



North Ayrshire Council
Comhairle Siorrachd Àir a Tuath

STRATEGIC FLOOD RISK ASSESSMENT

MAY 2018

DOCUMENT CONTROL

Document: North Ayrshire Council: Strategic Flood Risk Assessment

Version: B

Date Originated: January 2018

Prepared by: North Ayrshire Council
Flooding & Structural Design Team
Cunninghame House
Irvine
KA12 8EE

Revision List:

Revision No.	Reason for issue	Date of issue
-	Consultative draft	January 2018
A	Finalised draft	May 2018
B	Pre-publication consultation	May 2018

Contents

1. Introduction.....	4
2. Aims and Objectives.....	4
3. Flood Risk Review.....	5
4. Flood Sources.....	7
5. Flood Risk Management Strategy and Local Flood Risk Management Plan.....	8
5.1 Cycle 1 FRM Strategy.....	8
5.2 Local FRM Plan.....	9
5.3 Existing & forthcoming Flood Protection Studies.....	10
5.4 Constraints.....	11
5.5 Climate Change.....	11
6. Natural Flood Risk Management.....	12
7. Site Assessments.....	14
7.1 GIS Layers.....	14
7.2 Detailed Assessments.....	14
Appendix A: Land Use Vulnerability Classification	
Appendix B: Site Assessments for Proposed Housing Allocations	

1. INTRODUCTION

- 1.1 The purpose of the Strategic Flood Risk Assessment is to inform the Main Issues Report (MIR) and the Local Development Plan (LDP2) preparation process by providing a strategic overview of flood risk management issues in North Ayrshire.
- 1.2 The strategic overview of flood risk management issues shall support the identification of the areas that are most suitable for development and the areas that should be safeguarded for the purpose of sustainable flood management. The SFRA has been developed with information provided by the Scottish Environment Protection Agency (SEPA) and in liaison with the Council's Flooding and Structural Design Team.

2. AIMS AND OBJECTIVES

- 2.1 The primary aim is to ensure that the relationship between prospective site allocations and known flood risk accords with the principals of the Flood Risk Framework by considering the implications of coastal/tidal, fluvial and pluvial sources of flooding on the future development of North Ayrshire. It is also recognised that groundwater and sewer flooding can exacerbate the impact of other forms of flooding; therefore, where there is information on groundwater conditions or the capacity of sewerage or drainage infrastructure, this information will also be used to guide the future locations of site allocations within North Ayrshire.
- 2.2 Secondly, the SFRA shall identify opportunities within existing developments to reverse the effects of a less sustainable urban form. Measures to improve the quality of watercourses and/or to realise a more natural approach to flood risk management shall be identified. This a longer term ambition of the SFRA and will be used to support decisions on planning applications for urban regeneration projects, changes of use, etc. The outcome of this assessment shall be published as an annex to this report when further information becomes available, dependant on funding resources becoming available.
- 2.3 The objectives of the SFRA are to:
 1. Ensure an appropriate match between identified flood risk and the location, use-class and intensity of future development within North Ayrshire;
 2. Identify where mitigation is likely to be required to ensure that future development will not have a significant probability of being affected by flooding and will have a neutral or better effect on flood risk elsewhere;
 3. Identify where prospective development opportunity sites and other areas can contribute to natural flood management. Note that the contribution that existing areas of built form can make to natural flood

management is a longer term objective, dependant on resources becoming available, and;

4. Provide an evidence-base to inform the preparation of LDP2.

3. FLOOD RISK REVIEW

3.1 By collating and reviewing existing information on flood sources, flood risk and land use vulnerability, the North Ayrshire SFRA shall assist the local planning authority in its obligation to consider flood risk when allocating future development opportunities.

3.2 The main assumption underlying the assessment, however, is that development on the functional flood plain, which is defined by Scottish Planning Policy (SPP) as areas with, generally, a greater than 0.5% (1 in 200 year) probability of flooding in any year is only permitted when compatible with SPP's Flood Risk Framework, which is included overleaf. As the mitigation required to enable development on the functional flood plain may also increase the risk of flooding to existing property, prospective site allocations on the flood plain will only be acceptable where it can also be demonstrated that there is no likely negative impact on flood storage capacity or the conveyance of floodwater.

