State of the Environment Report

Renfrewshire Council

Contents

| 1 | Introduction

This is the first State of the Environment (SoE) Report for the Renfrewshire Council area and provides a snapshot of the current state of the environment of the area. It provides a baseline of environmental information and should be viewed as a starting point to be built upon as more information becomes available and reporting evolves further. Data has been gathered from internal and external sources, and where possible data has been gathered over a time series to enable identification of whether there are improvements or deterioration in that environmental issue.

The Report is structured around 11 environmental topics that support the monitoring and environmental appraisal of Renfrewshire's environmental issues:

- Biodiversity;
- Historical and Cultural Environment;
- Material Assets;
- Waste;
- Air;
- Water;
- Climate Change;
- Geology and Landscape;
- Population and Human Health;
- Noise and Light; and
- Transport.

These environmental topics are also the environmental issues that have to be considered through the Strategic Environmental Assessment process.

The Environmental Assessment (Scotland) Act 2005 requires all plans, programmes and strategies prepared by Councils and other public bodies to be subject to a Strategic Environmental Assessment (SEA). The purpose of a SEA is to assess how the plan, programme or strategy might affect the environment and to consider how environmental impacts can be avoided, reduced, mitigated or enhanced. The SEA is an important process which places environmental considerations at the centre of decision-making process.

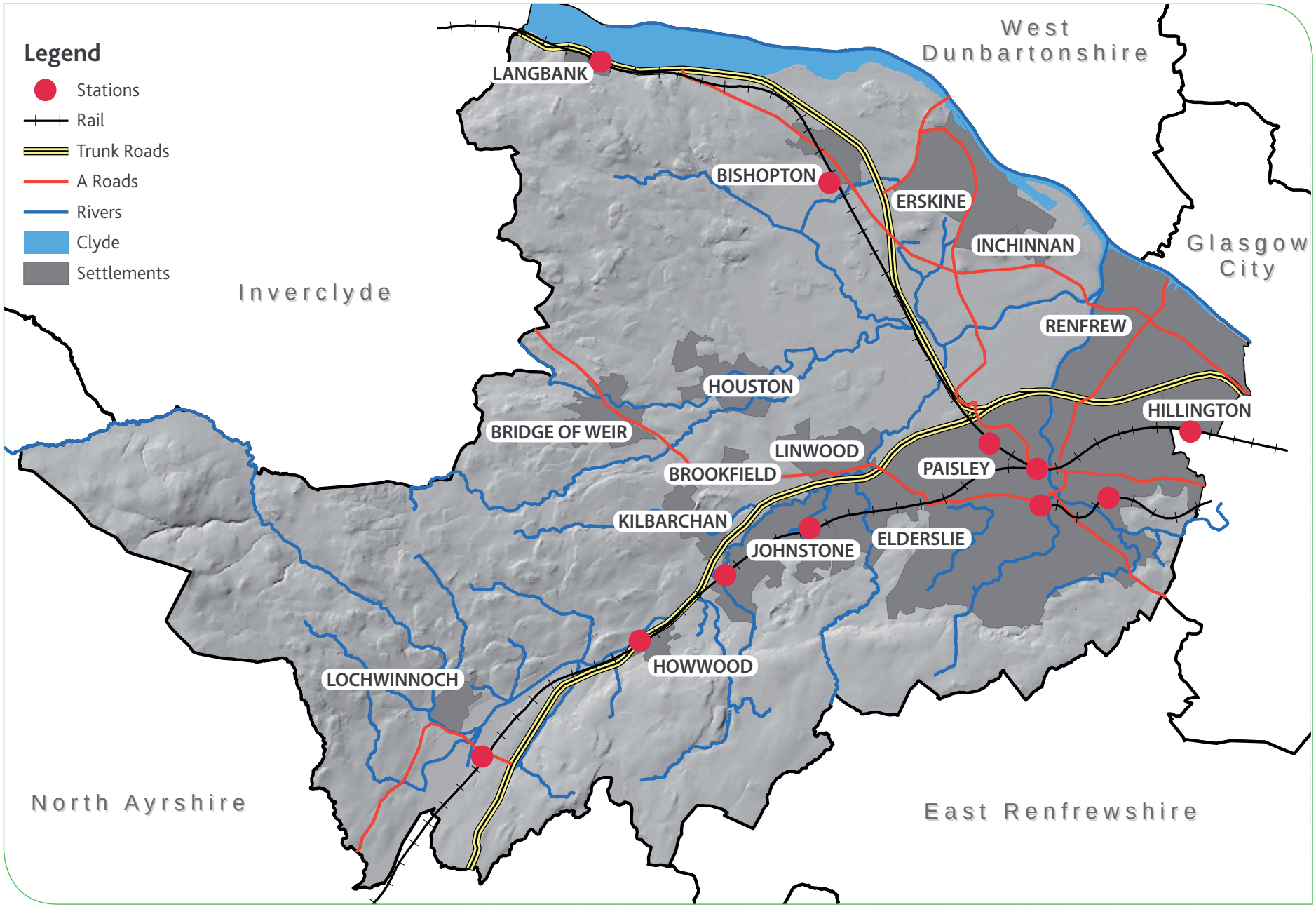
To help enable consistent SEAs to be undertaken by Renfrewshire Council on its plans, programmes and strategies each environmental topic commences with the identification of the Strategic Environmental Assessment Objectives that relate to that topic.

The environmental baseline information set out in this report forms the basis for the preliminary stage of the SEA process. The baseline data provides an overview of environmental conditions, allowing the key objectives of individual policy areas to be appraised against locally identified environmental issues. The use of indicators and the analysis of the trends within (and across) the data sets provides a monitoring mechanism with the report that allows the Council to monitor the environmental consequence of the individual policies.

Renfrewshire Council Area

The Renfrewshire Council area is shown in figure 1.1. It is situated to the west of Glasgow on the south bank of the River Clyde and covers nearly 270 square kilometres (103 square miles). To the west lies Inverclyde Council, to the south is North Ayrshire Council and East Renfrewshire is located to the south east. Renfrewshire is the ninth largest Council area in Scotland and has a population of approximately 170,000, which is 3% of the total Scottish population. Only 4% of the Renfrewshire population lives in its rural area and the area is relatively densely populated compared to the Scottish average (650 people per km in Renfrewshire, 65 people per km in Scotland). Renfrewshire has a very attractive and varied rural and urban environment. About 20% of the area of Renfrewshire is urbanised with the remainder rural countryside. The land in the east and north of Renfrewshire, adjacent to the main towns, is relatively flat and much of it is given over to agricultural uses. The River Clyde provides the northern boundary for Renfrewshire and the river valleys of the White and Black Cart provide important corridors. The land rises to the Gleniffer Braes in the south and the Renfrewshire Hills in the west. The rural area provides a rich diversity of landscapes and wildlife habitats, which is one of the defining characteristics of the area.

Fig 1.1: Renfrewshire Key Characteristics



| 2 | Biodiversity

SEA objectives that relate to Biodiversity:

- To protect and enhance designated and locally important sites
- To enhance the biodiversity

Biodiversity is a term that describes the variety of life on our planet, and includes:

- every variety and species of animal, plant and microbe;
- the habitat in which they live (air, land and water); and
- the interactions between species and habitats.

Biodiversity encompasses all living things and the habitats in which they live. It can be used to measure the health of an ecosystem. Biodiversity and the distribution of species is influenced by the geography, geology, topography and climate of an area. Renfrewshire Council is extremely fortunate in the range of species and habitats it has within its boundary. Together, these contribute to creating a good quality environment and an enviable biodiversity. Under the Nature Conservation (Scotland) Act 2004, the Council has a duty to further the conservation of biodiversity. Some sites are afforded protection through a statutory or local designation, however, it is recognised that the conservation of biodiversity requires us to be aware and take account of it in all of our actions.

A summary of the indicators used in assessing the state of Renfrewshire's environment is presented below, highlighting the current status of each indicator and the directional trend since the adoption of the Renfrewshire Local Plan in 2006.

The current status is shown by using the following colours:

- G — Good
- F — Fair
- P — Poor
- L — Limited data

The trend direction is shown with the following arrows:

- ↑ Improving
- ↓ Deteriorating
- ↔ No Change

INDICATOR	CURRENT STATUS	TREND DIRECTION	EXPLANATION
Status of Designations	G	↔	Many of Renfrewshire's designated sites have a favourable status, however, there are some that are declining. The Council would seek to reverse this trend and where possible conserve and enhance the nature conservation status of all sites.
Area of ancient and semi natural woodland	G	↔	Native ancient and semi-natural woodland is a valuable habitat nationally and locally. The Council seeks to protect and enhance the existing resource. It can also make an important contribution to Carbon sequestration.
Woodland habitat network	G	↔	Habitat networks and corridors perform an important function in their own right and as valuable connections between designated sites, allowing the movement of species. Greater connectivity between designated areas will enhance overall biodiversity and the Council aims to support this action.

Local Biodiversity Action Plan

For Renfrewshire, the Local Biodiversity Action Plan (LBAP) is a partnership initiative between Renfrewshire, East Renfrewshire and Inverclyde Councils and a range of conservation organisations. The partnership was set up in 1998 with the main aims of:

- Protecting, caring for and enhancing local habitats and wildlife;
- Raising public awareness of and encouraging involvement with local biodiversity issues.

The LBAP was launched on 1 April 2004 and includes a range of actions for identified habitats and species which will increase local biodiversity. The LBAP is also used to raise awareness of biodiversity in the area and to involve everyone including local communities, landowners, scientists, industries and business in the process.

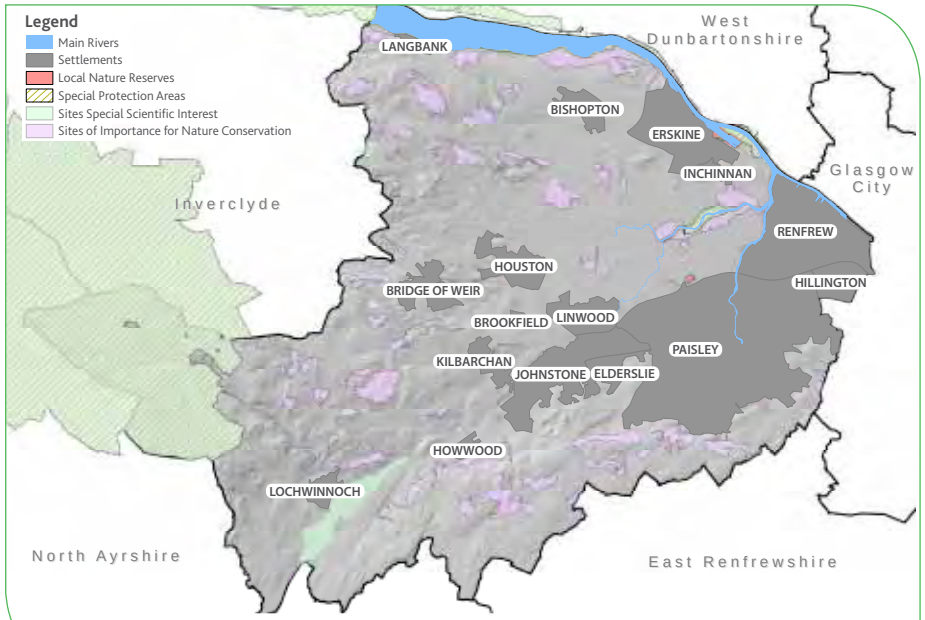
The Local Biodiversity Action Plan (LBAP) is made up of seven Habitat Action Plans (HAPs); and eleven Species Action Plans (SAPs), see figure 2.1. There will be more HAPs & SAPs added in time. The Action Plans outline the actions the LBAP Partnership will endeavour to undertake to conserve the habitat or species in question.

Fig 2.1: Habitat and Species Action Plans for Renfrewshire.

HABITAT ACTION PLAN	SPECIES ACTION PLAN
Dwarf Shrub	Greater and Lesser Butterfly Orchid
Mires	Spignel
Unimproved Grassland	Waxcaps
Rivers and Streams	Hen Harriers
Standing Open Water	Brown Hare
Broad leaved and Mixed Woodland	Lesser Whitethroat
Urban	Otter
Scrub	Pipistrelle Bat
	Aspen
	Green Hairstreak
	House Sparrow
	Mountain Hare
	Water Vole

Source: East Renfrewshire, Inverclyde and Renfrewshire Local Biodiversity Action Plan

Fig 2.2: Designated Sites in Renfrewshire



Source: Renfrewshire Council and SNH

Designated Sites

There are a number of sites within Renfrewshire which are designated to afford a degree of protection for the nature conservation or geological interest found at that location, these are highlighted in figure 2.2. The level of protection depends on the type of designation that has been given to the site.

International Designations

Scotland's protected areas include sites that rank amongst the best in the world. International designations are generally made by the UK or Scottish Parliament, and endorsed by European or World authorities. Natura sites represent the very best of Scotland's nature. Natura is the term given to **Special Protection Areas (SPAs)** and **Special Areas of Conservation (SAC)**. These internationally important sites are designated under two of the most influential pieces of European legislation relating to nature conservation, the Birds and Habitats Directives. In Renfrewshire, there are three SPAs designated under the Birds Directive - the Black Cart, Inner Clyde and Renfrewshire Heights (see figure 2.3). There are no sites designated under the Habitats Directive in Renfrewshire.

In addition, to European Designations, Renfrewshire contains a site designated under the Convention on Wetlands of International Importance (the Ramsar Convention). Any site designated as a Ramsar site is also designated as a Special Protection Area or a Special Area of Conservation (under the Habitats Directive). The Inner Clyde Estuary is recognised under the Ramsar Convention as consisting mostly of tidal mudflat with a shoreline of unmanaged semi-natural coastal vegetation; saltmarsh is also present. In winter, the site supports internationally important numbers of Redshank (Tringa totanus) and other overwintering wildfowl.

The Birds Directive

Directive 2009/147/EC of the European Parliament and Council on the conservation of wild birds, commonly known as the Birds Directive, protects all wild birds, their nests, eggs and habitats within the European Community. It gives member states of the European Union the power and responsibility to classify Special Protection Areas (SPAs), to protect birds which are rare or vulnerable in Europe, as well as all migratory birds which are regular visitors. These sites form an important network of protected areas across Europe. SPAs are selected for a number of rare, threatened or vulnerable bird species listed in Annex I of the Birds Directive, and also for regularly occurring migratory species. The national implementation of the Natura 2000 network and other special conservation measures needs to be co-ordinated at a European Union level, to ensure the survival and reproduction in the areas of distribution of each Annex I or migratory bird species. In the light of this objective, selection of SPAs in the UK has regard to conservation measures being taken for each species by other European Union Member States.

There are 153 classified Special Protection Areas (SPAs) in Scotland. Together, they cover an area of well over a million hectares. In Renfrewshire there are three SPAs:

Fig 2.3: SPAs in Renfrewshire

NAME OF SPA	NATURE CONSERVATION INTEREST	AREA (HA)
Black Cart	A 3 km tidal stretch of the Black Cart Water, and its associated floodplain, directly north of Glasgow Airport in Renfrewshire regularly supporting a wintering population of European importance Whooper Swan (Cygnus Cygnus). The population forages over the entire Black Cart SPA, roosts on the open water and uses the area as a severe winter refuge.	56
Inner Clyde	The Inner Clyde SPA extends 20km westward from Newshot Island, Erskine to Craigendoran Pier on the north shore and to Newark Castle, Port Glasgow on the south shore. It contains extensive intertidal flats which support large numbers of wintering waterfowl. The Inner Clyde SPA regularly supports an internationally important wintering population of Redshank Tringa totanus (1992/93-96/97 winter peak mean of 2,107, 1% of Eastern Atlantic Flyway, 2% of British). This is one of the highest density wintering populations of Redshank in Great Britain.	1,826
Renfrewshire Heights	An upland area of moorland; a section of which is located in Renfrewshire. The area is mainly covered by blanket mire, wet and dry heaths, and rough grassland. Much of the heath and mire is dominated by dwarf shrubs, especially heather Calluna vulgaris. Renfrewshire Heights SPA regularly supports a breeding population of European importance of the Annex 1 species Hen Harrier (Circus cyaneus) (an average of 10 breeding females annually between 1998 and 2004, 2% of Great Britain), see figure 2.5.	8,943

Source: SNH, (www.snh.gov.uk)

Fig 2.4: Hen Harrier – Renfrewshire Heights SPA

National Designations

Sites of Special Scientific Interest

Sites of Special Scientific Interest (SSSI) are areas of land and water (to the seaward limits of local authority areas) that Scottish Natural Heritage (SNH) considers to best represent our natural heritage - its diversity of plants, animals and habitats, rocks and landforms, or combinations of such natural features. Many are also designated as Natura sites (Special Protection Areas or Special Areas of Conservation). The national network of SSSIs in Scotland forms part of the wider Great Britain series.

SNH designates SSSIs under the Nature Conservation (Scotland) Act 2004. SSSIs are protected by law. It is an offence for any person to intentionally or recklessly damage the protected natural features of an SSSI.

There are just over 1,450 SSSIs in Scotland covering over 1,000,000 hectares or 12.9% of Scotland. Renfrewshire has ten of these sites within its boundary (figure 2.5). They are designated as being special for a variety of reason and they range in size quite dramatically. Most SSSIs are in private ownership and Scottish Natural Heritage works closely with their owners and managers to ensure appropriate management of the sites natural features; and to ensure decision-makers, land managers, their agents and advisors, as well as local authorities and other public bodies, are aware of SSSIs when considering changes in land-use or other activities which might affect them.

Anyone proposing to carry out an operation that may affect an SSSI must notify Scottish Natural Heritage before starting. If the public body thinks the operation may damage the protected natural features of the SSSI, the proposer must apply to SNH for consent before starting. SNH must provide each SSSI owner and occupier with a site management statement that describes the interest of the site and explains the management needed to conserve its protected natural feature.

Fig 2.5: SSSIs in Renfrewshire

NAME OF SSSI	NATURE CONSERVATION INTEREST	SITE CONDITION	OTHER DESIGNATION	AREA (HA)
Barmufflock Dam	Lying less than 2km south west of Bridge of Weir, this site is one of 3 Renfrewshire basin fens comprising the best examples of this habitat in West Central Scotland. It retains a very wet central fen area dominated by sedge species.	Unfavourable, declining	N/A	8.8
Black Cart	See fig 2.3.	Favourable, maintained	SPA	56
Castle Semple and Barr Lochs	The lochs lie immediately adjacent to Lochwinnoch. These water bodies form one of only two semi-natural eutrophic loch systems in west central Scotland and together with their surrounding habitats they support an important wetland breeding bird assemblage.	Eutrophic loch: Unfavourable declining Breeding bird assemblage: Favourable, maintained	RSPB Reserve	273
Clochoderick Stone (See Chapter 9.0)	Lies approximately 3km north-east of Lochwinnoch, is an unusually large glacial erratic boulder composed of trachytoid, porphyritic olivine-basalt – a relatively rare alkaline volcanic rock type consisting of large crystals set in a mass of fine material. It is still in situ where a former glacier deposited it and it is nationally important as one of the best lowland examples representative of this type of glacial phenomenon.	Favourable, maintained	N/A	0.03
Dargavel Burn	Located approximately one kilometre north east of Kilmacolm, is one of the best examples of active valley fen in west central Scotland. The valley fen is a complex mosaic of communities comprising sedge-dominated mire, wet willow woodland, wet grassland and swamp (supports lesser tussock sedge Carex diandra and lesser butterfly orchid Plantanthera bifolia).	Favourable, maintained	N/A	10.82
Formakin	Located approximately 3km west of Bishopton, is the best example of lowland acid grassland in Renfrewshire. This dry and herb rich acid grassland covers most of the site, with patches of scrub and bracken. The grassland is dominated by sheep's fescue Festuca ovina and common bent Agrostis capillaris, with tormentil Potentilla erecta and heath bedstraw Galium saxatile. Other species present include devil's bit scabious Succisa pratensis and tufted vetch Vicia cracca, as well as a number of species of hawkweeds Hieracium spp.	Unfavourable: No change	N/A	6.9

NAME OF SSSI	NATURE CONSERVATION INTEREST	SITE CONDITION	OTHER DESIGNATION	AREA (HA)
Glen Moss	Lying approximately 0.5km north east of Kilmacolm, is a mixed basin and valley mire with an area of shallow open water surrounded by sedge-dominated plant communities. The site is one of only four basin fens in Renfrewshire and Inverclyde and it supports an outstanding assemblage of dragonflies and damselflies of which there are 9 species breeding on the site including the azure dragonfly Coenagrion puella, the four-spotted chaser Libellula quadrimaculata and the emerald damselfly Lestes sponsa. The nationally scarce aquatic plant greater bladderwort Utricularia vulgaris is also present.	Unfavourable, declining	SWT Reserve	19.25
Inner Clyde	See fig 2.3.	Favourable, maintained	SPA	1,826
Renfrewshire Heights	See fig 2.3.	Unfavourable, declining	SPA	8,943
Shovelboard	Shovelboard, lying approximately 2.5km east of Kilmacolm village, is a small basin fen with a drier central area dominated by a wet natural ditch or ring lagg. The fen is encircled by willow carr. The nationally rare plant community Carex rostrata-Calliergon cuspidatum occurs within the lagg with cranberry Vaccinium oxycoccus abundant on the Sphagnum hummocks of the central area.	Unfavourable, recovering	N/A	1.92

Source: SNH (www.snh.gov.uk)

Local Designations

In addition to the sites in Renfrewshire that are recognised for their importance in terms of being nationally or internationally significant, there are a number sites that are recognised as having a locally important nature conservation value. There are several types of designation and these are outlined in figure 2.6.

Fig 2.6: Locally Important Designations

TYPE OF DESIGNATION	NUMBER OF SITES	NAME OF SITE(S)	TOTAL AREA (HA)
Local Nature Reserve (LNR)	3 Declared 1 Proposed	Paisley Moss, Jenny's Well and Durrockstock Park Newshot Island	53
RSPB Reserve	1	Lochwinnoch (Castle Semple and Barr Lochs)	N/A
SWT Reserve	1	Glen Moss	19
Sites of Importance for Nature Conservation (SINC)	106	Various	109840

Local Nature Reserves

Local Nature Reserves (LNRs) are areas of land designated by a local authority under Section 21 of the National Parks and Access to the Countryside Act 1949. They provide protection for sites of special local interest for nature and offer opportunities for both environmental education, community involvement, and for delivering a wide range of benefits to local communities and to visitors. Local authorities are responsible for the management of local nature reserves. They may also have local management committees involving representatives of the local community, as well as particular user/interest groups and Scottish Natural Heritage. The area must be of at least local importance and wholly within the area of the local authority which designates it. Prior to designation, the local authority must own or lease the land or have the formal agreement of the owner(s). Across Scotland, 57 LNRs have been designated. In Renfrewshire, the Council has declared three LNRs and proposed that Newshot Island also be declared an LNR.

Fig 2.7: Paisley Moss Local Nature Reserve

Paisley Moss is a small wetland area located next to Glasgow Airport and is owned by British Airports Authority (BAA), see figure 2.7. It was designated in 1993 and is managed by a group made up of officers from Renfrewshire Council, SNH, Scottish Ornithology Club, BAA and on occasion members of the local community. It contains ponds, mossy marshes, reeds and sedge beds supporting hundreds of different animals and plants. In order to facilitate the use of the site for educational purposes, a board walk has been installed to create a circular path through the LNR and a platform created adjacent to a small pond for pond dipping. The site is known for its wintering Jack Snipe, Common Snipe, 22 different types of grass and 11 types of sedge, marsh orchids and the Common Blue butterfly.

Jenny's Well is located in the Blackhall area of Paisley, on the southern bank of the White Cart (figure 2.8). Part of the site is owned by CIBA Specialty Chemicals. During the nineteenth century, limestone and whinstone were quarried at this site. At one time the Jenny's Well laundry and a railway line ran through the middle of what is now the nature reserve. Its most recent use was as a landfill site in the 1960s and 1970s. In the years of neglect that followed closure of the landfill site, the area became a magnet for dumped stolen cars, fly tipping and vandalism. In response to these problems, the Council organised a large-scale programme of environmental improvements in the early 1990s. The aim was to clean up Jenny's Well, encourage the wildlife that had moved into the area since the closure of the landfill site, and open it up to the public. These improvements led to Jenny's Well being designated a local nature reserve in 1996. The management group responsible for the LNR includes

Fig 2.8: Jenny's Well Local Nature Reserve

Source: Carts Greenspace

Fig 2.9: Durrockstock Park Local Nature Reserve

Source: Carts Greenspace

Council Officers, Carts Greenspace, Councillors, members of the community, CIBA and other local businesses. Both Jenny's Well and Paisley Moss are located on part of the national cycle network, therefore, Sustrans also had an involvement in these sites and their management. Areas of woodland planted in the 1990s are now starting to mature and Jenny's Well is now an important greenspace attracting a range of wildlife including the elephant hawk moth, kingfishers, otters, common whitethroats, many wetland plants and the common spotted orchid.

Durrockstock Park in Paisley is the third of Renfrewshire's LNR's (figure 2.9). A former industrial area, now a refuge for wildlife and a valued park for the community. At the western end, an old reservoir has transitional marshland forming a large expanse of open water providing a variety of habitats for invertebrates, birds and amphibians. A Scots pine plantation on the eastern side was planted approximately 100 years ago and offers potential for biodiversity management. A path runs along the periphery of the LNR and around the reservoir, which visitors can easily access.

Sites of Importance for Nature Conservation

In Renfrewshire, there are 106 Sites of Importance for Nature Conservation (SINCs) (See Fig 2.2). These sites have been identified by Renfrewshire Council from a habitat survey of the Council area. The sites are recognised as containing habitats or features of nature conservation value that are important and help to contribute to the wider network of local and nationally important sites. Some will be discrete sites and others will form corridors. The sites range in size from 0.2 ha to 2059 ha and they cover 4099 ha in total, or almost 15% of Renfrewshire's land area. These sites are afforded protection through the adopted Renfrewshire Local Plan. Where development does take place that may affect the nature conservation value of the site, mitigation measures are sought.

The original habitat data on which the SINC designations are based is now almost 10 years old. Occasional ad hoc assessments have been made of the condition and status of some of the sites and corridors, as and when required, for example, when they have been the subject of a development proposal. A review of the survey would allow an assessment to be made of the condition of this resource.

Woodland

Broadleaved woods often support a wide variety of species in their ground layer, including lichens, ferns, fungi, invertebrates, birds and small mammals. Ancient or long-established woodlands can be particularly valuable, as mature relatively undisturbed woods can support a diverse range of habitats and rich plant and animal communities. Riparian woodlands are corridors of trees that grow alongside watercourses, and are important in providing food, dens, roosts, and nesting sites; they also serve as important migration routes between habitats. Such woodlands also benefit the watercourse and the wildlife that lives in it, by providing cover and shade over the water for fish and attracting insects, that in turn are food for other wildlife. The root systems form a buffer zone that stops sediment and other pollutants entering the stream while holding the banks in place. Deadwood is a key microhabitat within woodland sites.

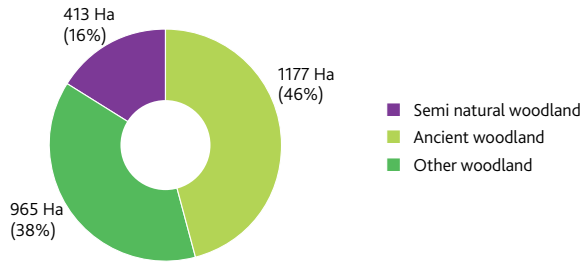
Standing, diseased and dead timber, as well as fallen dead wood, is important for a range of species. In socio-economic terms, broadleaved and mixed woodlands can also be important to the local community for their aesthetic and recreational value.

Within Renfrewshire, there is a total of 2555.5 Ha of woodland cover. Included within this total are coniferous plantations, riparian woods, ancient and semi-natural woodland and mixed plantations. Urban woodlands and street trees are also an important component of this resource.

Figure 2.10 shows the amount of ancient and semi-natural woodland in the Renfrewshire Council area in comparison to other woodland cover in the Council area. Ancient woodland sites are those which have been continuously wooded and were recorded as being of semi-natural origin since the early 1800's, and semi natural woods are composed predominantly of native trees and shrub species. Many woods are semi-natural even though they contain a few introduced trees, however, the latter has not change the character of the wood.

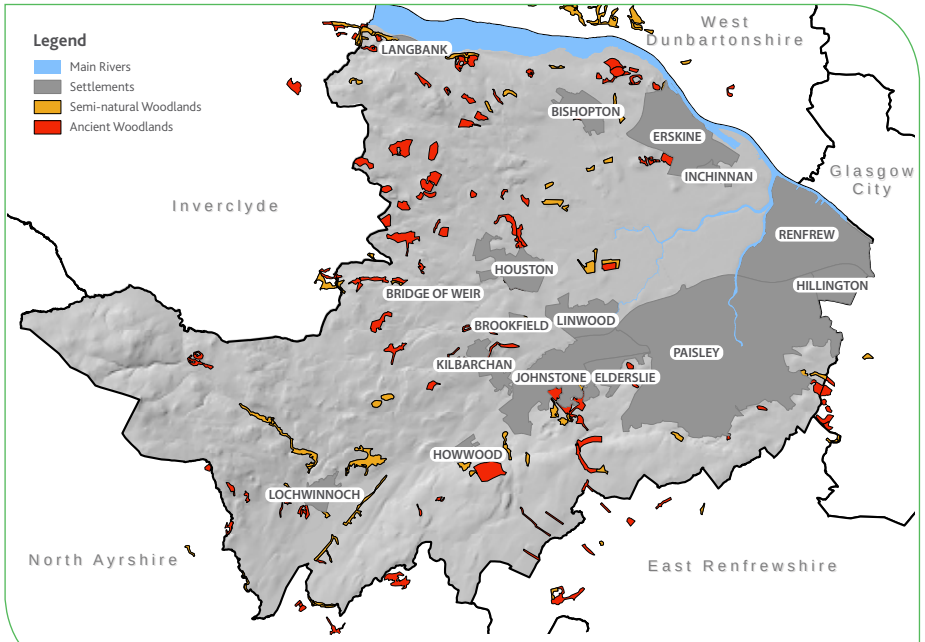
Figure 2.11 shows the extent of the ancient and semi natural woodland resource in Renfrewshire. These woodlands account for over half of the woodland cover in Renfrewshire. There are some areas of plantation woodland, for example the coniferous plantations at Muirshiel in the Renfrewshire Heights. These are relatively small scale and are now reaching maturity. A programme of felling and restocking with more native species is currently under way.

Fig 2.10: Area of Woodland in Renfrewshire



Source: Forestry Commission (www.forestry.gov.uk/scotland)

Fig 2.11: Distribution of Ancient and Semi-natural Woodland in Renfrewshire



Source: Forestry Commission (www.forestry.gov.uk/scotland)

For hundreds of years, woodland clearance for agriculture and development pressure has reduced woodland cover throughout Renfrewshire. Some of these activities are still relevant today, causing loss and fragmentation of woodland resources and leading to a less robust woodland ecosystem. The main factors affecting woodlands today are considered to be as follows:

- Land use pressures such as flood prevention, river engineering, transport, housing, industrial and business developments;
- Invasion by non-native species such as rhododendron, sycamore and beech can shade out the ground flora and radically alter soil conditions;
- Lack of woodland management leading to loss, invasion or dereliction;
- People pressure e.g. recreational use, vandalism, and;
- Over grazing by stock on farm woodlands preventing regeneration.

The LBAP recognises the value of the woodland habitat through an action plan. It proposes that the current extent of ancient semi natural woodland should be maintained and where possible increased. Thus, contributing to an increase in the total extent of UK priority woodland habitat types. It also recognises the contribution that well managed, diverse broadleaved and mixed woodland has for socio-economic and public benefits. Therefore, the LBAP seeks to enhance and increase the extent of the woodland resource. This would involve:

- Restoring some of the former areas of ancient sites for priority woodland habitat types that have been planted with non-native conifers since World War II, or are currently dominated by other non-native species.
- Encouraging the expansion of broadleaved and mixed woodland as a result of promoting natural colonisation and by planting species mixtures of site native and local genetic provenance. Sites will be selected where existing woodland habitats will become linked to each other, thus developing a Forest Habitat network.

The Lesser Whitethroat at Gleniffer Braes Country Park

Lesser Whitethroats are at the north-west edge of their range in Renfrewshire (figure 2.12). The secretive warbler is only here for the summer, arriving in April or May from north-east Africa and migrating south again in August or September. In the Gleniffer Braes Country Park, there is an area of scrub at the eastern end of the park, at the Brownside Braes, which has the potential to provide a suitable habitat for the Lesser Whitethroat. The species had bred successfully here previously but more recent nesting attempts had failed. The existing scrub had become degraded, in terms of its biodiversity value, because it was very dense, preventing light reaching the ground. Lack of light had restricted growth of the ground flora. In addition, invasive non-native species such as Sycamore trees had quickly dominated the vegetation.

The LBAP has a Species Action Plan for the Lesser Whitethroat and a Habitat Action Plan for scrub. Lesser Whitethroats require hawthorn scrub with sheltered and enclosed spaces which catch the sun and allow warm micro-climates to develop. The areas must be open enough to allow a thick bramble and dog rose understorey to grow. In 2007, it was decided that habitat management was required to improve the scrub at Brownside Braes. Funding from Renfrewshire Council and the Renfrewshire Environmental Trust allowed large scale planting of new scrub in winter 2008 and management of the existing scrub to improve the biodiversity value. The Lesser Whitethroat has been identified as a useful indicator for high quality scrub habitat, so its successful return to Brownside Braes would be a positive outcome for the both the Scrub and Lesser Whitethroat Species Action Plans. Early indications are that the work has been successful as the site has been used by Lesser Whitethroats for breeding.

Fig 2.12: Lesser White Throat at Gleniffer Braes Country Park
Source: Tom Byars

| 3 | Historical and Cultural Heritage

SEA objectives that relate to Historic and Cultural Heritage:

- To protect and enhance the built environment
- To maintain and conserve the historic setting of, and landscape surrounding buildings and settlements

Renfrewshire Council has a significant number and range of historic buildings in a variety of rich and diverse settings. These reflect the area's varied landscape setting. The upland area shows evidence of very early settlement, including Roman and iron age settlement or forts; and earlier Neolithic activity is also evident in some lowland settings. Various land uses throughout the ages, both industrial and agricultural, have left their mark on the landscape that we are familiar with today. The industrial revolution brought significant changes to the landscape with new forms of land management. Renfrewshire saw the creation of several fine country estates. The railways and canals facilitated the development of new industries, such as weaving or mills, and the expansion of planned settlements to accommodate the employees of the expanding businesses. The legacy of this activity can still be seen in the landscape it created and this provides the context for Renfrewshire's settlements today. The individuality and identity of the towns and villages has been created by the unique resource the built heritage provides. It creates an important sense of place for its residents and provides an important visitor resource which contributes to the economy of Renfrewshire.

INDICATOR	CURRENT STATUS	TREND DIRECTION	EXPLANATION
Conservation and Listed Buildings & Townscape Heritage	G	↔	Listed Building numbers remain steady. Although Buildings at Risk numbers have increased, Townscape Heritage Initiative and Conservation Area Renewal funded schemes have been established.
Country & Regional Parks	F	↔	Visitor numbers at both Muirshiel and Castle Semple Country Park fell slightly in 2009. However, both parks continue to offer a good range of visitor facilities. Gleniffer Country Park retains significant visitor numbers as it lies in close proximity to Paisley and it is easily accessible.
Archaeological Resource	L	Limited data	The total number of Historic Scotland Scheduled Monuments in Renfrewshire increased, in 2010, from eighteen to thirty. No Inventory Historic Battlefield sites are identified in Renfrewshire.
Historic Gardens & Landscapes	F	↔	Only one site in Renfrewshire on Historic Scotland Inventory of Gardens and Designed Landscapes in Scotland. A re-survey programme will be completed in 2016-18.

A summary of the indicators used in assessing the state of Renfrewshire's environment is presented below, highlighting the current status of each indicator and the directional trend since the adoption of the Renfrewshire Local Plan in 2006.

The current status is shown by using the following colours:

- G Good
- F Fair
- P Poor
- L Limited data

The trend direction is shown with the following arrows:

- ↑ Improving
- ↓ Deteriorating
- ↔ No Change

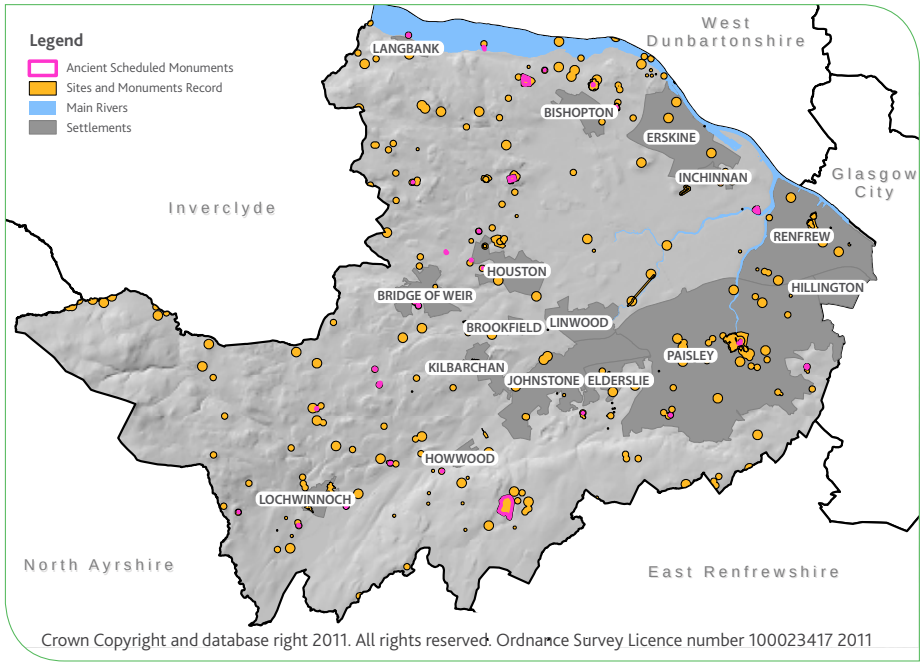
Archaeological Resource

The West of Scotland Archaeology Service (www.wosas.net/) provides a record of all known archaeological sites and monuments in the West of Scotland through the Site and Monuments Record (SMR), as shown in figure 3.1. The SMR database is used primarily to provide information and advice to the Planning Departments and other services of the partner Councils on potential archaeological issues raised by development proposals. At present, 314 sites have been recorded through the SMR. These sites are not all afforded any statutory protection, however, the SMR ensures that a full consultation can be carried out about the archaeological resource prior to a site being developed thus preventing the loss of any significant features through the provision of appropriate mitigation measures.

Monuments have been legally protected through scheduling since 1882. A scheduled monument is a monument of national importance that Scottish Ministers have given legal protection under the Ancient Monuments and Archaeological Areas Act 1979. Although the majority are on land, a small number lie under the sea. Over 260,000 archaeological sites and monuments, architectural objects and marine sites are recorded in Scotland, of which around 8,000 of the most important examples are presently scheduled.

In 2010, the number of scheduled monuments within Renfrewshire was increased from eighteen to thirty (Fig 3.2). One existing site, at Houston, market cross, was also removed.

Fig 3.1: Archaeological sites & Monuments



Source: Historic Scotland

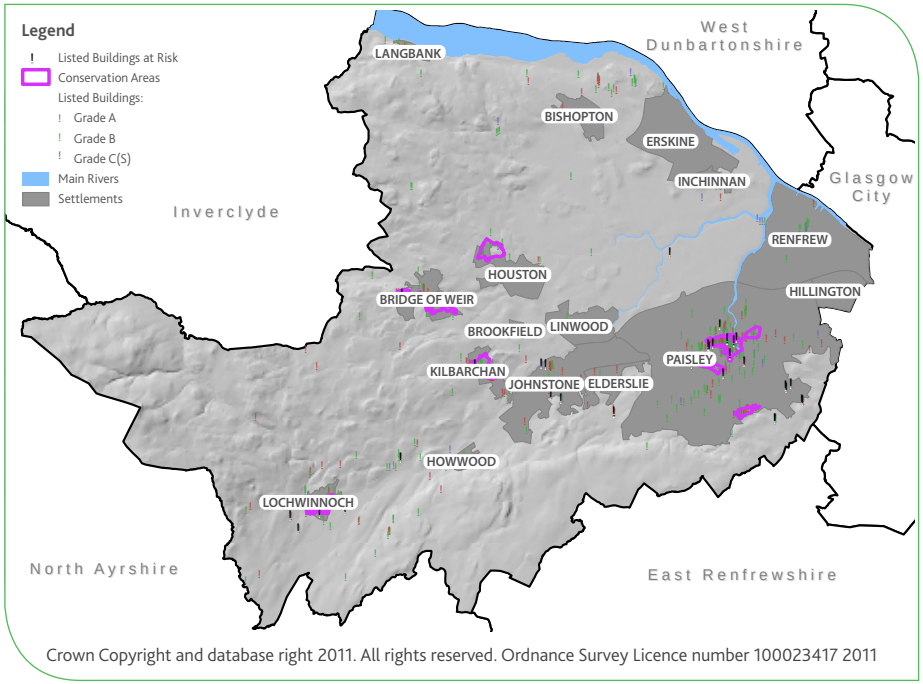
Fig 3.2: Scheduled Monuments

REASON FOR SCHEDULING	NAME OF MONUMENT
Prehistoric ritual and funerary	North Mound cairn, Houston High Craigenfeoch,Johnstone, cup and ring marked rock Back O'Hill Farm, Houston, cup marked stone South Mound cairn, Houston
Prehistoric domestic and defensive	Walls Hill,fort, Howwood Drumcross enclosure, Erskine No.4 Ritchieston enclosure, Bishopton Knockmade Hill homestead, Lochwinnoch Marshall Moor fort, Howwood Castle Hill enclosure, East Barnaigh, Howwood Rosshall Mains enclosure, Paisley Fornet Cottage crannog, Langbank Clydeview crannog, Langbank
Roman	Roman fort, Whitemoss, Bishopton Roman fort, Barochan Hill, Houston
Crosses and carved stones	Cross slabs and cross shaft, Inchinnan Parish Church Barochan Cross, in Paisley Abbey
Ecclesiastical	Semple Collegiate church, Lochwinnoch
Secular	Barr Castle, west of Lochwinnoch Ranfurly Castle, Bridge of Weir Castle Hill motte, Ranfurly, Bridge of Weir Stanely Castle, Paisley Lorabank Castle, motte, Lochwinnoch Castle Semple Loch, tower house, Lochwinnoch Elliston Castle, Howwood Anti-aircraft site, Gryffe Wraes Cottage, Bridge of Weir
Industrial	Bishopton, aqueduct

Source: Historic Scotland

The first scheduling in Renfrewshire occurred in the 1920s. The most notable periods of scheduling activity were during the 1990s, when 5 monuments were scheduled and 1 rescheduled, and last year, when the area was reviewed as part of Historic Scotland's Area Scheduling Programme. The most common type of scheduled monument in Renfrewshire is Secular, followed by Ecclesiastical. The least represented monument types are Prehistoric Domestic and Defensive and Industrial and Transport. The designation of any monument and the area of ground that the scheduling covers may be subject to change. Barochan Hill Fort is currently being considered for re-scheduling and Whitemoss Roman Fort site has been assessed as part of one of Historic Scotland's ongoing scheduling programmes.

