues, site development has possible impact of local surface water hazards
	STR.H2	West Leafield	158		Preparation of DIA advised	Pluvial issues, site development has possible impact of local surface water hazards
	STR.H3	Moorefield			Preparation of DIA advised	Pluvial issues, site development has possible impact of local surface water hazards
	STR.H4	Springbank	74		Preparation of DIA advised	Pluvial issues, site development has possible impact of local surface water hazards



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Stranraer	STR.H5	Garrick Hospital Site, Edinburgh Road	18		No additional issues	Pluvial issues, site development has possible impact of local surface water hazards
	STR.H6	Land Behind The Coachman's	9		Preparation of DIA advised	Pluvial issues, site development has possible impact of local surface water hazards
	STR.H7	Land to East of Glebe Cemetary	63		Preparation of DIA advised	Pluvial issues, site development has possible impact of local surface water hazards
	STR.H8	Leswalt Road	35		Preparation of DIA advised	Plan site guidance requires a FRA



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Stranraer	STR.B&I1	Blackparks Industrial Estate	6.7ha		Preparation of DIA advised	Plan site guidance requires a FRA
	STR.B&I2	Clashmahew	9.5ha		Preparation of DIA advised	Plan site guidance requires further investigation to determine the developable area, it is presumed this is about flood hazard
	STR.B&I3	Railway Yard	4ha		Preparation of DIA advised	Plan site guidance requires a FRA
Thornhill	THN.H1	Wallace Hall	37		No additional issues	
	THN.H2	Hospital Brae	112		No additional issues	
	THN.H3	Boatbrae	64		No additional issues	
	THN.H4	Queensberry Beeches		103	Preparation of DIA advised	Pluvial issues
	THN.H5	Queensberry Park		122	No additional issues	



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
Thornhill	THN.MU1	Gallows Knowe	47 + 2.6ha for flexible business units		Preparation of DIA advised	Pluvial issues
Twynholm	TWY.H1	Rear of Main Street	10		No additional issues	
	TWY.H2	Manse Road	15		No additional issues	
Whithorn	WTH.H1	Station Road	6		No additional issues	
	WTH.H2	Common Park	76		No additional issues	
	WTH.H3	Ladycroft	5		Preparation of DIA advised	Plan site guidance requires investigation of flood risk
	WTH.H4	Greencroft	8	103	No additional issues	
	WTH.B&I1	Stirnie Birnie Btidge	2.8ha		Preparation of DIA advised	Plan site guidance requires a FRA
Wigtown	WGT.H1	Southfiled Park	34		No additional issues	
	WGT.H2	Seaview	8		No additional issues	
	WGT.H3	Station Road	50		No additional issues	



1. Settlement	2. Site Ref.	3. Site Name	4. No. of Units to 2024	5. Units Beyond 2024	6. Additional Guidance in Response to Additional Information in 2014 Hazard Maps	7. Comments
A74(M)	A74(M).B&I1	Hangingshaws, Johnstonebridge	20ha		Preparation of DIA advised	Plan site guidance requires a FRA
	A74(M).B&I2	Hayfield / Newhope, Kirkpatrick Fleming	26.24ha		Preparation of DIA advised	Plan site guidance requires a FRA
	A74(M).B&I3	Redhouse, Kirkpatrick Fleming	28.19ha		Preparation of DIA advised	Plan site guidance requires a FRA
Chapelcross	CPC.B&I1	Chapelcross North	19.43ha		Preparation of DIA advised	Plan site guidance requires a FRA
	CPC.B&I2	Chapelcross South	7.13ha		Preparation of DIA advised	Plan site guidance requires a FRA
	CPC.B&I3	Chapelcross West	32.37ha		Preparation of DIA advised	Plan site guidance requires a FRA



Acronyms

AEP	Annual Exceedance Probability
CAR	Water Environment (Controlled Activities) Regulations 2011
CEH	Centre for Ecology and Hydrology
DIA	Drainage Impact Assessments
DGC	Dumfries & Galloway Council
CIRIA	Construction Industry Research and Information Association
FEH	Flood Estimation Handbook
FRA	Flood Risk Assessment
LDP	Local Development Plan
SEPA	Scottish Environment Protection Agency
PAN	Planning Advice Note
SFM	Sustainable Flood Management
SPP	Scottish Planning Policy (2014)
S-T RBMP	Solway-Tweed River Basin Management Plan
SuDS	Sustainable Drainage Systems
SW	Scottish Water
UKCIP	United Kingdom Climate Impacts Programme

Glossary

AEP (Annual Exceedance Probability): This is the accepted measure of the likelihood of a flood occurring at a particular location within a period of one year. For example, a flood with a 1% AEP has a statistical probability of being reached or exceeded in any year of 1% (1:100). This is often referred to as the 'once in 100 year flood'. It should be noted however, that the occurrence of a flood event does not change the statistical probability of another flood occurring.

Brownfield: Previously developed land and premises, including the curtilage of buildings, which may still be partially occupied or used. Most commonly associated with derelict urban land with redundant industrial buildings. Excludes agriculture, forestry and previously used land which now has nature conservation or recreation value.

DIA (Drainage Impact Assessment): A statement of the drainage issues relevant to a proposal and the suitable means of providing drainage. The length and detail should be proportionate to the issues. As appropriate it may include existing drainage systems and problems, infiltration, groundwater, surface

water flow, foul and storm water disposal, SuDS and drainage related flooding issues. See also PAN 61 paragraphs 23 – 24.

Flood Plain: Generally low lying areas adjacent to a watercourse, tidal lengths of the river or sea, where water flows in times of flood or would flow but for the presence of flood defences. SPP says that this is the equivalent to the 1:200 AEP area.

Flood Risk Assessment: An assessment of the likelihood of flooding in a particular area so that development needs and mitigation measures can be carefully considered.

Freeboard: This is often defined as the difference between the flood defence level and the design flood level. It can also however be the difference between the design flood level and the finished floor levels of any development. Freeboard is required to account for (a) the uncertainties involved in flood design and (b) physical imponderables such as post-construction settlement or wave action. Any allowance for climate change should be independent of the freeboard allowance.

Greenfield: Land not previously developed, can include agricultural land.

Relevant Bodies of Water: Expression used in the Flood Risk Management (Scotland) Act 2009 to defines those bodies of water (other than canals) that a local authority should assess for the purpose of ascertaining whether their condition gives rise to a risk of flooding of land within or outwith its area.

Sustainable Drainage System (SuDS): These are designed to reduce the potential impact of developments with respect to surface water discharges by replicating natural systems of drainage (rather than by routing water through solid pipes) allowing water to be released slowly back into the environment.

Transitional Water: Water (other than groundwater) in the vicinity of river mouths which is partly saline in character as a result of its proximity to coastal water but which is substantially influenced by freshwater flows.