The Flood Risk Framework

- **Little or No Risk** – annual probability of coastal or watercourse flooding is less than 0.1% (1:1000 years)

- No constraints due to coastal or watercourse flooding.

- **Low to Medium Risk** – annual probability of coastal or watercourse flooding is between 0.1% and 0.5% (1:1000 to 1:200 years)

- Suitable for most development. A flood risk assessment may be required at the upper end of the probability range (i.e. close to 0.5%), and for essential infrastructure and the most vulnerable uses. Water resistant materials and construction may be required.

- Generally not suitable for civil infrastructure. Where civil infrastructure must be located in these areas or is being substantially extended, it should be designed to be capable of remaining operational and accessible during extreme flood events.

- **Medium to High Risk** – annual probability of coastal or watercourse flooding is greater than 0.5% (1:200 years)

May be suitable for:

- residential, institutional, commercial and industrial development within built-up areas provided flood protection measures to the appropriate standard already exist and are maintained, are under construction, or are a planned measure in a current flood risk management plan;
- essential infrastructure within built-up areas, designed and constructed to remain operational during floods and not impede water flow;
- some recreational, sport, amenity and nature conservation uses, provided appropriate evacuation procedures are in place; and
- job-related accommodation, e.g. for caretakers or operational staff.
- Generally not suitable for:
 - civil infrastructure and the most vulnerable uses;
 - additional development in undeveloped and sparsely developed areas, unless a location is essential for operational reasons, e.g. for navigation and water-based recreation, agriculture, transport or utilities infrastructure (which should be designed and constructed to be operational during floods and not impede water flow), and an alternative, lower risk location is not available; and
 - new caravan and camping sites.
- Where built development is permitted, measures to protect against or manage flood risk will be required and any loss of flood storage capacity mitigated to achieve a neutral or better outcome.
- Water-resistant materials and construction should be used where appropriate. Elevated buildings on structures such as stilts are unlikely to be acceptable.

Surface Water Flooding

- Infrastructure and buildings should generally be designed to be free from surface water flooding in rainfall events where the annual probability of occurrence is greater than 0.5% (1:200 years).
- Surface water drainage measures should have a neutral or better effect on the risk of flooding both on and off the site, taking account of rain falling on the site and run-off from adjacent areas.

Table 1: Flood Risk Framework

- 3.3 Considering the flood risk framework, the SFRA will go on to document the following:
- i. the relationship between proposed sites and flood risk, informed by the National Flood Risk Assessment undertaken by SEPA in 2011;
 - ii. existing flood protection measures and the expected measures arising from the priorities and actions of the Local Flood Risk Management Plan;
 - iii. any constraints of existing culverted watercourses, drains and field drainage etc.;
 - iv. the impact of climate change; and
 - v. cumulative effects, by presenting the assessment results in a tabulated format.

4. FLOOD SOURCES

- 4.1 The primary source of information on flood risk is the SEPA hazard Maps that provide a national account of flood risk from fluvial, pluvial and coastal/tidal sources.
- 4.2 Comparing the information on the hazard maps with the proposed LDP2 housing allocations, it is possible to assess each individual site's outline flood risk. This information is supplemented by the priorities and future actions of the Flood Risk Management Strategy / Local Flood Risk Management Plan, the proximity of the site to watercourses, the condition / capacity of nearby culverts, any records of previous flooding, and the sensitivity, shape and proximity of the green network, to provide a more detailed assessment of flood risk. The assessments will, where appropriate, include possible mitigation measures and information on the considerations that prospective developers will be required to address should the assessed site go on to be allocated by the LDP2.
- 4.3 The outcome of the assessments for the prospective LDP2 housing sites is tabulated in Appendix B. Detailed maps are available on request to North Ayrshire Council's Planning Services (e-mail: LDP@north-ayrshire.gov.uk; Tel: 01294 324763).
- 4.4 The following sections of this report identifies the studies and other actions of the Flood Risk Management strategy / flood risk management plan, further information on constraints mapping, up-to-date information on the effect of climate change, and Natural Flood Management. The foregoing has informed the detailed site assessments that are presented in Appendix B of this report.