Fig 3.3: Listed Buildings in Renfrewshire



Source: Historic Scotland

Listed Buildings

Many buildings are of interest, architecturally or historically, but for the purposes of listing, this interest must be 'special'. To merit designation the property must satisfy set criteria which are used to distinguish this significance. The criteria by which the Scottish Ministers define the necessary quality and character under the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 are broadly:

- Age and Rarity;
- Architectural Interest; and
- Close Historical Association.

Historic Scotland manage and compile the list of buildings which are worthy of statutory protection. This is done through surveys (topographical, thematic studies and individual proposals) in consultation with owners, local authorities and expert bodies. Historic Scotland is responsible for administering the statutory list and ensuring that it is kept up to date. A listed building is still able to adapt and change however the listing process and listed building consent process takes into account the needs of the historic environment.

Listing is a continuous process, therefore, the number of buildings does vary year on year. Two new listings (Renfrewshire Trinity Church, Renfrew and New Globe Bingo [Former Globe Cinema], Johnstone) have been received by Historic Scotland and 1 de-listing (Bowfield Cottage) in 2009-10. The numbers and locations of listed buildings within Renfrewshire are shown in figure 3.3 and 3.4.

Each local authority, using the information and advice provided by Historic Scotland, decides whether proposals for change to a listed building are acceptable. In certain circumstances Historic Scotland will be consulted by the local authority before they take a decision – for example, applications affecting category A and B listed buildings, proposing the demolition of C(S) listed buildings or unlisted buildings in Conservation Areas. Renfrewshire Council has participated in a trial period

Fig 3.4: Listed Buildings

YEAR	CATEGORY A	CATEGORY B	CATEGORY C(S)	TOTAL
2009	36	343	188	567
2010	36	342	188	566

Source: Historic Scotland (www.historic-scotland.gov.uk)

where there was no duty to notify Historic Scotland on B listed applications. This trial period ran from January to June 2011.

Buildings at Risk

The Buildings at Risk Register is kept up-to-date by the Royal Commission on the Ancient and Historic Monuments of Scotland (RCAHMS), on behalf of Historic Scotland. It provides information on properties of architectural or historic merit throughout the country that are considered to be at risk. Renfrewshire Council also undertakes an annual review /survey of the buildings (see figures 3.5 and 3.6)

Fig 3.5: Buildings at Risk in Renfrewshire

Source: Renfrewshire Council and Scottish Civic Trust. (www.scottishcivictrust.org.uk/sct/)

Fig 3.6: Buildings at Risk in Renfrewshire

BUILDING ADDRESS		STATUS
1	7 Ferguslie, Paisley	RCAHMS Buildings at Risk
2	83 High Street, Johnstone	RCAHMS Buildings at Risk
3	Abbey Mission Halls, Lawn Street, Paisley	RCAHMS Buildings at Risk
4	Arnotts, Gauze St & Smithhills St, Paisley	RCAHMS Buildings at Risk
5	Bird in the Hand, Beith Road,	RCAHMS Buildings at Risk
6	Dykebar Hospital, Wards 20 & 22	RCAHMS Buildings at Risk
7	Fire Station, Gordon Street, Paisley	RCAHMS Buildings at Risk
8	Grand Fountain, Paisley	RCAHMS Buildings at Risk
9	Half Time School, Maxwellton Road, Paisley	RCAHMS Buildings at Risk
10	Hawkhead House Farmhouse	RCAHMS Buildings at Risk
11	Hawkhead House Steading	RCAHMS Buildings at Risk
12	Hermitage, Golf Course Road, Bridge of Weir	RCAHMS Buildings at Risk
13	Leethland, Elderslie	RCAHMS Buildings at Risk
14	Mid-Dykebar, Paisley	RCAHMS Buildings at Risk
15	Mission Hall (Former), 14 – 16 Wellmeadow Street	RCAHMS Buildings at Risk
16	Myles Camping Centre (Former), Wellmeadow Street, Paisley	RCAHMS Buildings at Risk
17	Patons Mill, Johnstone	RCAHMS Buildings at Risk
18	St Joseph's Lochwinnoch	RCAHMS Buildings at Risk
19	Struthers Lemonade Factory, Lochwinnoch	RCAHMS Buildings at Risk
20	TA Building, High Street, Paisley	RCAHMS Buildings at Risk
21	Walkinshaw House Stable, Paisley	RCAHMS Buildings at Risk
22	Hawkhead Hospital	RCAHMS Restoration under way

Fig 3.6: Buildings at Risk in Renfrewshire (continued)

BUILDING ADDRESS		STATUS
23	Johnstone Castle, Johnstone	RCAHMS Restoration under way
24	Moredun	RCAHMS Restoration complete
25	Ross House, Paisley	RCAHMS Restoration under way
26	3 County Place, Paisley	Building at Risk but not on RCAHMS Register
27	Barr Castle, Lochwinnoch	Building at Risk but not on RCAHMS Register
28	Blackhall House, Blackhall Lane, Paisley	Building at Risk but not on RCAHMS Register
29	Castle Semple Cascades, Lochwinnoch	Building at Risk but not on RCAHMS Register
30	Castle Semple Loch Tower House	Building at Risk but not on RCAHMS Register
31	3 Steeple Square (Rear of), Kilbarchan	Building at Risk but not on RCAHMS Register
32	Royal Alexandra Infirmary, Paisley	Building at Risk but not on RCAHMS Register
33	Stanely Castle, Paisley	Building at Risk but not on RCAHMS Register

Fig 3.7 - Anchor Mills, Paisley

Source : Murray Houston (2011)

The Council has also included eight properties considered to be at risk in the above total, however, they are not formally registered on the SCT website. Four properties have recently been removed as a result of on-going restoration or completion. These buildings are Hawkhead Hospital, Johnstone Castle, Moredun and Ross House.

Paton's Mill, Johnstone is probably Renfrewshire's most well known Building at Risk and the Council is currently working with the Prince's Regeneration Trust to identify a preferred developer to move this project forward. Previously the Council and the Prince's Regeneration Trust have successfully secured the regeneration of Anchor Mills in Paisley.

Fig 3.8: Kilbarchan Conservation Area

Source: Renfrewshire Council

Conservation Areas

Conservation areas are defined as 'areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance'. All planning authorities are required from time to time to determine which areas meet this definition and to designate them as conservation areas.

Fig 3.9 - Conservation Areas

NAME OF CONSERVATION AREA	YEAR OF DESIGNATION
Castlehead, Paisley	1975
Greenlaw, Paisley	1975
Houston	1968
Kilbarchan	1970, extended 1991
Lochwinnoch	1972
Ranfurly, Bridge of Weir	1972
Paisley Town Centre	1975, extended 2008
Thornly Park, Paisley	2001

Source: Renfrewshire Council

All buildings within conservation areas are offered a level of statutory protection (similar to that of a listed building) and Conservation Area Consent is required for demolition of any building. Planning authorities can extend planning controls in conservation areas through the use of an Article 4 Direction. The protection afforded to the Conservation area extends beyond the buildings and includes the layout, building curtilages, associated open spaces, trees, foot paths and roads. The legislation for Article 4 Directions is being updated. Each local authority is required to prepare Conservation Area Character Appraisals (CACA) for each Conservation Area. Currently Renfrewshire has one for Paisley Town Centre, with one in the early stages of development for Lochwinnoch.

Battlefields

The Scottish Ministers' overarching policy framework for the historic environment Scottish Historic Environment Policy (SHEP) now includes non statutory designations for historic battlefields considered to be of national importance. These will be placed on an Inventory of Historic Battlefields. There are, however, no Inventory historic battlefield sites identified in the Renfrewshire area.

Historic Gardens and Designed Landscapes

The Inventory of Gardens and Designed Landscapes in Scotland was originally compiled in 1987. In 2008, Historic Scotland began a comprehensive area-based Inventory resurvey programme and it is anticipated that this will be completed by 2016-18. Designed to provide a more up-to-date resource, this programme entails the full revision of all existing Inventory sites, the selection of new candidates for inclusion in the Inventory and the identification and removal of sites from the Inventory that no longer meet the criteria for inclusion.

At present, Formakin is the only Inventory garden and designed landscape in the

Fig 3.10: Formakin House

Source: Renfrewshire Council

Renfrewshire Council area. It includes an early 20th century landscape designed by Sir Robert Lorimer, containing several notable architectural features, woodland, parkland, gardens and important wildlife areas. In addition, Finlaystone House located on the boundary between Renfrewshire and Inverclyde Councils. The designed landscape is comprised of very attractive gardens, important architectural features, valuable wildlife habitats, trees and parkland.

In addition to sites that are of a suitable quality to be included on the Inventory, there are a number of 'Lost Gardens' within Renfrewshire. Elements of these gardens have been significantly degraded, or lost completely, however, some are still visible today and make a significant contribution to the quality of the Renfrewshire's landscape. Examples of such gardens include the Craigends estate in Houston and Castle Semple in Lochwinnoch. The latter includes policy woodlands, walls, gates and lodges defining the extent of the historical estate while features such as the ornamental waterfalls, cascades, grotto, folly and artificial cave give an important insight to the leisure time of the 18th and 19th century gentry.

Museums and Historical Attractions

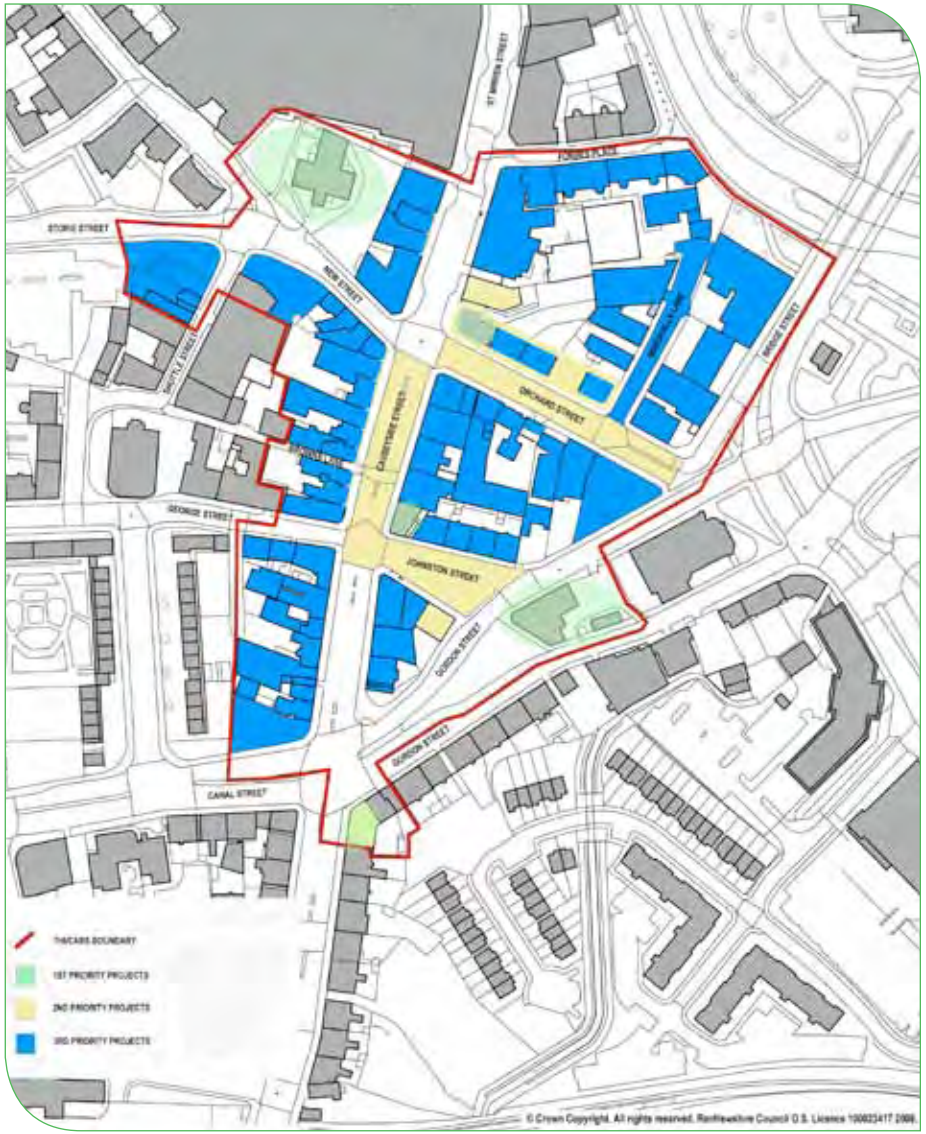
Fig 3.11: Museums and Historic Attractions in Renfrewshire

ATTRACTION SITE	DESCRIPTION	VISITOR NUMBERS 2009/10
Paisley Museum and Art Gallery	Paisley Museum opened in 1871. It houses a wealth of treasures, from Ancient Egyptian artefacts to reminders of our industrial past and our natural heritage. The Art Gallery has permanent collections of studio ceramics, paintings and sculptures. This includes work by artists from the Glasgow School, the Scottish Colourists and Paisley-born writer and artist John Byrne.	49,756
Coats Observatory	Gifted to the people of Paisley by Thomas Coats and designed by Glasgow Architect John Honeyman, Coats Observatory opened in 1883. The observatory also has a planetarium.	1,072
Renfrew Town Hall and Museum	Renfrew Town is home to Renfrew Community Museum, which tells the story of Renfrew, from the granting of the Burgh Charter more than 600 years ago to the modern day.	27,489
Tannahill's Cottage	Once the home of the popular poet Robert Tannahill. Now owned and maintained by the Paisley Burns Club.	Data gap
Weavers Cottage, Kilbarchan	Built in 1723, the Weavers Cottage is now owned by the National Trust for Scotland. It contains original working looms and gives a flavour of what life was like in the village when over 800 looms were in operation.	1,235
Sma' Shot Cottage	The Sma' Shot Cottages are in Shuttle Street and George Place in Paisley and are owned by the Old Paisley Society. The Society restored the cottages from a derelict state. They include an 18th century weaver's cottage with loom shop and living quarters, and a row of three early 19th century millworkers' cottages.	Data gap
Paisley Abbey	Paisley's magnificent Abbey lies at the heart of Paisley town centre. It has been a place of worship since the 12th century. The Abbey was established by Walter Fitzalan, on the site of Paisley's first church, which had been built by St Mirin in the 6th century.	50,000

Townscape Heritage Initiative and Conservation Regeneration Scheme

In June 2009, Renfrewshire Council was successful in securing £1.5million from the Heritage Lottery Fund for the Paisley Town Centre Townscape Heritage Initiative (THI). The Council was also awarded £738,000 from Historic Scotland to fund a conservation area regeneration scheme (CARS). These schemes allow those who own or rent a property in the designated area to apply for up to 90% funding for appropriate conservation repairs or reinstatement of architectural features. As funding is offered the quality and materials used need to meet conservation standards so these schemes can go a long way to improving the built heritage. They also include various training and raising awareness events to promote the importance of looking after our buildings. The area outlined in figure 3.12 outlines the Paisley THI area.

Fig 3.12: Paisley THI Area and Priorities



Source: Renfrewshire Council

4 Material Assets

SEA objectives that relate to Material Assets:

- Improve quality of life through improvements in facilities for education, health and reduction of health inequalities.
- Improve existing access and green space and increase opportunities for recreation.
- Protect and enhance playing fields.

INDICATOR	CURRENT STATUS	TREND DIRECTION	EXPLANATION
Recreational Land – Playing Fields	F	↑	Open Space Audit completed in 2007 and a Playing Fields Strategy has been prepared and implemented to improve provision and maintenance.
Access – Core Paths	F	↑	Core Paths Plan adopted in 2009 which identifies routes and potential routes. Problem issues have been identified and mapped.
Green Network – Corridors / Connectivity	L	Limited data	Glasgow and the Clyde Valley Green Network Partnership is producing a framework and strategy to improve access and biodiversity to link with existing Greenspace initiatives in Renfrewshire.
Built Facilities – Education	F	↑	A programme of new, replacement and improved schools has been underway for most of the past decade and further development is programmed over the next few years.
Built Facilities – Arts & Leisure	F	↑	A major investment programme (Building Better Communities) is about to commence. However, a number of the Council's other properties require investment in their fabric and maintenance.

Renfrewshire has a number of purpose built facilities ranging from sports facilities to community halls. The purpose of such facilities is to promote an active lifestyle, provide a sense of community identity and encourage learning. These facilities are important for promoting wellbeing and improving the health of the general population in the area.

A summary of the indicators used in assessing the state of Renfrewshire's environment is presented below, highlighting the current status of each indicator and the directional trend since the adoption of the Renfrewshire Local Plan in 2006.

The current status is shown by using the following colours:

- G Good
- F Fair
- P Poor
- L Limited data

The trend direction is shown with the following arrows:

- ↑ Improving
- ↓ Deteriorating
- ↔ No Change

Recreational Open Space and Green Space

Good quality green spaces can improve the appearance of urban neighbourhoods and offer improved opportunities for the health and quality of life of communities.

Well managed green space should contribute to the delivery of outputs that cut across key themes in both the Community Plan and the Local Development Plan. Areas of opportunity include:

- Urban regeneration and 'place competitiveness';
- Environmental sustainability;
- Health and wellbeing;
- Inclusion and equality of opportunity;
- Sustainable economic growth.

To accord with Scottish Government Policy an open space audit was completed in 2007. The open space audit will inform the production of a corporate Open Space Strategy for Renfrewshire to ensure protection, enhancement and maintenance of open space. An extensive mapping exercise throughout Renfrewshire's 15

main settlements has been carried out and open space has been mapped. Key tasks to be tackled, as part of the strategy, will relate to the maintenance of existing and new open space, agreeing standards on the appropriate amount of open space for an area, improving the physical quality of open space, and involving the community.

Green Space

The physical quality of open space across urban Renfrewshire was examined to assess whether it was fit for purpose and this is summarised in Table 4.1 below. Fifteen settlements were surveyed and assessments made under five separate themes: Overall fitness for purpose, Accessibility, Biodiversity, Attractiveness and Community. The survey results indicate that the open space resource within Renfrewshire is of generally good quality, however there is variation between settlements and within settlements themselves. This highlights the importance of taking the characteristics of each settlement into account when developing the open space vision and themes through the strategy.

Fig 4.1: Priority settlements

SETTLEMENT	OVERALL FITNESS FOR PURPOSE	ACCESSIBILITY	BIODIVERSITY	ATTRACTIVENESS	COMMUNITY
Bishopton					
Bridge of Weir					
Brookfield*					
Elderslie					
Erskine					
Houston					
Howwood					
Inchinnan					
Johnstone					
Kilbarchan					
Langbank*					
Linwood					
Lochwinnoch					
Paisley					
Renfrew					

**denotes settlements where the sample was less than 10*

Source: Renfrewshire Council

A greater number of coloured boxes in a row represent those settlements with most to be gained from improvements. Based on the overall score which represents fitness for purpose, this identifies Johnstone, Linwood and Paisley as settlements which would benefit most from action on open space. A greater number of coloured boxes in a column represent those themes most requiring to be addressed at a Renfrewshire-wide level. The audit also identified that there is particular opportunity to enhance open spaces in relation to the two themes of biodiversity and community awareness and health through participation. Site surveys also identified woodland, amenity green space for housing and open semi natural spaces as priorities across several themes.

Regional and Country Parks

Clyde Muirshiel Regional Park was formally designated in 1990. It covers 28,100 ha (108 sq mls) and is Scotland's largest Regional Park. The Park covers parts of Renfrewshire, Inverclyde and North Ayrshire Councils and is managed by a Park Authority and its joint committee consisting of members from the three constituent authorities. The 1981 the Wildlife and Countryside (Scotland) Act provided the enabling legislation for Regional Parks. In this Regional Parks are defined as 'large areas of countryside parts of which are available for informal countryside recreation'.

The land is principally upland grassland and moorland on which hill farmers raise sheep. Some of the hill slopes are wooded. There are important semi-natural woodlands at Muirshiel and Parkhill. Commercial plantations of conifers, many now reaching maturity, exist within the Regional Park boundary. There are the pastoral valleys of the River Calder within the Park but no sizeable residential communities lie within the Park boundary. In addition to providing opportunities for informal recreation, a range of visitor facilities are provided at Barnbrock and the two designated Country Parks at Muirshiel and Castle Semple. The former is a mixed semi-natural and plantation woodland. It has extensive trails, car parks and facilities at a visitor centre. Muirshiel is set in the heart of the Park and gives excellent access to the moorland core, outwith the Country Park. Castle Semple Country Park comprises the loch and Parkhill Wood. National Cycle Route 7 passes through it and beside Castle Semple Centre, the Regional Park's "Gateway site". Other centres at Lunderston Bay and Cornalees Bridge are outwith Renfrewshire Council.

Gleniffer Braes Country Park

The country park lies to the south of the town of Paisley on the Gleniffer and Brownside Braes. It is approximately 190 hectares in area, three miles long and one mile wide. It is an upland park, mainly of moorland but it also has woodland parts and hill farming areas. Situated on the edge of the Clyde Plateau lavas, the Park includes the Gleniffer Gorge situated along the Tannahill walkway. It reaches some 15 metres deep in places and is eroded by Gleniffer Burn, which runs along a fault. Spectacular panoramic views can be seen particularly from the Robertson Car Park. Other attractions are the woodlands, wildlife, waymarked and guided walks, and the Glen Nature Trail beginning near the information centre. The Park has associations with the 18th and 19th century weaver poets of Paisley. Robert Tannahill (1774-1810) and Hugh Macdonald (1817-1860) are commemorated by the Tannahill Walkway and the Tannahill Well, Macdonald's Walks and the Bonnie Wee Well. It is estimated that the Country Park attracts up to 300,000 visitors annually.

Fig 4.2: Visitor Numbers at Castle Semple and Muirshiel

Source: Clyde Muirshiel Regional Park (www.clydemuirshiel.co.uk)

Recreational Open Space

Renfrewshire Council has prepared and implemented a Playing Fields Strategy which is consistent with the Scottish Government Strategic Objectives of Safer and Stronger, Wealthier and Fairer, Greener, Smarter, and Healthier. This strategic approach to the management of playing fields in Renfrewshire aims to improve the provision and maintenance of playing fields for school and community use.

The existing provision, capacity and quality of playing fields within Renfrewshire has been reviewed. Although there are some very good pitches and changing facilities, and new pitches have recently enhanced provision at Seedhill, Penilee and through the Glasgow Airport Rail Link (GARL) project, a requirement for higher quality pitches has been identified.

Demand for playing fields

Demand is almost entirely from football clubs. Capacity for 125 games per week exists (168 if poorer pitches included). At present this is adequate, however in practice cancellations due to weather reduce this capacity due to the playability of the pitches. Better quality pitches would result in fewer such cancellations.

Demand from other sports

Most of the demand for other sports is currently met through private provision. A programme for the use of indoor facilities, to ensure equity of use across a variety of sports is being developed.

Associated Facilities

Consultation with user groups highlighted that football clubs raised concerns in relation to changing facilities, pitch provision, pitch quality and training facilities. These clubs support the development of a community/hub framework. Other sporting groups identified a lack of Council owned facilities for activities such as hockey, rugby and cricket.

Although a need has been identified for improved quality of some existing playing fields, no requirement has been identified for additional playing fields within Renfrewshire.

Fig 4.3: Condition of Renfrewshire Council Grass Pitches

PITCH QUALITY	NUMBER OF PITCHES
A – Good quality, maintained to a high specification	17
A/B	4* (includes 1 rugby pitch)
B - Acceptable quality, requires a specific maintenance regime	9
B/C	19
C - Poor quality, requires upgrading and a significantly enhanced maintenance regime	17
C/D	6* (includes 2 rugby pitches)
D – Very poor quality, poor drainage, requires upgrading and a significantly enhanced maintenance regime,	5
E – Uncategorised: Open, fairly level grassland areas offering potential scope for adaptation for use as informal training or kick about areas.	5
Total	82

Source: Renfrewshire Council

Fig 4.4: Condition of Renfrewshire Council Changing Facilities

CATEGORY	NUMBER OF CHANGING FACILITIES
A - Good quality, well maintained facilities	10
A/B	1
B - Acceptable quality, requires significant upgrading	4
B/C	2
C - Poor quality, require replacement or significant upgrading	14
Total	31

Source: Renfrewshire Council

Community Sports Hubs

A number of existing sports facilities have been identified as either requiring upgrading or replacement. In order to maximise the use of sports facilities and to reduce costs, Renfrewshire Council has approved the development of Community Sports Hubs for most of the larger settlements within Renfrewshire. The Building Better Communities programme will invest £92 million in our schools, sports, social care and community facilities. The concept allows for central points of activity within the main settlements of Renfrewshire in which to integrate Council and partner services, such as sports, leisure and day care facilities for adults with learning disabilities. This also promotes the shared use of facilities and permits sports and leisure facilities located at some of the main schools to be used by pupils during the day and the general public during evenings. Community Sports Hubs will be developed at the following locations:

Paisley Lagoon Centre – a further £7.1 million refurbishment to the swimming pool and the former ice arena will be made. Also include improvements to the changing facilities and fitness gym and the provision of a new care facility for adults with learning disabilities.

Linwood Sports Centre – Linwood Sports Centre and Brediland Road Community Centre will be demolished and replaced with a community sports hub, which will also include an adult day care centre.

Johnstone High School – Johnstone community sports hub will be built at Johnstone High School and will feature a 25m four lane swimming pool, dance studio, fitness gym and a full size synthetic pitch in addition to the existing four court sports hall.

Park Mains High School, Erskine – the school will have enhanced physical education facilities including a 4 court games hall, gymnasium, and dance studio and fitness suite with associated changing areas.

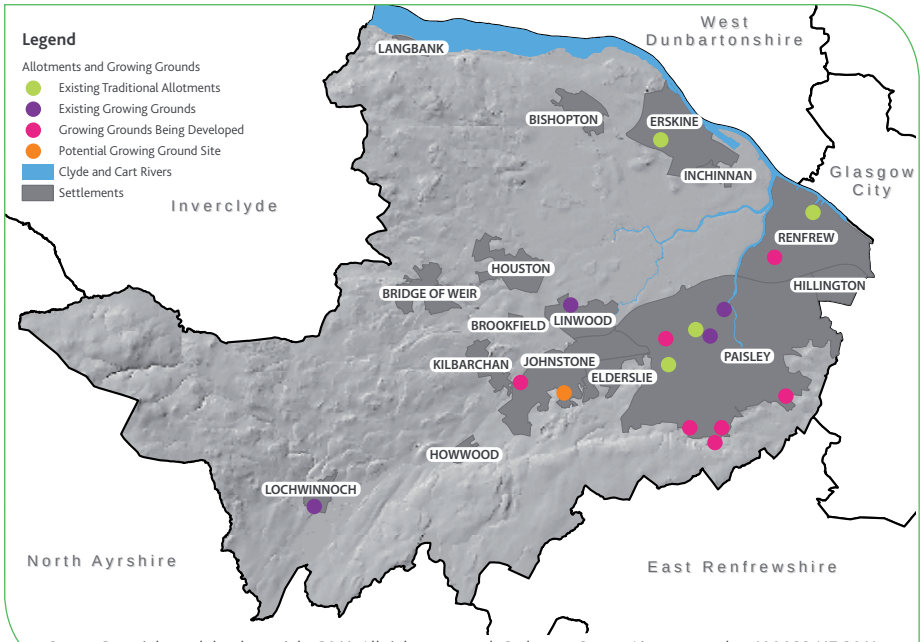
Allotments

Allotments provide a range of benefits, from healthier lifestyle to greater biodiversity in the local environment. They provide opportunities for regular outdoor physical activity as well as improved mental wellbeing. Allotments also provide opportunities for self sufficiency and sustainability and a habitat network for wildlife and plant species. Renfrewshire Council currently owns three allotments, however it is not responsible for their management. A small number of similar growing grounds are located, or are being developed, within Renfrewshire.

Renfrewshire Growing Grounds Forum

The Renfrewshire Growing Grounds Forum was set up in December 2009 to bring together aspiring growers, existing allotment associations, local authority services and support agencies from both the public and voluntary sectors to deliver a common mission. This group aims to increase the quantity and quality of Growing Grounds opportunities available for people in Renfrewshire. Figure 4.5 shows the distribution, within Renfrewshire, of existing Growing Grounds, those being developed and one further potential site. The locations of four traditional types of allotments are also shown. A detailed list of locations are outlined in figure 4.6.

Fig 4.5: Allotments and Growing Grounds



Source: Renfrewshire Council

Figure 4.6: Existing Traditional Allotments

LAND IN RENFREWSHIRE COUNCIL OWNERSHIP	
Erskine	Lamont Farm, Barrhill Rd
Paisley	Brediland Allotments Association, Cardell Drive
Paisley	West End Allotments Association (off Well Street and Douglas Street)
OTHER LAND OWNERSHIP	
Renfrew	Patterson Park, Ferry Road
(The four allotment associations combined hold 115 allotment plots)	
EXISTING GROWING GROUNDS	
Lochwinnoch	Community Garden
Linwood	Community Centre
Paisley	Behind Coats Memorial Church
Paisley	Disability Resource Centre, Love Street, Paisley
GROWING GROUNDS BEING DEVELOPED	
Johnstone	Capability Scotland site, Cartside
Paisley	Kersland School
Paisley	'Grow in Glenburn' site at Glen Park, Gleniffer Braes Country Park
Paisley	Weavers Linn Respite Centre, Glenburn
Paisley	Langcraigs School
Paisley	Ferguslie Park Community Garden scheme
Renfrew	Cherrie Centre, Moorpark
POTENTIAL GROWING GROUND SITE	
Johnstone	Johnstone Castle

Countryside Access

Core Path Network/Public Rights of Way/Cycling Network/Green Network

Access to the local countryside is necessary for providing public access for active recreational pursuits, including walking, cycling or horse riding. Renfrewshire has an extensive network of paths by which the public can take access to community and social facilities, education and employment opportunities and recreation. The Land Reform (Scotland) Act 2003 gives everyone statutory access rights to most land and inland water. Section 17(1) of the Act also placed a duty on the council to produce a 'Core Paths Plan' within three years.

Renfrewshire's Core Paths Plan was adopted by Renfrewshire Council in February 2009. It was prepared following extensive informal and formal consultation with the land owners, the general public, Community Councils, agencies, Council departments and Council officers. The Renfrewshire Core Paths Plan includes a number of adopted minor roads, footways as well as paths away from roads (remote paths). The Core Path Network includes approximately 90% of the Public Rights of Way within Renfrewshire and the National Cycling Network which is a comprehensive network of safe and attractive cycling routes. Renfrewshire Council works with partners such as Strathclyde Partnership for Transport (SPT), SUSTRANS and Cycling Scotland to fund and develop cycling projects in the area.

Renfrewshire Council is part of the Glasgow and Clyde Valley Green Network Partnership, an ambitious 20 year programme which will link parks, walkways, woodlands and countryside along miles of path and cycle routes, bringing a range of social, economic and environmental benefits to the region. Scotland's National Planning Framework 2 (NPF2) recognizes that strategic planning for city regions provide the opportunity to develop extensive Green Networks. Paragraph 202 in the NPF2 document states "the Glasgow and Clyde Valley Green Network Partnership is taking forward a programme of greenspace enhancements designed to promote healthier lifestyles, better environments, greater biodiversity, stronger communities and economic opportunity'.

The GCV Green Network will connect our inner urban areas with their surrounding rural environments. This is important, as many parts of central Scotland are heavily urbanised and have high population densities. In 2009, Renfrewshire ranked sixth in Scotland, lying behind the four

main cities.[1] The Glasgow and Clyde Valley Green Network will provide a wide range of social, health, economic and environmental benefits.

The Carts Greenspace is a partnership project, with Inverclyde and East Renfrewshire Councils, and its team works with local people to create, transform and improve the Central Scotland Green Network.

The Ferguslie Park Green Network project aims to improve the quality of the urban environment, enhance quality of life for residents, strengthen biodiversity and help create new economic opportunities. It also hopes to develop physical links locally and across the region, sharing good practice and ideas between communities.

Renfrewshire's Core Paths

In Renfrewshire there are approximately 225 miles of Core Paths (excludes potential routes). These are divided into 291 individual numbered routes. These consist of a variety of types; the majority of the routes, 63.8%, are "away from roads" which may be paths through housing estates, through parks or woodland, across fields, farm tracks, beside rivers or off road cycle routes, whilst 8.4% are on minor roads, or consist of designated cycle lanes or signposted cycle routes on roads. A further 10.7% are classified as being adjacent to roads i.e. on footways and 17.1% are made up of a mixture of on road, by road and away from road sections. The paths have a variety of surfaces, with some having a solid bitumen surface, whilst others may be unbound or even grassed routes. Parts of the Network are incomplete for a variety of reasons.

In 2008 a condition survey was carried out of all the proposed core paths. The results of this survey are stored in the CAMS (Countryside Access Management) database held by the Council. This data base is used by two thirds of the Local Authorities in Scotland to store paths data. The survey showed that many of the paths chosen as core paths were unsatisfactory in terms of maintenance issues. These issues ranged from missing signposts, surface damaged, missing or damaged stiles/seats or steps or had overgrown vegetation. Figure 4.7 shows an example of the maintenance and structural issues found on the core paths.

1 General Register Office for Scotland Mid-2009 Population estimates

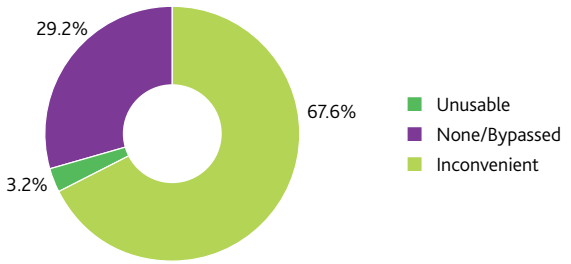
Fig 4.7: Issues affecting Core Paths (Core Path Survey 2008)

ISSUE	NO OF ROUTES	% OF CORE PATHS
Unsatisfactory surface	96	32.9
Drainage works required	35	12.0
Dropped kerbs required	36	12.3
Missing signs	274	94.1
Overgrown vegetation	133	45.7
Missing or work required on stile/seat/steps	27	9.2
Damaged bridges	11	3.7
Damaged/unsatisfactory/missing gates	32	10.9

Source: Renfrewshire Council

The effects of these issues are summarised, in percentage terms, in figure 4.8 below which expresses the three main reasons for the Core Path Network being incomplete.

Fig 4.8: Three main reasons for the Core Path Network being incomplete



Source: Renfrewshire Council

Arts and Craft facilities

The principal arts facility within Renfrewshire is Paisley Arts Centre. The venue, a converted church and listed building, was opened in 1987 and incorporates a 150 seat theatre. A study has been undertaken to assess the feasibility of creating a new Cultural Centre for Paisley. This would involve relocating the town's Central Library to Paisley Town Hall and extensively refurbishing Paisley Museum and Art Gallery. Under the plans, a new 175 seat theatre would be constructed within the revamped museum for performing arts, lectures and films.

The Council's Education and Leisure Department's operational estate comprises 175 key built assets (excluding playing fields) which are summarised in Figure 4.9.

Fig 4.9: Operational estate of Education and Leisure Services Department

FACILITY	NUMBER
Nursery classes and pre-5 Centres	35
Community facilities	32
Cultural Facilities / Arts and Museums	8
Community Libraries	12
Sports pavilions	10
Playing fields	60
Stores	3
Renfrewshire Leisure Ltd facilities – indoor sports centres and swimming pools	11

Source: Renfrewshire Council Education and Leisure Services

Community Centres and Halls

There are 32 community centres and halls, managed and let by Education and Leisure Services, which are spread across most of the settlements of Renfrewshire. These provide accommodation for the activities of a variety of community groups and voluntary organisations. The Council currently has 9 conference / meetings venues located within Paisley, Johnstone and Renfrew. These are listed in Figure 4.10 on the right.

Fig 4.10: Conference and Meetings venues managed by Education and Leisure Services

VENUE	CAPACITY (INDIVIDUAL FACILITIES > 100)
Paisley Town Hall – Main auditorium	740 (380 ground floor only)
Paisley Town Hall – Logia	100
Paisley Town Hall – Alexander Wilson Suite	130
Paisley Town Hall – Minor Hall North	120
Paisley Arts Centre	150
Renfrew Town Hall	200
Johnstone Town Hall – Large hall	430
Johnstone Town Hall – Small hall	150

Source: Renfrewshire Council Education and Leisure Services

Renfrew Town Hall is currently being refurbished as part of the town centre regeneration programme. It will include a new marriage suite, new Renfrew Community Museum, improved access for people with mobility restrictions and additional visitor facilities. The refurbishment work is due to be completed by the end of 2011.

The Education & Leisure Services Service Property Asset Management Plan records 20 of the Community and Learning Centres as Category C or D in the 'Sufficiency' grading column of their register. This indicates their poor quality relative to the rest of the town halls and community centres property estate.

Housing

Renfrewshire Council currently has some 13,411 houses compared to just over 18,000 in 2003. Levels of Right to buy sales have in the past played a major role in increasing levels of owner occupation and decreasing Council stock.

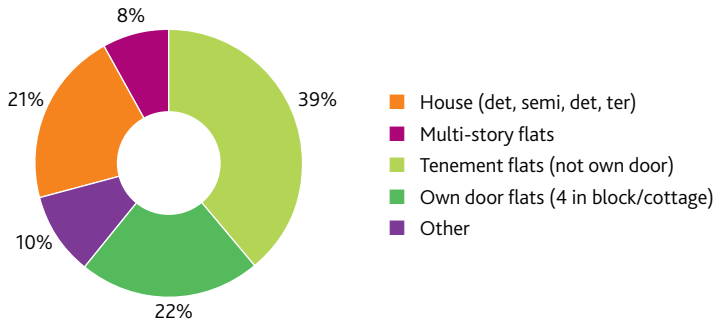
Demolition of existing obsolete Council stock will continue in the future but at a much lower rate as existing regeneration programmes are completed. Figure 4.12 shows the total number of Council properties from 2000 to 2010.

Fig 4.11: Local Authority Housing Demolition, Johnstone

Source: Renfrewshire Council Local Housing Strategy

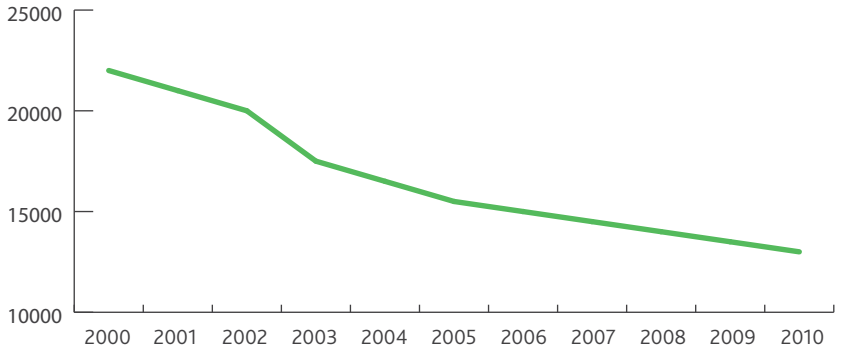
The stock type held by the Council is dominated by flats as shown on figure 4.13.

Fig 4.13: Type of Housing Stock



Source: Renfrewshire Council Property Management Database March 2010

Figure 4.12: Number of Council Houses

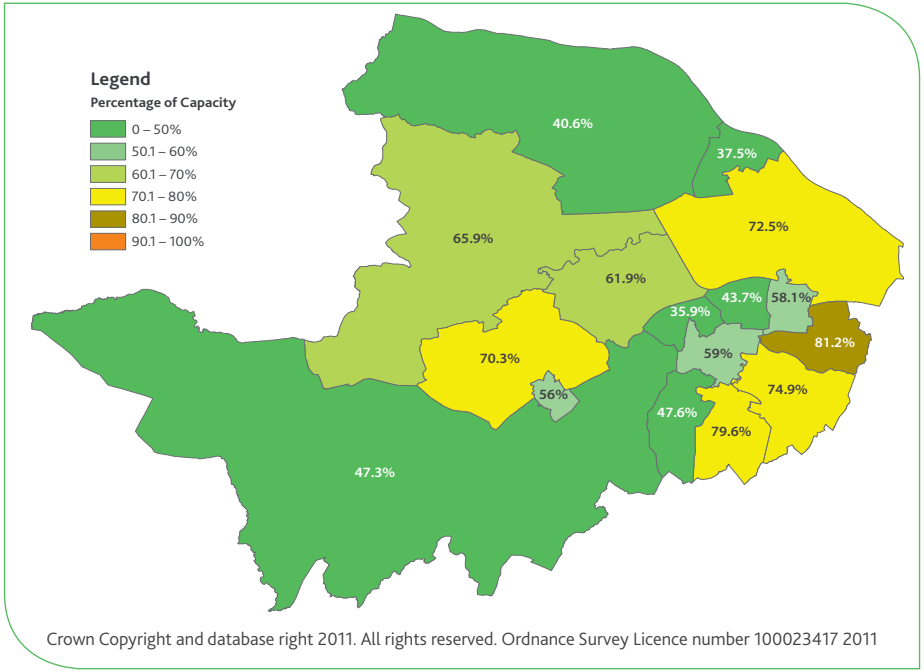


Source: Renfrewshire Council Local Housing Strategy

Primary Schools

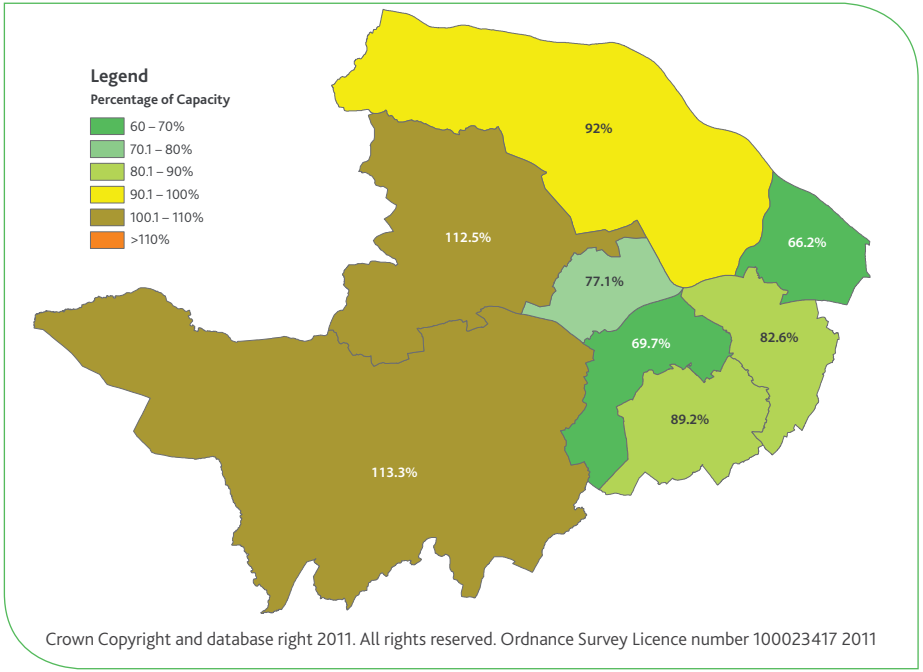
The Council runs 49 primary schools throughout Renfrewshire, and a further 23 nursery facilities and 12 pre-5 centres. In autumn 2010 there were 12,554 children of primary school age (5-12 year age group) enrolled within Renfrewshire's primary schools. A major modernisation programme has been established, through the School Estates Management Plan (SEMP), over the past decade to upgrade many of the primary schools, which will produce 6 new schools and 4 refurbished schools by the end of 2012. Development plans are now in place for the refurbishment of Kirklandneuk Primary, Renfrew. However, Education & Leisure Services Service Property Asset Management Plan records 18 of the Primary Schools as Category C or D

Fig 4.14: Denominational Primary Schools – Capacity Percentage 2010



Source: Renfrewshire Council

Fig 4.15: Non-Denominational Secondary Schools – Capacity Percentage 2011



Source: Renfrewshire Council

in the 'Sufficiency' grading column of their register. The same register records 14 Primary Schools as Category C in the 'Condition' column. Also, 10 of the Pre-5 Centres and Nursery Classes as Category C or D in the 'Sufficiency' grading column of their register. This part of the school estate is therefore of poorer quality than much of the rest.

A number of Denominational primary schools are currently running at levels significantly below their capacity, as can be seen in the map below. This is potentially an issue as local government funding is reduced over the next few years.

Secondary Schools

There are eleven secondary schools within Renfrewshire with a total roll of 10,800 secondary age pupils (12-18 year age group). A major modernisation programme is also underway to upgrade all of the secondary schools which will produce 4 new schools and 3 refurbished schools.

Other Schools

Renfrewshire has three special schools, with a total roll of 341, which support children and young people (from the 5-18 age group) who have a range of additional needs. These include the Clippens, Kersland and the Mary Russell schools.

The map above shows that, in contrast with the Denominational Primary School capacity position, some Non-Denominational Secondary schools are running at levels significantly over their capacity.

Community Learning and Development

The Renfrewshire Community Planning Partnership has set a strategy for the community learning and development needs of communities across Renfrewshire. Renfrewshire's Community Learning and Development (CLAD) programme provides a wide choice of courses for both adult learning and young persons development, in order that they may improve personal, social and educational skills. Twelve learning centres are located throughout Renfrewshire offering courses such as computing, literacy, numeracy, English for speakers of other languages, photography, art and beauty care. Learning centre venues include libraries, community centres, youth clubs, schools and colleges.

Colleges and Universities

Reid Kerr College - The college supports (in 2010) approximately 20,000 full time and part time students. The main campus is located north of Paisley Town Centre and this has been substantially re-developed. Ancillary college facilities are located within the town centre.

University of the West of Scotland (Paisley Campus) - The university's main campus is located within Paisley Town Centre, with separate campus facilities being located in Hamilton, Ayr and Dumfries. The university offers a range of undergraduate and postgraduate courses and the Paisley Campus (in 2010) has a total student population of 8,246, which comprises 7302 Undergraduate and 944 Postgraduate students.

Libraries

There are 12 public libraries across Renfrewshire, including the Paisley Central Lending and Reference library, offering reading and learning opportunities. This facility is an historic listed building which also accommodates a Local Studies and Family History research unit. In addition, the Council provides a wheelchair accessible mobile library service covering the settlements of Elderslie, Houston, Howwood, Kilbarchan, Inchinnan and Langbank, in addition to parts of the main urban centres. In addition, a library service delivers and collects books for those who are homebound.

Museums

The principal museum in Renfrewshire is located in Paisley Town Centre and houses an important collection of shawls. The nearby historic Coats Observatory provides facilities for astronomers and has a planetarium. A smaller community museum is located in Renfrew Town Centre. As part of Renfrew Town Hall refurbishment and extension proposals, due for completion in summer 2011, the Renfrew museum will relocate within the town hall.

Sports and Leisure Facilities

Renfrewshire's population is at risk from physical inactivity and the health factors associated with this, including coronary heart disease (refer to Section 10 : Population and Human Health), it is therefore important that the Council encourage both adults and young people to become more active throughout their lives either through participation or through increasing their leisure activities. To assist this aim, a development plan exists for new and improved sports complexes at Johnstone, Linwood and Paisley.

The Have a Heart Paisley initiative, established in 2000, is a partnership between NHS Argyll & Clyde, Renfrewshire Council, voluntary and community organisations and the people of Paisley. Its aim is to focus action across a broad front to prevent coronary heart disease, promote good health and reduce health inequalities in Paisley and Renfrewshire. It targets those aged 45–60 who are at risk of heart disease and those of any age with heart disease. Risk factors include physical inactivity and therefore the initiative encourages participation in activities such as walking, swimming and aerobics.

There are 11 sports and leisure facilities, 5 swimming pools, 10 sports pavilions and 60 playing fields, within Renfrewshire which are managed by Renfrewshire Leisure Ltd.

Sports and Leisure facilities include a wide range of sports and recreation facilities such as: health suites, gyms, fitness studios, sports halls, dance studios and running tracks. Indoor sports centres are situated at Paisley (Lagoon), and Erskine. Sports centres with outdoor facilities include those at Linwood, Renfrew (Paisley Road), Paisley (Seedhill) and Elderslie.

Five Public Swimming Pools are located in the town centres of Paisley (Lagoon Centre), Johnstone, Renfrew, Erskine and at Elderslie village centre. Investment through the Building Better Communities programme will provide a new swimming pool at new sports complexes at Linwood, extending the current sports centre, and a new pool at Johnstone High School, which will replace the existing ageing pool in the town centre. Improvements are also being made to Erskine and Renfrew swimming pools.

A variety of Outdoor Recreation Facilities include bowling greens, a putting course, and tennis courts are provided within some of the four urban parks in Paisley, Renfrew and Johnstone. Water based sports, in the form of sailing, windsurfing and canoeing, is provided at the Clyde-Muirshiel Country Park visitor centre at Castle Semple, Lochwinnoch. (The Country Park is managed by a Joint Committee with Inverclyde and North Ayrshire Council and covers a territory of 281 km2).

One Municipal Golf Course, comprising 18 holes, is located at Barshaw, Paisley.

A range of private sports complexes, catering for a variety of other sports are situated within Renfrewshire. These include the following:

- Braehead, Renfrew – indoor curling rink;
- Xscape, Renfrew – indoor artificial ski slope;
- David Lloyd Centre, Renfrew indoor tennis and squash and health and fitness facilities Strathgryffe Club, Houston – indoor tennis and squash;
- Ingliston, Bishopton, Mid Gavin, Howwood, and Fordbank, Johnstone equestrian centres.

Ten private golf courses are located within Renfrewshire and two of these are also linked to the country hotels at Gleddoch House, Langbank and Marr Hall, Erskine.

Implemented Developments and Future Projects

Progress continues to be made with the ongoing re-development and re-furbishment of the school estate which has been underway for the past decade. Proposals have been also been approved and finance allocated for the creation of a number of community Sports Hubs throughout Renfrewshire.

The Carts Greenspace partnership has successfully completed a wide variety of projects in recent years. For example, the design and construction of community gardens, enhancing landscape setting and bringing vacant and derelict land into beneficial use, the increase in woodland cover, and the creation of high quality routes for active travel and recreation. A strategy for the Ferguslie Park Green Network has also been established.

Fig 4.16: Landscape works, Johnstone

Source: Renfrewshire Council

| 5 | Waste

SEA objectives that relate to Waste:

- To minimise the generation of waste
- Maximise recycling and composting to reduce waste going to landfill
- Promote and contribute to the ability of communities to minimise waste, and maximise waste recovery, recycling, composting etc.

INDICATOR	CURRENT STATUS	TREND DIRECTION	EXPLANATION
Waste generation	G	↔	The level of waste generated in Renfrewshire has decreased since 2004 and has plateaued out since 2008. Individual households produced 1.085 tonnes of waste in 2009/10.
Waste treatment	G	↑	The level of recycling and composting in Renfrewshire has continuously increased since 2004, whilst disposal to landfill has decreased. The recycling rate for 2009/10 was 37.4%.
Waste management	G	↑	The recycling rate at the Household waste and recycling centres across Renfrewshire exceeds 70% and the number of local recycling sites increasing to provide more facilities for residents to recycle.
Environmental waste			GAP

The amount of waste generated and the subsequent methods of treatment are of growing social, economic and environmental concern. The types of waste produced, the transport of waste and the various methods of waste treatment and disposal available all have an impact on the environment. Good integrated waste management practices are therefore essential to minimise these environmental impacts and protect human health.

A summary of the indicators used in assessing the state of Renfrewshire's environment is presented below, highlighting the current status of each indicator and the directional trend since the adoption of the Renfrewshire Local Plan in 2006.

The current status is shown by using the following colours:

- G — Good
- F — Fair
- P — Poor
- L — Limited data

The trend direction is shown with the following arrows:

- ↑ Improving
- ↓ Deteriorating
- ↔ No Change

The Scottish Government's Zero Waste Plan adopted in 2009 views waste as a resource and is underpinned by a determination to achieve the best overall outcomes for Scotland's environment, by making best practical use of the approach in the waste management hierarchy: waste prevention, reuse, recycling and recovery. The plan sets clear targets for waste disposal and recovery in the short and long term which Renfrewshire Council will work towards going forward.

The current impact that waste has on Renfrewshire's environment is summarised by the environmental indicators shown below. Highlighted is the current status of each indicator and the directional trend. The most recent data available from 2009/2010 has been used to assess the environmental indicators.

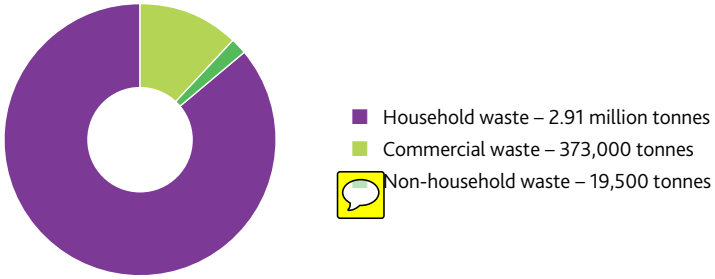
Baseline Situation

During 2008/09, 3.29 million tonnes of municipal waste were collected by or on behalf of local authorities in Scotland. Figure 5.1 shows the breakdown of this waste.

local authority regions in the Glasgow and Clyde Valley area. One third of the waste collected in Scotland is generated in this area.

Currently all of the waste collected by Renfrewshire Council is municipal waste.

Figure 5.1 Total amount of municipal waste (tonnes) collected in Scotland



Source: www.sepa.org

Waste can damage the environment in several ways, including:

- Emissions of air pollutants including; greenhouse gases, dioxins and nitrogen oxides;
- Discharge of landfill leachate to groundwater and surface water;
- Reduction in land use through landfill sites; and,
- Localized litter problems.

Scotland is split into 11 waste strategy areas and Renfrewshire is one of eight

Waste generation has reduced significantly over the last 6 years and levelled out since 2008. The Council has invested heavily in infrastructure to increase the level of household municipal waste being recycled. The development of the civic amenity sites and the provision of separate recycling facilities either from the kerbside or through purpose installed mini recycling centres for all households in the Renfrewshire area has contributed to a reduction in the amount of municipal waste generated.

Waste Generation

During 2009/2010 a total of 92,298 tonnes of municipal waste was collected by Renfrewshire Council. The amount of waste collected by the Council has decreased over recent years (see figures 5.2 and 5.3). There are several changes to Council operations that have contributed to this:

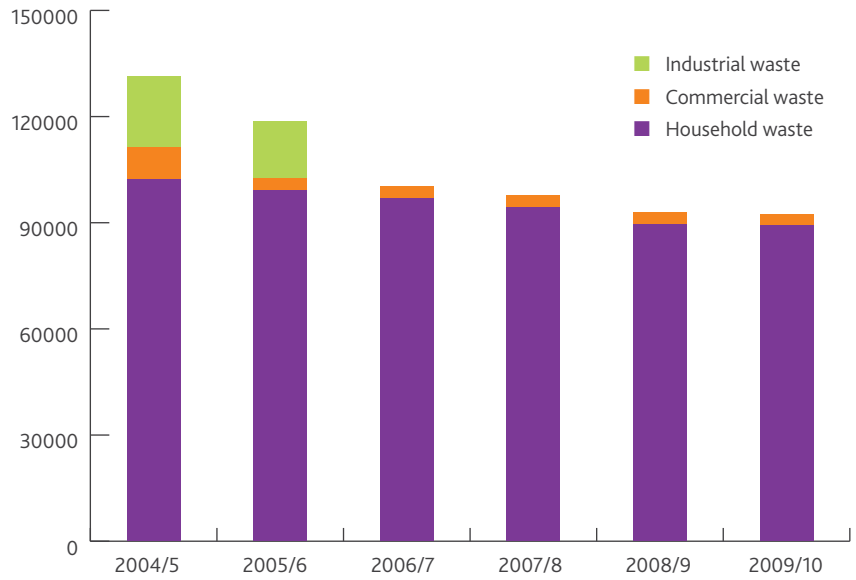
- the privatisation of the Council's skip hire service in 2005;
- the upgrade of the Council's Civic Amenity sites in 2006; and,
- the closure of the Council's inactive waste landfill site at Linwood in 2006.

Fig 5.2 Total amount of municipal waste (tonnes) collected by Renfrewshire Council

YEAR	TOTAL WASTE COLLECTED	HOUSEHOLD WASTE	COMMERCIAL WASTE	NUMBER OF HOUSEHOLDS	WASTE PER HOUSEHOLD
2004/05	129,523	102,177	9,325	80,578	1.268
2005/06	118,605	99,172	3,444	80,974	1.224
2006/07	100,499	96,867	3,631	81,575	1.187
2007/08	97,805	94,239	3,566	82,095	1.148
2008/09	93,023	89,578	3,445	82,435	1.086
2009/10	92,298	89,144	3,154	82,124	1.085

Source: Renfrewshire Council

Fig 5.3 - Total amount of municipal waste (tonnes) collected by Renfrewshire Council



Source: Renfrewshire Council

Household Waste

The number of households in Renfrewshire has increased over the years, see figure 10.9. Of the municipal waste collected by the Council in 2009/2010, a total of 89,144 tonnes was household waste, which is 1.085 tonnes per household.

Since 2006 the amount of waste generated per household in Renfrewshire has been less than the Scottish national average. For example, data from 2008/09 shows a total of 2.94 million tonnes of household waste was collected in Scotland which is an average of 1.179 tonnes per household whilst in Renfrewshire this figure was 1.086 tonnes per household.

Commercial Waste and Industrial Waste

The terms Commercial waste and Industrial waste describe a broad range of waste types generated by business premises ranging from sole traders to large industrial complexes. Producing data for this waste is difficult because not all businesses are legally required to report on the level of waste they produce. SEPA have undertaken a survey to address the data gap and have used this to estimate the total waste generated by the commercial and industrial sectors in Scotland and each of the waste strategy areas.

A total of 7.94 million tonnes of commercial and industrial waste was collected in Scotland in 2008. The survey showed that 2.6 million tonnes of this was generated in the Glasgow and Clyde Valley area; 1.91million tonnes of this being commercial waste and 0.69 million tonnes of industrial waste. The region is the most densely populated area in Scotland and as a consequence it generates over a third of Scotland's total commercial and industrial waste each year.

Renfrewshire is one of eight local authorities in the Glasgow and Clyde Valley area. The Council operates a commercial waste service which currently services 1,367 premises. This is only a small percentage of the total number of premises in the area, the remainder of which will have their waste collected by local private companies. The tonnage of waste collected by the Council through this service was 3,154 tonnes in 2009/2010.

Construction and Demolition Waste

Construction and demolition waste is diverse in nature and can include soil, concrete, bricks, glass, wood, plasterboard, asbestos, metal and plastics. The data reported in figure 5.4 is derived from statutory waste data returns held by SEPA for Scotland. The Council do not collect construction and demolition waste. Within the Glasgow and Clyde Valley area, 3.91 million tonnes of construction and demolition waste were produced in 2008.

Fig 5.4: Construction and demolition waste managed within Scotland

YEAR	MILLION TONNES
2006	8.03
2007	9.44
2008	8.63

Source: Renfrewshire Council

Special and Hazardous Waste

Special and hazardous waste are classified as such because they display one or more hazardous characteristics or properties such as being explosive, highly flammable, toxic or carcinogenic. SEPA maintains a register of the movement and disposal of special and hazardous waste. SEPA's waste data

digest 2008 reported that approximately 455,000 tonnes of special and hazardous waste were identified within Scotland.

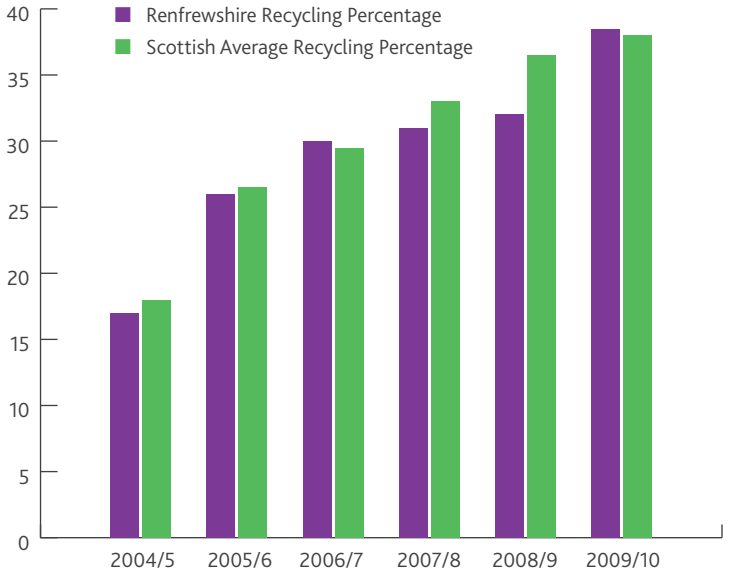
Waste is an increasingly important issue, legislatively, politically and practically in addition to its impact on the environment. The Landfill Directive has improved the way we manage waste by increasing the need to recover waste through recycling, composting and to a lesser extent energy recovery therefore diverting it away from landfill. The Directive places tighter constraints on the waste that can be sent to landfill, setting targets for landfilling biodegradable waste. By 2010 only 75% of 1995 quantities can be landfilled, whilst by 2013 this drops to 50% and by 2020 only 35%.

The Scottish Government's Zero Waste Plan sets a long term target to recycle 70% of all Scotland's waste by 2025 with only 5% of the remaining waste being landfilled. In order to attain these targets Renfrewshire Council in line with the Glasgow and Clyde Valley Area has developed an Area Waste Management Plan, which includes targets for recycling and composting.

Waste Recovery

The level of waste collected by the Council for recycling and composting has increased steadily since 2004. The Council achieved the Scottish Government's recycling target of 30% in 2008, 37.4% in 2009/10 and 40% in 2010. The tonnes of waste collected for recycling and disposal are shown below in figure 5.5 and shown as percentages in figure 5.6.

Fig 5.6 - The % level of recycling within Renfrewshire since 2004



Source: Renfrewshire Council

Fig 5.5: Disposal routes for municipal waste (in tonnes) collected by Renfrewshire Council

YEAR	WASTE COLLECTED FOR DISPOSAL (TONNES)			WASTE COLLECTED FOR RECYCLING AND COMPOSTING (TONNES)		
	HOUSEHOLD	COMMERCIAL	INDUSTRIAL	HOUSEHOLD	COMMERCIAL	INDUSTRIAL
2004/05	102,177	9,325	18,021	24,363	0	0
2005/06	99,172	3,444	15,990	25,127	0	0
2006/07	96,867	3,631	0	28,363	0	0
2007/08	94,239	3,566	0	29,440	0	0
2008/09	89,578	3,445	0	28,362	0	0
2009/10	89,144	3,154	0	34,543	0	0

Recycling

There have been a number of programmes initiated in Renfrewshire in order to increase the level of waste diverted from landfill. The first of these schemes was introduced in 2005 which involved:

- kerbside collection of paper, plastic bottles, cans, glass and garden waste from properties with access from front to back;
- Kerbside collection of paper for tenemental properties; and
- recycling points for high flatted properties.

Recently the kerbside scheme was expanded to include additional materials, tetrapak, textiles and mixed plastics in conjunction with the introduction of managed weekly collections. This involves the alternate collection of refuse and recyclate. In addition, maisonette properties were provided with mini-recycling points and a recycling sack collection has been introduced for properties that present their waste in a sack because they are not suitable to use a wheeled bin.

Through the current kerbside collection scheme dry recycling material is collected in a co-mingled form and transported to a materials recycling facility where the material is sorted into different types for recycling.

Composting

Composting reduces the amount of biodegradable waste going to landfill. In addition to the collection of dry recyclate, Renfrewshire Council introduced a separate collection of garden waste in 2004 which now services 55,000 properties. Garden waste is also collected separately at the Household Waste and Recycling sites. Renfrewshire Council composted 10,799 tonnes of collected municipal waste in 2009/10 (approximately 11.5% of the total waste collected). This material is composted at a facility in Lugton operated by William Tracey's limited.

Home composting is important in preventing unnecessary waste, but it is difficult to quantify the tonnage of waste diverted from the waste stream through this method. The council has actively promoted the sale of household compost bins in conjunction with a national campaign in Scotland co-ordinated by Wrap. Almost 200 composters were distributed to households across Renfrewshire through the scheme in 2009/10. Scottish Water have obtained planning permission for the creation of anaerobic digestion facility to treat local authority waste streams and food waste from commercial & industrial facilities at the former sewage treatment works in Linwood.

Household Waste and Recycling Sites

There are six Household Waste and Recycling sites in Renfrewshire where householders can dispose of items for recycling or excess waste. All the sites are licensed to and operated by the Council and provide segregated collection facilities for most recyclable items. Mixed waste from these sites is also transported for processing to reclaim any other recyclable material. The sites collected 17,567 tonnes of waste in 2009/10, of which 12,900 tonnes were recycled, thus providing a recycling rate of 73% for the sites as a whole.

There are six household waste and recycling sites in Renfrewshire located in Erskine, Foxbar, Johnstone, Linwood, Renfrew and Underwood Road in Paisley. At these sites there are faciliites for dealing with the following, green waste, waste wood, scrap metal, rubble, general waste, glass, food and drink cans, paper, plastics, tetrapak, textiles, household batteries, used motor oil, car batteries, fluorescent tubes and electrical and electronic equipment for recycling.

Recycling facilities

There is a network of 57 recycling points across Renfrewshire to allow residents to recycle items which would normally be disposed of in their residual waste bins if they do not have a kerbside recycling collection. Many of the facilities are located in supermarket car parks or beside maisonette/high flatted properties. Facilities vary from site to site but usually they consist of (at least) a bank for glass and mixed dry recyclate.

Waste Disposal

Energy recovery

Through the Zero Waste Plan the production of energy from waste is considered as a recovery activity, even if it is a disposal activity. There are only two municipal waste incinerators recovering energy from waste operating in Scotland. These facilities are in Dundee and Shetland. At present, Renfrewshire does not directly send any waste for disposal through waste incineration.

Landfill

The inert landfill site operated by Renfrewshire Council closed in 2006 and there are no other licensed landfill facilities in the area. Landfill material from

Renfrewshire is transported in bulk to Greengairs landfill site in North Lanarkshire for disposal. There has been a steady decline in the level of waste to landfill by Renfrewshire Council since 2004, with 57,755 tonnes of waste disposed at landfill in 2009/10.

The first recycling collections were carried out in the winter of 2009 as part of Renfrewshire Council's enhanced recycling service. The new collections have resulted in almost 49 tonnes of waste being diverted from landfill. The first collection of recyclable materials from Langbank, Bishopton, Inchinnan and parts of Erskine was instead taken to the recycling centre in Linwood.

Renfrewshire Council has worked closely with Waste Aware Scotland to manage the introduction of the new service, which it believes will help achieve its environmental goals as well as making sure the Authority is not subject to fines for failing to meet Government recycling targets of 50% by 2013, 60% by 2020 and 70% by 2025. The council has undertaken a full programme of activity to ensure all residents were made aware of the introduction of the new service ahead of it going live. Activities included community roadshows, web information, an advertising campaign and uplift schedules posted to each house set to receive the new scheme.

Fig 5.7: First recycling collection diverts 49 tonnes from landfill

6 Air

SEA objectives that relate to Air:

- To improve air quality
- To reduce levels of air pollutants.
- To reduce the level of nuisance from odour and dust.
- To maintain frequency of air quality monitoring in line with national standards.

Air is a mixture of gases that constitute the earth's atmosphere; mainly nitrogen (78%), oxygen (21%) and the remaining gases 1% include argon and carbon dioxide. Poor air quality can have both acute and chronic effects on human health. Air pollution can also negatively affect ecosystems, the quality of soil and water, and contribute to climate change.

The main contribution to air pollution is emissions from individual sites (or point sources e.g. large scale industrial activities) and along transport routes/nodes (linear/ nodal sources e.g. road traffic, air traffic). Diffusive sources such as agriculture are also an important source.

A summary of the indicators used in assessing the state of Renfrewshire's environment is presented below, highlighting the current status of each indicator and the directional trend since the adoption of the Renfrewshire Local Plan in 2006.

The current status is shown by using the following colours:

G Good
P Poor
F Fair
L Limited data

The trend direction is shown with the following arrows:

↑ Improving
↓ Deteriorating
↔ No Change

INDICATOR	CURRENT STATUS	TREND DIRECTION	EXPLANATION
No. Of Days Exceeding Air Quality Limits	G	↑	District wide the background air quality is improving. Within particular urban areas there are increasing levels of key air pollutants due to traffic emissions. This may lead to further AQMA's being identified.
Exceedance in Annual Mean Limits	G	↑	Although concentrations of total nitrogen dioxide have declined over the years, concentrations in NO_2 have not shown the same decrease.
Reduction in emissions from road traffic	F	↑	Renfrewshire Council in partnership with Strathclyde Partnership for Transport is working towards reducing emissions across the Council area.
Reduce number of nuisance complaints	F	↑	The Council will continue to monitor the number of complaints

The release of pollutants and the subsequent secondary pollutant generated can have a detrimental effect on:

- Deterioration in human health; air pollutants can trigger, or exacerbate, breathing difficulties such as those caused by asthma and bronchitis in sensitive individuals;
- Changes in climate; emissions of greenhouse gases such as carbon dioxide, methane and nitrous oxide alter our climate;
- Acidification and eutrophication of habitats; pollutants like oxides of nitrogen and sulphur dioxide as well as ammonia undergo changes in the atmosphere. When deposited they can result in acidification and nutrient enrichment of land and water, harming ecosystems;

- Oxidative damage; ground level ozone can cause damage to plants, animals and building materials;
- Nuisance; odour, light, noise and particulates (including haze and smoke) can affect the overall amenity value of the environment;
- Depletion of the ozone layer; when certain man-made chemicals enter the stratosphere they can destroy stratospheric ozone and can lead to increased exposure to harmful ultraviolet (uv) radiation.

Within the urban environment the pollutants that cause the main concerns are those found close to source, primarily emitted from transport, domestic and commercial heating and small scale industrial activities. These pollutants are listed in the National Air Quality Objectives as:

- Benzene;
- 1,3-Butadiene;
- Carbon Monoxide;
- Lead;
- Nitrogen Dioxide (NO_2);
- Particles (PM_{10}) and ($PM_{2.5}$);
- Sulphur Dioxide (SO_2).

Within Renfrewshire the overall air quality is of a good level. However there are issues concerning air quality related to transport with the concentration of key air pollutants being higher in urban areas and along busy transport routes. Continual air quality improvements have to be implemented in order to reduce adverse health effects brought on by poor air quality and to reduce potential damage to ecosystems and potential acidification damage.

Legislation

The Environment Act 1995 required local authorities to assess compliance of air quality in their area with the standards and objectives set out in the Air Quality Strategy for England, Scotland Wales and Northern Ireland 2000 (NAQS). With respect to local authorities within Scotland further regulations are set out in the Air Quality (Scotland) Regulations 2000 and Air Quality (Scotland) Amendment Regulations 2002.

The Local Air Quality Management (LAQM) Framework requires that local authorities carry out regular reviews of air quality. The LAQM guidance requires that where a risk of exceedence of an air quality objective at a location with relevant public exposure is identified then a Detailed Assessment is undertaken. A Detailed Assessment will consider any risk of exceedence of an objective in greater depth in order to determine whether it is necessary to declare an Air Quality Management Area (AQMA).

Fig 6.1: Air Quality Objectives Included in Regulations for the Purpose of Air Quality Management in Scotland

POLLUTANT	AIR QUALITY OBJECTIVE		TO BE ACHIEVED BY
	CONCENTRATION	MEASURED AS	
Benzene	3.25 µg m-3	Running annual mean	31 Dec 2010
1,3-Butadiene	2.25 µg m-3	Running annual mean	31 Dec 2003
Carbon monoxide	10.0 mg m-3	Running 8-hour mean	31 Dec 2003
Lead	0.5 µg m-3	Annual mean	31 Dec 2004
	0.25 µg m-3	Annual mean	31 Dec 2008
Nitrogen Dioxide	200 µg m-3 not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 µg m-3	Annual mean	31 Dec 2005
Particles (PM_{10}) (gravimetric)	50 µg m-3, not to be exceeded more than 35 times a year	Daily mean	31 Dec 2004
	50 µg m-3, not to be exceeded more than 7 times a year	Daily mean	31 Dec 2010
	18 µg m-3	Annual mean	31 Dec 2010
Particles ($PM_{2.5}$) (gravimetric)*	12 µg m-3 (target)	Annual mean	2020
	15% cut in urban background exposure	Annual mean	2010 - 2020
	12 µg m-3 (limit)	Annual mean	2010
Sulphur dioxide	350 µg m-3, not to be exceeded more than 24 times a year	1-hour mean	31 Dec 2004
	125 µg m-3, not to be exceeded more than 3 times a year	24-hour mean	31 Dec 2004
	266 µg m-3, not to be exceeded more than 35 times a year	15-minute mean	31 Dec 2005

Source – SEPA National Air Quality Report 2008

Local Air Pollutants

Nitrogen Dioxide

All combustion processes in air produce oxides of nitrogen (NO_x) which is a collective term for the 2 main nitrogenous gases that cause air pollution problems; nitric oxide (NO) and nitrogen dioxide (NO_2). NO reacts with oxygen (O_2) or ozone (O_3) in the air to form NO_2. Although the primary pollutant is NO the impacts on human health and the environment are generally associated with the NO_2 with the NO_2 that is formed when NO is oxidised.

Renfrewshire Council have undertaken monitoring of ambient NO_2 and PM_{10} at three locations within the Council area using automatic sampling analysers from 2006.

The location of these sites are:

1 Central Road , Paisley

2 Gordon Street , Paisley

3 Glasgow Airport

Fig 6.2: Nitrogen Dioxide: Comparison with Annual Mean Objective with the Exceedance of Annual Mean Figures Highlighted in Green

SITE ID	WITHIN AQMA	% OF VALID DATA	ANNUAL MEAN CONCENTRATION (UG/M3)		
			2006	2007	2008
Central Road	YES	88.8	89	92	87
Gordon St	NO	75.0	34	35	36
Glasgow Airport	NO	88.5	-	-	25

Source: 2009 Air Quality Updating and Screening Assessment for Renfrewshire Council May 2009, BMT Cordah.

This information indicates that the annual mean for Nitrogen Dioxide is still exceeded at Central Road and that the trend for Gordon Street is an increasing figure, but not yet above the annual mean. The automatic monitoring data from the Glasgow Airport site indicates that NO_2 objectives are being met.

Figure 6.3 shows the diffusion tube monitoring data for the period 2006-2010 for NO_2 with the exceedance in annual mean figures highlighted in green.

Fig 6.3: NO_2 levels 2006-2010 (exceedance in annual mean figures highlighted in Green)

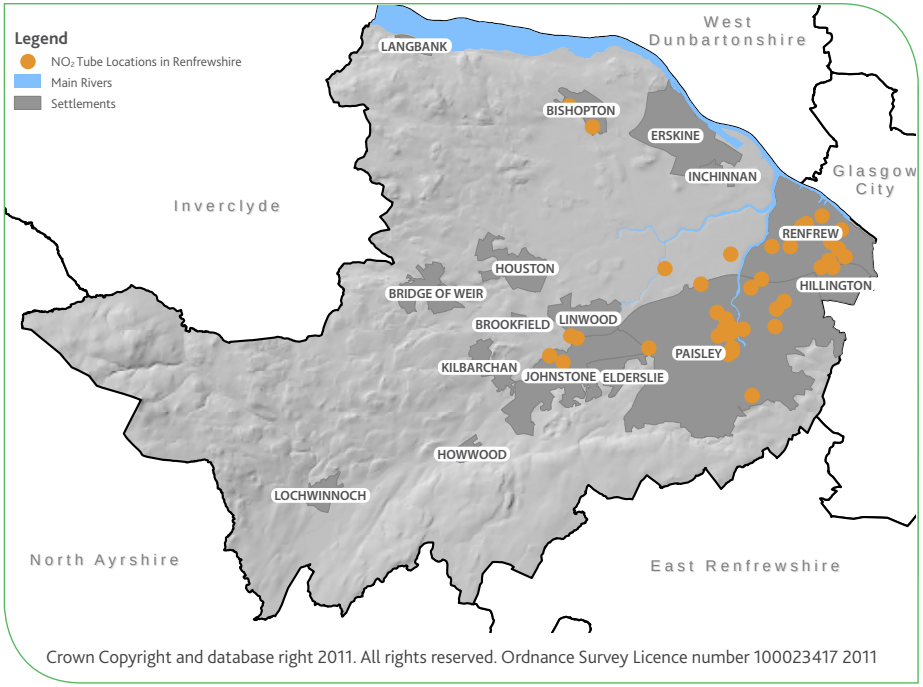
SITE ID	LOCATION	ANNUAL MEAN CONCENTRATION				
		2006	2007	2008	2009	2010
1	Gilmour Street, Paisley	21.1	24.0	27.1	23.7	28.6
2	Oakshaw Street Paisley	19.7	17.7	18.0	16.5	21.9
3	Lochfield Drive Paisley	14.1	11.5	13.0	12.4	16.6
4	Regent Street Paisley	18.1	16.2	16.1	17.5	22.6
5	Central Road Paisley	53.1	76.0	79.1	-	-
7	High Street Johnstone	29.5	33.5	34.3	28.8	37.9
8	Hairst Street Renfrew	40.1	-	37.9	40.6	40.0
9	Station Road Bishopton	15.1	16.3	13.7	14..3	16.1
13	Greenock Road Paisley	23.5	25.8	26.0	23.8	30.5
14	St Andrews Crescent Paisley	25.5	27.1	27.3	23.8	25.1
15	Montgommery Drive Paisley	32.6	34.4	37.5	30.6	36.7
17	Tanar Way Renfrew	35.3	34.8	38.6	35.5	39.8
18	Incle Street Paisley	39.0	53.9	49.2	41.1	48.7
19	Linwood Road Paisley	26.5	30.9	31.7	26.1	33.9
20	High Street Johnstone	-	44.3	34.5	33.8	44.0
21	Causeyside Street Paisley (Triplicate)	33.5	38.7	39.4	34.2	38.5
23	Hillington Road Renfrew	26.1	30.2	31.6	28.2	33.1

Fig 6.3: NO_2 levels 2006-2010 (exceedance in annual mean figures highlighted in Green)

SITE ID	LOCATION	ANNUAL MEAN CONCENTRATION				
		2006	2007	2008	2009	2010
24	Glasgow Road Renfrew	22.3	26.0	24.2	22.4	28.0
25	French Street Renfrew	17.3	16.4	17.4	15.4	20.8
27	Rossland Gardens Bishopton	10.1	10.0	11.2	10.2	14.9
30	Kintyre Avenue Linwood	19.6	15.9	17.8	18.0	21.9
31	West Walkinshaw	25.8	25.5	28.0	24.2	20.8
32	Gordon Street Paisley	40.0	44.9	47.9	37.8	-
33	76 Causeyside Street Paisley	35.1	40.6	44.4	38.7	47.5
34	63 Causeyside Street Paisley	40.4	41.7	44.7	38.9	45.1
35	Old Sneddon Street Paisley	46.0	51.7	49.9	40.1	47.8
36	37 Caledonia Street Paisley	35.9	37.5	34.5	28.5	32.6
37	Central Road Paisley (Triplicate)	60.2	73.5	68.0	48.1	40.7
38	99 Paisley Road Renfrew	31.4	34.3	37.5	32.0	32.7
39	Glasgow Airport (Triplicate)	23.2	25.2	22.6	20.8	24.2
40	Hairst Street Renfrew	39.2	36.5	22.3	31.7	34.8
41	Smithhills Street (West) Paisley	49.5	63.7	62.3	45.3	-
42	Central Road (West) Paisley	36.7	47.2	46.2	34.5	40.06
43	Smithhills Street (East) Paisley	41.8	50.4	48.7	-	-
44	Love Street Paisley	N/A	28.4	32.0	44.3	36.2
45	Xscape Renfrew	N/A	N/A	33.7	27.2	33.0
46	Ferry Village Renfrew	N/A	N/A	20.6	23.5	28.9
47	Paisley				29.0	33.6
48	Renfrew					35.7

Source 2009 Air Quality Updating and Screening Assessment for Renfrewshire Council May 2009, BMT Cordah. (The figures for 2009/2010 were provided to the dept as monthly figures and these were refined by taking the annual mean and applying the Glasgow Scientific Services overall correction factor of 0.97)

Fig 6.4: The NO_2 Tube Locations in Renfrewshire



The data shows that in 2008 there were 10 sites where an exceedence of the 2005 annual mean objective occured. These sites were all located within Paisley Town Centre. The exceedences at High Street Johnstone in 2007 and Hairst Street Renfrew in 2006 were both reduced to below the annual mean objective by 2008. When monitored over the 3 years the results indicate that overall the trend for NO_2 in Renfrewshire is rising, whilst national trends are decreasing.

Road traffic is the most significant contributor to high NO_2 levels in urban areas. Since 1999 traffic counts have been carried out at various locations across Renfrewshire. Traffic is generally increasing by approximately 0.5% per annum, however for the M8 this increases to 0.9% and for the A737 South of Howwood this is a growth of 6% per annum since 1999.

Further information on traffic growth can be found in part 12 of this report.

PM_{10}

A significant proportion of the annual mean concentrations of PM_{10} is likely to have originated from local sources such as materials that have been disturbed by passing road traffic, agricultural activity or a local combustion source, but there are occaisions when it will have been carried in from other areas. The Airborne Particles Expert Group (APEG) reported that in a year with typical weather about 15% of the total annual average of PM_{10} concentrations in the UK are derived from mainland Europe.

The environmental impacts of PM_{10} include:

- Covering of vegetation by dust;
- Deposition of pollutants changing the nutrient and chemical balance, which can lead to acidification and eutrophication;
- Deposition of heavy metals with toxic effects on animals, plants and humans;
- Transboundary transport of air pollutants as fine particles;
- Light scattering leading to the potental to offset global warming and reductions in visibility.

Measured PM_{10} concentration levels at Gordon Street Paisley indicate that the average annual concentration is below the 2010 objective. However due to low capture rates, further analysis indicated that the rates may be unrepresentatively low for annual averages. As such the risk of exceeding the 2010 annual mean PM_{10} for Paisley Town Centre cannot be determined at this time.

Sulphur Dioxide

Renfrewshire Council previously monitored SO_2 concentrations at Glasgow Airport, however as the data showed a continued substantial decrease in line with national trends this monitoring was ceased.

Other Pollutants

Renfrewshire Council does not undertake monitoring for any other pollutants.

Background Pollutant Concentrations

Nitrogen Dioxide

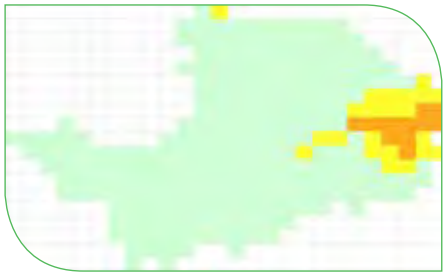
The predicted changes to the background annual mean concentrations of NO_2 are shown on figure 6.5 and 6.6 below. The highest predicted concentrations of NO_2 are expected to occur in Paisley and in Renfrew close to the boundary with Glasgow. The maximum estimated background figures show concentrations below the annual mean background objective (40ug/m3) and have decreased compared to the 2004 database predictions.

Fig 6.5: Predicted Annual Mean Background Concentrations Of NO_2

PREDICTED BACKGROUND CONCENTRATION (UG/M3)	MEAN	MAXIMUM	MINIMUM
2008 (2006 Base Year)	7.8	25.4	2.8
2010 (2004 Base Year)	7.0	22.7	2.2
2010 (2006 Base Year)	7.2	24.6	2.7

Source SEPA National Air Quality Report 2008

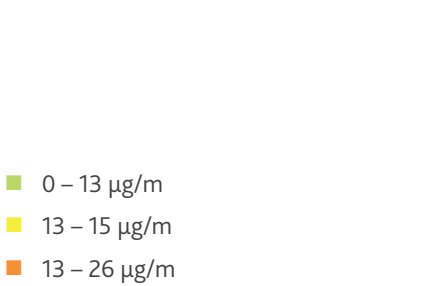
Fig 6.6: Predicted Annual Mean Background Concentrations (NO_2)



2008 Annual Mean NO_2 Concentrations (2006 Base Year)

2010 Annual Mean NO_2 Concentration (2006 Base Year)

2010 Annual Mean NO_2 Concentration (2004 Base Year)



Source SEPA National Air Quality Report 2008

Particles PM_{10}

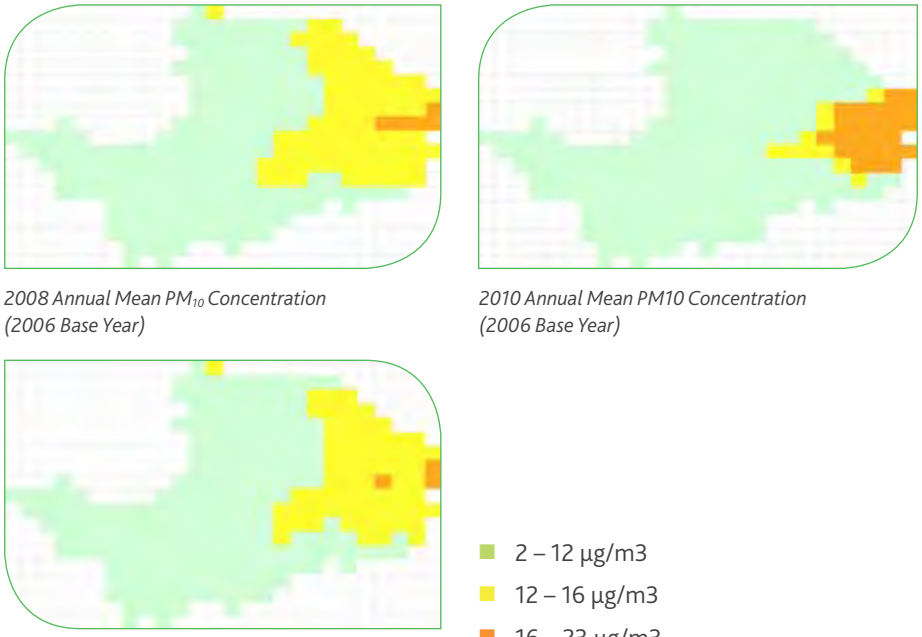
The predicted changes to the background annual mean concentrations of PM10 are shown below. The highest concentrations are predicted to occur in Paisley and Renfrew. The predictions for both 2008 and 2010 are below the annual mean objective of 18ug/m3.