5. FLOOD RISK MANAGEMENT STRATEGY & LOCAL FLOOD RISK MANAGEMENT PLAN

5.1 The Cycle 1 Flood Risk Management Strategy

- 5.1.1 The three 'Ayrshire' local authorities together with SEPA, Scottish Water, and other organisations with an interest in flood risk management contributed to the production of the Cycle 1 Ayrshire Flood Risk Management Strategy. The purpose of the strategy was to identify levels of flood risk within Potentially Vulnerable Areas (PVAs) and a series of co-ordinated objectives, actions, and priorities for the management of flood risk in the Ayrshire Local Plan District. 18 PVAs and one candidate PVA were identified within the Ayrshire Local Plan District in 2011 by SEPA's National Flood Risk Assessment.
- 5.1.2 The identified actions, studies, works and schemes within the Ayrshire Flood Risk Management Strategy (2015) were subject to national prioritisation, which included a cost-benefit appraisal to ensure that they represent the most effective arrangement to address flooding in high risk areas. The strategy is available online at: <http://apps.sepa.org.uk/FRMStrategies/ayrshire.html>
- 5.1.3 The following 8 PVAs fall wholly or partly within the North Ayrshire Council Local Authority Area:
- Noddsdale Water (PVA No. 12/01)
 - Great Cumbrae (Candidate PVA No. 12/02)
 - Largs to Stevenston (PVA No. 12/03)
 - Upper Garnock Catchment (PVA No. 12/04)
 - Kilwinning (PVA No. 12/05)
 - River Irvine and Annick Water Catchments (PVA No. 12/06)
 - Irvine to Troon (PVA No. 12/07)
 - Isle of Arran (PVA No. 12/08)