Fig 6.7: Predicted Annual Mean Background Concentrations of PM_{10}

PREDICTED CONCENTRATION	MEAN	MAXIMUM	MINIMUM
2008 (2006 Base Year)	11.5	18.4	9.7
2010 (2004 Base Year)	7.0	22.7	2.2
2010 (2006 Base Year)	11.2	17.9	9.5

Source SEPA National Air Quality Report 2008

Fig 6.8 - Predicted Annual Mean Background Concentrations (PM_{10})



2008 Annual Mean PM_{10} Concentration (2006 Base Year)

2010 Annual Mean PM10 Concentration (2006 Base Year)

2010 Annual Mean PM_{10} Concentration (2004 Base Year)

Source SEPA National Air Quality Report 2008

Pollution Prevention and Control (PPC)

Under the PPC Regulations the Scottish Environment Protection Agency (SEPA) is responsible for regulating prescribed industrial activities and emissions into the air. Under the regulations SEPA requires the operator to use the best available techniques to prevent or minimise emissions from the operation of an installation in accordance with permit conditions. SEPA regularly monitors the performance of each installation regulated under PPC.

Within Renfrewshire there are currently 5 part A PPC regulated processes and 42 part B regulated processes. These processes comprise:

- Combustion and organic chemicals manufacturer;
- Producer of ready mixed concrete;
- 23 Sites for unloading of fuel at a service station;
- Bulk cement facility;
- Batching of ready mixed concrete;
- Road stone coating and concrete batching
- Manufacture of organic compounds containing nitrogen;
- Crematorium;
- Incineration of non hazardous waste in an incineration plant;
- Landfill site;
- Treatment and transfer of non hazardous and hazardous waste;
- 1 Car spraying;
- Spray coating of wooden furniture during manufacture;
- Respraying of road vehicles;
- Leather finishing;
- Tanneries;
- Abattoir;
- 6 Dry cleaners.

Local Air Quality Management Areas

In 2004 a detailed assessment was carried out of the air quality in Renfrewshire and it concluded that air quality objectives were being met for all locations with the exception of Central Road Paisley. The air quality issue was due in the main to the physical area. Central Road is enclosed by a shopping centre and multi storey car park.

The area was the main bus stops in the town centre and was the location of the only taxi rank. This area is shown on the map below. The Council declared Central Road as an Air Quality Management Area (AQMA) in 2005.

The 2006 Updating and Screening Assessment identified further potential exceedences of the Air Quality Objectives for NO2 and PM10 at several other locations within Paisley town centre outwith the existing AQMA. The Detailed Assessment in 2007 and 2008 Progress Report confirmed these exceedences and identified the main source as traffic emissions. After statutory consultations the Council declared a further AQMA within Paisley Town Centre in 2009 which included the existing AQMA. The Paisley Town Centre AQMA is shown on the map below.

Fig 6.9: Central Road Air Quality Management Area

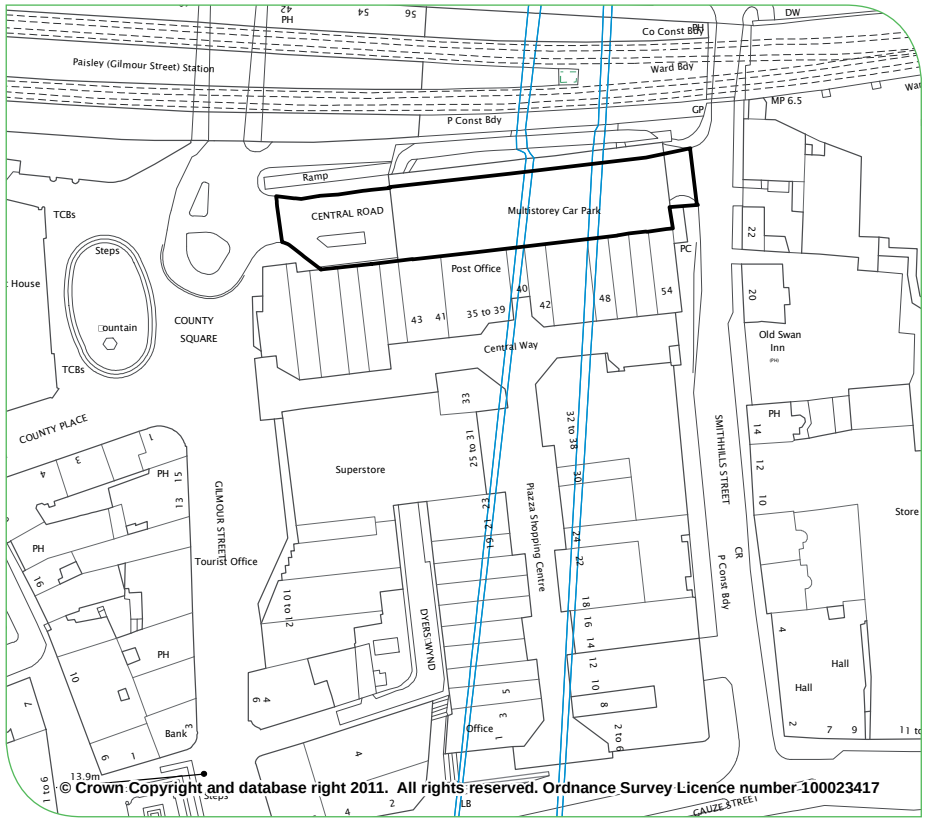
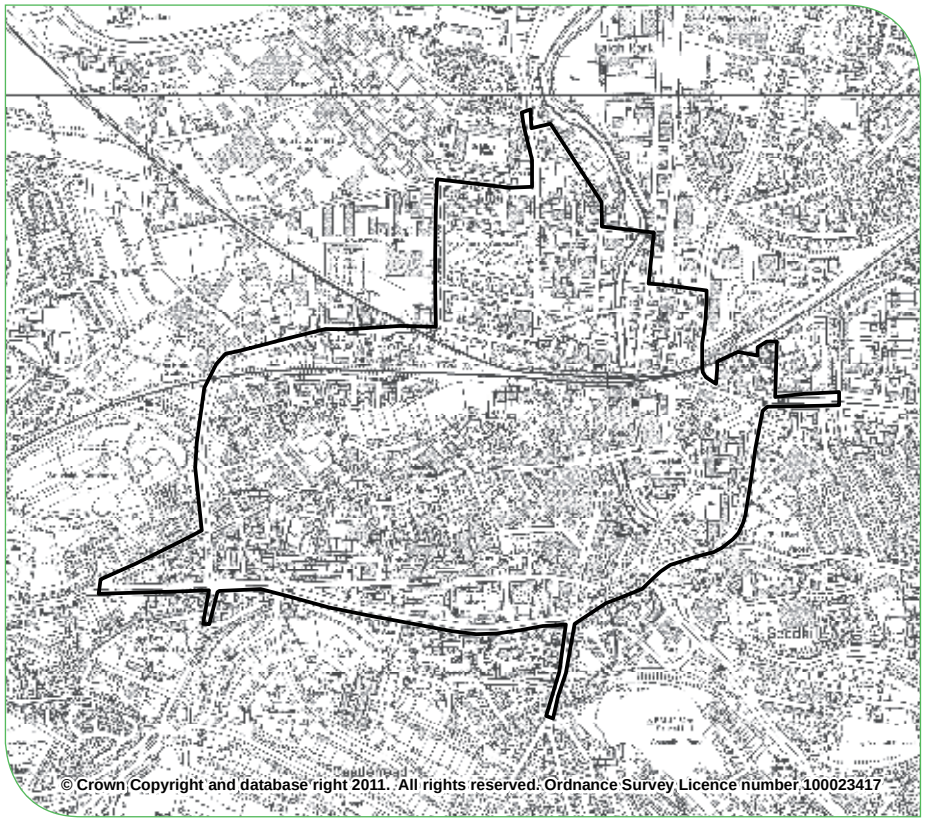


Fig 6.10: Paisley Town Centre AQMA



Complaints

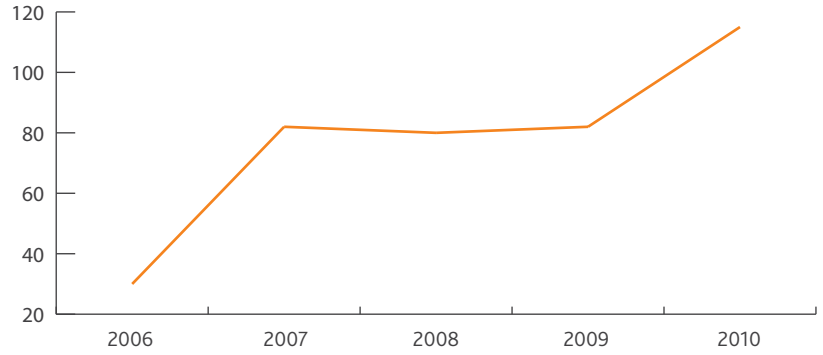
The number of complaints received regarding Air Nuisance is shown on Figure 6.11.

This shows that the total number of complaints has increased from 2006 to 2010. The graph on the right shows all complaints received since 2006.

Fig 6.11: Number of complaints received regarding Air Nuisance

	DUST	FUMES & GAS	ODOUR & GAS	SMOKE	TOTAL COMPLAINTS PER YEAR
2006	2	2	16	9	**29**
2007	5	14	32	31	**82**
2008	11	6	13	50	**80**
2009	12	7	16	47	**82**
2010	8	8	29	71	**106**
Total complaints by type 2006–2010	**38**	**37**	**106**	**208**	

Fig 6.13: Total number of complaints received 2006-2010

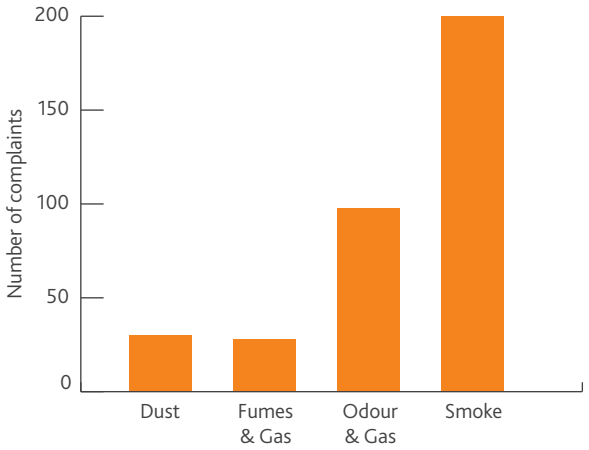


Source: Environmental Services Renfrewshire Council

The total number of complaints has increased from 29 in 2006 to 106 in 2010 which is an overall increase of 365%. The most common complaint is smoke related and these have generated more than 50% of all complaints over the period 2006-2010.

This shows that the major generator of complaints over the period 2006 – 2010 was smoke, which includes all reports of smoke nuisance.

Fig 6.12: Total number of complaints received per type of nuisance 2006-2010



Source: Environmental Services Renfrewshire Council

Measures to Improve Air Quality

Strathclyde Partnership for Transport Bus Wardens monitor bus operations across the West of Scotland with the aim of improving the quality of bus services and will also encourage bus drivers to comply with the rules on switching off engines at terminal points to reduce emissions and noise pollution and reduce the environmental impact of bus operation.

In Renfrewshire the bus wardens will enforce the provisions of Paisley Traffic Regulation Condition (TRC) that requires buses to stop only for as long as necessary to set down and uplift passengers. The wardens can move buses on from bus stops as soon as passengers have boarded. Since monitoring began, there has been a significant reduction in buses breaching the TRC and a marked improvement in traffic flow.

7 Water

SEA objectives that relate to Water:

- To reduce pollution and improve water quality
- Ensure good ecological status of water bodies
- To promote Sustainable Flood Risk Management

Renfrewshire is an area of contrast with densely urbanised towns such as Paisley and Renfrew and large expanses of rural land to the south and west. The landscape is generally low lying, however, there are a number of higher areas such as the Renfrewshire Heights. The River Clyde and its tributaries are essential to the character of the area. As the River Clyde flows west from the City of Glasgow into Renfrewshire it enters its final stages. As the river flows through Renfrewshire it widens to form the Clyde Estuary before reaching the Firth of the Clyde beyond Erskine Bridge.

A summary of the indicators used in assessing the state of Renfrewshire's environment is presented below, highlighting the current status of each indicator and the directional trend since the adoption of the Renfrewshire Local Plan in 2006.

The current status is shown by using the following colours:

- G Good
- F Fair
- P Poor
- L Limited data

The trend direction is shown with the following arrows:

- ↑ Improving
- ↓ Deteriorating
- ↔ No Change

INDICATOR	CURRENT STATUS	TREND DIRECTION	EXPLANATION
River Quality	F	↑	The quality of rivers is generally improving, however, the overall quality of stretches of some rivers within Renfrewshire is still relatively poor in.
River Flow Rate	F	↑	The annual river flow rates have decreased slightly in the last 20 years, this is closely linked to annual precipitation rates.
Standing Water Quality	L	Limited Data	The current water classification status of monitored Reservoirs and Lochs is moderate. There is limited data to report on trends or the other standing water across the area.
Water Pollution	L	Limited Data	Information Gap Number of Controlled Activities Regulations (CAR) licensed activities relating to Scottish Water discharges including Combined Sewage Overflows (CSOs), the number of Sewage Treatment Works, and the number Pollution Prevention Control (PPC) licensed activities that discharge to water or waste water. The number of water pollution incidents in Renfrewshire.
Drinking Water Quality	G	↑	Drinking water quality has improved in recent years with the number of water samples that have failed quality tests decreasing.
Flooding	F	↑	Current predictions of climate change suggest that Scotland will become warmer and wetter, sea levels may rise, ground water levels will rise and storm events will become more frequent. Flood hazards from river and coastal flooding and from intense rainfall overloading natural and artificial drainage systems are predicted to increase. Flood risk is managed through the promotion of flood prevention schemes and non structural sustainable sustainable flood risk management. Renfrewshire Council have invested in a number of major flood prevention schemes in recent years which have improved flood protection within the area. Recent investment has improved flood protection and there has not been any deterioration in terms of flooding in recent years.

Water Quality

The quality of the water environment can have a significant effect on the health of the natural flora and fauna as well as human health. Water pollution occurs when pollutants are discharged directly or indirectly into water bodies without adequate treatment to remove harmful compounds. The specific contaminants leading to pollution in water include a wide spectrum of chemicals and pathogens. Excessive nutrients and other natural materials, such as plant matter can lead to blue-green algae bloom which is toxic to humans and fauna and can deplete oxygen levels.

Scottish Environment Protection Agency's (SEPA) Water Classification System Pre 2006

In using SEPA's Pre 2006 Water Classification System the water quality classification was based on:

- Chemical quality assessments;
- Biological/ecological quality assessment;
- Aesthetic assessment; and,
- Toxic substances

The overall quality class was based on the lowest class determined from the chemical, biological, aesthetic and toxic monitoring. See figure 7.1 for an outline of the water quality classification categories.

Fig 7.1: SEPA Water Quality Classification (Pre 2006)

CLASS	DESCRIPTION	CLASS	DESCRIPTION
A1	Excellent	C	Poor
A2	Good	D	Seriously Polluted
B	Fair	E	Unclassified

(www.sepa.org.uk)

Water Framework Directive (WFD) Classification System Detailed within the River Basin Management Plan 2009–2015

The classification of surface water bodies detailed within The River Basin Management Plan 2009-2015 describes by how much their condition, or status, differs from near natural conditions. Water bodies in a near natural condition are classified at high status. Those whose ecological quality has been severely damaged are at bad status. Each surface water body in given an overall classification (High, Good, Moderate, Poor, or Bad) based and an assessment of a wide range of human activities and chemical and biological impacts. This overall classification status is made up of many different tiers of classification data.

The classification system also indicates where there is high confidence that action is needed to improve the water environment and where the need for action is less clear. This information provides the basis for prioritising action or targeting further monitoring effort. The overall classification results for individual surface water bodies within Renfrewshire are detailed in figures 7.2 and 7.3. Further information is available using the interactive map available on SEPA's website at www. gis.sepa.org.uk/rbmp.

Principal Water-Courses

Figure 7.2 and 7.3 detail the principle water courses that flow through Renfrewshire. The tables identify the quality of the sampled stretch of water which is based on the WFD classification system and is detailed within The River Basin Management Plan 2009-2015. It is important to note that the way water quality is classified changed post 2006. The scheme used pre-2006 was designed to describe the cleanliness of waters based on chemical and biological assessments. In contrast, the current overall classification describes the impact on the water environment on a wide range of human activities, not just pollution pressures.

River Cart

Fig 7.2: Principle Water Courses in Renfrewshire – Water Quality Classifications

PRINCIPLE WATER COURSE	CATCHMENT	LENGTH (KM)	WATER QUALITY – TREND 2000-2006	CURRENT OVERALL CLASSIFICATION 2009
White Cart Water (Kittoch Water to Hamills Weir)	White Cart Water	19.96	↑ B (Fair)	Poor ecological potential
Candrens Burn	Glasgow Coastal	9.15	↑ Almost 3.5 Km reclassified from C (Poor) to B (Fair)	Bad ecological potential
Old Patrick Water	Black Cart Water	10.78	↓ Reclassified from A2 (Good) to B (Fair)	Moderate
Dubbs Water	Black Cart Water	4.18	↑ Reclassified from A2 to A1	Poor ecological potential
Maich Water	Black Cart Water	9.31	↔ A1 – no records before 2003	High
Roebank Burn (d/s Barcraigs Reservoir)	Black Cart Water	6.78	↔ A1 – no records before 2003	Good ecological potential
Roebank Burn (u/s Barcraigs Reservoir)	Black Cart Water	3.11	↔ A1 – no records before 2003	Moderate
River Calder (u/s Castle Semple Loch)	Black Cart Water	16.60	↑ Fluctuates between B and A2, A2 in 2006	Poor
River Gryfe (d/s Barochan Burn)	River Gryfe	2.62	No records	Moderate
River Gryfe (Gryfe Reservoirs to Barochan Burn conf)	River Gryfe	21.36	↔ A2 – no records before 2004	Good ecological potential
Dargavel Burn	Glasgow Coastal	8.55	↔ A2	Poor
Barochan Burn	River Gryfe	9.04	↔ A1 – no records before 2003	Moderate
Locher Water	River Gryfe	12.82	↑ Reclassified from B to A2	Moderate
River Calder (u/s Castle Semple Loch)	Black Cart Water	0.10	↔ Mostly A2, A1 2003, B 2004	High
Black Cart Water	Black Cart Water	11.99	↑ Reclassified from C to B	Bad ecological potential

(www.sepa.org.uk)

Fig 7.3: Clyde Estuary – Water Quality Classifications

PRINCIPLE WATER COURSE	AREA (KM2)	WATER QUALITY – TREND 2000-2006	CURRENT OVERALL CLASSIFICATION
Clyde Estuary - Outer	70.74	↑ Improved from Good to Excellent	Moderate
Clyde Estuary - Inner (inc Cart)	4.40	↔ Unsatisfactory	Moderate ecological potential

(www.sepa.org.uk)

General Changes in River/Estuarial Water Quality 2000-2006

Water quality in the lower reaches of the Black Cart Water (Renfrew) improved considerably at the end of 2004. Under Scottish Water's investment programme Q&S II both the Sewage Treatment Works (STW) in Johnstone and Linwood closed in December 2004. Both effluents are now diverted to the Clyde Estuary via the new Erskine STW. Following these closures almost 4 km of the Black Cart Water downstream from the former discharges has shown an improvement in water quality[2].

Unsatisfactory Combined Sewer Overflows (uCSOs) have been a problem in the Paisley area. Work in relation to the Candren Burn was initiated in 2005 and more than half of this watercourse (almost 3.5 km) has since been reclassified from Class C (poor) to Class B (fair)[3].

Cart Estuary

The Cart Estuary consists of riverine water from the White Cart Water and Black Cart Water mixing with the waters from the Clyde Estuary. The first biological classification survey of the Cart Estuary was carried out in 2000 by assessing the invertebrate fauna dwelling in riverbed sediments. The survey found that the fauna of the Black Cart Water at Bascule Bridge Inchinnan was composed entirely of freshwater fauna species[4].

The Cart Estuary was mainly Class C (poor) or D (seriously polluted) throughout this period and remains heavily impacted from benthic disturbance, aesthetic problems from the Paisley STW and associated CSO discharges. Waters of the White Cart are still heavily impacted through modified invertebrate fauna and poor aesthetics. A recurring foaming problem at Paisley STW adversely affected the estuary receiving water, but this was resolved in 2004. A major oil spill from Glasgow International Airport in 2004 further stressed the estuary, pushing some areas into a lower class status for over a year[5].

River Calder

Clyde Estuary

The Clyde Estuary is a complex hydrodynamic area where freshwater from the River Clyde and its tributaries mix with seawater from the Firth of Clyde. The water quality further from Glasgow has improved in recent years, reducing the areas classed as poor water quality. However, the inner estuary retained its Class C (poor) quality designation in 2006 due to low dissolved oxygen levels and aesthetic/litter problems.[6] These trends are illustrated in figures 7.4 and 7.5.

2 SEPA. Scotland's Water Environment Review 2000-2006

3 SEPA. Scotland's Water Environment Review 2000-2006

4 SEPA. Scotland's Water Environment Review 2000-2006

5 SEPA. Scotland's Water Environment Review 2000-2006

6 SEPA. Scotland's Water Environment Review 2000-2006

Fig 7.4 - Clyde Estuary classification, 2000 (Source: www.sepa.org.uk)

Fig 7.5: Clyde Estuary classification, 2006 (Source: www.sepa.org.uk)

An improvement in the aesthetic condition of the Clyde Estuary between Erskine and Milton has enabled an area of 2.6 km2 to be upgraded. This improvement resulted from an upgraded system at the Bowling STW where sewage is now screened (to collect debris) and transferred via a pumping station. High flows were reflected by much improved dissolved oxygen levels in the middle estuary between Dalmuir and the Leven confluence. In addition, the foaming problem at Dalmuir STW has recently declined, resulting in the upgrading of a further 0.7 km2 of the estuary[7].

The inner estuary from Glasgow to near Erskine was completely devoid of oxygen at certain seasons during the 1970s. The steady improvement in the 1980s coincided with the return of salmon to the Clyde in 1983 after an absence of over 120 years. This marked the culmination of a century of effort to restore to health one of the worst polluted river basins in Britain[8].

A number of pressures (both current and historic) mean the improvement in water quality in the inner estuary is more modest than that of the outer estuary. The general improvement is a consequence of:

- decline of ship-building and other industry on the Clyde;
- better integrated pollution control;
- improvements to the surrounding sewerage systems[9].

7 SEPA. Scotland's Water Environment Review 2000-2006

8 'Cleaning the Clyde – A Century of Progress', D. Hammerton, 1986. Journal of the Operational Research Society, Vol. 37, 911-921

9 SEPA. Scotland's Water Environment Review 2000-2006

River Flow

River flow rates are affected by the amount of water in the catchment and as such the level and intensity of rainfall. Average rainfall within Renfrewshire has generally increased over the last 125 years[10]. Figure 7.6 details the total annual rainfall during the last 20 years. This graph demonstrates a slight downwards trend, however, it should be noted that rainfall amounts have been variable during this period, ranging between 1424mm and 842mm per year. Total rainfall was recorded as 1240mm in 2009.

Gauging stations within Renfrewshire are listed in figure 7.7 with links to a summary of flow information for each station.

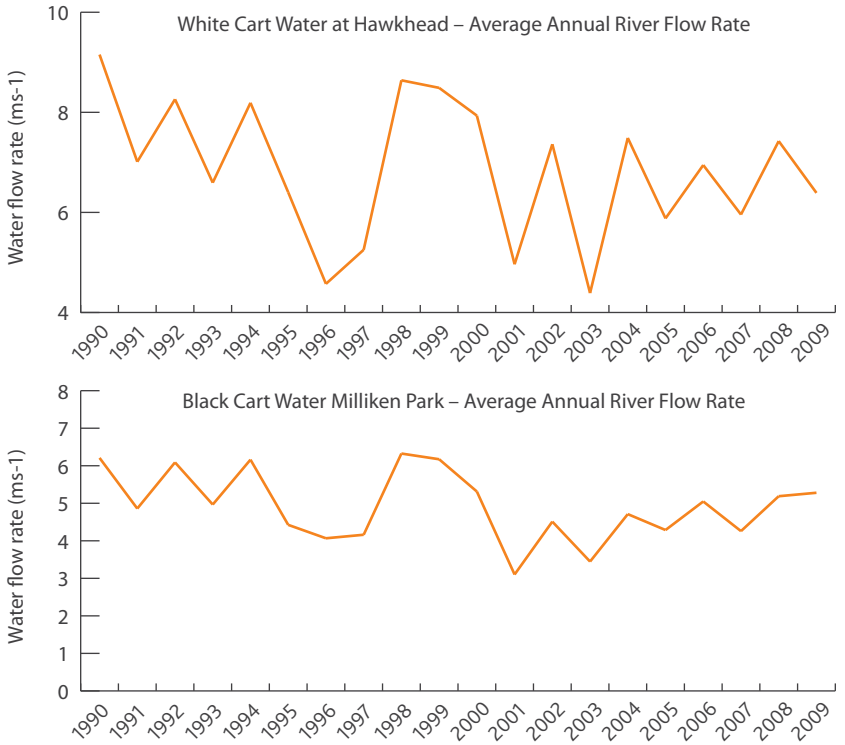
Fig 7.7: River Gauging Stations within Renfrewshire (CEH www.nwl.ac.uk)

NO.	RIVER	LOCATION	AREA (KM2)	AVAILABLE DATA PERIOD	LINK
84002	Calder	Muirshiel	12.4	1952-2001	www.ceh.ac.uk/data/nrfa/data/station.html?84002
84011	Gryffe	Craigend	71	1963-2008	www.ceh.ac.uk/data/nrfa/data/time_series.html?84011
84012	White Cart Water	Hawkhead	234.9	1963-2008	www.ceh.ac.uk/data/nrfa/data/station.html?84012
84017	Black Cart Water	Milliken Park	103.1	1967-2008	www.ceh.ac.uk/data/nrfa/data/station.html?84017

The average annual river flow rates over the last 20 years are detailed in figure 7.8 for the gauging stations at White Cart Water (Hawkhead) and Black Cart Water (Milliken Park). There has been a slight downwards trend in river flow rate at each of the stations in line with the annual rainfall trends for the same period. While rainfall

Fig 7.6: Changes in Rainfall Amounts within Paisley
(Created using data provided by Coats Observatory, Paisley)

Fig 7.8: Trends in yearly mean water flow rates at two river gauging stations
(Created using flow archive data CEH www.nwl.ac.uk)



10 Records from Coats Observatory, Paisley

is an important factor in river flow rates it should be noted that river flows are the combined result of the many climatological and geographical factors which interact within a drainage basin.

Standing water bodies

Lochs and Reservoirs

The quality of standing waters (Lochs and Reservoirs) is classified using the WFD, similar to the river quality classification. In Renfrewshire there are 4 water bodies that have been classified by SEPA in the River Basin Management Plan. All of the water bodies are classified overall as being of Moderate quality[11]. Figure 7.9 details the classification of each of the Lochs and Reservoirs.

Fig 7.9: Water Classifications for Lochs and Reservoirs in Renfrewshire

WATER BODY	OVERALL STATUS 2008	OVERALL CHEMICAL 2008	OVERALL ECOLOGICAL 2008
Castle Semple Loch	Moderate with High Confidence	Pass	Moderate
Barr Loch	Moderate with High Confidence	Pass	Moderate
Barcraigs Reservoir	Moderate with Moderate Confidence	Pass	Bad
Kilbirnie Loch	Moderate with High Confidence	Pass	Moderate

(www.sepa.org.uk)

Groundwater

There are 7 ground water bodies within or intersecting Renfrewshire that have been classified by SEPA based on complex hydrological, qualitative and quantitative tests. These water bodies vary from 10.89 km2 to 274.56 km2. 6 are classified by SEPA as of good status and 1 is of poor status. The groundwater that is of poor status is the Paisley and Rutherglen bedrock and localised sand and gravel aquifers[12].

Water Pollution

Point Source

The Water Environment and Water Services Act (WEWS) requires any activity likely to cause pollution to be authorised. SEPA currently uses this act to control discharges to the environment.

Point source discharge means a release of effluent or other matter to the water environment or land, via a fixed installation, pipe, outlet or otherwise. This includes:

- sewage and trade effluent;
- surface water discharges from urban areas;
- abandoned mine discharges.[13]
- Diffuse Pollution

Unlike point source pollution, which enters a river course at a specific site such as a pipe discharge, diffuse pollution occurs when potentially-polluting substances leach into surface waters and groundwater as a result of rainfall, soil infiltration and surface runoff. The source of this pollution is usually due to a recent or past activity on land and can take the form of a diversity of contaminants. Examples of diffuse pollution include, pesticides from a wide range of land uses, the use of fertiliser in agriculture and forestry, contaminants from roads areas of hard surface, and atmospheric deposition of contaminants arising from industry. Diffuse pollution from each of these sources have significant impacts on water quality in Renfrewshire.

Drinking Water Quality

Public Supply

Scottish Water carried out a total of 10,187 tests on tap samples within Renfrewshire during 2009 to test the quality of the public water supply. Figure 7.10 details the findings of the tests that were undertaken in 2008 and 2009. There was a general improvement in the quality of the public water supply in 2009 with 6 of the tests being failed as opposed to the 14 that were failed the previous year.

11 The River Basin Management Plan 2009-2015 – www.sepa.org.uk

12 The River Basin Management Plan 2009-2015 – www.sepa.org.uk

13 www.sepa.org.uk

Fig 7.10: Quality of Public Water Supply in Renfrewshire

PARAMETER	TOTAL NO. OF TESTS (2008)	TOTAL NO. OF FAILS	% OF FAILS	TOTAL NO. OF TESTS (2009)	TOTAL NO. OF FAILS	% OF FAILS
Total	10,339	14	0.14	10,187	6	0.06

(Drinking Water Quality in Scotland 2009, Annual Report by the Drinking Water Quality Regulator.)
2009: http://www.dwqr.org.uk/reports/DWQ2009.pdf
2008: http://www.dwqr.org.uk/reports/DWQR_Annual_Report_2008.pdf

Private Supply

In the UK private water supplies are defined as any water supply that is not provided by a statutory water undertaker and in which the responsibility for its maintenance lies with the owner or person who uses the supply. The Council is responsible for ensuring that the quality of water from private water supplies complies with the Private Water Supplies (Scotland) Regulations 2006. Renfrewshire has 116 registered private water supplies. In 2009, compliance with microbiological standards was poor, with 27.27% of samples failing the total coliforms standard and 18.18% of samples failing the E. coli standard. Failures of the total coliforms standard do not necessarily mean that there is a risk to health, but they do indicate that there is no disinfection, inadequate disinfection or a breach in the water supply system. E. coli is an indicator of faecal contamination. There was an improvement in compliance with the total coliforms standard when compared with 2008, when 46.67% of samples failed the standard, but compliance with the E. coli standard dropped – in 2008, 6.90% failed the E. Coli standard. Compliance with the pH standard was poor at 84.21%; failures of the pH standard increase the risk of metals from plumbing materials dissolving into supplies. Compliance with the lead standard was also poor, with 25.00% of samples failing the standard[14].

Waste Water Treatment

The main issue in the Renfrewshire with regards to water quality is the water quality within the Muirdykes Water Operational Area. In November last year Scottish Water received a number of customer complaints within this zone due to black water coming out of taps – this is known as manganese (an organic compound which isn't actually harmful but aesthetically doesn't look good). There are high levels of manganese in the reservoirs each year around October /November. The reservoirs supply Muirdykes Wastewater Treatment Works (WTW) which has no means of filtering the manganese out. Therefore Muirdykes WTW is putting water into distribution with higher levels of manganese than permitted.

The areas worse affected are Quarrelton (South), Linwood (South), Clippens, Johnstone (South), Brookfield, Craigend and Kilbarchan. The issues appear to have settled down but Scottish Water are aware that they still need to be addressed. The Drinking Water Quality Regulator have issued an 'Undertaking' to Scottish Water which requires them to be informed about what will be done to resolve the issue. Within the distribution system Scottish Water are planning to bring mains rehab work forward (starting later this year). Scottish Water Solutions are currently investigating the best method of addressing the manganese issues at Muirdykes WTW (includes possible work at the reservoirs, adding secondary filtration at Muirdykes WTW or closing Muirdykes WTW and supplying the area from an alternative works).

There are currently performance problems associated with Johnstone pumping station and therefore development of sufficient scale would require a Drainage Impact Assessment to ensure that there are no additional spills from the Combined Sewer Overflows.

There are no capacity issues associated with Laighpark WTW's, however, there has been instances of flooding in Paisley at Cotton Street, Seedhill Road, Lanfine Road, Glasgow Road and Buchlyvie Road as there are capacity issues within the main trunk sewer causing it to back up and flood. Scottish Water are currently working on network schemes to look into these flooding issues.

Flooding

Flooding in Renfrewshire

Major flooding has taken place in Paisley, Johnstone and Houston in the recent past and the north of Renfrew has been subject to regular flooding from the River Clyde. Renfrewshire experienced major flood events in 1994, 1999 and most recently in December 2006. Flood events in Renfrewshire are typically characterised by a complex interaction between intense rainfall events, watercourses exceeding peak flow capacities, surface water run-off

14 (Drinking Water Quality in Scotland 2009, Annual Report by the Drinking Water Quality Regulator.) 2009: http://www.dwqr.org.uk/reports/DWQ2009.pdf

from developed areas, a lack of capacity in the sewerage system and the tidal influence of the Clyde. The key flooding issue in the urban area within Renfrewshire, as seen in December 2006, relates to the lack of capacity in the sewerage system and local watercourses which is exacerbated by overland flow (water which becomes concentrated and flows across land after heavy rainfall).

Current predictions of climate change suggest that Scotland will become warmer and wetter, sea levels may rise, ground water levels will rise and storm events will become more frequent. Flood hazards from river and coastal flooding and from intense rainfall overloading natural and artificial drainage systems are predicted to increase. The increased threat of flooding could potentially impact on Renfrewshire's economy, disrupt the transportation network and increase the risk to residential and commercial properties.

Flood Risk

Regional flood mapping for Renfrewshire maps flood risk for three sources of flooding: Pluvial; Fluvial; and, Coastal. The availability of Light Detection and Ranging (LiDAR) data for the majority of Renfrewshire offers improved ground topographic data to update the fluvial and coastal elements of the mapping and allows new pluvial effects to be accuretly defined.

Figure 7.11 details the types of ground floor properties that are at risk of flooding within Renfrewshire. It identifies that there are 13,610 properties in Renfrewshire identified through the 1/200 year flood risk mapping that are at risk of flooding. Of the 13,610 properties that are at risk, 94% are at risk of pluvial flooding. This is flooding from rainfall generated overland flow before the runoff enters any watercourse or sewer. It is usually associated with summer thunderstorms or high intensity rainfall within longer duration events. There are 1,930 properties in Renfrewshire at risk of fluvial flooding, this equates to 2.2% of the total property in Renfrewshire. The risk of coastal flooding is less widespread with 252 properties identified within the 1/200 year coastal flooding area.

Flooding Incidents

There were a total of 345 flood incidents across Renfrewshire recorded between 1st January 2000 and 1st October 2010 (flood records are being updated after this date). It should be noted that not every temporary covering by water of land not normally covered by water constitutes a flood. Renfrewshire Council only records a flood when it is considered to result in affects on human health, the environment, cultural heritage and economic activity, or combinations thereof. There were no recorded floods in Renfrewshire during 2009-2010. This does not mean that there were no temporary coverings of land by water, however, none of these were considered to be of sufficient scale or result in the type of affects that would warrant them to be recorded as a flood.

The recorded flooding incidents form the basis for assessment of risk and resulting management measures to be undertaken through the Local Flood Risk Management Plan promotion in 2015/16.

Figure 7.11: Number of ground floor properties in Renfrewshire at risk of flooding within the 1/200 pluvial, fluvial and coastal flood zones (2009)

	PLUVIAL	FLUVIAL	COASTAL	TOTAL NUMBER OF PROPERTIES AT RISK
Commercial/Industrial	1,304	349	66	1,503
Residential	11,508	1581	185	12,107
Total	12,812	1,930	251	13,610

(Renfrewshire Council – Renfrewshire Flood Mapping 2009)

Our Role

The Council is working in conjuction with neighbouring local authorities, Scottish Water and SEPA on the development of a Flood Risk Management Plan as required under the Flood Risk Management Scotland Act (2009) to promote measures and policies to address flood risk from all sources. Renfrewshire Council has been involved in developing specimen long term maintenance agreements for sustainable drainage in new developments and network sharing (Section 7 Agreements).

Flood maps have been produced for most of Renfrewshire. The probability and the risk of flooding from all sources is considered when preparing the development plan and when deciding planning and building standards applications

Renfrewshire Council have discretionary powers to promote flood prevention schemes and have a duty to assess watercourses in our area to determine whether the condition of any of them is likely to cause flooding of non-agricultural land.

A system of inspection and clearing of watercourses and grids at key locations

throughout Renfrewshire has been introduced. How often these inspections take place depends on the season and, to some extent, on weather predictions. The Council also have a responsibility to maintain and repair watercourses where such action reduces the risk of flooding substantially, for example, where there is an obstruction which may block a river and cause flooding to other property. However, the principal owner still has the primary responsibility.

Flood Prevention Measures

The storm events of winter 2006 generally showed that the works to date on flood prevention and protection and on watercourses both buried and open have been successful, with the sewers generally being seen to discharge in isolation. However there were still significant urban fringe overland flows which led to flooding within Renfrewshire.

Measures implemented within Renfrewshire have included major flood prevention schemes on the Black Cart and River Gryffe, two major flood barriers (Collier Street, Johnstone and Crosslee), and one major storage scheme at Moredun / Stanely Reservoirs (Moredun Reservoir stores 25,000 m3). The £8m flood prevention work at Renfrew North commenced in 2008, when complete in 2011/12 this will protect local businesses, residential properties and road infrastructure from high water levels in the River Clyde. Other measures have included culvert upgrades, screen upgrades, debris traps and other measures intended to bring the minimum conveyance potentials up to the average over the length of the watercourse.

Significant mapping of flood areas has also been undertaken and to date Renfrewshire is well advanced in this respect. Uniquely Renfrewshire Council have developed maps of pluvial hazard and not just tidal and watercourse effects.

Renfrew North Flood Prevention Scheme

Work commenced in 2008 to create a flood prevention scheme for the north of Renfrew in accordance with the Flood Prevention (Scotland) Act 1961.

Phase 1 of the work involved the construction of flood embankments and retaining walls as well as the diversion of the Mill Burn culvert. The embankments have been created between the Scottish Water sewage pumping station off North Lodge Road and Meadowside Street/Neil Street. In addition, ramping of Ferry Road to the north of the junction with King's Inch Road will be introduced to provide initial 1 in 10 year flood protection (prior to the erection of a demountable barrier) and halt progress of flood waters into premises surrounding Canal Street and the town centre.

Phase 1 created physical flood bunds and partial Mill Burn diversion and retaining wall creation.

Phase 2 involved the dredging of 10,000 tonnes of sediment from the river's bed before the foundations are laid for the new pumping station. This work is now complete.

Phase 3 will see the creation of a pumping station in the vicinity of Primrose Quay. This will ensure that the waters of the Mill Burn will be discharged into the River Clyde for up to a 1 in 200 year tidal surge - decreasing flood risk from these sources. Work is due to commence during late 2011/ early 2012 and it is expected that this phase will take 15 months to complete.

Once Phase 3 is complete the £8m flood prevention work will ensure that the area will have a 1 in 200 year level of flood protection from the combined risks of Mill Burn flow and tidal surge from the River Clyde. This is particularly important to protect Renfrew Town Centre in addition to the significant development that is currently taking place to transform Renfrew North in line with the Council's policy of sustainable development.

| 8 | Climate Change

SEA objectives that relate to Climate Change:

- Reduce green-house gas emissions
- Increase energy efficiency
- Reduce Renfrewshire's carbon foot print
- Adaptation and mitigation

There is substantive scientific evidence that points towards human activity causing changes in the Earth's climate. In particular the generation of greenhouse gases (GHG) from industrial activity and the destruction of GHG absorbing natural systems are causing an effect. The evidence is now widely accepted across the international community. Changes have now been observed in many different climate variables, in addition to temperature: the amount of moisture in the atmosphere; continuing sea-level rise; and a decreasing Arctic sea-ice extent. All are consistent with a long-term warming trend. The period 2000–2009 was warmer than the 1990s that, in turn, were warmer than 1980s. The average temperature over the first decade of the 21st century was significantly warmer than any preceding decade in the instrumental record, stretching back 160 years. Despite variability from year to year — which sees some years warmer and others cooler — a clear underlying trend of increasing global temperatures from the late 1970s of about 0.16 °C per decade has been identified.

A summary of the indicators used in assessing the state of Renfrewshire's environment is presented below, highlighting the current status of each indicator and the directional trend since the adoption of the Renfrewshire Local Plan in 2006.

The current status is shown by using the following colours:

G Good
P Poor
F Fair
L Limited data

The trend direction is shown with the following arrows:

↑ Improving
↓ Deteriorating
↔ No Change

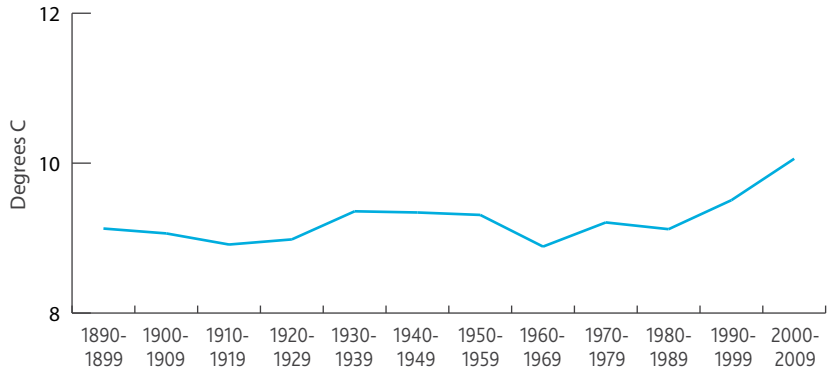
INDICATOR	CURRENT STATUS	TREND DIRECTION	EXPLANATION
Green house gas emissions	F	↑	The figure is reducing in line with the national trend.
Energy Consumption	F	↑	Energy consumption has decreased slightly, this appears to be a continuing trend which Renfrewshire will need to continue if we are to make a significant contribution to national targets.
Carbon Footprint	P	↓	Renfrewshire's Carbon footprint has increased which follows the national trend. If we are to address carbon emission levels caused by our rate of production and consumption we need to reverse this trend and reduce Renfrewshire's Carbon Footprint
Overall Flood Risk on economy, environment, cultural heritage and human health	F	↑	Water course inspection, cleaning and repair and non-structural sustainable flood risk management continues to reduce overall floodrisk

Renfrewshire's Climate

The Met Office collects data about Britain's climate. Statistics have been collected for Paisley since the late 19th century. Although there will be areas of Renfrewshire that demonstrate slight variations in rainfall and temperature, the data for Paisley gives a good indication of any trends that may be evident.

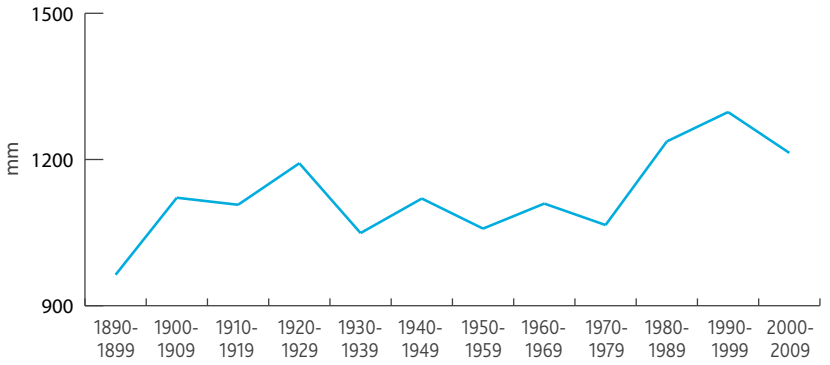
Figure 8.1 shows mean or average temperature data and a clear trend indicating a rise in mean temperature. The mean temperature between 2000 and 2009 was 10.1°C, however the mean temperature between 1890 and 1899 was 9.1°C showing a significant increase of 1°C in just over 100 years. More detailed analysis of the data shows that the greatest

Fig 8.1: Paisley: Mean Temperature by Decade (1885–2009)



Source: Met Office (www.metoffice.gov.uk)

Fig 8.2: Paisley: Mean Rainfall by Decade (1890–2009)



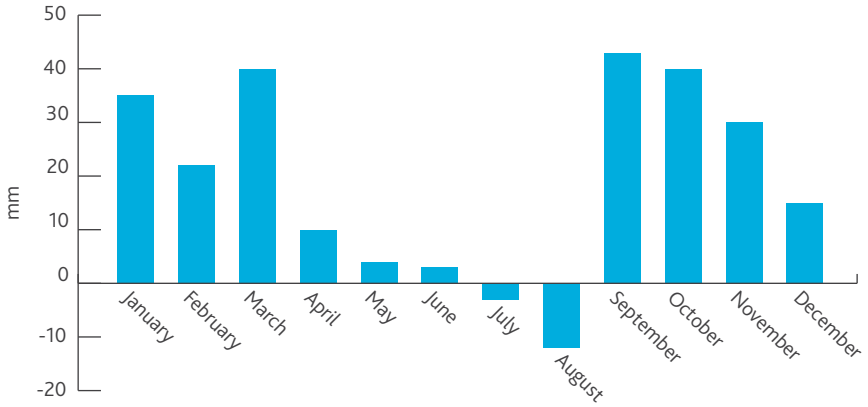
Source: Met Office (www.metoffice.gov.uk)

temperature increases have taken place in March, May, August and October. Both May and August show an increase of over 1°C. Such an increase suggests that the 'summer season' is lengthening. As a corollary to this, winter temperatures have shown an average increase of around 0.5 degree. The change demonstrated in Renfrewshire reflects that of the rest of the UK. Nationally, the growing season has lengthened due to spring starting earlier and the delayed onset of autumn/winter. Wildlife experts have noted that many species are changing their behaviour, from butterflies appearing earlier in the year to birds starting to change their migration patterns.

Figure 8.2 shows how the mean rainfall over the last 100 years has increased. Over the decade 1890 – 1899, the mean rainfall was 9635mm, however, by 2000 – 2009 the figure had increased to 12136mm. The diagram demonstrates that there have been fluctuations in the mean rainfall figure, with a significantly drier period between 1940 and the late 1980s.

Figure 8.3 demonstrates how changes in the rainfall patterns in Renfrewshire are matching those nationally. Over the last 125 years, there have been large increases in the rainfall in January, February, March, September, October, November, December. Winters are getting wetter and the summer months of July and August

Fig 8.3: Paisley: Change in Mean Monthly Rainfall (1890–2009)



Source: Met Office (www.metoffice.gov.uk)

have shown a significant decrease in rainfall. These climatic shifts along with more extreme weather events will have a dramatic impact on Renfrewshire's environment, population, wildlife habitats, homes and transport.

Climate Change Commitments

Green house gases (GHG) are gases in the earth's atmosphere that absorb and re-emit infra-red radiation. These gases occur through both natural and human-influenced processes. The major GHG is water vapour. The Kyoto-Protocol includes the following GHGs: carbon dioxide, methane, nitrous oxide, HFCs, PFCs, SF6. It is recognised that global emissions of GHGs must be reduced in order to minimise the impacts of climate change. The Kyoto Protocol is the international agreement setting stringent targets for 2012 on the reduction of the main GHG emissions.

The UK Climate Change Programme sets out policy priorities for action within the UK to address both the causes and consequences of climate change, whilst the Climate Change Act 2008 creates a new approach to tackling climate change. The Act sets ambitious reduction targets, whilst enhancing the ability to adapt to the impact of climate change and establishing clear accountability to devolved and local administrations. The UK's Climate Change Programme published in March 2006, described measures to ensure that the UK delivers its legally binding target under the Kyoto Protocol to reduce emissions of the basket of the six greenhouse gases to 12.5% below base year levels over the first commitment period 2008–2012, and to move the UK towards its domestic goal of a 20% reduction in carbon dioxide emissions below 1990 levels by 2010. The 2008 Act also places an emphasis on Scottish Government and local authorities to undertake actions reducing local GHG emissions. The UK is on track to meet, and surpass, its Kyoto target, with UK emissions in 2010 predicted to be 23.6% below base year levels, 11.1% lower than required by the Kyoto agreement.

The Scottish Government's Climate Change Programme, 'Changing Our Ways', sets out a programme of actions to tackle climate change, including ambitious reduction targets for emissions, as set out in the Climate Change (Scotland) Bill. The Bill sets out a long-term framework for delivering the Scottish Government's 80% reduction target for GHG emissions by 2050.

Renfrewshire Council is a signatory to the 'Climate Change Declaration'; re-affirming the Council's commitment to addressing the impacts on and adapting to the effects of climate change. To deliver the Council's commitment to the declaration the Council has recently reviewed its Carbon Management Plan in association with the Carbon Trust. A Sustainable Development Strategy is being developed and the Council has become involved in some key national projects.

Greenhouse Gas Emissions

The increase in global temperature is linked to the rise in atmospheric CO_2 and other GHG's, released by human activities. The United States, China, and the European Union together account for approximately 50% of the global GHG emissions, with the UK's contribution at approximately 2%. Most of the GHGs, however, remain in the atmosphere over a long period of time continually contributing to global warming therefore, the cumulative effect of these emissions is considered as important in measuring a country's contribution to climate change. As a consequence the UK's contribution to climate change increases to 6%.

UK Emissions

In 2008, UK emissions of the six GHGs covered by the Kyoto Protocol were estimated to be 629.8 metric tonnes CO_2 equivalent, with CO_2 the main GHG, accounting for about 85% of the total UK emissions. Reductions in GHG emissions have been recorded across the residential and business sectors, whilst increases have been recorded in the energy and transport sectors.

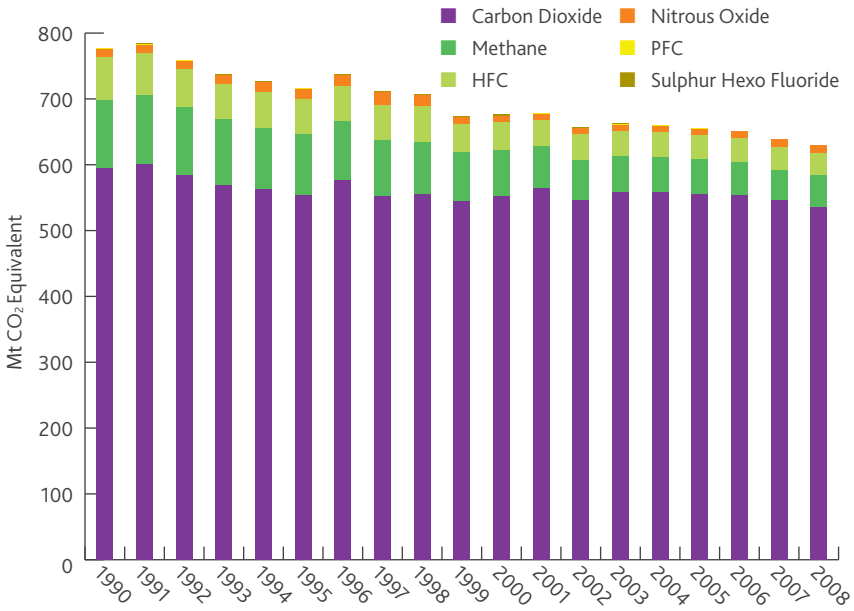
The largest contribution to greenhouse gas emissions arises from the energy sector. In 2008 this contributed 85% to the total emissions including relevant OTs. Emissions of CO_2, methane and nitrous oxide all arise from this sector. Since 1990, emissions from the energy sector have declined by about 12%. The second largest source of greenhouse gases is the agricultural sector. Emissions from this sector arise for both CH_4 and N2O. Since 1990, emissions from this sector have declined by 21%, due to a decline in emissions from enteric fermentation and agricultural waste disposal, see figure 8.4.

Scotland's Emissions

The emissions of GHGs differ in Scotland than the rest of the UK, due to the following:

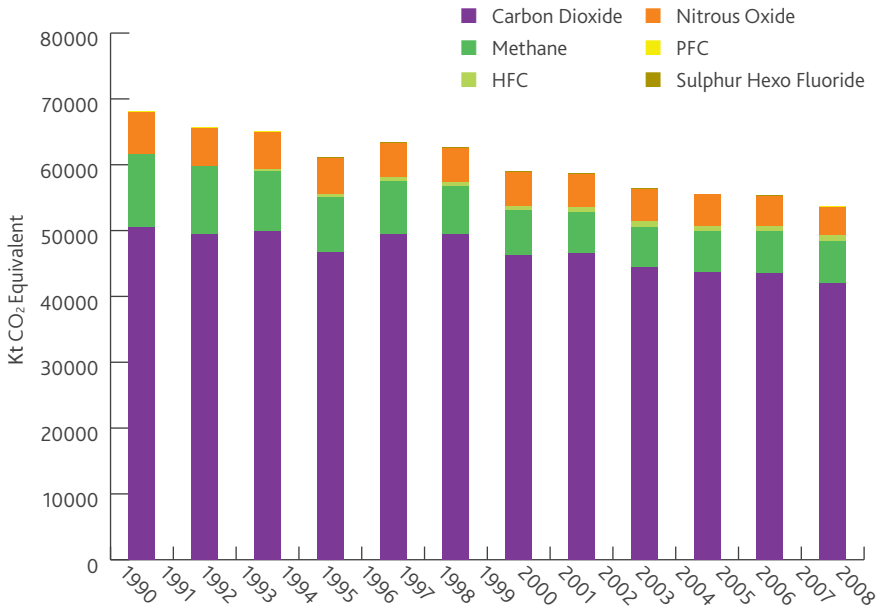
- Lower number of large-scale industrial sources;
- Higher domestic heating emissions partially due to a cooler climate, exposed buildings and a higher proportion of traditional solid wall buildings;

Fig 8.4: UK Greenhouse Gas Emissions



Source: (www.defra.gov.uk)

Fig 8.5: Scotland's Greenhouse Gas Emissions, 1990 - 2008



Source: www.naei.org.uk

- Lower car ownership levels in urban areas and a higher use of public transport and a high annual vehicle mileage in rural areas;
- Significant carbon-sink from land use.

A carbon sink is a natural or artificial reservoir that accumulates and stores some carbon-containing chemical compound for an indefinite period. The process by which carbon sinks remove carbon dioxide from the atmosphere is known as carbon sequestration. The main natural sinks are absorption of carbon dioxide by the oceans via physicochemical and biological processes and photosynthesis by terrestrial plants. Artificial carbon sinks can also be created, however, these are not as effective as their natural counterparts.

Figure 8.5 illustrates the trends for Scottish GHG emissions from 1990 to 2008. As with the UK, emissions are dominated by CO_2 with significant contributions from CH_4 and N2O, whereas the contributions from the remainder are relatively small. The overall emissions of GHG in Scotland have decreased by 13.4% against the 1990/95 baseline. However there was a 5% increase in emissions between 2005 and 2006 to 53,700 kilotonnes CO_2 equivalent, primarily due to changes in electricity supply Scotland has an 8.4% share of UK GHG emissions in 2008, and the trend in emissions since the Base Year on an end user basis is -27.1% across all GHGs.

The main greenhouse gas (GHG) emitted in Renfrewshire is CO_2, derived from transport, industry and domestic sources (such as heating, lighting and cooking). In order to mitigate climate change both the cause and consequences of this phenomenon must be addressed. Renfrewshire must play its part in contributing to the national 80% reduction target for GHG emissions, whilst also adapting to a changing climate.

Fig 8.6: Greenhouse Gas Emissions for Renfrewshire

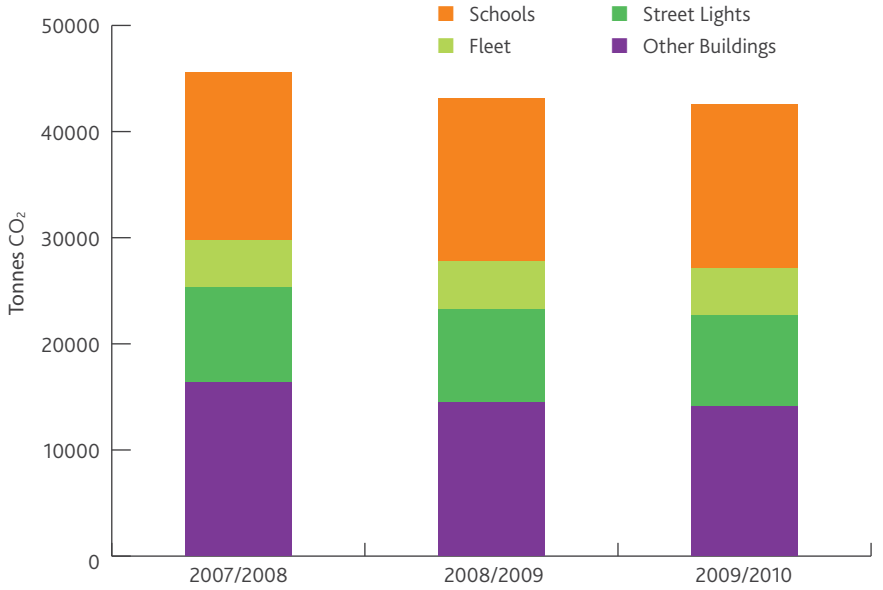
YEAR	INDUSTRY AND COMMERCIAL (KT*)	DOMESTIC (KT)	ROAD TRANSPORT (KT)	LULUCF** (KT)	TOTAL (KT)	PER CAPITA EMISSIONS (T)
2005	513	439	359	13	1,325	7.8
2006	531	437	354	12	1,335	7.9
2007	520	427	357	12	1,317	7.8
2008	480	430	349	11	1,270	7.5

** kilo tonnes ** Land Use, Land Use Change and Forestry*
Source: www.decc.gov.uk[15]

Figure 8.6 provides the carbon emission figures for Renfrewshire based on levels of production of carbon. Overall the figures show a significant decrease in the amount of carbon that is being produced within Renfrewshire as an area. After a small rise in carbon emissions between 2005 and 2006 the trend has been downwards with a total reduction of 3.8% in the per capita emissions since 2005 for Renfrewshire. There is a wide variation in this figure across the Scottish Local Authorities, however, Renfrewshire is within the top ten (8th) best performing authorities. The most significant decrease has been in the Industry and Commercial sector of a 7% reduction in emissions overall.

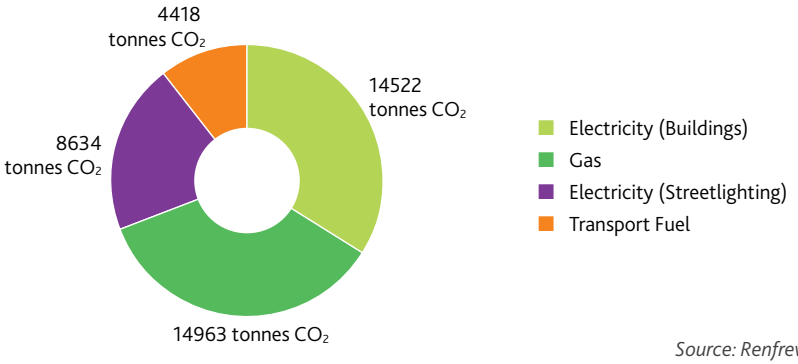
Figure 8.7 shows the total emissions for Renfrewshire Council (as an organisation and one of the largest employers within Renfrewshire) were 42,538 tonnes CO_2 for the year 2009/10. The total for 2009/10 shows a reduction of 4.59% on the 2007/08 baseline figure.

Fig 8.7: Time Series of Carbon Emissions for Renfrewshire Council by Source



Source: Renfrewshire Council

Fig 8.8: CO_2 Emissions for Renfrewshire Council 2009/10

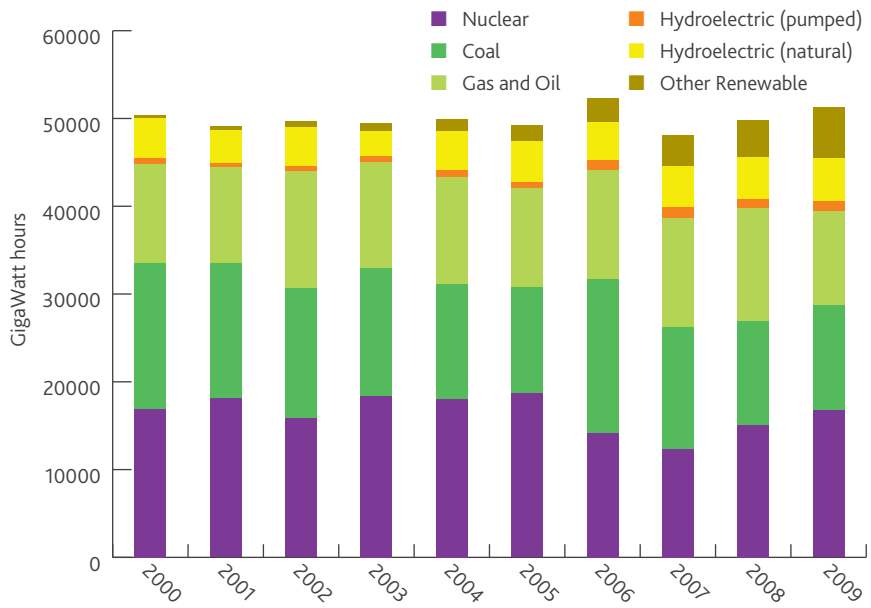


Source: Renfrewshire Council

The new Carbon Management Programme (CMP) was approved by the Council in April 2010. Through the CMP, the Council is committed to reducing CO_2 emissions to 25% below the 2007/08 baseline year by March 31, 2014 (including emissions from the fleet vehicles and streetlights). The emissions for this are shown in figure 8.8. There has been a continued decline since the baseline year; which represents an almost 5% reduction. (It should be noted that this figure does not include heating oil for 2009/10).

15 http://www.decc.gov.uk/en/content/cms/statistics/climate_change/gg_emissions/uk_emissions/2008_local/2008_local.aspx

Fig 8.9: Electricity Generation



Source: www.scotland.gov.uk and /www.decc.gov.uk/

Scottish Energy Production and Consumption

A major source of Carbon is from the generation of electricity by the combustion of fossil fuels which is demonstrated by figure 8.9. Fossil fuels accounted for 44% of Scotland's electricity generation in 2009[16]. Coal and gas are the two main fossil fuels used for electricity generation, with oil used to a lesser extent. There was a slight upward trend in generation from gas from 2005 to 2008 – but this dropped back in 2009 to its lowest level in the 21st century.

16 Energy in Scotland: A Compendium of Scottish Energy Statistics and Information, http://www.scotland.gov.uk/Resource/Doc/933/0110153.pdf

The Scottish Government has set emissions reduction targets which are supported by targets for renewable energy. Achieving these outcomes will require major changes in energy generation and use. In order to meet the targets set in the Climate Change (Scotland) Act 2009 the Scottish Government produced a Climate Change Delivery Plan (June 2009) which identified two transformational outcomes for the energy sector:

- a largely de-carbonised electricity generation sector by 2030;
- a largely de-carbonised heat sector by 2050 with significant progress by 2030.

Renewables will play a key role in Scotland's transformation to a low-carbon economy. The Scottish Government set out its strategic approach in the Renewables Action Plan and Renewable Heat Action Plan. Scotland is committed to a target of 20% of total energy use coming from renewable sources by 2020 with sectoral targets as follows:

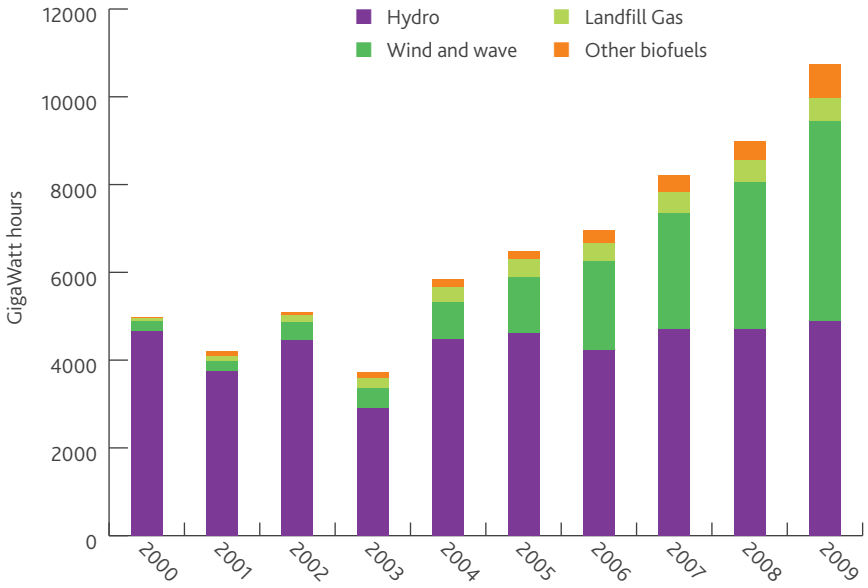
- Electricity – annual renewable electricity generation to be the equivalent of 80% of gross annual electricity consumption by 2020, with an interim target of 31% by 2011. *(Figure 8.10 shows that in 2009, the equivalent of 27.4% of gross electricity consumption was from renewable sources and that the amount of electricity generated by renewables in Scotland has more than doubled since 2000.)*
- Transport – 10% share of biofuels in transport petrol and diesel consumption by 2020. *Biofuels had a 2.4% share in the UK as a whole in 2008.*
- Heat – 11% of heat demand to be met from renewable sources by 2020. Compared to a March 2009 baseline, the target requires a more than sevenfold increase in renewable heat generation.

It is recognised that many of the lowest-cost emissions reductions can be achieved by lowering the demand for energy. Energy efficiency measures, such as cavity wall insulation, have the twin benefits of reduced greenhouse gas emissions and lower energy bills. The Scottish Government published the "Conserve and Save: Energy Efficiency Action Plan" in October 2010. The action plan introduces a headline target to reduce Scottish final energy consumption by 12% by 2020.

Scotland's energy sector benefits from a strong natural resource base:

Extensive renewable energy resources. Scotland already has significant installed hydro and onshore wind electricity generation capacity. There is considerable potential for offshore wind, wave, and tidal power.

Fig 8.10: Renewable Energy Generation and Consumption 2000 – 2009



Source: www.scotland.gov.uk and www.decc.gov.uk/

Oil and gas production rates in excess of Scotland's total energy consumption, and large remaining reserves in offshore fields.

Large storage sites for carbon capture and storage (CCS) - Scotland has sufficient capacity for at least 200 years.

Figure 8.10 below provides greater detail on how much electricity is being produced from renewable resources in Scotland and consumption rates. The increase in the generation of electricity by wind and wave which is only a small proportion of this total, is evident.

Energy Consumption in Renfrewshire

There is a clear link between energy use and the level of GHG emissions. By gaining a better understanding of energy consumption in Renfrewshire, it should be possible to start to address energy efficiency measures and work towards amelioration of the trends that we are starting to experience associated with climate change.

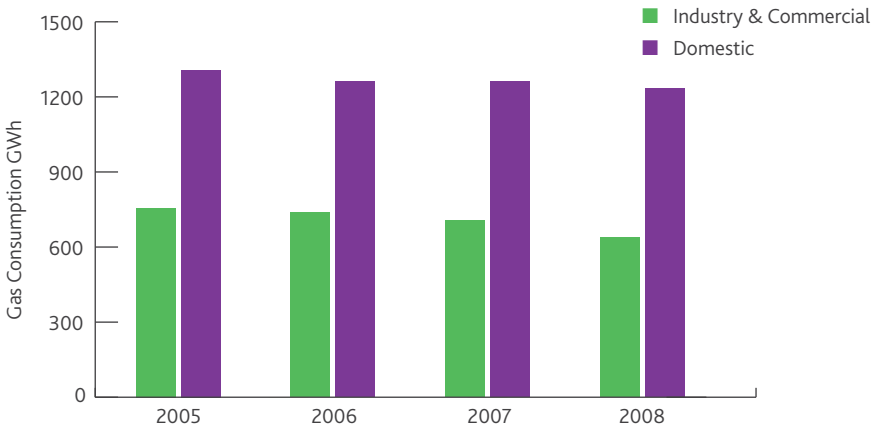
Gas Consumption

Figure 8.11 outlines the gas consumption in Renfrewshire. Domestic use of gas is considerably higher than that for industrial and commercial consumption, however, both demonstrate a downward trend. The highest consumption figures in Scotland for 2008 were for Glasgow, at 6,380 GWh. Renfrewshire was 10th highest at 1871 GWh (or 3% of the national total) out of the 32 Local Authorities. There is a high dependancy on gas as a fuel for central heating, hence, the high consumption.

Electricity

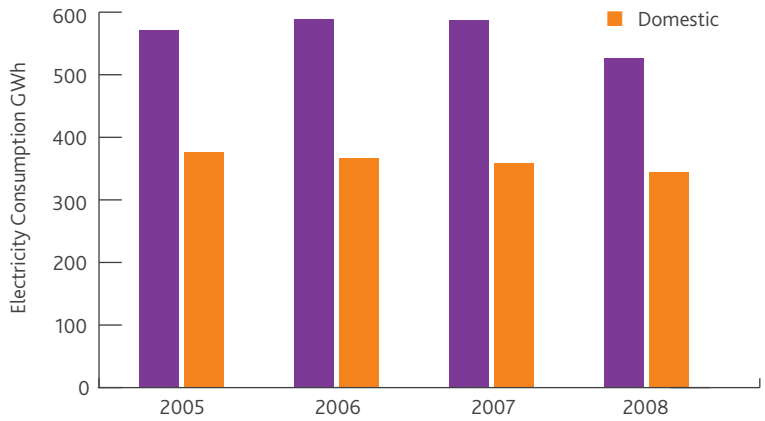
Figure 8.12 shows that electricity consumption in Renfrewshire for the industrial and commercial sector far exceeds that of the domestic sector. The trend for the industrial and commercial sector shows an increase between 2005 and 2006 before it declined to 527 GWh in 2008. Domestic consumption is considerably lower and has shown a steady decline between 2005 and 2008. When compared with the other Scottish local authorities in 2008, Renfrewshire has the 11th highest consumption figure at 871 GWh or 3% of the national total.

Fig 8.11: Gas Consumption in Renfrewshire



Source: www.decc.gov.uk/

Fig 8.12: Electricity Consumption in Renfrewshire



Source: www.decc.gov.uk/

The reduction in both electricity and gas consumption in the industrial and commercial sector may be due in part to energy saving measures and energy efficiency, however, it may also be a reflection of a restructuring of the economy.

Road and Transport Fuel

Emissions from vehicles make a significant contribution to pollution levels and green house gasses in the atmosphere. Air quality has been significantly reduced in certain parts of Renfrewshire due to traffic and the emission of NOx (nitrogen oxides), CO (carbon monoxide) and CO_2 (carbon dioxide). In order to address this an Air Quality Management area has been designated in Paisley and further information about this and the monitoring or air quality in Renfrewshire can be found in the Air Quality chapter of this document.

Figure 8.13 shows total consumption of road and transport fuel in Renfrewshire has declined slightly between 2005 and 2008. The amount on fuel consumed by petrol cars has declined slightly by 2.8k tonnes, however, the amount of fuel consumed by diesel cars has increased by 4.3k tonnes. In 2008, the highest consumption of transport fuel was by City of Glasgow at 242.7k tonnes, whilst Renfrewshire was 22nd out of the 32 local authorities with a total consumption of 97.4k tonnes.

Ecological and Carbon Footprint

Traditional methods of accounting for an area's greenhouse gas emissions measure the direct emissions of all the industries, homes, vehicles and land use within the area's boundary. These are known as territorial or production impacts and are the emissions targeted in the Scottish and UK Climate Change Acts. In addition to counting territorial impacts, the footprint

Fig 8.13: Renfrewshire: Road Transport Energy Consumption

Source: www.decc.gov.uk/

approach also considers the impacts associated with the production of goods and services, and attributes the impact to the place and person where goods are bought and consumed. These are known as indirect impacts. Many of the goods we purchase are produced, and impacts caused, in other parts of the world. In order to fully account for the impact of a good or service, the footprint approach takes into account the full supply chain of production, summing the impacts through the chain.

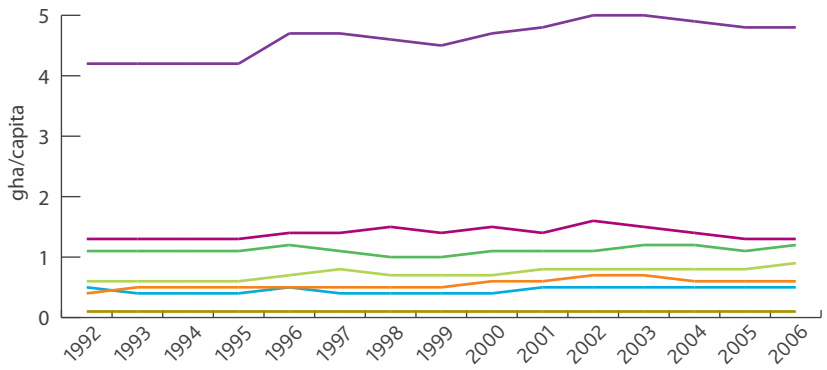
In April 2009 the Stockholm Environment Institute[17] published a report that estimated Scotland's green house gas and ecological footprint[18] for the first time. In addition to the traditional measures of emissions from industrial plants, vehicle exhausts and buildings on Scottish territory, emissions from consumer goods bought from abroad were considered. It is useful to compare these two measures because, while it is important to reduce emissions territorially, if consumption is driving an increase in emissions outside a country's boundary then any territorial reductions may be offset by increases elsewhere. The resulting figures reveal that the country's carbon emissions have actually increased by 11% to 85 million tonnes between 1995 and 2004. This contrasts with government figures that Scotland's territorial emissions had fallen by 13% to 57 million tonnes over the same period. The main explanation for the discrepancy is that the manufacture of goods and materials in Scotland has declined, while imports have dramatically increased. The pollution attributable to imports nearly tripled from 10.6 to 28 million tonnes between 1995 and 2004.

Figure 8.14 shows the ecological footprint per capita from 1992 to 2006. Since 1992 the ecological footprint of Scotland has increased by 13.8%, from 4.2 gha/capita to 4.8 gha/capita. This equates to an average annual increase of 0.9%. This increase is noticeable from 1992 to 2003, but there has been a slight decline in recent years. Since 2003, the footprint has declined by 5%. Given the complex nature of the background to the Ecological Footprint it cannot be assumed that this decline will continue. The figures also indicate that the overall impact of Scotland's consumption is not sustainable and that we are essentially living beyond our means.

17 Production Of A Time Series Of Scotland's Ecological and Greenhouse Gas Footprints by SEI, (2009) Scottish Government Social Research (http://www.scotland.gov.uk/Resource/Doc/289580/0088635.pdf)

18 The Ecological Footprint is usually described in terms of global hectares (gha). This is a hectare of land with world average bio-productivity – a world-average ability to produce resources and absorb waste.

Fig 8.14: Scotland's Ecological Footprint per Capita by Theme 1992-2006



Renfrewshire Carbon Footprint

A 'carbon footprint' measures the total greenhouse gas emissions caused directly and indirectly by a person, organisation, event or product. The footprint considers all six of the Kyoto Protocol greenhouse gases. A carbon footprint is measured in tonnes of carbon dioxide equivalent (tCO_2e). The carbon dioxide equivalent (CO_2e) allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of CO_2.

The Council has access to the Resource Energy Analysis Programme (REAP) which provides information about consumption based emissions for the whole of Renfrewshire and it enables local authorities to develop scenarios that will reduce their Carbon and Ecological footprints. The figures listed below take in to account both production and consumption. Figure 8.15 demonstrates that Renfrewshire's carbon footprint is lower than the national average and provides a comparison between the Scottish Council's with the lowest and highest carbon footprints., as is the figure for greenhouse gas emissions.

Fig 8.15: Carbon footprint Comparisons

	2001 CARBON FOOTPRINT (TONNES CO2 PER CAPITA)	2008 CARBON FOOTPRINT (TONNES CO2 PER CAPITA)	2011 CARBON FOOTPRINT FIGURE(TONNES CO2 PER CAPITA)	DIFFERENCE BETWEEN 2001-2011 FIGURES (TONNES CO2 PER CAPITA)
Renfrewshire Council	11.42	11.96	12.27	0.54
North Lanarkshire Council (lowest Carbon footprint)	11.40	11.54	11.65	0.25
Orkney Isles (highest Carbon footprint)	12.94	13.30	13.85	0.91
Scotland	11.71	12.60	12.49	0.78

Source: Stockholm Environment Institute

From figure 8.15 it can be seen that Renfrewshire's Carbon footprint has increased since 2001 from 11.42 tonnes CO2 per capita to 12.27 tonnes CO2 per capita. Scotland's footprint has also increased and this is a trend experienced by all other local authorities. When considering the trend between 2001 and 2011 in more detail, Renfrewshire's carbon footprint has increased at a faster rate than some other local authorities. If the growth between 2008 and 2011 is compared, however, Renfrewshire's carbon footprint) has grown faster than the national figure i.e, a growth of +0.31 tonnes CO2 per capita as opposed to the national growth figure of +0.11 tonnes CO2 per capita. The trend may in part be due to a refinement of the footprint data and complex calculations associated with establishing the final figures. On balance, however, it still suggests that in Renfrewshire carbon consumption is still increasing and at a faster rate than the national average.

Figure 8.16 demonstrates that over 60% of Renfrewshire's Carbon footprint can be attributed to housing (consumption of energy within homes for heating and living etc.), transport, and food. Across Scotland there is a similar trend. Over 20% of the Carbon footprint can be attributed to consumer items (clothing, electrical equipment, furniture etc.)

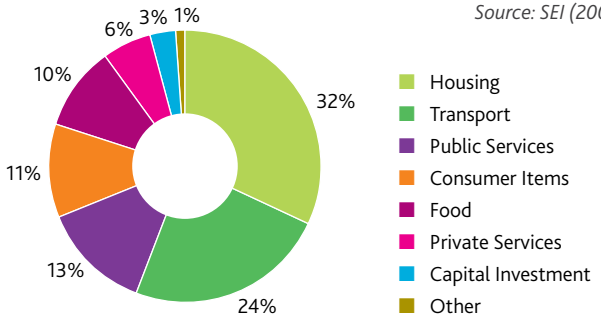


Fig 8.16: Renfrewshire's Carbon Footprint by Theme
Source: SEI (2008)

and public services (recreation, postal services, insurance etc). In order to make a significant impact on reducing Renfrewshire's Carbon Footprint, the main focus should be on the housing, transport and food related elements of the Carbon Footprint.

Ecological Footprint

An Ecological Footprint is an alternative measure of global resource consumption. This is a measure of the total environmental burden humans place on the planet. The Ecological Footprint represents the area of land needed to provide raw materials, energy and food, and to absorb pollution and waste created. It is measured in global hectares and is expressed as a per person measure (gha/capita).The ecological footprint is a measure of the area needed to support a population's lifestyle. It includes the consumption of food, fuel, wood, and fibres. Pollution, such as carbon dioxide emissions, is also counted as part of the footprint. Globally, people are using about 25% more natural resources than the planet can replace. The Global Footprint Network (GFN) calculates that the world average ecological footprint is 2.2 hectares per person. The GFN have also calculated the amount of biologically productive area on earth, and divided it equally amongst the world population

with a figure of 2.1 hectares of land with world average productivity. Currently in the UK, we're consuming three times our fair share of the planet's natural resources and in Scotland we are also living beyond fair share. As a country, we would require three planets (4.6 global hectares2) of resources to provide us with everything that we consume at present.

Renfrewshire's Ecological Footprint is 0.06 global ha per capita less than the Scottish average and it is slightly higher than the figure for the UK (figure 8.17). Figure 8.17 also demonstrates how the different measures of consumption based carbon figures are comparable; for example, Orkney consistently demonstrates the highest figure for ecological, carbon and greenhouse gas footprint, and North Lanarkshire has the lowest. For truly sustainable development where we are living within the Earth's capital or resource availability, there is a strong argument that we should be aiming to reduce our ecological footprint to a situation where we only consume resources that are the equivalent of what is called a 'One Planet Future'. To do so, we would have to have lifestyle where we only used our fair share of the planet's natural resources, rather than the 'Three Planet' lifestyle that we currently lead.

Fig 8.17: Ecological, Carbon and Greenhouse Gas Footprints for Renfrewshire (2010)

	ECOLOGICAL FOOTPRINT (GLOBAL HA PER CAPITA)	CARBON FOOTPRINT (CO2 PER CAPITA)	GREENHOUSE GAS FOOTPRINT
Renfrewshire	4.69	12.27	16.40
Orkney	5.23	13.85	18.35
North Lanarkshire	4.43	11.65	15.56
Scotland	4.75	12.49	16.66
UK	4.64	12.10	16.24

The Greenhouse Gas Footprint (GHGF) represents the total amount of greenhouse gases that are directly and indirectly caused by human activities. The GHGF is measured in carbon dioxide equivalent tonnes per capita (tCO2e/capita) and includes carbon dioxide, methane, nitrous oxide and other harmful greenhouse gases.

Fig 8.18: Ecological, Carbon and Green House Gas Comparison

	ECOLOGICAL FOOTPRINT (GLOBAL HA PER CAPITA)	CARBON FOOTPRINT (CO2 PER CAPITA)	GREENHOUSE GAS FOOTPRINT
Renfrewshire	5.26	11.96	16.21
Scotland	5.43	12.16	16.46
UK	5.30	12.08	16.34

Source: REAP v2 Experimental release: 15-10-08.[19] Published by SEI 2008.

19 http://www.resource-accounting.org.uk/downloads

Scotland's Climate Change Declaration

In 2007, all 32 local authorities in Scotland signed up to Scotland's Climate Change Declaration (SCCD). Signatories to the SCCD acknowledge the importance of climate change and are committed to:

- mitigating their impact on climate change through reducing greenhouse gas emissions;
- taking steps to adapt to the unavoidable impacts of a changing climate;
- working in partnership with their communities to respond to climate change.

The Declaration recognises that Scottish local authorities play a key role in our collective response to the challenge of climate change, and publicly demonstrates their commitment to action.

Signatories to Scotland's Climate Change Declaration are committed to producing an annual report, detailing their progress in mitigating, and adapting to, climate change. In August 2010, all Council Leaders in Scotland were formally contacted by the Chair of COSLA's Climate Change Task Group, with a request that their local authority complete their SCCD Annual Report for 2009 - 2010. Renfrewshire Council has submitted to the Sustainable Scotland Network and it will be available on the following web site: http://climatechange.sustainable-scotland.net/.

The Council's Report on the Climate Change Declaration outlines the Council's carbon emissions and reflects the cross Service actions that have been taken with regard to Climate Change adaptation and mitigation. It highlights some of the innovative action undertaken by the Council in order to meet the challenges associated with Climate Change. In particular, it demonstrates how Services are working together, in partnership with other agencies, to reduce emissions and promote adaptation. It is anticipated that the SCCD Annual Report may form the basis for the reporting mechanism required under the forthcoming Climate Change (Scotland) Act 2009 Public Sector Duties which came into effect on 1st January 2011.

| 9 | Geology and Landscape

SEA objectives that relate to Geology and Landscape:

- To strengthen landscape character
- To protect and enhance natural resources
- To conserve and manage the Green Belt

Renfrewshire's landscape is diverse in terms of landscape character and land uses. The landscape is an important asset for the area and landscape character is what makes an area unique. Successfully managing landscapes helps contribute to peoples' enjoyment of their environment which in turn creates health benefits as well as supporting biodiversity and contributing to the local economy.