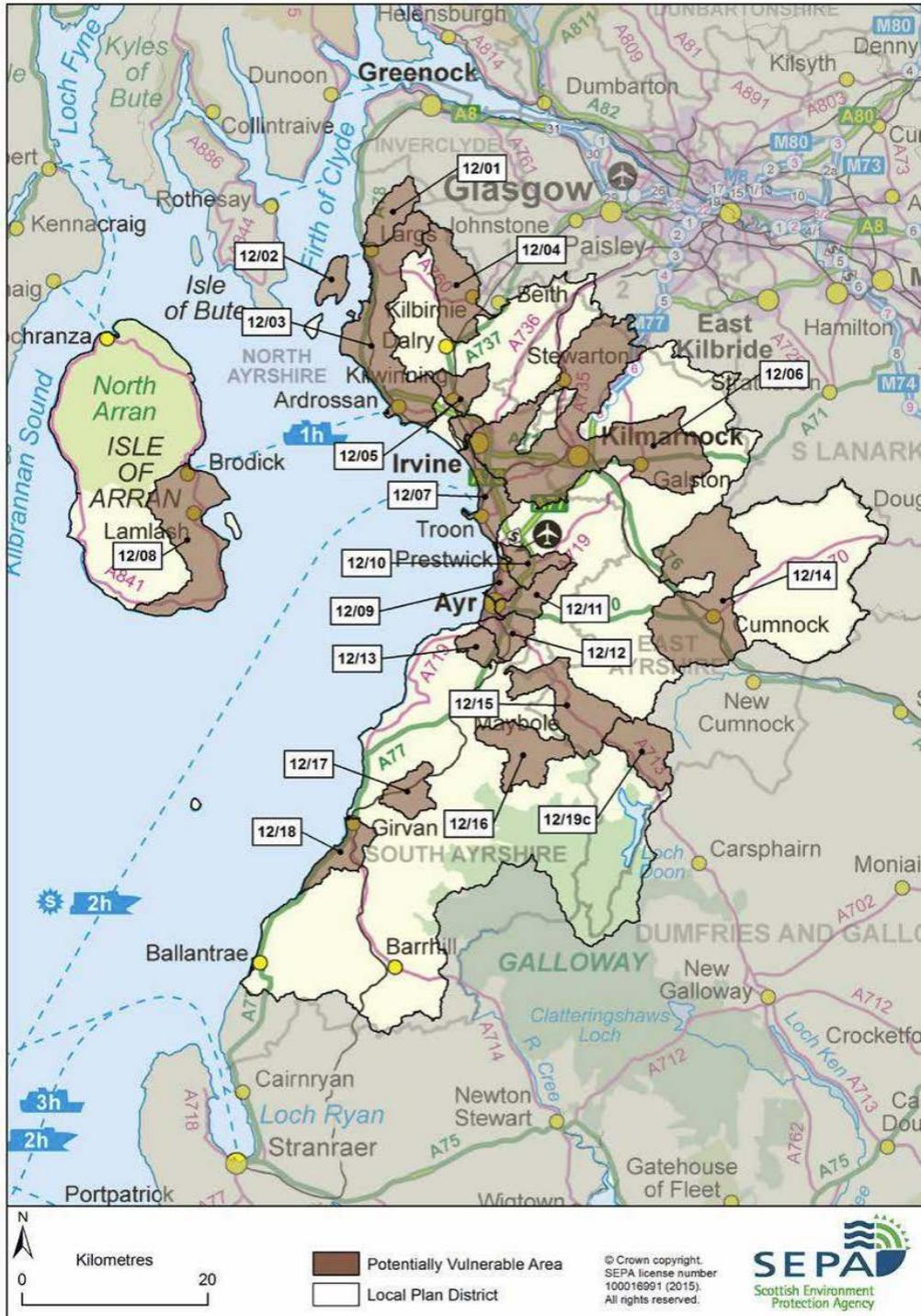


Figure 1: Potentially Vulnerable Areas within the Ayrshire Local Plan District

5.2 Local Flood Risk Management Plan

5.2.1 The Ayrshire Local Flood Risk Management Plan identifies the programme for the implementation of the identified actions and priorities of the Ayrshire Flood Risk Management Strategy over a six year planning cycle (2016 to 2022) and provides clarity on the co-ordination of activities and funding sources for the

delivery of actions. The plan is available on the flooding pages of the North Ayrshire Council's website (<https://www.north-ayrshire.gov.uk/community-safety/flood-risk-management-plan.aspx>).

5.3 Existing and forthcoming Flood Protection Studies:

Meadowhead Integrated Catchment Study (ICS):

Scottish Water shall investigate and model the sewer catchment to improve the knowledge and understanding of Flood Risk. The project is scheduled for completion in 2019.

Stevenston Point Integrated Catchment Study (ICS):

Scottish Water shall investigate and model the sewer catchment to improve the knowledge and understanding of Flood Risk. The project is scheduled for completion in 2019.

Shoreline Management Plan:

Within the North Ayrshire Local Authority Area, the Shoreline Management plan covers the coastline of Arran, Great Cumbrae, and from Skelmorlie to the Galloway Forest on the mainland. The public consultation stage shall be finalised by summer 2018 with outline maintenance measures and interventions to follow.

Upper Garnock Flood Protection Scheme:

The outcome of the modelling exercise has been adopted by SEPA and has informed the production of the most up-to-date hazard map(s).

Millport Coastal Flood Protection Scheme:

As of May 2018, the geotechnical and environmental studies are ongoing.

Arran Flood Risk Studies:

Several studies are ongoing to inform the 2019 national prioritisation of flood risk actions.

Lower Irvine Valley Flood Risk Assessment:

This detailed study seeks to provide a more accurate account of flood risk in the lower Irvine Valley (including flooding from the Annick Water). SEPA has agreed the verification of the model. The intention is that the findings of the study shall will inform the content of the Hazard Maps published by SEPA.

Table 2: Existing and forthcoming studies

5.3.8 The foregoing studies may refine the findings of the national assessment and inform the views of the planning authority and SEPA on flood risk within North Ayrshire. As the outcome of these studies will be used to support decisions on planning applications, prospective developers should contact the Flooding Team at North Ayrshire Council to determine the status of the studies and the consequences, if any, for their proposals.

5.4 Constraints

5.4.1 The Council's mapped assets that were used to inform the site assessments include coastal protection structures, culverted watercourses, trash screens, the notable features of inspected watercourses, and the green network.

5.4.2 Where appropriate, the constraints arising from any mapped asset have been noted in the site assessments. Any future drainage and water assessment should take account of the mapped constraint / tabulated comments assuming that the site goes on to be allocated by LDP2.

5.5 Climate Change

5.5.1 'An assessment of the vulnerability of Scotland's river catchments and coasts to the impacts of climate change', published by the Centre for Ecology & Hydrology, presents the potential impacts of climate change on flood flows across Scotland.

5.5.2 The North Ayrshire Local Authority Area falls within the Clyde basin. The report indicates that, in a high emissions scenario, a 44% increase in flood flow is unlikely to be exceeded in 2080 within the Clyde River Basin Region. This has implications for flood risk and drainage as the 'traditional' allowance of 20% increase in peak flows for climate change is shown as no longer being conservative.