A summary of the indicators used in assessing the state of Renfrewshire's environment is presented below, highlighting the current status of each indicator and the directional trend since the adoption of the Renfrewshire Local Plan in 2006.

The current status is shown by using the following colours:

G Good
P Poor
F Fair
L Limited data

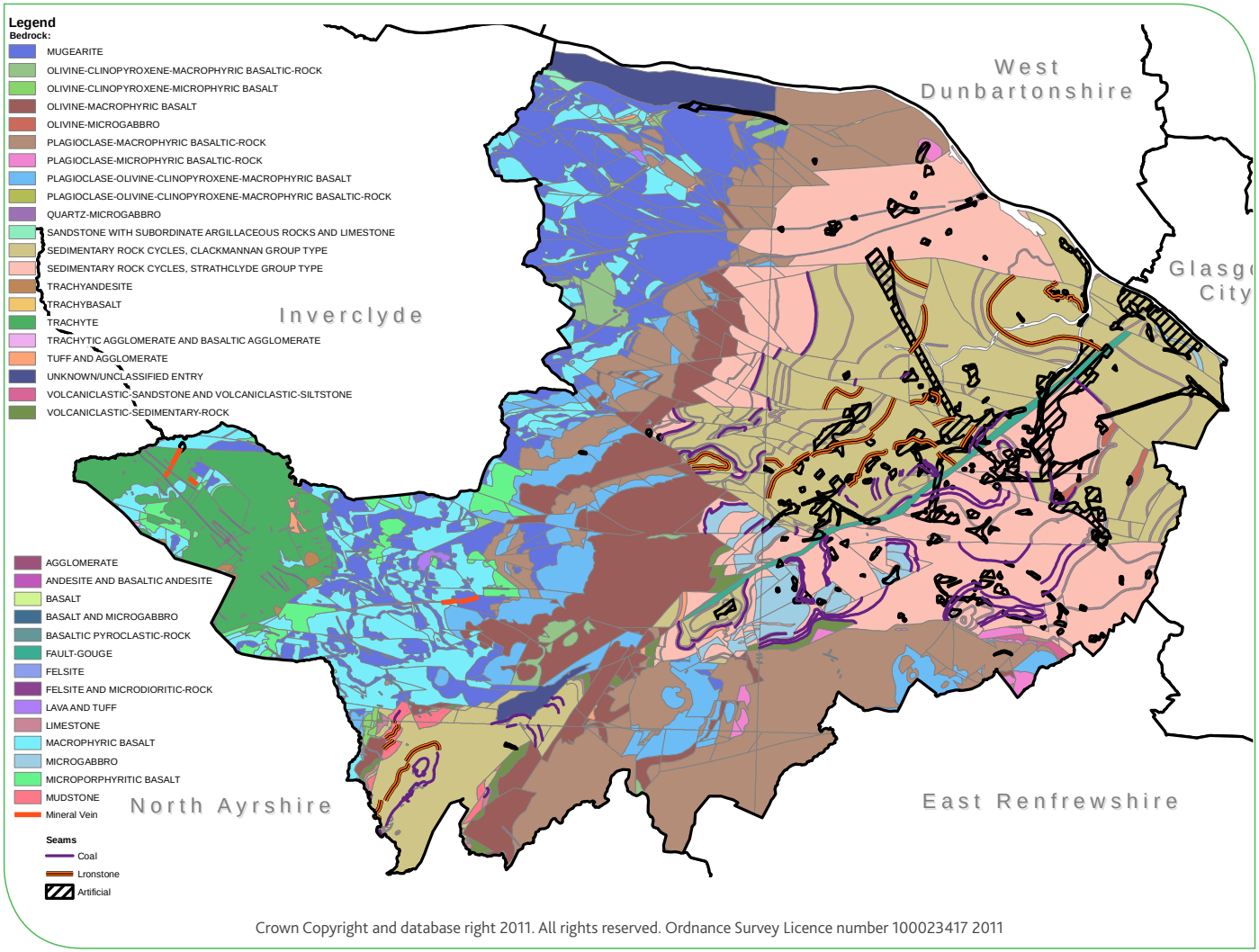
The trend direction is shown with the following arrows:

↑ Improving
↓ Deteriorating
↔ No Change

INDICATOR	CURRENT STATUS	TREND DIRECTION	EXPLANATION
Vacant and Derelict Land	F	↔	Since 1998 the urban vacant and derelict land total has varied significantly. Development take-up of Vacant and Derelict Urban Land averaged 23 ha annually between 1999 and 2010. However due the current economic situation take-up has slowed over the last few years
Landscape Character	L	Limited data	
Contaminated Land	L	Limited data	

Geology

Fig 9.1: Renfrewshire's Solid and Drift Geology



Bedrock Geology

The geology of the Renfrewshire area has been fundamental in shaping the landscape, pattern of development and biodiversity that we are familiar with today. The bedrock in Renfrewshire can be divided into two main types, closely related to topography. (Fig 9.1)

Low ground in the eastern part the Council area around the main settlements (Paisley, Johnstone and Renfrew) and north of Gleniffer Braes, Neilston and Patterton is underlain by mainly sedimentary rocks of the Strathclyde and Clackmannan Groups of early to mid Carboniferous age (354-316 Million years). These relatively soft, easily eroded rocks are mainly claystones ("shales"), sandstones, coal seams and thin, but regionally persistent limestones. They will tend to produce relatively fertile soils, likely to become quite alkaline on the limestones. These softer rocks are locally intruded by sills of dolerite, a basic igneous rock similar to basalt. These sills produce distinctive crags and waterfalls where exposed. Dolerite, limestone, sandstone, coal and associated ironstones have all been economically exploited at various times.

High ground, including Muirshiel, between Houston and Loch Thom, the Gleniffer and Brownside Braes, and eastwards,

is underlain by more resistant volcanic igneous rocks of the Clyde Plateau Volcanic Formation of earliest Carboniferous age. These mainly basaltic rocks dominate the moorland and steeper slopes of western Renfrewshire. While rich in bases, basalt is rather impermeable and thus poorly drained, and when combined with the high rainfall this tends to produce rather waterlogged soils with large areas of blanket peat cover.

The most acid (silicic) and resistant rocks are trachytes, rhyolites and volcanic agglomerates (volcanic vent deposits) and these form the highest ground in the region. A linear belt of shattered rock, known as the "Paisley Ruck" extends from Renfrew to Lochwinnoch. This reflects an area of ancient earthquake activity along a major fault, and the consequent weakening and preferential erosion of the rock has resulted in the formation of the Black Cart valley and Castle Semple Loch.

Superficial Deposits

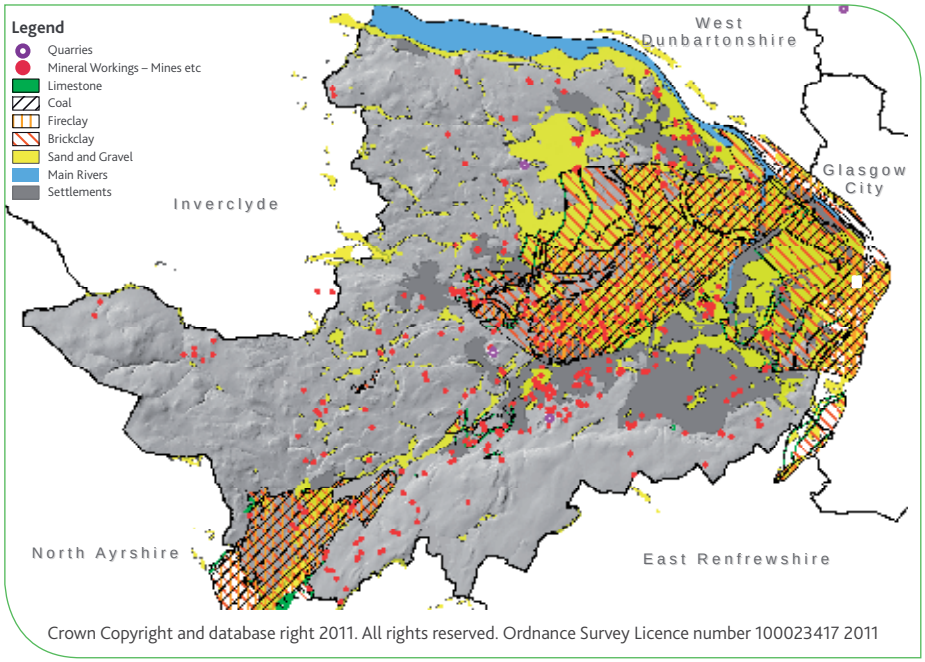
The cover of superficial deposits or "drift" over the bedrock is the result of the action of glaciers, seas and rivers from ancient times. The lower, flatter ground from the northern parts of Paisley and Johnstone, plus Renfrew, Glasgow Airport and up to Bishopton are underlain by glacio-marine silts and clays, with local patches of sand and gravel around Erskine and Bishopton. These were deposited in shallow seas as the glaciers retreated 10,000 years ago. Further south the ground becomes increasingly hummocky, with low, rounded hills known as "drumlins" characteristic of south Paisley and Johnstone and north of the Gleniffer Braes. These are tills or "boulder clays" - stiff silts and clays with abundant embedded cobbles and boulders deposited and moulded below glacial ice. Moving south onto the Braes, and westwards onto Muirshiel and the Loch Thom area, these isolated hummocks of till merge into a more continuous cover, but are thin or absent on the highest ground, where bedrock is close to the surface. Tills are locally overlain by blanket peat deposits in broad hollows, such as at Caplaw Dam. Extensive areas of peat are also found on the poorly drained glacio-marine clays at Linwood Moss and Barochan Moss. One of Renfrewshire's most notable glacial features is the Clochodrick Stone, lying 3 km north-east of Lochwinnoch. It is of national importance being a representative example of a 'glacial erratic', therefore, it has been designated as a Site of Special Scientific Interest. An 'erratic' is a large ice-transported boulder. It has a 20.6 m in circumference and stands up to 4.0 m high. It is composed of 'basalt' lava (fine-grained volcanic rock) of similar composition to the bedrock that occurs two or three miles to the west and north. It was probably transported to its present position by ice from the south-west Highlands moving across the Clyde estuary during the Devensian age, around 18,000 to 13,000 years ago.

Fig 9.2: The Clochodrick Stone, Renfrewshire

In the eastern part of Renfrewshire the River Clyde, White Cart Water and Black Cart Water have deposited linear belts of sand and gravel. West of Renfrew, extending along the River Clyde, a narrow strip of the coast is marked by one or more flat terraces of sand and gravel that are former beaches, now raised above sea level by post-glacial uplift ("raised beaches"). These provide level ground suitable for transport links such as the railway and M8 motorway. The superficial deposits tend to dominate the soil and drainage characteristics, so that the influence of bedrock is only seen where it is close to the surface, or has been uncovered by mining or quarrying activity.

Mineral Deposits

Fig 9.3: Mineral Resources within Renfrewshire



A range of mineral deposits are found in Renfrewshire (see figure 9.3), many of which are or have been extracted for their commercial value.

Sand and Gravel

Significant areas of sand and gravel deposits are found in the eastern part of Renfrewshire. Small scale, localised extraction sites can be identified such as those at Dargavel House, Bishopton. There is no large scale, commercial extraction of this resource.

Coal

There have been many coal workings with Renfrewshire in the past. A number of pits existed in the Johnstone and Linwood area including Walkinshaw, Blackstone, Benston, Linwood and Inkerman during the 1700s and 1800s. New settlements were built to accommodate the miners at Inkerman and Balaclava near Linwood. The mines in the Johnstone area were prone to flooding and fires. The last of these pits closed in 1860s after 5 miners were killed at Benston mine when it flooded. Coal continued to be extracted, however, at this location coal shale and bricks were made from the blaes associated with the former coal workings. Oil was also extracted from oil shale at this location at the end of the 19th century.

Brick Clay

There is a considerable brick clay deposit, however, none of this is currently being worked commercially. During the 19th and early 20th century this resource was extracted. In the past, small scale brick clay excavations are evident around Bishopton and Linwood and they were associated with brickworks. Often such workings were subsequently filled in as landfill or the ground made up for development.

Other Minerals

The upland part of Renfrewshire was once the site of the former Muirshiel barytes mine. Situated in rugged moorland close to the Muirshiel Centre, it was worked more or less continuously for over 200 years beginning in the mid-18th century. Barytes, or barium sulphate, is a high density mineral used in oil drilling, paint and paper-making, and - as a 'barium meal', in x-ray procedures. During the early years of production, all mineral extraction was done by open cast working, leaving rocky gullies which are still evident today. Later excavations took place to a depth of 660 feet. The mine closed in 1969, unable to compete with the quality or cost of barytes produced abroad, and the shafts were sealed off.

Hard Rock

There are a number of small 'borrow pits' located in Renfrewshire. There are only three sizeable hard rock quarries that have been worked recently and only one of these is still operational. The quarries in question are Reilly Quarry, Highcraigs and Kilbarchan Quarry. Initially rocks from the quartz-dolerite dyke were quarried at Reilly Quarry. The excavation was then extended to the surrounding olivine-basalt lavas. The rock from this quarry was used as aggregate during the construction of the Erskine Bridge and its approach roads. The void was subsequently filled with waste.

Kilbarchan Quarry, or Spring Grove Quarry was worked for dolerite using conventional drill and blast techniques. The dolerite was used in an ancillary road stone coating plant. The quarry is no longer active, and is now partly flooded. Planning consent was in place for the quarry to be used as for landfill, however, this has lapsed and

the site is currently the subject of a new application for landfill.

High Craigs Quarry, Johnstone is still in use. Aggregate was last extracted at this location for the construction industry in 2009.

Contaminated Land

Due to Renfrewshire's rich industrial past, some areas of land may have been affected by contamination. While this may be true of many sites in Renfrewshire, the vast majority of these sites will not be 'contaminated land', as specified by the following legal definition;

> "Any land which appears to the local authority in whose area it is situated to be in such condition, by reason of substances in, on or under the land, that:
>
> Significant harm is being caused or there is a significant possibility of such harm being caused; or
>
> Significant pollution of the water environment is being caused or there is a significant possibility of such pollution being caused."

Contaminated land is land which poses unacceptable risks to human health or the wider environment in its current use.

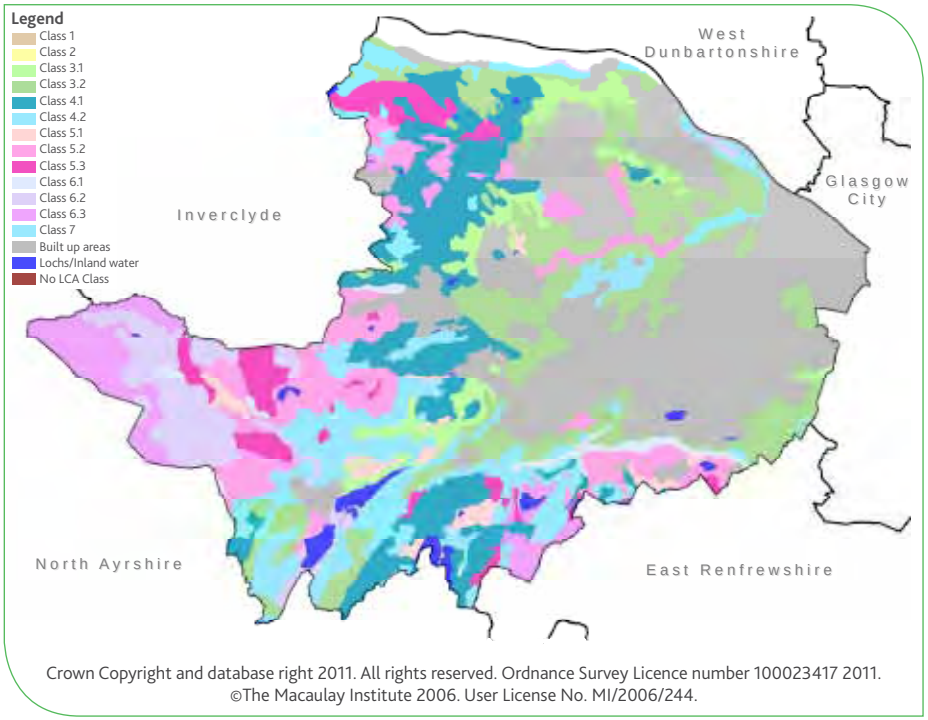
The Council's Environmental Improvements Team aims to protect human health and the environment by working to make sure that land affected by contamination is cleaned up to a suitable standard. This is achieved using the legal provisions of Part IIA of the Environmental Protection Act 1990 and also through the Environmental Improvements Team's role as consultees in the planning process. Part IIA of the Environmental Protection Act 1990 requires each local authority to draw up an inspection strategy for dealing with contaminated land within its area.

The Council first developed a contaminated land strategy for Renfrewshire in September 2001, based on guidance from the then Scottish Executive. That document was revised and updated in May 2010 and the strategy is available to download from the Council's website.

Land Capability for Agriculture

Figure 9.4 shows that Renfrewshire contains a small amount of prime agricultural land; or land that has been categorised by the Macaulay Landuse Research Institute as Class 1, 2.1 or 3.1 on their Land Capability for Agriculture maps. Across Scotland this is a relatively scarce resource as it only covers 8% of the country's land area. These areas are capable of being used to produce a wide range of crops. The climate is favourable, slopes are no greater than 7 degrees and the soils are at least 45cm deep and are imperfectly drained at worst. This land is highly flexible for other uses as well, such as for biofuel crops and woodland. As a rule, such land is protected from development as it provides a unique resource for crop production.

Fig 9.4: Land Capability for Agriculture within Renfrewshire



Source: Macaulay Landuse Research Institute

Much of the rest of the low lying parts of Renfrewshire fall within the Land Capability classes 3.2 to 4.2. Across Scotland, 20% of the land area falls within this category. Land in these classes is capable of being used to grow a moderate range of crops including cereals (primarily barley), forage crops and grass. Grass becomes predominant in the rotation in Class 4.2

whilst other more demanding crops such as potatoes can be grown in Class 3.2. The climate is less favourable than on prime land, slopes up to 15 degrees are included and many soils exhibit drainage limitations. As the soils tend to be 'wetter' they are often restricted to livestock production.

Land on the fringes of upland ground is predominantly is known as having the potential for supporting Improved Grassland (Class 5.1 to Class 5.3). Nationally, 18% of Scotland is within this category. A range of different limitation types, either operating singly or in combination, can restrict the land capability to this class. These limitations include climate, slope, wetness, and often a heterogeneous pattern of conditions that render even occasional cultivation unsuitable. Land which has been improved is much more productive than land which remains in its unimproved state.

Finally, the largest and most extensive category of land capability in Scotland is Rough Grazing (Class 6.1 to Class 7). Over 50% of the agricultural land in Scotland is found in these classes because it includes most of the western and central highlands and the Southern Uplands. In Renfrewshire, the Renfrewshire Heights are the main concentration of this land capability. This land has very severe limitations that prevent turf improvement by mechanical means. This land is either steep, very poorly drained, has very acid or shallow soils and occurs in wet, cool or cold climates zones. In many circumstances, these limitations operate together. The existing vegetation is assessed for its grazing quality (Class 6.1 is of high grazing value for example) but Class 7 land is of very limited agriculture value. Nonetheless, this ground often has a high value, for example in terms of storing carbon in its organic soils and supporting rare species and habitats.

Soils

Scotland is dominated by four types of soils, Brown Earth, Podsol, Gley and Organic Peat. In Renfrewshire, the main soil type that can be attributed to the area is Brown Earth. Smaller areas of Gley and Organic Peat are also to be found. Soils are classified according to the nature and sequence of horizons in the soil profile resulting from the interaction of the following soil characteristics:

Soil Characteristics

1 Soil Parent Material

An array of different soil parent materials exists within Scotland, the direct result of different phases of glaciation. Soil parent materials fall into different groupings:

- Shattered rock or rock in situ;
- Glacial drift (unsorted, weathered mineral material moved by ice) including colluvium and solifluction deposits;
- Lodgement till being ground up rock material characteristically unsorted, deposited by ice;
- Water-modified glacial till with the upper soil horizons of coarser texture than the underlying till;
- Fluvio-glacial meltwater deposits of sand and gravel and in highland areas, morainic deposits;
- Mountain-top detritus; frost shattered debris with common rock and scree;
- Recent deposits, including Aeolian sand, alluvium raised beach deposits, peat and saltings.

An association represents a grouping of soils developed on the same or similar parent material. In Renfrewshire the most extensive soil association is the Darleith Association.

2 Climate

Climate affects soil formation through local differences in precipitation (snowfall and rainfall) and temperature. It also indirectly influences the soil by determining the mass and distribution of plant communities, the soil water balance over long periods, the rate of decay of organic matter and any change in soil temperature. An increase in temperature will result in an increase in the rate of chemical reactions and microbial activity.

3 Topography

The configuration of the land influences the drainage and the subsequent formation of the soil. For instance, differences associated with local climate e.g. the biological activity in soils (and the decomposition of plant litter) is much higher in warm, dry conditions at low elevation than at higher elevation where cool, wet conditions tend to prevail leading to peat formation.

4 Organisms

Soils contain a range of organisms including microbes, fungi, bacteria, invertebrates and other animals. As the temperature increases, so the activity of these creatures within the soils increases.

5 Time

Soils require time to develop. Rocks are broken down by various weathering processes to smaller particles, such as sand, silt and clay. The rate of weathering is often dependent upon climatic forces such as rain, heat, cold and wind. In time, plants become established only to decompose and be incorporated into the topsoil where there is an intimate mixture of organic and

mineral matter. Nutrients are continually being released from minerals to the soil solution where they can be absorbed by plant roots. Over a long time period, the soil matures at a rate dependent upon localised conditions. Within Scotland, soils are relatively 'young' being at most 10,000 years – the time elapsed since the end of the last Ice Age.

Soil Types in Renfrewshire

1 Brown Earth Soils

Much of the lower lying area within Renfrewshire is covered by Brown soils, often referred to as brown forest soils or brown earths. They are well drained with brownish subsoils where iron oxides created through weathering processes are bonded to silicate clays. Other properties such as texture and level of fertility depend on the nature of the parent material and the degree of alteration it has undergone. In Scotland, the occurrence of brown earth soils is restricted to the warmer, drier climate characteristic of eastern areas but they also occur in sheltered highland glens at lower elevations and on areas of base-rich parent materials. Under natural conditions the soils would form under broadleaf forest which promotes rapid decomposition of plant residue and consequent recycling of plant nutrients. Given the deep nature of these soils, their free drainage and often high levels of natural fertility, brown soils are often cultivated.

2 Gley

Gleys are widespread throughout Scotland, being developed under conditions of intermittent or permanent waterlogging. The greyish or bluey-grey colours and orange mottling are characteristic of gley soils and are generally of secondary origin, replacing those inherited from the parent material. Gleys are often confined to depressed or receiving sites where anaerobic conditions result from the periodic or long-term waterlogging, either a direct result of surface water collection or groundwater conditions. They also occur where the soil is dense and water is prevented from moving through the soil. They are found at all elevations. Where the upper soil horizons are wet for much of the year, they are generally rich in organic matter with intergrades to shallow peat being widespread. Gleys require adequate drainage for proper agricultural use and some form of drainage/remediation for satisfactory tree growth. In humid upland areas gley soils with peaty topsoils develop under moorland or blanket bog vegetation and rough grazing or forestry are the principal forms of land use.

3 Peat

There are extensive areas of blanket peat in the upland part of Renfrewshire to the west in Clyde Muirshiel Regional Park. The peat exists in this location due to the impermeable nature of the underlying bed rock and the high rainfalls associated with the west of Scotland. Such blanket bog obtains most of its moisture from precipitation. In addition, there are areas of low lying peat including Barochan and Linwood Moss. Here the peat has formed on top of glacial deposits which have prevented free drainage of the soil. Peat extraction has occurred here previously, however, there is no commercial activity at present. Reinstatement of the lowland peat in Renfrewshire is an objective of the current Local Biodiversity Action Plan as its importance as a key habitat is now recognised. Where once the upland peat in Renfrewshire was used for gun sports, much of this area is now afforded protection through its designation under the European Birds Directive as part of the Renfrewshire Heights Special Protection Area.

4 Characterisation of Peat

- Soils have greater than 60% organic matter
- Organic surface layers are greater than 50cm deep
- Shallow peat has a prescribed depth of organic matter of 50 - 100cm
- Deep peat has a prescribed depth of organic matter of >1 metre
- Peat can be described as fibrous, semi-fibrous or amorphous according to its degree of decomposition
- Peat is usually acidic (pH <5) unless associated with calcareous or base rich water
- Peats possess a low bulk density, high water holding capacity and low load-bearing strength
- Peats are often characterised by mire and blanket bog plant communities.

Previously, land management of peat did see certain areas used for arable cropping, however, current management practices do not include this land use. Continual cropping tended to result in significant shrinkage and the soil being subject to various physical and chemical limitations. In the semi-natural state, peat provides grazing of low quality but has no other agricultural value. Use for fuel or on land below about 400 metres for afforestation, is well documented. On upland sites, peat is of limited use outwith low quality grazing for sheep or deer.

Landscape

Landscape Character Areas

The Glasgow and Clyde Valley Landscape Character Assessment was published in 1998. It formed part of the national survey of landscape character covering the whole of Scotland. Renfrewshire is characterised by 6 different types of landscape character types including rugged moorland hills, rugged upland farmland, broad valley lowland, alluvial plain, urban greenspace and raised beach. The different landscape characters are shown in figure 9.5 and the key characteristics of each landscape character are summarised in figure 9.6.

Fig 9.5: Landscape Character Types in Renfrewshire

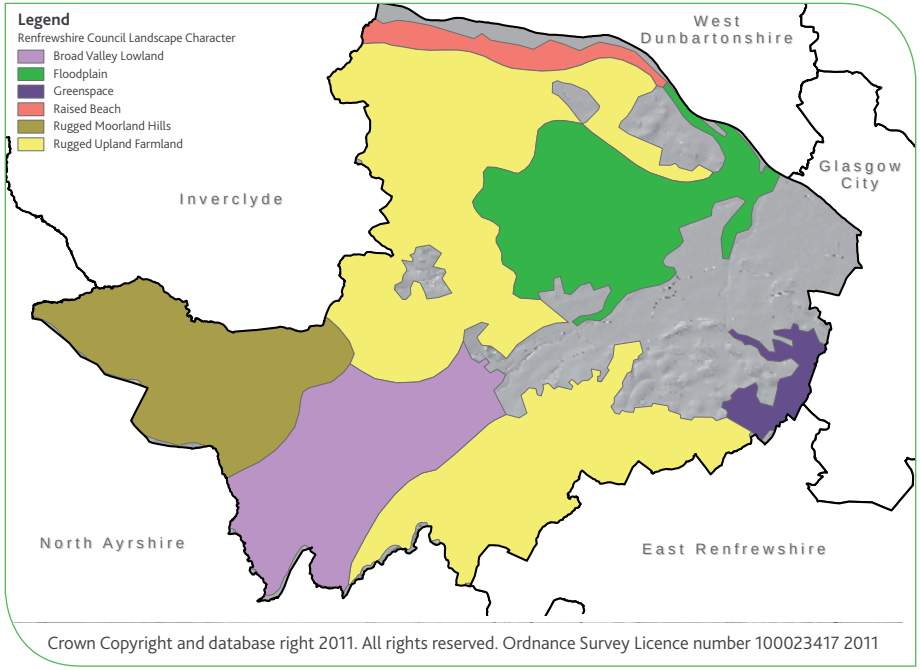


Fig 9.6: Landscape Character Types in Renfrewshire

LANDSCAPE CHARACTER AREAS	AREA (HA)	% OF RENFREWSHIRE AREA	KEY LANDSCAPE CHARACTERISTICS
Rugged Upland Farmland	9576	36%	Rugged landform comprising rocky bluffs and shallow troughs; dominance of pastoral farming; and tree cover often emphasising landform.
Broad Valley Lowland	35536	13%	Wide flat bottomed valley; presence of water bodies, wetlands and rivers; transport routes and settlements along the valley sides; transition from arable to rough grazing from the valley floor to the high valley sides; historic sites and communication routes along the valley sides; and presence of farm and policy woodland.
Alluvial Plain	33597	12%	Distinctive, low-lying landform; generally open character though woodland blocks and remnant field boundary trees create containment in some areas; lush pastures, arable fields and a number of surviving mosses; and significant urban influences in some areas, resulting from urban expansion, transport infrastructure and activities such as waste disposal.
Rugged Moorland Hills	32725	12%	Distinctive upland character created by the combination of elevation, exposure, rugged landform, moorland vegetation and the predominant lack of modern development; these areas share a sense of apparent naturalness and remoteness which contrasts strongly with the farmed and developed lowland areas; and presence of archaeological sites on hilltops and sides.

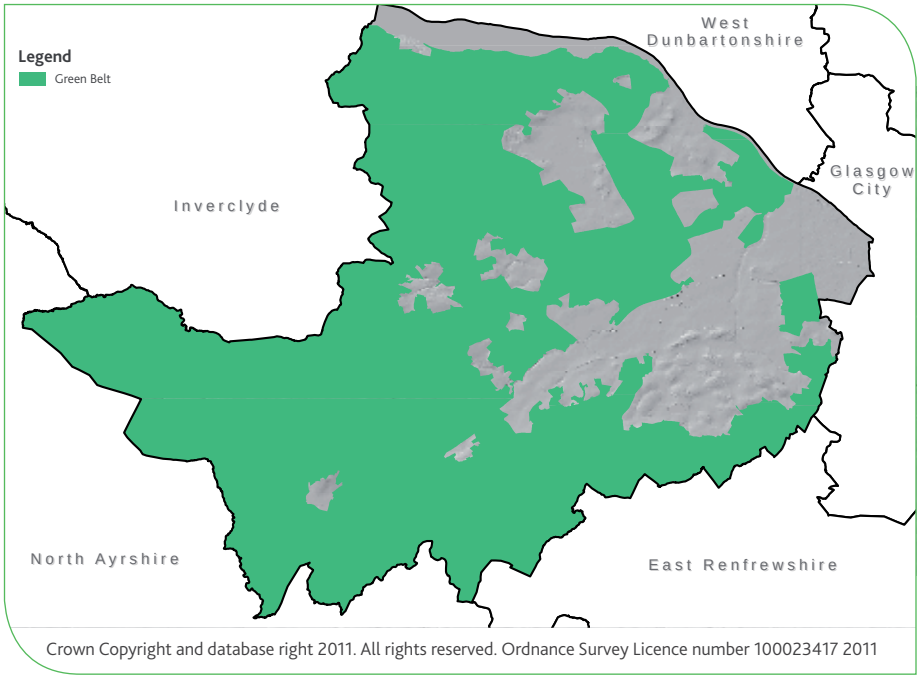
Fig 9.6: Landscape Character Types in Renfrewshire (continued)

LANDSCAPE CHARACTER AREAS	AREA (HA)	% OF RENFREWSHIRE AREA	KEY LANDSCAPE CHARACTERISTICS
Raised Beach	6361	2%	Steep scarp, representing the former cliff line, and narrow platform, representing the former beach, with estuarine mudflats along the inner part of the Firth of Clyde; `hanging' broadleaf woodland on many of the steeper slopes; coastal settlements; defensive sites, castles, historic houses and designed landscapes; dominance of horizontal landscape elements; and prominent area with extensive views.
Urban Greenspace	5245	2%	Remnant policy woodlands and landscapes creating distinctive pockets of open countryside landscape within the urban area; visual influence of surrounding urban areas and activities; the decline in landscape management and the increase in development and urban fringe pressures means these are landscapes under stress.

Green Belt

The Glasgow and Clyde Valley Structure Plan and the Renfrewshire Local Plan identify the parts of Renfrewshire that are covered by the Green Belt policy. The Green Belt policy has been a long standing element of the development plan and it is drawn tightly around the existing towns and villages. The Green Belt policy protects the countryside around the urban area and directs development to the built up areas which therefore contributes to the renewal of the urban areas in a sustainable way. Figure 9.7 shows the extent of the Green Belt boundary which covers 73.3% of the Council area.

Fig 9.7: Renfrewshire's Green Belt Boundary



Vacant and Derelict Land

There is a blighting effect associated with vacant and derelict land on the local environment. Land recorded as vacant on the Scottish Vacant & Derelict Land Survey is urban land, not requiring rehabilitation, which is not currently used for a purpose allocated in an adopted local plan or council approved replacement plan and is viewed as an appropriate site for development. Derelict land (and buildings) is urban and rural land which has been so damaged by development, that it is incapable of development for beneficial use without rehabilitation. This includes land (or a building) which is not being used and has a previous un-remediated use which could constrain future development. As with vacant land, derelict land (and buildings) are recorded when they are not currently in use for a purpose allocated in an adopted local plan or council approved replacement plan.

Renfrewshire records the fourth highest total, for urban vacant and derelict land, of the eight Local Authorities within the Glasgow & the Clyde Valley Strategic Development Plan area. The ranking is third, when rural derelict sites are included i.e. the former Royal Ordnance Factory site (708 ha) at Bishopton.

The total amount of vacant and derelict land in the urban part of Renfrewshire in 2010 was 256.4 ha, and comprise 183 sites. Vacant land within the urban area amounts to 197 hectares, whilst the amount of derelict land is 59 ha. Most of these sites are located in the older urban areas of Paisley, Renfrew and Johnstone. Since 1998 the urban vacant and derelict land total has varied significantly, recording a low of 220 ha in 2000, and a high of 287 ha in 2004, with a subsequent decrease between the years 2004 and 2008 (see fig 9.8). The total showed a significant increase in 2009 (22 ha) and a slight increase in 2010. The average annual total for the period 1998 to 2010 was 250 ha.

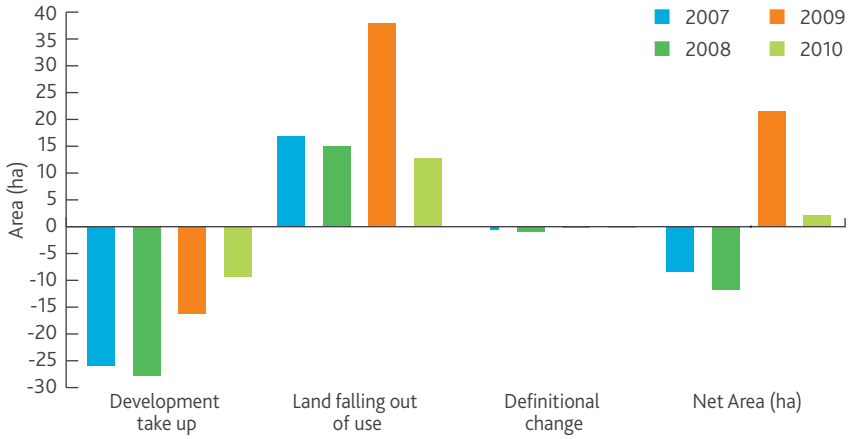
Development take-up of Vacant and Derelict Urban Land averaged 23 ha annually between 1999 and 2010. The years 2004/05 to 2007/08 experienced levels of take higher than the period average, with annual development take-up peaking at particularly high levels in 2004/05 (35.8 ha) and 2005/06 (49.8 ha).

Residential development take-up regularly forms the major part of this take-up. This was also the case in 2005/06, however development take-up for the category others experienced an exceptionally high total in that year (25.2 ha). The years 2008 and 2009 have been characterised by lower than average levels of development take-up and the current economic situation has undoubtedly contributed towards this, as shown on the Figure 9.9. Consequently, the overall vacant and derelict land total is likely to rise as land continues to fall out of use at a rate similar to recent years, and which exceeds annual development take-up rates. Approximately 27% of the urban vacant and derelict land total has been recorded on the survey for more than 21 years, whilst 34% has been recorded since 2006. In terms of ownership, approximately 24% of the urban vacant and derelict land total lies within Council ownership, whilst 27% is privately owned.

Taking a national perspective (source: Scottish Government Statistical Bulletin PLG/2010/1 – January 2011 Tables 10 and 4), over the period 2002-2010 Renfrewshire Council experienced a 22% growth in total urban vacant land area, whereas Scotland as a whole experienced a fall of 11%. The total amount of derelict land in both urban and rural locations within the Renfrewshire Council area showed a fall of 4%, whilst the equivalent figure for Scotland showed a rise of 5%.[20]

Fig 9.8: Renfrewshire's Urban and Derelict Land 1998 – 2010

Fig 9.9: Changes in Renfrewshire's Urban and Derelict Land 2007 – 2010



20 Scottish Government Statistical Bulletin PLG/2010/1 www.scotland.gov.uk/publications/2010/01/26135819/0

| 10 | Population and Human Health

SEA objectives that relate to Population and Human Health:

- To minimise any detrimental impact of activity on human health.
- To protect and sustain human health and enhance human well being.
- To help stabilise Renfrewshire's population

Renfrewshire is the ninth largest Council in Scotland in terms of its population (169,910) and covers an area of nearly 270 square kilometres. Renfrewshire has an attractive and varied rural and urban landscape. Approximately a fifth of the area of Renfrewshire is built up and the remaining four fifths is rural countryside. The towns and villages of Renfrewshire, for the most part, provide attractive pleasant places to live and can offer an excellent quality of life with high standards of health care and low levels of crime. However there are pockets of deprivation dispersed through the Renfrewshire area and people in these communities may experience disadvantage, and encounter problems associated with low income, poor health, low educational attainment, lack of access to learning opportunities and employment, and have low expectations.

A summary of the indicators used in assessing the state of Renfrewshire's environment is presented below, highlighting the current status of each indicator and the directional trend since the adoption of the Renfrewshire Local Plan in 2006.

The current status is shown by using the following colours:

G Good
P Poor
F Fair
L Limited data

The trend direction is shown with the following arrows:

↑ Improving
↓ Deteriorating
↔ No Change

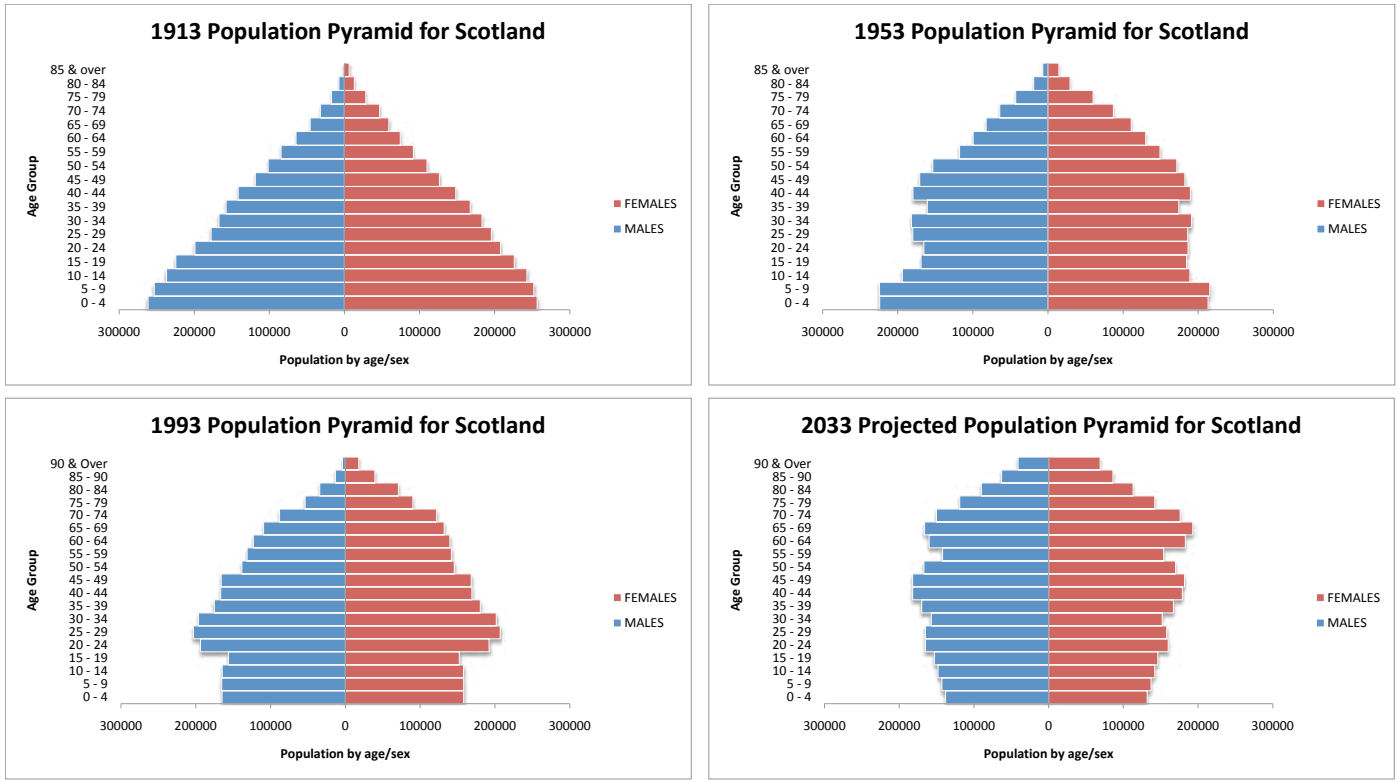
INDICATOR	CURRENT STATUS	TREND DIRECTION	EXPLANATION
Population change	F	↑	The population of Renfrewshire has been increasing slowly since 2008
Life Expectancy (Males)	F	↑	Life expectancy for men in Renfrewshire has increased in recent years, but it remains below the Scottish average.
Life Expectancy (Females)	F	↑	Life expectancy for women in Renfrewshire has increased in recent years, but it remains below the Scottish average.
Deprivation	F	↑	Renfrewshire's position in terms of population and number of datazones within the 15% threshold in SIMD 2009 remains better than in SIMD 2004.
Employment	P	↓	Between 1998-2008 Renfrewshire's economy contracted with the loss of 2,500 jobs however while the number of jobs has declined in Renfrewshire there has been growth in the number of registered businesses
Alcohol Related Deaths	P	↓	Alcohol is a particularly acute problem in Renfrewshire, which has the fourth highest rate by local authority of alcohol related deaths in males in the UK. Over 1650 patients are admitted to hospital annually for alcohol related or attributable causes.
Weekly Wage	G	↑	The gross weekly pay for Renfrewshire residents has risen steadily from 2002 to 2009. Apart from in 2007 the average gross weekly pay of Renfrewshire residents has been higher than in Scotland.
Crime	P	↓	The total numbers of crimes recorded by Strathclyde Police in the Renfrewshire Division have increased from 26558 in 2003 to 30010 in 2010 an increase of 13%

Population

The 2010 population for Renfrewshire was 169,910; an increase of 0.1% from 169,800 in 2008 of which 81,304 were male and 88,606 were female. The population of Renfrewshire accounts for 3.3% of the total population of Scotland.[21]

Changes in population are determined by natural change, the difference between the number of births and deaths together with net migration (the difference between immigration and emigration). Between 2002 and 2007 Renfrewshire had been experiencing higher levels of deaths than births, therefore the natural change was negative. But in 2008 there was positive change, with higher births than deaths. In addition, the annual migration figure which is the net change resulting from those moving out of and those moving into Renfrewshire is normally a far more significant source of change. The loss of population arising from migration has reduced significantly, over recent years, moving from negative figures (-609) through the years 2001/02 - 2005/06, to positive figures (+160) through the years 2006/07 - 2008/09.[22]

Fig 10.1: Population Pyramid Comparison for Scotland



The past two decades have seen a sustained growth in single person households within Renfrewshire and this is reflected in the change in the estimated number of households between 1991 (70,537) and 2009 (79,026), an increase of 12%.[23]

In 2009, the population density of Renfrewshire, in terms of persons per square kilometre, was 651 persons. This figure is greater than the equivalent figure for Scotland, which is recorded as 67 persons, and the neighbouring Councils of East Renfrewshire (513 persons) and Inverclyde (500 persons). However, the Renfrewshire figure is significantly lower than the City of Glasgow (3,353 persons).[24]

In 2009, the average age of males in Renfrewshire was 39 years, whilst the figure for females was 41 years, both

21 http://www.gro-scotland.gov.uk/files2/stats/population-estimates/mid-2009/mid-2009-pop-est-scotland.pdf
22 www.gro-scotland.gov.uk/statistics/theme/migration/mig-stats/total.html
23 www.gro-scotland.gov.uk/statistics/theme/households/estimates/household-estimates-2009/listof-tables
24 www.gro-scotland.gov.uk/statistics/theme/population/estimates/mid-year/2009/list-of tables.html

mirroring that of Scotland as a whole. The percentage of males recorded under 16 years of age is 19%, whilst the equivalent figure for females is 17%. The percentage of males recorded as being of working age is 66%, whilst the equivalent figure for females is 59%. Finally, the percentage of pensionable age males is 15%, whereas the equivalent figure for females is significantly higher at 25%. The percentage figures for both males and females are identical to those for Scotland, with the exception of the percentage of working males which is recorded as 67% for Scotland.[25]

Source: Scottish Mid-year population estimates and Projected Population of Scotland 2008-based (http://www.gro-scotland.gov.uk/index.html)

The net effect of natural change and migration to the population structure of Renfrewshire over the last one hundred years has significantly altered the population structure. The population trend, towards a position whereby the older age groups will form a greater proportion of the population, is projected to continue well into the 21st century. Consequently, the original population 'pyramid' illustrated on figure 10.1 will be reversed. This will clearly have socio-economic implications for Renfrewshire whereby there will be a proportionately larger elderly population and a reducing economically active population. [26]

Deprivation

Areas within Renfrewshire where there are significant levels of poverty and deprivation including parts of Paisley, Johnstone and Renfrew. However there are also areas within Renfrewshire which are relatively affluent and characterised by high levels of income, employment, education and health. These areas include Erskine, Houston, Bridge of Weir, Elderslie and parts of Paisley. The Scottish Index of Multiple Deprivation (SIMD) identifies areas of concentrations of multiple deprivation across Scotland in a consistent way by utilising income, employment, health, education, housing, access to services and crime data. In terms of deprivation Renfrewshire's relative position has worsened in SIMD 2009, compared to SIMD 2006. However, Renfrewshire's position in terms of population and number of datazones within the 15% threshold in SIMD 2009 remains better than in SIMD 2004. The SIMD 2009 shows Renfrewshire to have a population of 29,190 within the most deprived 15% in Scotland. This is an 11% increase from the SIMD 2006 in which Renfrewshire had a population of 26,321 within the most deprived 15%. This still compares well to the SIMD 2004 position, where a population of 32,450 lived within the most deprived 15% areas in Scotland.

Renfrewshire has seen the third largest increase (2.4%) in the proportion of datazones within the Local Authority in the 15% most deprived. Renfrewshire also has the second most deprived datazone in Scotland within the SIMD 2009, this datazone in Ferguslie Park was ranked 1st (most deprived) in Scotland in SIMD 2006 and ranked 18th in SIMD 2004.[27]

Health

In 2007-2009, life expectancy at birth for Renfrewshire was 76.5 years, an increase of 2.9 per cent when compared to 1997–1999. Female life expectancy at birth (79.2 years) is greater than male life expectancy (73.7 years), but both were lower than the Scottish average as shown in figure 10.2 and 10.3.

Fig 10.2: Life Expectancy in Renfrewshire

	RENFREWSHIRE					
	LIFE EXPECTANCY AT BIRTH			LIFE EXPECTANCY AT 65		
	ALL PERSONS	MALE	FEMALE	ALL PERSONS	MALE	FEMALE
2007-2009	76.5	73.7	79.2	17.1	15.7	18.2
1997-1999	74.3	71	77.5	-	-	-
% Change between 1997-1999 and 2007-1999	2.9%	3.8%	2.2%	-	-	-

Source:http://www.gro-scotland.gov.uk/files2/stats/council-area-data-sheets/renfrewshire-factsheet.pdf

25 http://www.gro-scotland.gov.uk/files2/stats/population-estimates/mid-2009/mid-2009-pop-est-scotland.pdf

26 http://www.gro-scotland.gov.uk/files2/stats/population-estimates/mid-2009/mid-2009-pop-est-scotland.pdf

27 Scottish Index of Multiple Deprivation http://www.scotland.gov.uk/Topics/Statistics/SIMD

Fig 10.3: Life Expectancy in Scotland

	SCOTLAND					
	LIFE EXPECTANCY AT BIRTH			LIFE EXPECTANCY AT 65		
	ALL PERSONS	MALE	FEMALE	ALL PERSONS	MALE	FEMALE
2007-2009	77.8	75.4	80.1	17.9	16.5	19.1
1997-1999	75.5	72.7	78.2	-	-	-
% Change between 1997-1999 and 2007-1999	3.1%	3.7%	2.5%	-	-	-

Source:http://www.gro-scotland.gov.uk/files2/stats/council-area-data-sheets/renfrewshire-factsheet.pdf

Fig 10.4: Cause of Deaths in Males 2009

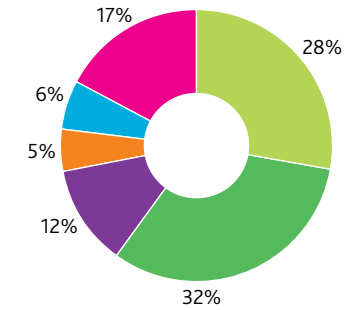
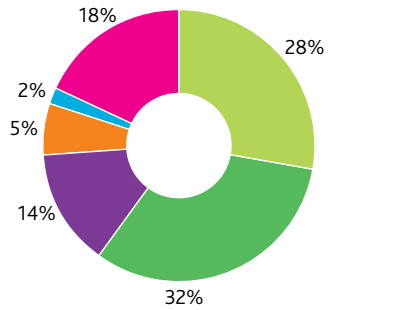


Fig 10.5: Cause of Deaths in Females 2009



Source: GRO Deaths, by sex, cause and administrative area http://www.gro-scotland.gov.uk/files2/stats/ve-reftables-09/ve09-t6-3.pdf

Male life expectancy at birth in Renfrewshire is improving more rapidly than female life expectancy. Life expectancy at age 65 in Renfrewshire based on the period 2007-2009 was 17.1 years, 0.8 years less than for Scotland as a whole. In Renfrewshire female life expectancy at age 65 (18.2 years) is greater than male life expectancy at age 65 (15.7 years).[28] Comparing different areas of Renfrewshire, there is a gap in life expectancy across the neighbourhoods of at least 20 years for men and nearly 12 years for women. In a number of neighbourhoods with lower than average life expectancy, life expectancy appears to have remained static or may even have fallen.

Smoking, obesity and alcohol are the three main health factors that require to be addressed most urgently in Scotland. Alcohol consumption and its damaging effects have increased greatly in the Greater Glasgow and Clyde area since the 1990s. Alcohol is a particularly acute problem in Renfrewshire, which has the fourth highest rate by local authority of alcohol related death in males in the UK. Over 1650 patients are admitted to hospital annually for alcohol related or attributable causes and there have been 336 deaths due to alcohol in the last five years. An estimated 37,000 adults smoke in Renfrewshire, slightly less than the Scottish average. However, 25% of women in Renfrewshire smoke during pregnancy compared to 24% nationally. During the period 2002 – 2009, there have been 135 drug related deaths in Renfrewshire.

The number of deaths in Renfrewshire decreased from 1,982 in 2008 to 1,929 in 2009. Over the period 2007 to 2009 the overall death rate was higher for males than for females. Compared to Scotland over the period 2007 to 2009, Renfrewshire had a higher death rate. Mortality rates from cancer, coronary heart disease and cerebrovascular disease (in the under 75s) are all above the Scottish average but have fallen considerably in recent years. Statistics for 'Patients hospitalised with cerebrovascular disease' (strokes) also show that Renfrewshire is statistically significantly worse than the Scottish average. Behavioural factors that can contribute to strokes, which is closely linked with high blood pressure, include smoking and the consumption of alcohol. The main cause of death for both male and females in Renfrewshire was circulatory disease, followed by cancer.[29] Figure 10.4 and 10.5 show the causes of deaths in males and females in 2009.

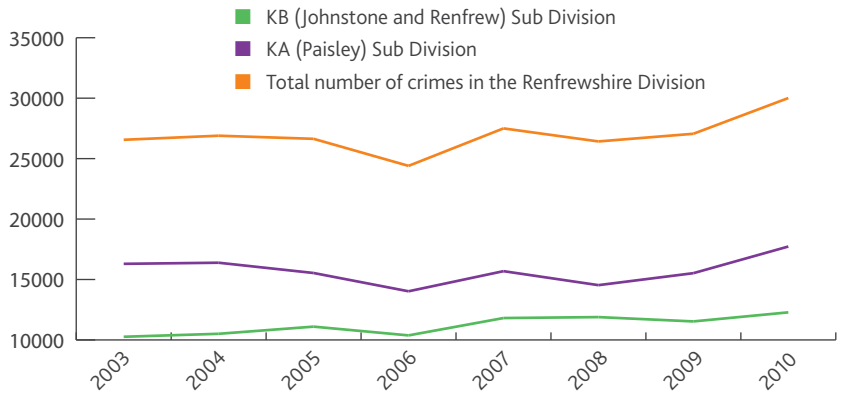
28 Renfrewshire Demographic Profile http://www.gro-scotland.gov.uk/files2/stats/council-area-data-sheets/renfrewshire-factsheet.pdf

29 GRO Deaths, by sex, cause and administrative area http://www.gro-scotland.gov.uk/statistics/publications-and-data/vital-events/ref-tables-2009/deaths-causes.html

Crime

Renfrewshire has a relatively high level of crime and disorder compared to other areas of Scotland. A number of complex factors affect Renfrewshire's crime and disorder levels including poor housing density, unemployment rates, social exclusion, family breakdown, poor parenting and health inequalities. Recorded crime figures for 2009/2010 indicate that Renfrewshire has the ninth highest crime rate in Scotland based on number of recorded crimes. Renfrewshire also has the third highest rate of non sexual crimes of violence. Antisocial behaviour continues to be one of the public's main concerns in Renfrewshire.[30] Although the number of vandalism incidents has decreased from 3371 in 2007/2008 to 2642 in 2009/10. The overall crime statistics as illustrated in figure 10.6 for the Johnstone, Renfrew and Paisley Sub divisions have shown a steady increase over the period 2003-2010. The total numbers of crimes in the Renfrewshire Division have increased from 26558 in 2003 to 30010 in 2010 an increase of 13%[31]. The Renfrewshire Warden Service is working with the community to increase community safety and tackle anti social behaviour and the service aims to make a significant improvement to the environment to deliver a cleaner and safer Renfrewshire.

Fig 10.6: Total Number of Crimes in the Johnstone, Renfrew and Paisley Sub Division



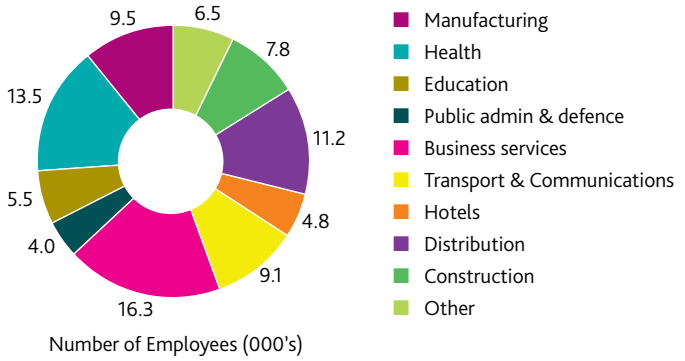
Source: Strathclyde Police Crime Statistics 2003-2010

Employment

Renfrewshire is a key part of the West of Scotland economy with a rich industrial and cultural heritage. Since the decline in manufacturing which started in the mid 1980's, Renfrewshire's economy has largely been dependant on Business Services and the Public Sector for economic growth. However, employment is still significantly reliant on large enterprises with manufacturing industries playing a greater role in Renfrewshire than in Scotland as a whole. Figure 10.7 demonstrates the composition of employment within Renfrewshire.

Between 1998-2008 Renfrewshire's economy contracted with the loss of 2,500 jobs. This was contrary to the general trend of growth within the Glasgow Clyde Valley (GCV) area and Scotland as a whole. Renfrewshire is forecast to reverse this trend during the period 2010-2020 with 2.09% growth predicted which is slightly lower than the predicted 2.79% growth in the GCV area and the 2.32% growth expected for Scotland[32].

Fig 10.7: Number of Employees in Renfrewshire Per Sector – 2008
Source: ABI, Oxford Economics



30 Police Have Your Say Events 2007/08
31 Strathclyde Police Crime Statistics http://www.strathclyde.police.uk/crimestats/search_stats/default.aspx

32 Oxford Economics/GCVSDPA

Fig 10.8: Labour Market Key Indicators

	UNEMPLOYMENT RATE 2009 (%)	RESIDENT EMPLOYMENT RATE 2008 (%)	EMPLOYMENT CHANGE 1998-2008 (000s)	AVERAGE WEEKLY WAGE – RESIDENCE BASED 2009	AVERAGE WEEKLY WAGE – WORKPLACE BASED 2009
Renfrewshire	4.2	75.5	-2.5	471.1	494.1
GCV	4.8	70.3	115.8	457.3	457.8
Scotland	4.5	72.9	293.7	457	455.5

Source: Nomis, APS, ABI, Oxford Economics, ASHE, DCLG

Despite the loss of jobs within the Renfrewshire economy the Renfrewshire labour market remained healthy as a result of the opportunities available for employment in nearby Glasgow. Figure 10.8 identifies some of the key indicators of the health of Renfrewshire's labour market relative to the GCV area and Scotland as a whole.

Renfrewshire is a key part of the West of Scotland economy centred on Glasgow. 40% of people travel out of Renfrewshire to work, and 38% of Renfrewshire jobs are filled by commuters from elsewhere. Manufacturing and export industries play a greater role in Renfrewshire than in Scotland as a whole. Employment is significantly more reliant on large enterprises in Renfrewshire than in Scotland.

The gross weekly pay for Renfrewshire residents has risen steadily from £372.60 in 2002 to £494.10 in 2009. Apart from in 2007 the average gross weekly pay of Renfrewshire residents has been higher than in Scotland as a whole.[33]

Fig 10.9: Population and Households in Renfrewshire

YEAR	2003	2004	2005	2006	2007	2008	2009
Population	170980	170610	170000	169590	169600	169800	169910
Households	76950	76750	77010	77550	78180	78750	79026

Source: General Register Office for Scotland – Annual mid year estimates

Housing

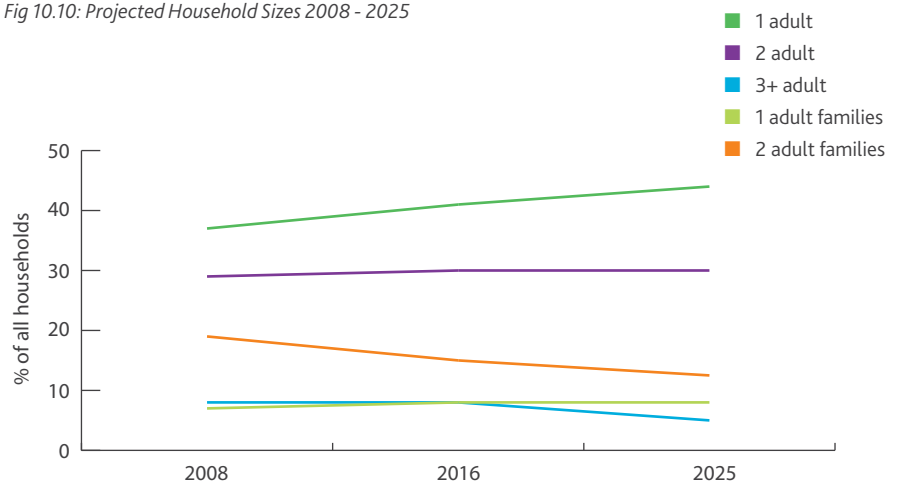
The number of households in Renfrewshire increased between 2003–2009, as illustrated in figure 10.9.

33 NOMIS Official Labour Market Statistics https://www.nomisweb.co.uk/ Accessed 29/9/10. Crown copyright material is reproduced with the permission of the Controller Office of Public Sector Information (OPSI).

This is due to the fact that people are increasingly living in smaller households. However an increase in smaller households does not necessarily translate into a need for smaller houses; evidence shows that many older people prefer a spare room for visiting relatives and carers, while younger households may prefer to have an additional room in expectation of future requirements. Figure 10.10 illustrates the projected household sizes over the period 2008 to 2025.

As shown in Figure 10.10 the proportion of one adult households are predicted to show the biggest growth, from 37% of

Fig 10.10: Projected Household Sizes 2008 - 2025



Source: Renfrewshire Council Local Housing Strategy 2011-2016 (Draft)

all households in 2008 to 44% in 2025, while the proportion of larger 2 adult families shows the biggest fall down 7% from 19% of the total households by 2025. As shown by Figure 10.11 household growth is focussed in the older age groups. Households headed up by a person aged 75 and over is expected to show the biggest increase up from 12% of all households to 16% of all households by 2025.

Tenure of Housing Stock

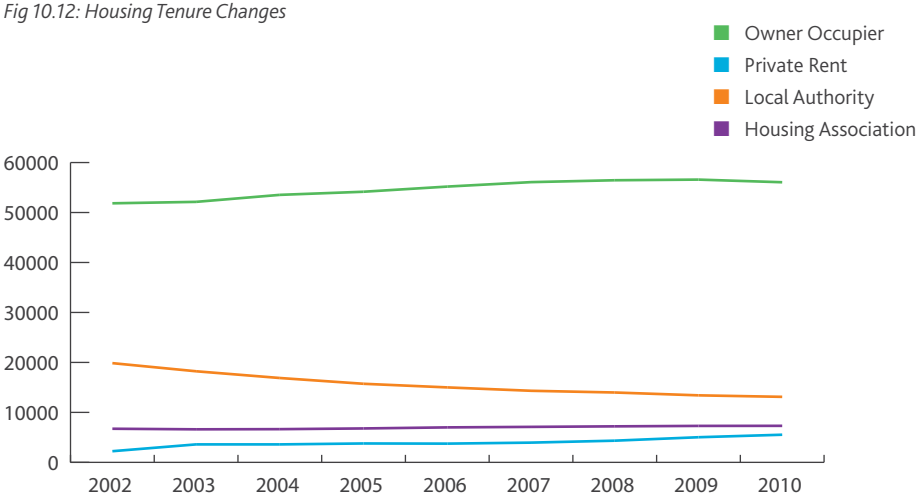
The total housing stock in Renfrewshire is around 82,700 which represents a 2% growth since 2001. Figure 10.12 shows the tenure since 2004. Owner occupation continues to be the dominant tenure within Renfrewshire accounting for some 69% which is a 3% growth since 2004.

Social rented (Local Authority plus Housing Association) accounts for 25% which is a decrease from 2004. This is due to Right to buy sales and demolition of low demand Council housing. Demolition of obsolete Council stock will progress in the future but at a reduced rate as the timescales for completing existing regeneration programmes are extended due to financial funding for implementation of these projects lessening.

New build developments by housing associations have increased the social rented supply in their ownership by almost 10% since 2004. Much of this stock has been for particular needs, for example very sheltered housing for the elderly. Other significant investment by housing associations has been in regeneration projects such as Shortroods, Linwood and Moorpark.

In the private sector stock, houses account for over half of dwelling types, while flats make up 44% of the stock. Differences exist by tenure though, with the majority of social rented stock comprising flats 77% and only 22% houses.

Fig 10.12: Housing Tenure Changes



Source: Renfrewshire Council

Fig 10.11: Estimated and Projected Population Change, Change in Pensionable age included, 2008-2025

AGE BAND	2008	2025 PLANNING SCENARIO	2025 LOWER MIGRATION SCENARIO	% CHANGE PLANNING SCENARIO	% CHANGE LOWER MIGRATION SCENARIO
Children 0-15	30,686	30,229	29,455	-1.5%	-4%
Working Ages	105,960	103,543	101,167	-2.3%	-4.5%
Retirement – 74	20,776	16,143	16,080	22%	23%
Aged 75+	12,378	18,197	18,091	47%	46%
TOTAL	169,800	168,112	164,793		

Source: Draft HNDA

Condition of Housing

Figure 10.13 sets out the available information regarding the current quality of the housing stock in Renfrewshire.

Below Tolerable Standard Housing (BTS)

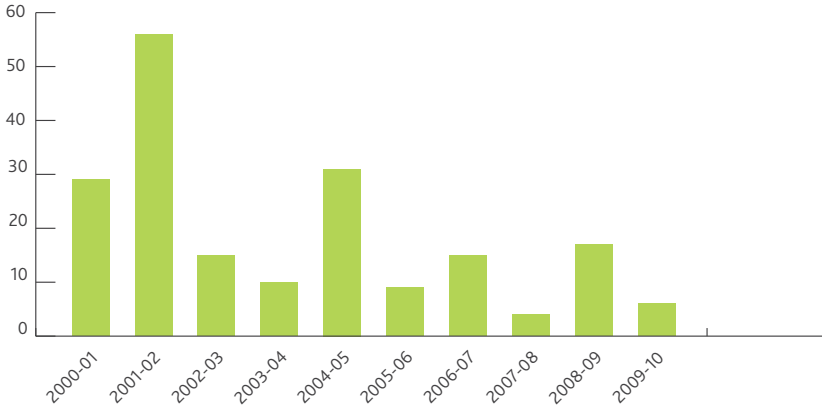
The tolerable standard was first defined in the Housing (Scotland) Act 1987 as the minimum requirement that a house needs to meet in order to be deemed fit to live in. The definition was extended under the Housing (Scotland) Act 2006 and now includes additional requirements relating to thermal insulation and electrical safety.

Fig 10.13: Estimates for key features of the Housing Stock in Renfrewshire and Scotland

ESTIMATES FOR KEY FEATURES OF THE HOUSING STOCK	RENFREWSHIRE	SCOTLAND
% of dwellings with any disrepair no matter how small, to any element of the dwelling.	81%	79%
% of dwellings with disrepair that have urgent disrepair which if not rectified would cause the fabric of the building to deteriorate further and/or place the health and safety of the occupier at risk.	43%	37%
% of private sector dwellings with urgent disrepair which if not rectified would cause the fabric of the building to deteriorate further and/or place the health and safety of the occupier at risk.	40%	36%
% public sector dwellings with urgent disrepair which if not rectified would cause the fabric of the building to deteriorate further and/or place the health and safety of the occupier at risk.	53%	39%
Median annual household income- with disrepair no matter how small, to any element of the dwelling.	£18,100	£17,500
Median annual household income – with urgent disrepair which if not rectified would cause the fabric of the building to deteriorate further and/or place the health and safety of the occupier at risk.	£17,300	£17,700

Source: Scottish House Condition Survey, Local Authority report midpoint of 2008.

Fig 10.14: Number of grants approved for BTS properties in Renfrewshire

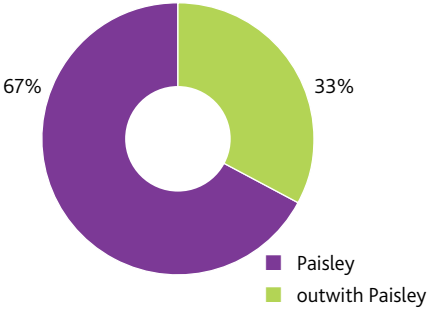


Source: Draft Local Housing Strategy November 2010

The most recent local private sector stock condition survey took place in 2003. This indicated that there were approximately 1,200 BTS housing in Renfrewshire. It was highlighted that much of the BTS housing in Renfrewshire is concentrated in privately owned tenement flats in the centre of Paisley. Figure 10.14 shows the number of Private Sector Housing Grants approved for BTS properties value £4 million.

Further investment in BTS has also been carried out through Housing Association Grant which allowed Registered Social Landlord's to acquire and improve tenement buildings. The distribution of this funding is shown on figure 10.15.

Fig 10.15: Distribution of HAG investment 2004-2010



Source: Renfrewshire Council Draft Local Housing Strategy 2011-2016

Energy Efficiency of the Council Housing Stock

The energy efficiency of the housing stock is important in helping to reduce fuel poverty and as a cost effective means of reducing carbon dioxide emissions from housing.

The energy efficiency of housing stock as measured by the National Home Energy Rating (NHER) is shown below. NHER rates dwellings on a scale of 0 (poor) to 10 (excellent). Good is 7 or more. The NHER is the most commonly used measurement in Scotland as it considers all energy use and allows for regional and geographical climatic variations.

This shows that in comparison to Scotland, Renfrewshire has a slightly greater proportion of dwellings with a good NHER rating. In Renfrewshire, like Scotland as a whole, the public stock is more energy efficient than the private stock as shown in figure 10.17.

Fig 10.17: NHER in private and Public Stock in Renfrewshire and Scotland

	PRIVATE STOCK		PUBLIC STOCK	
	0-5 NHER RATING	6-10 NHER RATING	0-5 NHER RATING	6-10 NHER RATING
Renfrewshire	26%	74%	10%	90%
Scotland	37%	63%	18%	82%

Source: NHER profile of private/public stock in Renfrewshire midpoint 2008

Improvements to the energy efficiency of the social rented stock will continue to be made as social landlords undertake work to meet the requirement of the Scottish Housing Quality Standard (SHQS) by 2015. This sets out minimum energy efficiency standards. The majority of Housing Associations stock currently meets the SHQS, whereas less than 5% of the Council stock currently meets the standard. The Council's programme of works started in April 2010 and will bring significant energy efficiency improvements to heating, insulation and energy efficiency.

Figure 10.17 shows the private stock in Renfrewshire is considerably less energy efficient than the public stock.

Currently there are limited powers to require homeowners or landlords to make energy efficiency improvements to their properties. The Scottish Government intends to make a ministerial statement on regulation of the private sector in this area in 2011.

Environmental Linkages

Many factors influence health, alongside individual choices and wealth, the physical environment has a key role to play. This means that policy decisions in a variety of areas, and especially those that are not about health care, will impact on health e.g. education, employment, transport, housing, finance and welfare.

Fig 10.16: NHER in Renfrewshire and Scotland

NATIONAL HOME ENERGY RATING	0-2	3-6	7-10
Proportion of Properties in Renfrewshire	1%	40%	60%
Proportion of Properties in Scotland	3%	45%	52%

Source: NHER SCHS 2007-09 midpoint 2008

| 11 | Noise and Light

SEA objectives that relate to Noise and Light:

- Reduce the impacts of noise pollution on sensitive receptors
- Minimise the impact of light pollution on sensitive receptors

Noise can be defined as unwanted sound and within Renfrewshire the key sources of noise includes major roads, railways and airports. The perception of sound as noise can be influenced by properties of the noise such as repetition, level/volume, timing and nature of background sound. Noise can have an adverse impact on residents' quality of life and excessive noise can cause annoyance and stress to peoples' health and may disturb sleep.

A summary of the indicators used in assessing the state of Renfrewshire's environment is presented below, highlighting the current status of each indicator and the directional trend since the adoption of the Renfrewshire Local Plan in 2006.

The current status is shown by using the following colours:

G Good

F Fair

P Poor

L Limited data

The trend direction is shown with the following arrows:

↑ Improving

↓ Deteriorating

↔ No Change

INDICATOR	CURRENT STATUS	TREND DIRECTION	EXPLANATION
Noise Complaints	F	↔	The level of nose complaints received by the Council especially in relation to domestic noise increased considerably between 2006 and 2009 due to the introduction of the Antisocial Behaviour etc. (Scotland) Act 2004. However the level of complaints have now stabilised
Light Pollution	F	↑	The level of light complaints received by the Council increased considerably between 2006 and 2009 due to the introduction of the Public Health Act 2008. However light complaint levels fell by 40% between 2009 and 2010.

Noise and Nuisance Complaints

Domestic Noise Complaints

The Antisocial Behaviour etc. (Scotland) Act 2004 introduced new provisions in relation to noise nuisance. In particular, the act gave local authorities additional powers to deal with noise nuisance and tackles the problems of night noise in dwellings. Domestic noise can be caused from a variety of sources including loud music, televisions, household appliances, animals and burglar alarms.

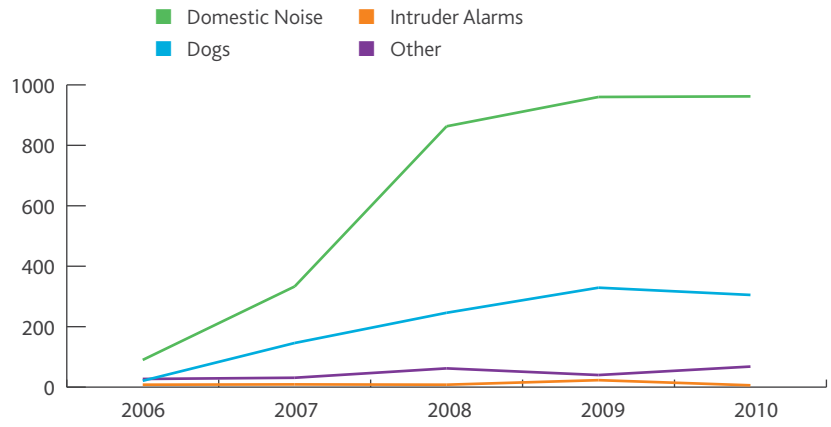
Within Renfrewshire the Antisocial Behaviour Noise Service is in operation which is addressing noise disorder complaints. Since the introduction of the Antisocial Behaviour etc. (Scotland) Act 2004 domestic noise complaints have risen rapidly and this increase can be attributed to the publicity highlighting the implications of the Act. This increase is common across Scotland, which as a whole has experienced a four-fold increase in complaints since the legislation was introduced. This increase is seen as an inevitable consequence of local authorities publicising their complaints service and thus increasing awareness. Nevertheless it

shows that the new legislation is working and that the public now have the chance to report problems and get a speedy response. Figure 11.1 illustrates that domestic noise and dog noise complaints rose sharply from 2006 to 2009. This is in line with the pattern of a dramatic rise of domestic noise complaints in Scotland. Domestic noise complaints appear to have stabilised for now. Paisley saw the greatest rise in noise complaints as it is the largest settlement. However, each of the other towns and villages have also seen a rise over the 2006 – 2009 period.

Environmental Noise Complaints

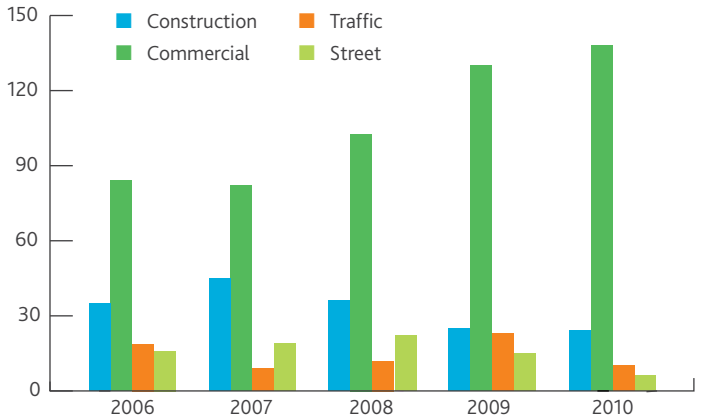
Environmental noise is the summary of noise from transport, industrial and recreational activities. In response to the Environmental Noise Directive (END), the Scottish Government has produced strategic noise maps for major roads which have more than six million vehicle passages a year, major railways which have more than 60,000 train passages a year, major airports with more than 50,000 movements along with transport sources and industry in agglomerations (large urban areas). The Noise Maps are available at http://www.scottishnoisemapping.org/public/view-map.aspx

Fig 11.1: Complaints Received Regarding Domestic Noise in Renfrewshire



Source: Renfrewshire Council Records of Domestic Noise Complaints

Fig 11.2: Types and Numbers of Complaints Received Regarding Environmental Noise



Source: Renfrewshire Council (2011)

The number of complaints received by the Council relating to environmental noise have varied since 2006. Commercial complaints have risen steadily from just over 80 in 2007 to around 140 in 2010. Street environmental noise complaints are now at their lowest since 2006 with only a handful of complaints. This contrasts construction noise complaints which have varied between 20 and 40 annual complaints between 2006 and 2010.

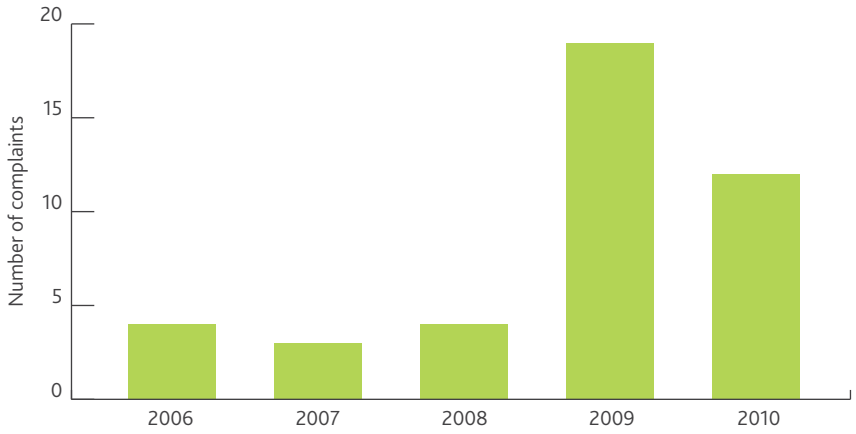
Candidate Quiet Areas

The European Noise Directive requires member states to determine the noise exposure of the population through the adoption of a noise mapping approach. Action Plans are required to be developed to reduce noise levels and to preserve environmental noise quality where it is good. The Directive relates specifically to environmental noise caused by road, rail, air traffic and from industrial sources. To meet the requirements under the Directive, the Scottish Government has devised a two stage approach to noise mapping and action plan development as delivered through the Environmental Noise (Scotland) Regulations 2006. The two stages are production of strategic noise maps and action plans drawn up to manage noise issues. Action Plans have been drawn up for the Edinburgh and Glasgow agglomeration and these have included identification of candidate Noise Management Areas (cNMA) and candidate Quiet Areas (cQA). To determine whether an area is identified as a cQA a number of criteria need to be met. This includes that that at least 75% of the area is quiet, noise levels are recorded as being less than 55db, the area needs to be at least 9 hectares in size, the area is within the Glasgow-Edinburgh agglomeration or within 2km of the boundary and not next to industrial, business, retail uses and can be used by the public. Using this criteria there are currently no cQA within Renfrewshire as any area identified was below the 9 hectares in size. A second round of mapping cQA will be undertaken in 2012.

Light Pollution

Artificial light is essential in our modern society. It has many uses including illumination of streets, roads and hazardous areas; for security lighting; to increase the hours of usage for outdoor sports and recreation facilities, or to enhance the appearance of buildings at night. The increased use of lighting, however, can cause problems. Light in the wrong place at the wrong time can be intrusive. There has been an increase in complaints about light in recent years as it is a source of pollution and nuisance which can be detrimental to human health and the environment. Although the importance of artificial lighting for pedestrian and traffic safety and general security is recognised, lighting does have a marked impact on the night environment. Artificial light can significantly change the local character of the area, altering wildlife behavioural and ecological patterns and reducing visibility of the dark skies.

Fig 11.3: Complaints Received Regarding Light Pollution in Renfrewshire



Source: Renfrewshire Council (2011)

Renfrewshire Council has received 42 complainants on light pollution since 2006 as illustrated in figure 11.3. The Public Health Act 2008 has introduced legislation to enable local authorities to deal with light pollution which is now considered a statutory nuisance. As illustrated by figure 11.3. The Council has seen a rise in the numbers of complaints on light pollution since it now has the necessary legislation to deal with the complaints. There was however a 40% drop in light pollution complaints between 2009 and 2010.

| 12 | Transport

SEA objectives that relate to Transport:

- Ensure better integration between transport and land use planning
- Increase the proportion of trips undertaken by walking, cycling and public transport
- Partnership working to try and reduce emissions from transport

Sustainable transport and travel is central to the Scottish Government's commitment to achieving sustainable economic growth as well as lessening the impact of climate change. The main aim is to reduce the need to travel by better integration of transport and land use planning and the promotion of active travel and public transport options aiming to ensure more sustainable travel.

A summary of the indicators used in assessing the state of Renfrewshire's environment is presented below, highlighting the current status of each indicator and the directional trend since the adoption of the Renfrewshire Local Plan in 2006.

The current status is shown by using the following colours:

G Good
P Poor
F Fair
L Limited data

The trend direction is shown with the following arrows:

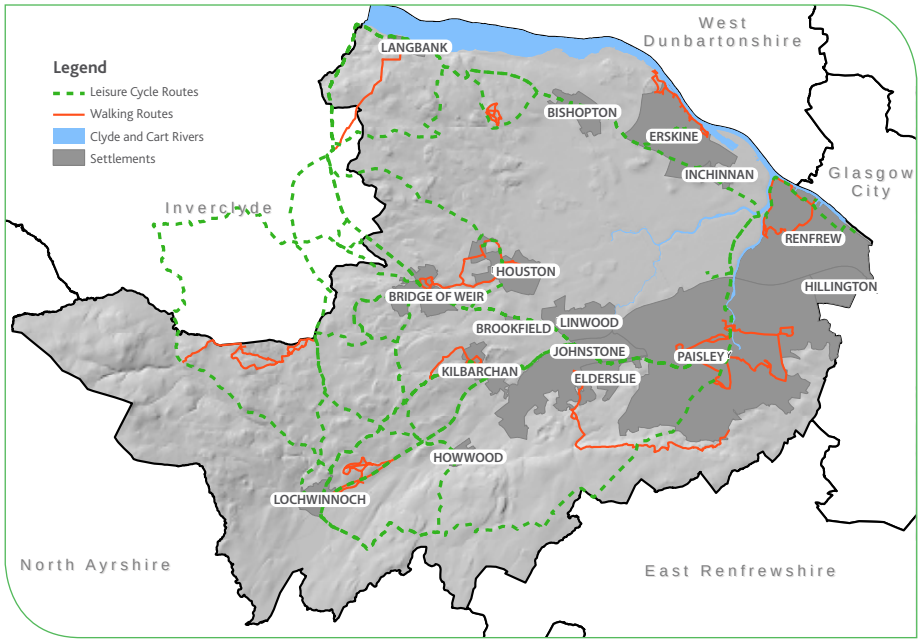
↑ Improving
↓ Deteriorating
↔ No Change

INDICATOR	CURRENT STATUS	TREND DIRECTION	EXPLANATION
Walking & Cycling Trips	F	↔	Over the last 10 years the number of people walking or cycling to work has been at a constant level with very little variation in the numbers. The number of residents walking/ cycling as a leisure activity has increased slightly.
Public Transport Trips	F	↔	The number of Renfrewshire residents using rail has increased whereas the number using buses as a means of public transport has declined. Overall no change.
Road Safety	G	↑	Overall reduction in casualty levels across Renfrewshire.
Traffic Growth / Network Performance	F	↓	Slight increase in traffic growth between 0.5 – 3% around Renfrewshire's roads. Although the trend shows an increase in traffic growth, the situation in Renfrewshire is better than Scotland as a whole.
Transport Emissions	G	↑	Significant decrease since 2005. Renfrewshire is within the top ten best performing Local Authorities for transport emission reduction.

Walking/Cycling

There are a number of access routes in and around Renfrewshire, including an extensive network of paths with 291 core paths and two national cycle routes 7 / 75. The core path corridors include 90% of the public rights of way within Renfrewshire. The active travel routes provide a comprehensive network of safe and attractive walking and cycling routes. Figure 12.1 outlines the main walking and cycling routes in and around Renfrewshire.

Fig 12.1: Renfrewshire's Principle Walking & Cycling Routes



Walking and Cycling Trips

The number of people walking and cycling as a means of getting to work in Renfrewshire has been at a constant level in line or just below the Scottish average for the last ten years. However in terms of travel to school, walking and cycling has increased year on year since 2003 and has been above the Scottish average for the last 5 years with over 50% of pupils choosing to travel by this mode.