5.5.3 While it is not possible to consider the implications of flood flows at a strategic level, the site assessments have adopted a precautionary approach. Site's that are currently at risk of flooding or adjacent to areas that are at risk of flooding will require stand-off areas to inform the extent of the developable area. Where the flood risk is expansive the assessment may either recommend that the extents of a proposed site are revised or that the site is not allocated by LDP2.

6. NATURAL FLOOD MANAGEMENT (NFM)

- 6.1 The production of (NFM) maps presents the first national source of information on opportunity areas for NFM across Scotland. The maps are part of a suite of tools, which inform the Flood Risk Management Planning Process and contribute to a co-ordinated approach to manage flooding in North Ayrshire.
- 6.2 The NFM maps have identified where NFM measures are likely be most effective in storing or slowing water or managing instream sediment. SEPA, in consultation with local authorities and other responsible authorities, will consider what measures within these opportunity areas would be most appropriate to help meet the objectives set for the PVAs. NFM measures, therefore, will be detailed in the forthcoming Flood Risk Management Strategies.
- 6.4 The detailed site assessments will be updated in due course to reflect the contents of the next cycle of Flood Risk Management Strategies and Local Flood Risk Management Plans and will, amongst other considerations, direct developers and decision makers to take account of NFM where appropriate. The following tables provide a summary of the key features of NFM Maps and the range of measures that can meet the aims of NFM.
- 6.5 Developers should, therefore, take cognisance of the following information, particularly where they intent to lodge an application within the next planning cycle of FRM Plans / Strategies as the advice contained within the Site Assessments may not necessarily be up to date.

Summary of key features of the NFM maps

- the NFM maps are strategic high level maps for identifying where NFM measures would be most effective in storing or slowing water, or managing sediment;
- they do not relate opportunities for NFM to areas of flood risk or identify which specific measures should be implemented where;
- they should be interpreted together with other key data such as information on flood risk, land cover, flood protection and physical alterations to river bodies; and
- NFM measures will only be implemented in a small proportion of the areas identified and only with the full cooperation of landowners and key stakeholders.

Table 3: Key features of NFM Maps.

- 6.6 While the NFM maps identify where measures would be most effective, this does not mean that NFM should not be pursued in other areas. It will still be important to identify local opportunities that can deliver local benefits to flood risk as well as the many other benefits associated with NFM.
- 6.7 The following table illustrates the range of possible actions that landowners and prospective developers should take into account when maintaining their land or when formulating development proposals.

NFM	Map Technique
Runoff reduction:	Woodland planting (including upland, floodplain, riparian, gully or cross slope woodlands); Creation/restoration of non-floodplain wetlands; Agricultural and upland drainage modifications (e.g. upland drain blocking); Land and soil management practices (e.g. ploughing along the contour of the land or soil aeration);
Floodplain Storage:	Reach and floodplain restoration; Floodplain and riparian woodlands; Instream structures (e.g. large woody debris and boulders); Reach restoration (e.g. re-meandering); Offline storage areas and wash-lands;
Sediment management:	Reach restoration (e.g. re-meandering); Sediment traps; Bank restoration (e.g. riparian planting, green bank restoration);
Estuarine surge attenuation:	Restoration of intertidal habitats including managed realignment;
Wave energy dissipation:	Beach management (e.g. beach recharge); Sand dune restoration; Restoration of intertidal habitats including managed realignment;

Table 4: Suite of suggested measures that can contribute to NFM objectives

7. SITE ASSESSMENTS

7.1 GIS Layers

7.1.1 The site assessments are based on an examination of the development opportunity sites and the following information:

- i. Terrain Information e.g. LiDAR, OS contours;
- ii. Hydrology e.g. the main and ordinary watercourses, location and information on Hydrometric Gauges;
- iii. Flood Protection Infrastructure (existing and proposed) e.g. flood banks, sluices;
- iv. Flood Risk Assessments e.g. on previous development sites;
- v. Scottish Environment Protection Agency Flood Maps;
- vi. Local Authority Information e.g. Local Development Plans, completed flood risk studies, the green network etc.;
- vii. Natural Flood Management (NFM) Maps.

7.2 Detailed Assessments

7.2.1 The sources of flooding have been used to identify flooding impacts of sites proposed for development in the Proposed Local Development Plan, including sites already allocated in the adopted LDP. Appendix B includes the assessment of sites considered for potential allocation in the LDP, and potential management actions (including avoidance, mitigation or technical studies). Of the potential allocations, the proposed site at Fairlie is recommended for deletion. At this stage no other proposed sites in Appendix B are recommended for deletion, although a range of mitigation actions are identified, including further investigatory work. It is recommended that the findings of the site assessments are embedded into the LDP as actions, should the sites be allocated, and that the findings are included in the action programme associated with the LDP where appropriate.

7.2.2 For the remaining sites assessed as part of this process, since the principle of development is established for those sites, there is no objection to their continued inclusion in the LDP, although output from site assessments should be considered in the development of the sites where planning applications are proposed, or through any development briefs produced to support the development of those sites. Where opportunities exist to embed the output of flooding assessments for existing LDP allocations into future iterations of the LDP action programme, these should be taken up. All assessment work for the existing LDP allocations, and other background work will be published separately, with a view to informing actions programmes and development management processes.

APPENDIX A: LAND USE VULNERABILITY CLASSIFICATION

Table 1: SEPA Land Use Vulnerability Classification¹

<p>1. Most Vulnerable Uses</p> <p>For the purpose of this guidance, Most Vulnerable Uses include land uses that are defined as both civil infrastructure and most vulnerable in the SPP 2014 glossary. Civil infrastructure is denoted with an asterisk (*) in the list below.</p> <p>Most Vulnerable Uses therefore comprise:</p> <ul style="list-style-type: none"> • police stations* • ambulance stations* • fire stations* • command centres and telecommunications installations required to be operational during flooding* • emergency dispersal points* • hospitals* • schools* • care homes* • nurseries • residential institutions, e.g. prisons, children's homes • basement dwellings • single dwelling houses in remote rural locations • dwelling houses situated behind informal embankments² • caravans, mobile homes, chalets and park homes intended for permanent residential use • holiday caravan, chalet, and camping sites • installations requiring hazardous substance consent (but where there is demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or with energy infrastructure, that require a coastal or water-side location, or other high flood risk areas, then the facilities should be classified as Essential Infrastructure – see column 4). 	<p>2. Highly Vulnerable Uses</p> <p>Comprise:</p> <ul style="list-style-type: none"> • buildings used for dwelling houses • social services homes (ambulant /adult) • hostels and hotels • student halls of residence • non-residential uses for health service • landfill and sites used for waste management facilities for hazardous waste 	<p>3. Least Vulnerable Uses</p> <p>Comprise:</p> <ul style="list-style-type: none"> • shops • financial, professional, and other services • restaurants and cafés • hot-food takeaways • drinking establishments • nightclubs • offices • general industry • storage and distribution • non-residential institutions not included in Most Vulnerable or Highly Vulnerable Uses • assembly and leisure • land and buildings used for agriculture and forestry that are subject to planning control • waste treatment (except landfill and hazardous waste facilities) • minerals working and processing (except for sand and gravel) 	<p>4. Essential Infrastructure</p> <p>Comprises:</p> <ul style="list-style-type: none"> • essential transport infrastructure (including mass evacuation routes) that has to cross the area at risk • essential utility infrastructure that has to be located in a flood risk area for operational reasons (this includes electricity generating power stations and grid and primary sub-stations, sewage treatment plants and water treatment works, wind turbines and other energy generating technologies) • installations requiring hazardous substance consent only where there is demonstrable need to locate such installations for the bulk storage of materials with port or other similar facilities, or with energy infrastructure that requires a coastal, water-side, or other high flood risk area location. 	<p>5. Water Compatible Uses³</p> <p>Comprise:</p> <ul style="list-style-type: none"> • flood control infrastructure • environmental monitoring stations • water transmission infrastructure and pumping stations • sewage transmission infrastructure and pumping stations • sand and gravel workings • docks, marinas and wharves • navigation facilities • MOD defence installations • ship building, repairing, and dismantling • dockside fish processing and refrigeration and compatible activities requiring a waterside location • water-based recreation (excluding sleeping accommodation) • lifeguard and coastguard stations • amenity open space • nature conservation and biodiversity • outdoor sports and recreation and essential facilities such as changing rooms • essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific operational warning⁴ and evacuation plan.
--	--	--	--	--

¹ Developments that combine a mixture of uses should be placed in the higher of the relevant classes of flood risk vulnerability. The impact of a flood on the particular land use could vary within each vulnerability class. In particular, a change of use to a dwelling house within the 'Highly Vulnerable' category could significantly increase the overall flood risk, especially in relation to human health and financial impacts. Any proposal for a change of use to a dwelling house should therefore be supported by a flood risk assessment. The redevelopment (including change of use) of an existing building or site provides a valuable opportunity to reduce the vulnerability of that site to flooding and therefore to reduce overall flood risk. This can be achieved through changes to less vulnerable land uses and improvements to the management of flood risk on the site.

² Embankments not formally constituted under flood prevention legislation including agricultural flood embankments constructed under permitted development rights.

³ Advice in the SPP risk framework on these activities is limited. The nature of the above activities necessitates locations that are prone to flooding. Generally, it is difficult to recommend a specific annual return period to guide development decisions for such uses. SEPA would recommend that the risk of flooding should be assessed giving particular consideration to:

1. Specific locational requirements of the development and availability of alternative locations;
2. Consideration of any loss of floodplain storage (in riverside developments) that may increase flood risk to nearby existing development and options to mitigate against this;
3. Appropriate mitigation measures, including water resistance and resilience measures;
4. Health and safety implications and the need for access, egress, and evacuation, with specific consideration of, and provision of, measures to provide for these where:
 - The development will attract the public especially vulnerable people such as children and old people.
 - Large numbers of the public may gather and where evacuation routes are limited.
 - Hazardous materials are stored or processed.

⁴ In this context, specific warning does not mean a formal flood warning from SEPA. SEPA does not support the provision of flood warning as a viable reason to develop in flood risk areas. Warning is a non-structural measure that does not physically prevent flooding and has associated uncertainties.

APPENDIX B: SITE ASSESSMENTS FOR HOUSING ALLOCATIONS (LDP2)

UID	PVA	Location Ref	Site Ref	Site Name	Proposed Land Use	Land Use Vulnerability Classification	Fluvial Flooding	Surface Water Flooding	Coastal Flooding	Coastal Flood Defences	Other recorded Infrastructure Constraints	Flooding Comment	SEPA Actions	Proposed LFRMP Measures	Recommendation
85	12/06	25	CFS07	Lochlibo Road, Irvine	Housing - 100 units	Highly Vulnerable Use	No	Yes	No	No	No	There is one area within and around the Lawthorn Plantation (i.e. the South-East of the site) that is at high, medium and low risk of surface water flooding. The road that transects the site is also at high risk of flooding from surface water.	Appropriate Surface Water Management Measures should be adopted.	Proposed development should be compatible with any relevant outcomes of the forthcoming Surface Water Plan /Study (Objective ID 12042) for Irvine.	Water and Drainage Assessments are required to address how surface water will be drained, treated and managed.
30	12/03	12	CFS08	Chapelhill Road, West Kilbride	Housing - 120 units	Highly Vulnerable Use	No	No	No	No	Yes - significant land/field drainage.	There is no record of notable flood risk within the site. There is a field drain that runs East to West through the site before outfalling to the Kilbride Burn via a pipe/headwall to the north of 'Hillcrest'.	Appropriate Surface Water Management Measures should be adopted.	The development of the site should not contribute to the high risk of surface water flooding that exists on the road network to the North of the site and the neighbouring farmhouse (Objective ID 12039)	Water and Drainage Assessments are required to address how surface water will be drained, treated and managed.
62	12/05	18	CFS15	Wood Farm, Kilwinning	Housing - 173 units	Highly Vulnerable Use	No	Yes	No	No	No	There are three discrete areas within the site that are at high risk of surface water flooding.	Appropriate Surface Water Management Measures should be adopted.	Proposed development should be compatible with any relevant outcomes of the forthcoming Surface Water Plan /Study (Objective ID 12041) for Kilwinning, Saltcoats, Ardrossan and Stevenston.	Water and Drainage Assessments are required to address how surface water will be drained, treated and managed.
115	12/04	36	CFS44	Newhouse Drive, Kilbirnie	Housing/Community Green Space. 100-125 units & potential phase 2 40-50 units	Highly Vulnerable Use	No	Yes	No	No	No	There is a watercourse that traverses the site before entering into a more substantial tributary of the River Garnock. The land around the watercourse and at the site's Western edge is at medium risk of surface water flooding.	Flood Risk Assessment required and discussion about Surface Water Flooding with flood prevention, roads department and Scottish Water recommended.	Any proposed development must be compatible with, and ideally implement, natural flood management to the tributaries of the River Garnock (Objective ID 12010).	Flood Risk Assessment Required to determine the developable area of the site. Water and Drainage Assessments are required to address how surface water will be drained, treated and managed.
1	12/01	01	CFS48	Brisbane Glen Road, Largs	Housing - 86 units including infrastructure, greenspace, landscaping etc & carpark to allow easier access to Meridian Pillars & conservatory	Highly Vulnerable Use	Yes	Yes;	No	No	No	The majority of the site is not at risk from fluvial flooding due to the site's elevated position in relation to the watercourse. A notable area of the site is at Medium and Low risk of surface water flooding. Any significant land raising or change to the profile of the channel face of the watercourse will not be permitted.	Flood Risk Assessment required and discussion about Surface Water Flooding with flood prevention, roads department and Scottish Water recommended.	Any proposed development must be compatible with, ideally implement, natural flood management to reduce run-off to the Noddsdale Water (Objective ID 12001).	Flood Risk Assessment Required to determine the developable area of the site. Water and Drainage Assessments are required to address how surface water will be drained, treated and managed.
43	12/03	15	CFS51	Mayfield Farm, Stevenston	Housing - 300 units	Highly Vulnerable Use	No	Yes	No	No	Yes. There is a culvert to the South-East of the site. Surface water is conveyed from the existing field drainage infrastructure to the culvert. The location of the culvert's outfall is not known.	The existing culvert presents a flood risk to properties under which it runs and the Council has records of one incidence of flooding from this source. There are several areas within the site that are at high risk of surface water flooding.	Appropriate Surface Water Management Measures should be adopted.	Proposed development should be compatible with any relevant outcomes of the forthcoming Surface Water Plan /Study (Objective ID 12041) for Kilwinning, Saltcoats, Ardrossan and Stevenston.	Water and Drainage Assessments are required to address how surface water will be drained, treated and managed.

16	12/03		CFS65a (North)	Portencross Road, Seamill	Housing & potential school site	Most Vulnerable Use	No	Yes	No	No	No	The land that abuts the A78 Irvine Road is at high risk of surface water flooding. This area extends to the North and South of Bogriggs.	Flood Risk Assessment required and discussion about Surface Water Flooding with flood prevention, roads department and Scottish Water recommended.	There are no relevant actions or objectives identified within the Local Flood Risk Management Plan.	Water and Drainage Assessments are required to address how surface water will be drained, treated and managed. FRA Required.
16	12/03	10	CFS65 (South)	Portencross Road, Seamill	Housing		No	Yes	No	No	No	The land that abuts Wildcat Road is at high, medium and low risk of surface water flooding. There appears to be a flow-path (possibly via an open channel) running North to South, from the B7048 to the coast.	Flood Risk Assessment required and discussion about Surface Water Flooding with flood prevention, roads department and Scottish Water recommended.	There are no relevant actions or objectives identified within the Local Flood Risk Management Plan.	Water and Drainage Assessments are required to address how surface water will be drained, treated and managed. FRA Required.
8a	12/03	07	CFS66	Main Street, Fairlie	Housing	Highly Vulnerable Use	Yes	Yes	Yes	No	Yes. There is a culverted road crossing to the East of the site.	High risk of flooding from surface water sources at the North-East of the site. The open channel that traverses the site from east to west constitutes a high risk of fluvial flooding to an extensive area within the site. The majority of the site is at medium risk of flooding from coastal sources.	Flood Risk Assessment required and discussion about Surface Water Flooding with flood prevention, roads department and Scottish Water recommended.	The allocation of the site is contrary to the objective to reduce and avoid overall flood risk by planning policy action (Objective ID 12082 and 12039).	Removal of the site is recommended.
123	N/A	38	CFS84	Burnhouse Manor Farm, Burnhouse	Residential development (75 units)/Farm shop/Tearoom	Highly Vulnerable Use	No	No	No	No	No	There is no record of notable flood risk within the site.	None Specified.	The site is not within a Potentially Vulnerable Area.	Water and Drainage Assessments are required to address how surface water will be drained, treated and managed.