Renfrewshire's Single Outcome Agreement (2009 – 2011) outlines the importance of accessing services and facilities by sustainable travel means and has set a target of 70% of Renfrewshire's residents undertaking journeys of under 2km by foot by 2015. Currently there are around 65% of Renfrewshire's residents that will walk if the distance is under 2 km. Figures 12.2 & 12.3 outline the percentage of people that use

Fig 12.2: Frequency of Walking (Adults 16+) – As a Means of Transport (2007/08)

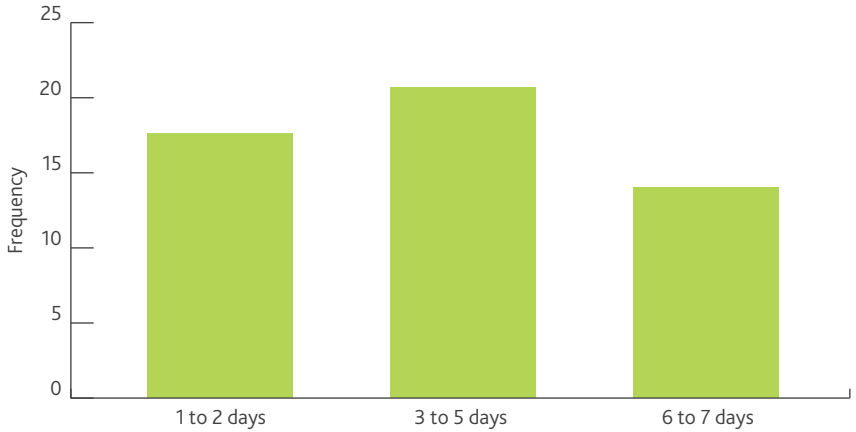
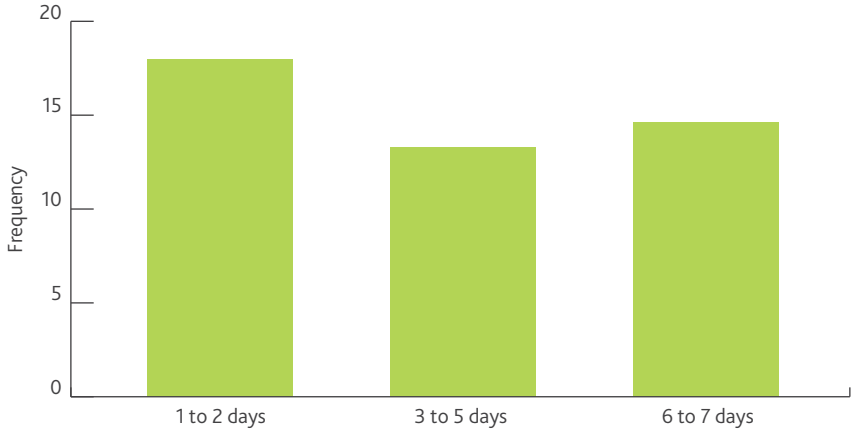
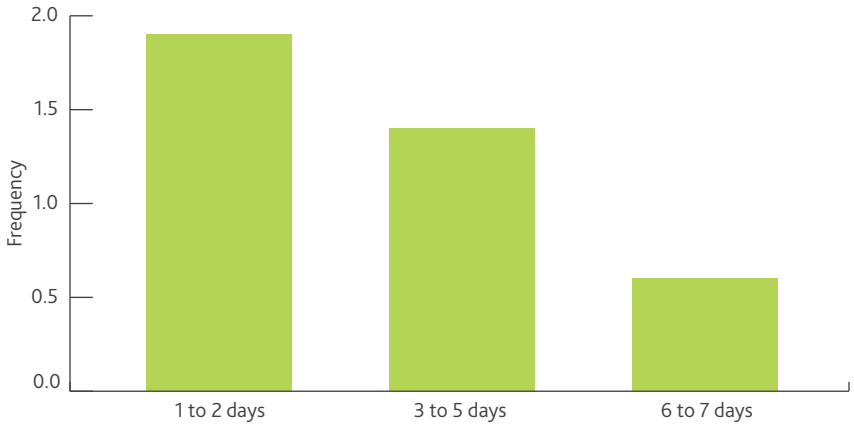


Fig 12.3: Frequency of Walking (Adults 16+) – Just for Pleasure or to Keep Fit (2007/08)



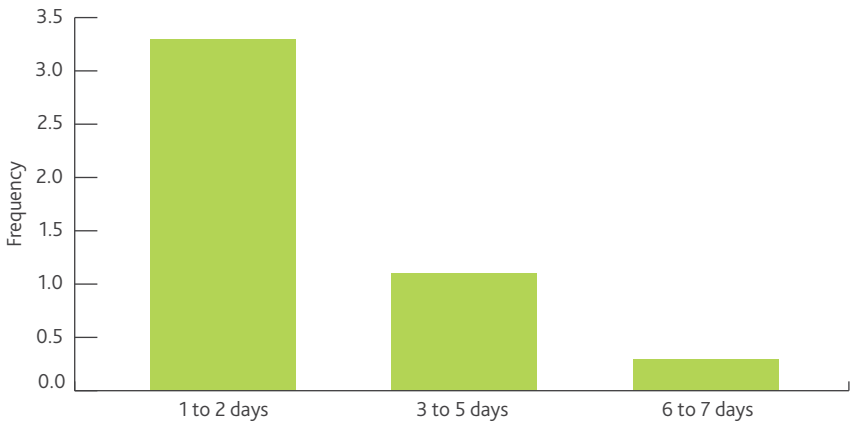
Source: SHS Transport: Local Area Analysis 2007/08

Fig 12.4: Frequency of Cycling (Adults 16+) – As a Means of Transport (2007/08)



Source: SHS Transport: Local Area Analysis 2007/08

Fig 12.5: Frequency of Cycling (Adults 16+) – Just for Pleasure or to Keep Fit (2007/08)



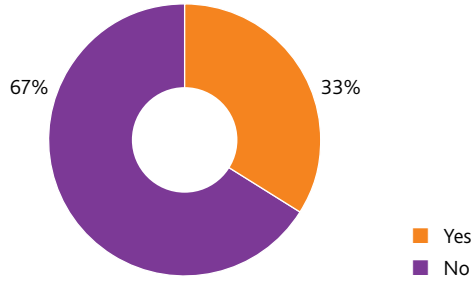
Source: SHS Transport: Local Area Analysis 2007/08

walking as a means of transport to work and those that walk as a leisure pursuit.

1% of Renfrewshire residents use cycling as a means of transport and 2% as a leisure activity. This compares to the Scottish average of 3% using cycling as means of transport. Figure 12.6 outlines the number of Renfrewshire residents that have a bicycle.

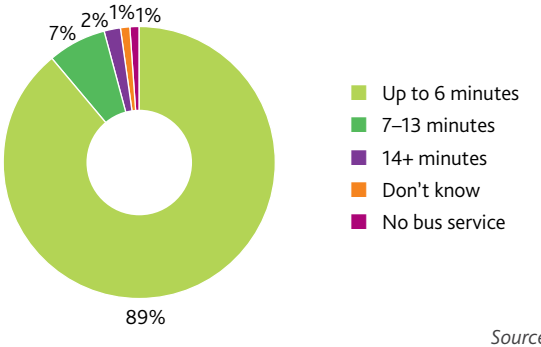
Increasing active travel through the use of walking and cycling routes is important to support the principles of sustainable development and climate change mitigation and adaptation. Renfrewshire Council has an Outdoor Access Strategy which was launched in 2005. The strategy provides a framework for the development of paths in Renfrewshire. The vision is to have a network of integrated paths for all activities which are accessible to all. Access also requires to be safe and attractive, providing opportunities to explore areas that surround towns and settlements. Integration of active travel routes and good links are essential. Renfrewshire's Outdoor Access Strategy has the potential to deliver good active travel links and corridors.

Fig 12.6: Households with Access to a Bicycle (2007/08)



Source: SHS Transport: Local Area Analysis 2007/08

Fig 12.7: Walking Time to the Nearest Bus Stop from Households – (2007/08)



Source: SHS Transport: Local Area Analysis 2007/08

Bus

In terms of bus passengers although bus patronage fell by 0.8% to 493 million in 2008/09, bus patronage is still the dominant form of public transport journeys. 38% of Renfrewshire's residents use the bus at least once a week.

There are over 30 bus companies operating in and around Renfrewshire and there are over 950 bus stops within the Council boundary. The 2008 Scottish Household Survey shows 85% of households in Scotland are within 6 minutes walk of a bus stop, whilst Renfrewshire is slightly below the average at 70%.

Bus services are at their most frequent in and around Paisley and on the road corridors linking up to Glasgow. The main issue with bus provision elsewhere in Renfrewshire is the frequency and provision at off-peak times in the evening and at the weekend.

In partnership with Strathclyde Partnership for Transport (SPT), an on-demand bus service operates in and around rural areas of Renfrewshire, providing a local bus service to communities that do not currently have public transport provision or where services are limited.

Fig 12.8: Frequency of Bus Service – As a Percentage of Sampled Households in Renfrewshire (2007/08)

Source: SHS Transport: Local Area Analysis 2007/08

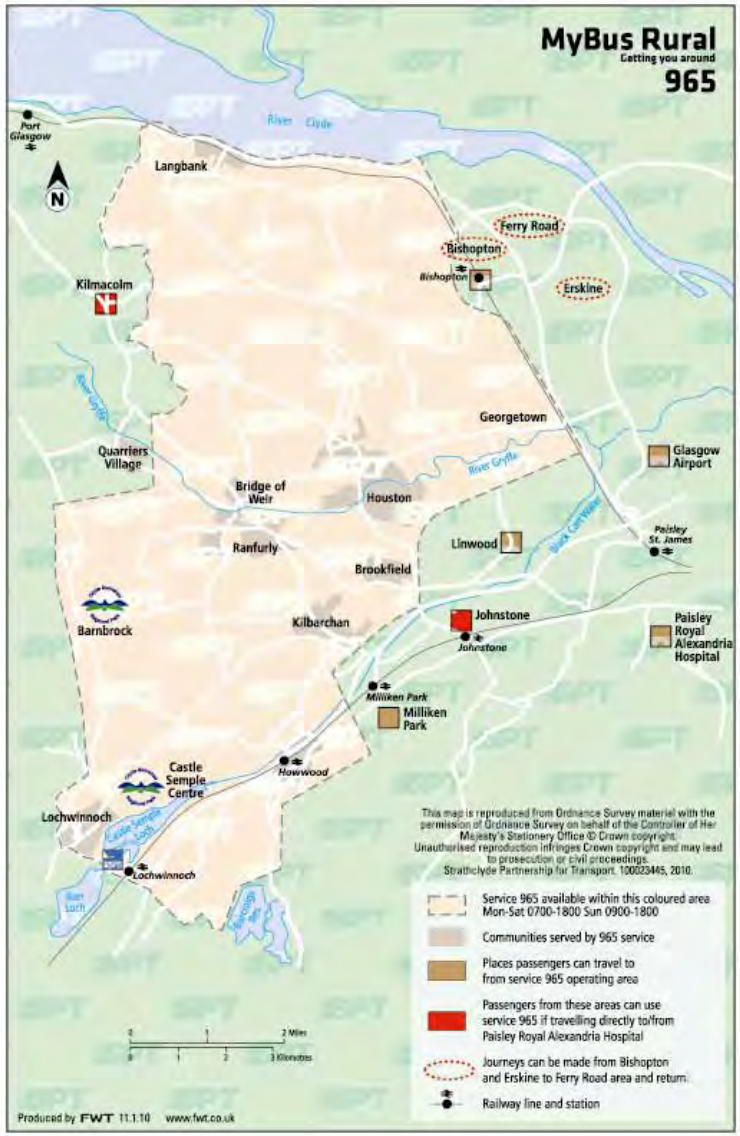
The SPT MyBus Rural service that operates within Renfrewshire is the Gryffe Valley Route covering Langbank, Bishopton, Bridge of Weir, Houston, Kilbarchan and Howwood. This service provides direct links between these more rural settlements and other town centres, health centres, hospitals and train stations, seven days a week during the daytime. The route that SPT's MYBus operates within Renfrewshire can be seen in figure 12.9. This service is currently subsidised service for the next 4 years and therefore not a permanent service provision.[34]

Apart from the subsided bus services provided by SPT, all other bus operators are private companies that operate routes for profit. One of the biggest issues with private companies operating within a de-regulated market is that bus operators can decide when and where to run buses and can withdraw or simply change services without much notice. This can sometimes leave some settlements without any public transport at all or without evening and weekend services.

Similar to the Gryffe Valley route outlined above, there are occasions where SPT can step in to subsidise bus services, where they are considered to be 'socially

34 www.spt.co.uk

Fig 12.9: Strathclyde Partnership for Transport – MyBus Rural, Renfrewshire



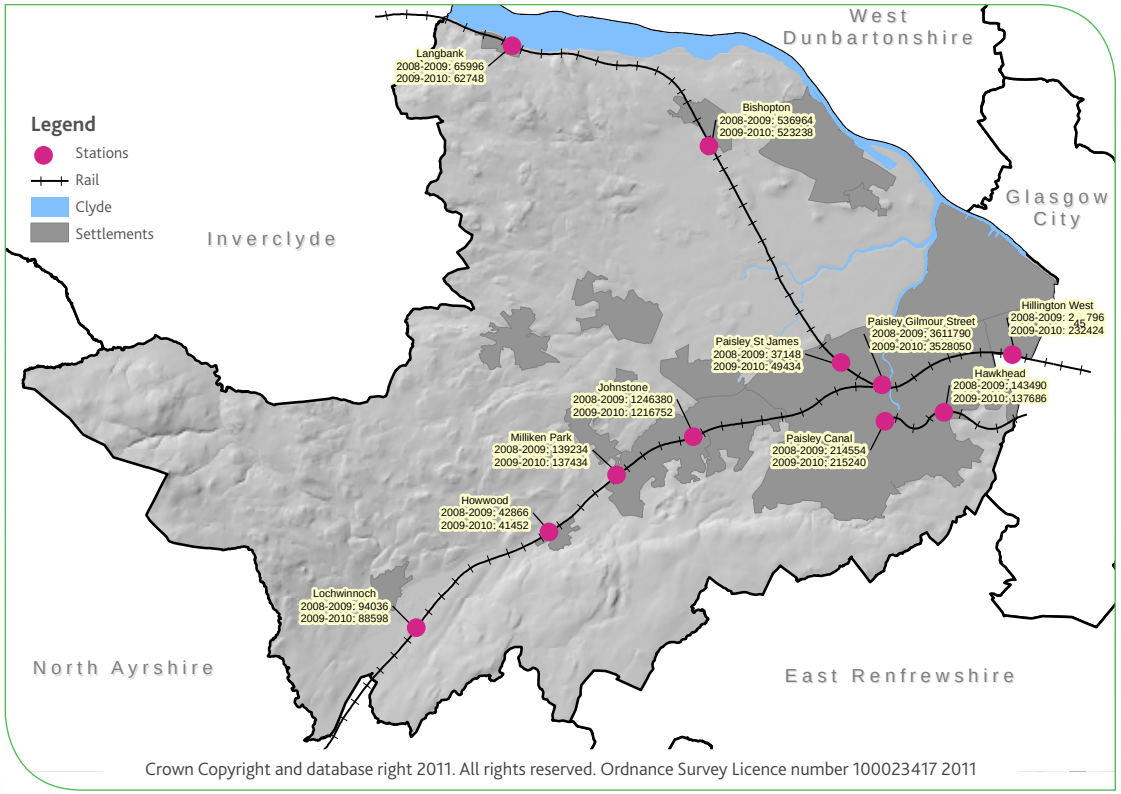
Source: www.spt.co.uk

necessary' where it does not pay for a private operator to run the service. SPT has limited resources and the biggest challenge that they have to decide is what supported services require to be operated and run, which covers the entire Regional Transport Partnership area, which includes 11 other local authority areas.

Rail

Renfrewshire is also well connected to surrounding areas by rail. There are 11 rail stations on two rail lines within Renfrewshire including the Paisley Canal line providing connections to Glasgow and the main Glasgow to Ayrshire/ Inverclyde route. The main rail line through Renfrewshire is the Glasgow Central to

Fig 12.10: Renfrewshire Rail Passenger numbers 2008 / 2009 & 2009 / 2010



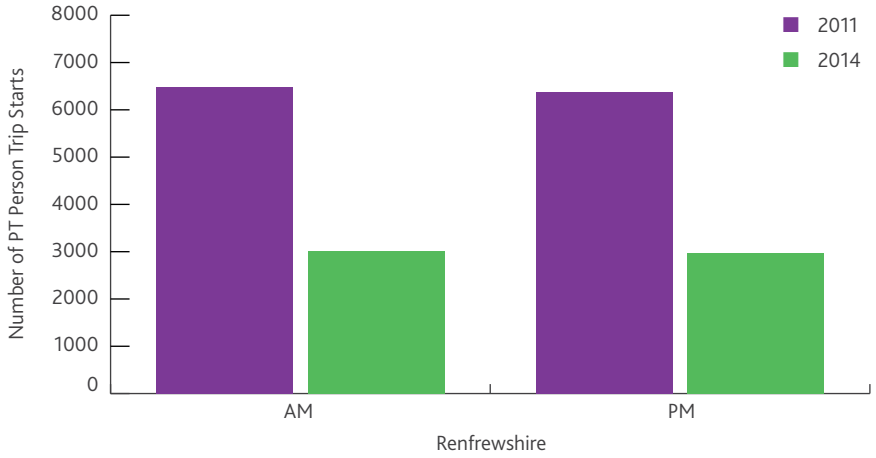
Ayrshire / Inverclyde route. From Glasgow this rail line calls at Hillington, Paisley Gilmour Street before branching into two routes, one to Inverclyde calling at Paisley St James, Bishopton and Langbank before going on to Inverclyde. The other rail line branches off to Ayrshire calling at Johnstone, Milliken Park, Howwood and Lochwinnoch before reaching Ayrshire. The second rail line is from Glasgow Central and terminates at Paisley Canal to the south of Paisley Town Centre calling at Hawkhead to the east of Paisley Town Centre as well as other locations within Glasgow City.

Passenger journeys by rail in Scotland have increased year on year with a 20% increase in rail passengers since 2004/05 with rail passengers at 76.9 million in the 2009/10 financial year.[35] In Renfrewshire, 5% of adults use rail to get to and from work, with only 1.2% of pupils in full-time education using rail as a mode of transport.[36] 10% of Renfrewshire residents had used the train at least once per week.

Figures 12.11 and 12.12 outline that the number of passengers using public transport is predicted to fall in the next few years.

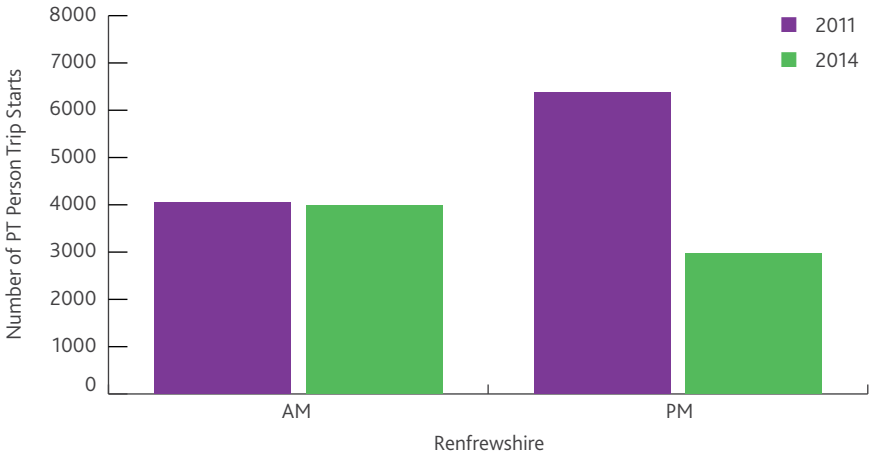
35 Statistical Bulletin Transport Series produced by the Scottish Government (23 August 2010)
36 SHS Transport: Local Area Analysis 2007/08.

Fig 12.11: Public Transport Total Trip Starts (2011 & 2014)



Source: SPT Transport Planning (2011)

Fig 12.12: Public Transport Total Trip Ends (2011 & 2014)

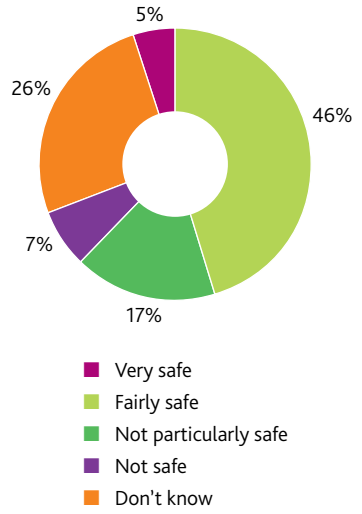


Source: SPT Transport Planning (2011)

Travelling by Public Transport

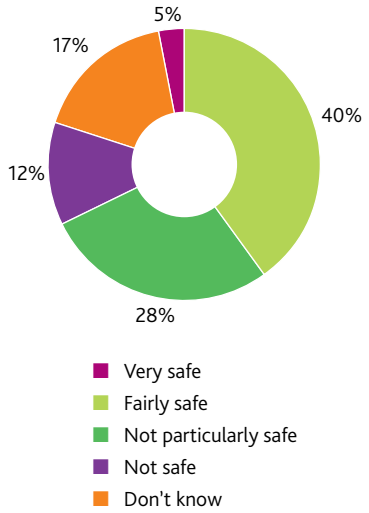
Many people suggest that as well as convenience, the reason why they do not use public transport is due to the safety aspect and the fear of crime whilst travelling by public transport. In Renfrewshire, 17% stated that they didn't feel particularly safe using the train in the evening and 46% felt fairly safe. In terms of travelling by bus, 40% felt fairly safe or safe with 40% not feeling particularly safe or not safe.

F1g 12.13: Safety from Crime While Travelling by Train in the Evening – As a Percentage of Adult 16+ Respondents within Renfrewshire (2007/08)



Source: SHS Transport: Local Area Analysis 2007/08

Fig 12.14: Safety from Crime While Travelling by Bus in the Evening – As a Percentage of Adult 16+ Respondents within Renfrewshire (2007/08)



Source: SHS Transport: Local Area Analysis 2007/08

In terms of views on the quality of public transport in Renfrewshire, from a small sample size, over 18% of people responded that the quality of public transport was good and 5.6 % suggested that the quality was poor.

With regard to convenience of public transport within Renfrewshire, again from a fairly small sample size of respondents, over 85% suggested that public transport was fairly convenient.

Roads

Within the Renfrewshire Council area there is over 860km of roads with the strategic trunk roads of the M8 and the A737 being the main arterial routes through Renfrewshire connecting to Glasgow, Ayrshire and Inverclyde. Other main routes include the A737, A726, A8, A761 and the B790/B789. Figure 12.15 indicates the location of these routes.

Fig 12.15: Renfrewshire Roads

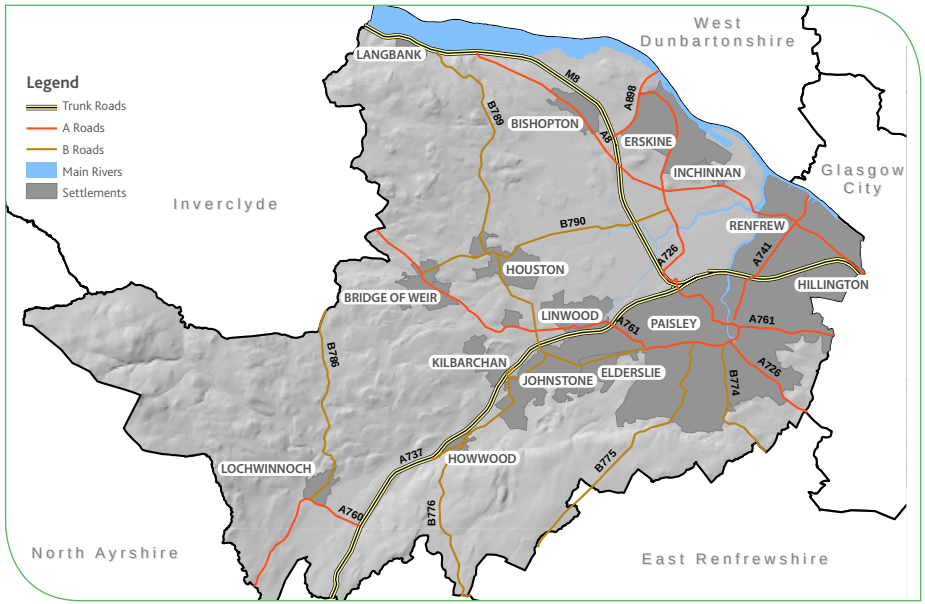


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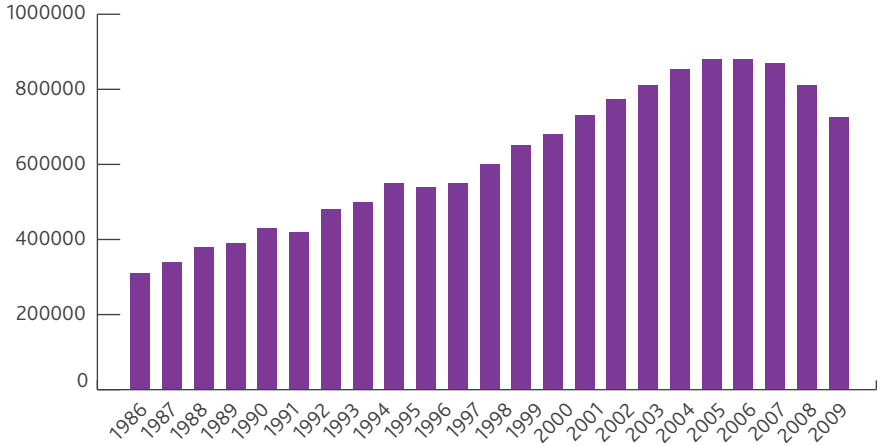
Fig 12.16: Air Passenger Throughput at Glasgow Airports (1986 - 2009)



Source: Glasgow Airport Draft Masterplan, 2011

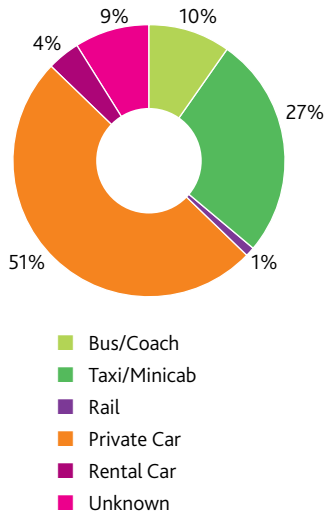
Air Travel

Glasgow Airport handled 7.2m passengers in 2009 (passenger numbers over the years is outlined in figure 12.6). The forecast passenger numbers for 2020 are around 10 million with over 16 million forecast for 2040. The passenger numbers are growing on average 2.7% per year. There are around 30 airlines that fly to over 90 destinations, with 29% of these passengers flying from the airport for business use. Just under half (47%) of all throughput at Glasgow Airport was attributable to international passengers in 2009, with 99% of passengers destination being a location within Scotland.

The airport contributed around £200m to the Scottish economy in 2009, and supports some 7300 jobs across Scotland, 4500 of which are directly at the airport[37]. The airport is currently the largest private sector employer within Renfrewshire.

In terms of how people travel to Glasgow Airport only 11.2% of passengers and staff use public transport to travel to and from the airport. It is hoped to increase that number to 15% by 2012. Glasgow Airport operators BAA are trying to encourage their staff to change travel behaviours to more sustainable means of travel. A staff travel plan has been introduced to try and increase the number of staff walking to work from 2% to 4%, with encouragement of staff to cycle to work from 1% to 2% and those traveling by public transport from 8% to 12%. There are a number of footways around the airport which link up to Paisley, Renfrew and Erskine. There is also a cycle route which connects to National Cycle Routes 7 and 75.

Fig 12.17: Modes of Travel to Glasgow Airport (2010)



Source: Modes of travel to Glasgow Airport, MVA (July 2010)

There are around 250 buses per day that depart from the airport. There is currently no direct rail service to/from Glasgow Airport and there remains uncertainty over the implementation of a direct rail service or equivalent public transport interventions to serve Glasgow Airport.

In relation to traffic in and around the airport, 17% or 1 in 5 vehicles on the M8 motorway in the vicinity of the airport campus is actually airport related. In terms of trips to Glasgow Airport, figure 12.17 indicates that four fifths of trips are by car (private, rental or taxi), over 90% of trips are by road based modes.

Travel to Work/Education

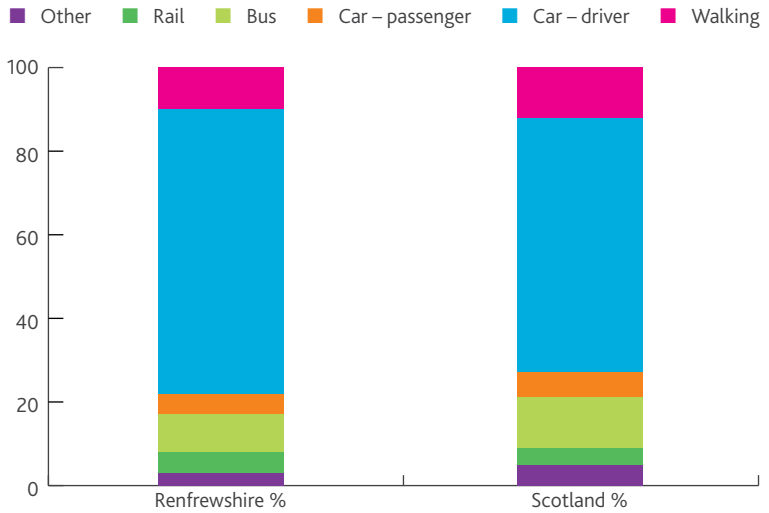
Renfrewshire has an estimated population of around 160,910. The economically active population is estimated to be around 86,900. At present, Renfrewshire experiences a high level of inward and outward commuting with 40% of residents travel out of Renfrewshire to work and 38% of Renfrewshire jobs are taken up by commuter living outside Renfrewshire. There are around 65,000 people who live in Renfrewshire that work in Renfrewshire.

The high level of commuting movement is not just the result of journeys to and from Glasgow, large numbers of out-commuters are also attracted to jobs available in Inverclyde, Ayrshire and Lanarkshire, while significant numbers commute in from Ayrshire as well as Lanarkshire.

Figure 12.18 compares the method of travel to work for residents of Renfrewshire to Scotland as a whole. In comparison to the rest of Scotland, Renfrewshire residents are more reliant on the car or a van as a method to get to work, and slightly more likely to travel to work by train.

In terms of travelling to school, 55% of Renfrewshire children walk or cycle to school, 24% go by bus and 20% are taken in a car or a van. (Scottish Household Survey 2008).

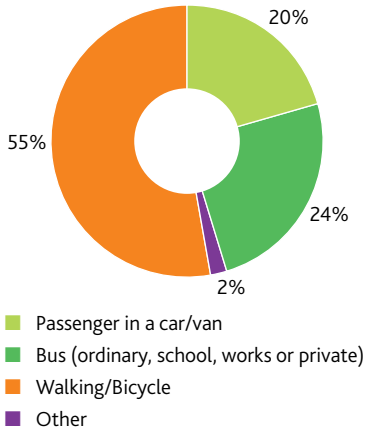
Fig 12.18: Method of travel to work – 2008



Source: Scottish Household Survey 2007–2008

37 Glasgow Airport Draft Masterplan, 2011

Fig 12.19: How Children Travel to School in Renfrewshire



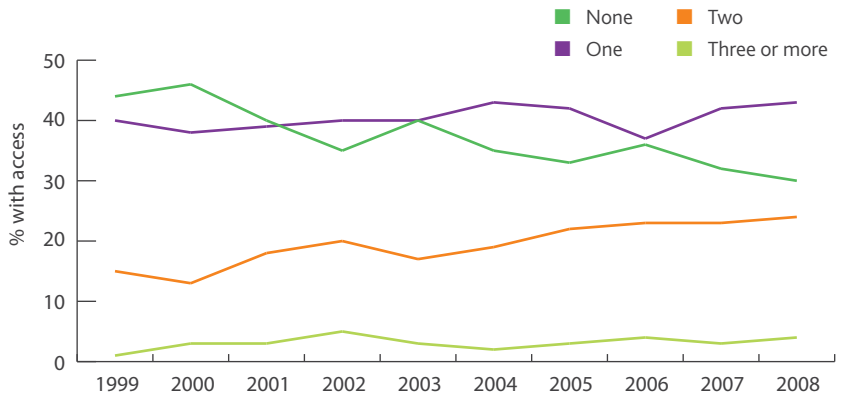
Source: Scottish Household Survey 2007-2008

Car Ownership

The Scottish Household Survey indicates that 31% of Renfrewshire households do not have access to a car and that this percentage is reducing year on year. The Scottish average is 30.2% that do not have access to a car.

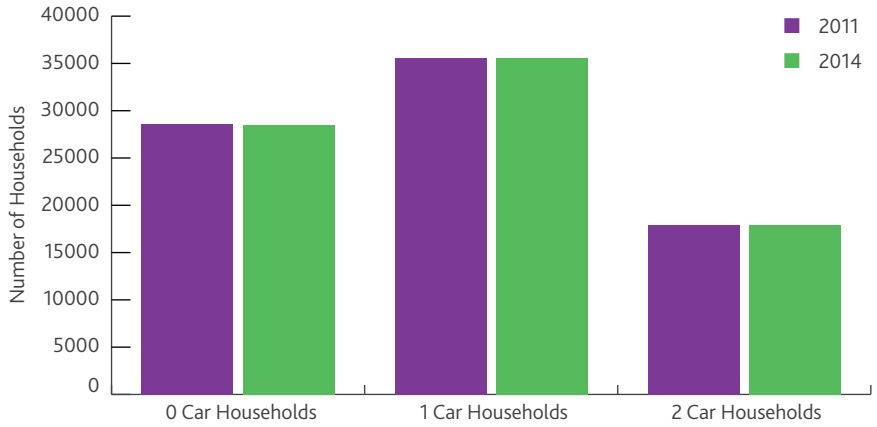
The following diagram shows projected car ownership levels at 2014.

Fig 12.20: Renfrewshire Household Car Access by Year



Source: Scottish Household Survey, 2007-2008

Fig 12.21: Forecast Car Ownership Levels in Renfrewshire (2011 - 2014)



Source: SPT Transport Planning (2011)

Traffic Growth

The car is overwhelmingly the dominant mode of travel in Scotland. It is estimated that the total volume of traffic on major roads in Scotland has grown by about 16% since 1990.

Traffic counts have been carried out in various locations across Renfrewshire since 1999 in order to measure trends and changes in traffic flows. Traffic on Renfrewshire roads appears to be increasing overall by approximately 0.5% per annum. This rate is considered to be reasonable given that car ownership rates have been increasing in Scotland on average 2 – 3% per year. Although the average rate of increase in traffic growth is 0.5%, within parts of Paisley, Johnstone and Bridge of Weir, the traffic growth is above Renfrewshire's average as a growth of around 1% is experienced.

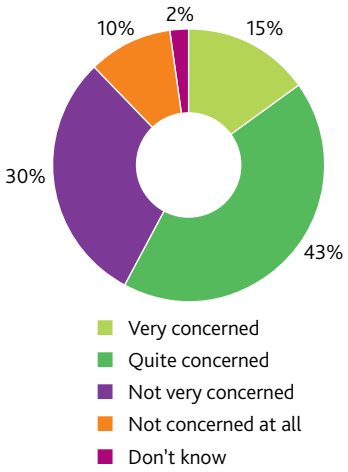
On the trunk road network around Renfrewshire, the M8 is growing at a rate of around 0.9% per year, with the A737, south of Howwood showing a dramatic level of growth at around 6% per year since monitoring was first undertaken in 1999.

Even though overall congestion within Renfrewshire has not increased at a rate experienced by many other local authorities in the surrounding area, a

survey carried out in 2007/08 indicated that over 58% of residents questioned were quite or very concerned about traffic growth. Figure 12.22 outlines the general feeling regarding traffic growth in Renfrewshire.

Renfrewshire Council are proactive in trying to manage the demand from increasing traffic volume and effect modal shift from car usage to more sustainable modes. Measures include the coordination of travel plans for schools as well as substantial funding to provide and improve safer routes to school. Other measures include the Council's own travel plan which incorporates numerous activities to promote walking & cycling as well as a successful employee car sharing and cycle scheme. Developers are now conditioned by planning consent to develop travel plans for new developments outlining how they will encourage their employees to use alternative modes of travel and there are a number of large employers who have produced and continue to deliver their travel plans on a voluntary basis. This work is ongoing along with the implementation of network improvements to try and reduce traffic levels across Renfrewshire.

Fig 12.22: Level of Concern About Traffic Growth – (2007/08)



Source: SHS Transport: Local Area Analysis 2007/08

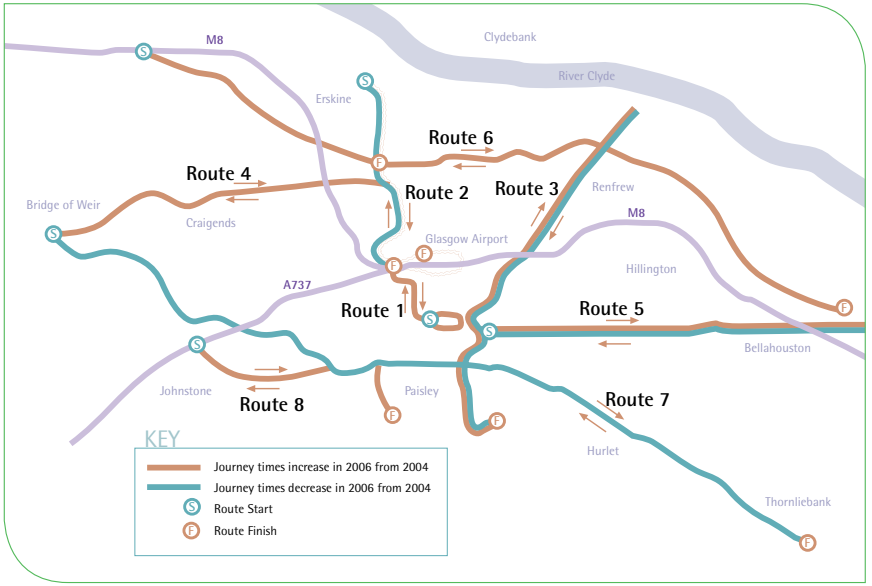
Transport Network Performance

Renfrewshire Council currently undertake journey run surveys on eight key road routes in and around Renfrewshire in order to highlight the trends in journey times for vehicles using these routes. Figure 12.23 outlines each of these routes.

The results of these surveys, that are carried out every two years, indicate that the journey times on all eight routes have increased at each time of the survey. It should be noted that the increase in journey times is not substantial, as in 2004 to 2006 the increase was only just over 0.02%, an increase of only 18 seconds.

Overall, the surveys between the years of 2004 and 2006 showed an increase in journey times on four routes in both directions, but one route showed a decrease in journey times in both directions. In general the PM peak period has seen no change in journey times with a slight increase in AM peak period.

Fig 12.23: Renfrewshire Journey Run Survey – Monitored Routes
Source: Renfrewshire Journey Run Survey – Renfrewshire Local Transport Strategy (2007)



Transport Emissions

An efficient transport system is a central component to a low carbon economy as well as delivering sustainable economic growth. The Climate Change (Scotland) Act 2009 commits Scotland to reductions of at least 80% from 1990 levels by 2050, with the interim target of 42% by 2020.

Transport as a sector accounts for over a quarter of the total energy consumed in Scotland. Approximately 99% of the energy consumed in the transport sector comes

directly from oil-based fuels, such as petrol and diesel, with the remaining 1% from electricity.[38]

Reducing emissions from transport sources as a contribution to achieving the Scottish Government greenhouse gas emission targets is central to Renfrewshire Council's Single Outcome Agreement and the Local Transport Strategy.

Under the obligations as set out within the Environment Act 1995, Renfrewshire Council requires to assess concentrations of air pollutants to ensure compliance with the standards and objectives of the Air Quality Strategy. The Council undertake a review and assessment of air quality through the local air quality management framework. Further information and details on air quality can be found in Section 6 of this report.

With regard to reducing emissions from transport, Renfrewshire Council's Single Outcome Agreement has set a target of traffic growth in 2010/11 being no greater than 0.5% each year and the Council and its partners are working together to stabilise the growth of traffic in Renfrewshire to 0.5% each year until 2017.

38 'Towards a Low Carbon Economy for Scotland: Discussion Paper', produced by The Scottish Government (March 2010)

Road Safety

Improving road safety is an important element in making areas and communities safer places to live and move around in. The Council's road safety strategy is contained within Renfrewshire's Local Transport Strategy where the focus has been on behavioural change.

The speed of vehicles within residential areas has become a great concern and many road safety initiatives have been undertaken to try and reinforce 20mph limits in and around residential areas, the Council's schools and where it is considered that lower speed limits require to be implemented.

Statistically over-represented casualty groups such as children and young people are a continued focus for various road safety education, training and publicity activities. Effective partnership working with external agencies helps to add value to both regional and national campaigns in an attempt to maximise impact and effect.

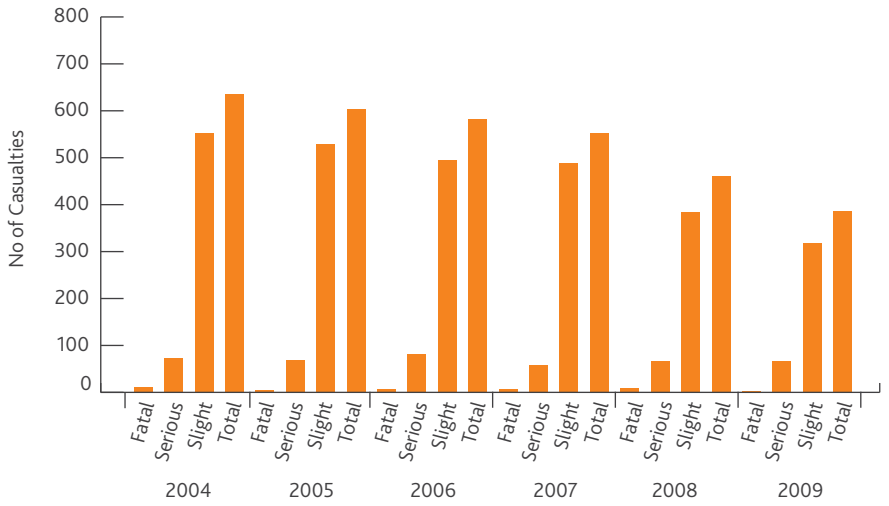
As part of progressing and delivering on the Scottish Government's fifteen national priorities, a target has been set within Renfrewshire's Single Outcome Agreement (SOA), to try and reduce the number of injuries and deaths due to accidents. The target is to reduce the number of people killed or seriously injured by 40%.

Fig 12.24: Road Safety Targets (Scottish Road Safety Framework)

TARGET	2015 MILESTONE % REDUCTION	2020 TARGET % REDUCTION
People killed	30%	40%
People seriously injured	43%	55%
Children (aged <16) killed	35%	50%
Children (aged<16) seriously injured	50%	65%

Source: www.scotland.gov.uk

Fig 12.25: Casualties by Casualty Severity by Crash Date in Renfrewshire



Source: Data taken from AST Road Safety Analysis

The Scottish Government has recently set detailed road safety targets from the period beginning on the 1 January 2011 to 31 December 2020. These targets are shown in figure 12.24.

Renfrewshire Council annually monitors road injury accidents from information supplied by Strathclyde Police to determine what progress has been made towards achieving the reduction targets. Figure 12.25

outlines the recent trends within Renfrewshire.

The monitoring and analysis that has been undertaken over the years highlights that the road safety strategy has had an impact upon casualty levels across Renfrewshire. The overall trend has been encouraging with a reduction in the number of casualties moving towards the Scottish Government's target.

Data Gaps/Limitations

In relation to the road network performance, there has been substantial work carried out monitoring the road network in 2004 and 2006 but there has not been any data available to assess this trend in 2008 and 2010.

Statutory Quality Bus Partnership

In partnership with Strathclyde Partnership for Transport (SPT) and local bus companies, Renfrewshire Council have developed a Statutory Quality Bus Partnership (SQBP) to ensure that at least 90% of buses operating in central Paisley have low floors for wheelchair accessibility and that the engines of the buses comply with European emission standards reducing the amount of emission in and around Paisley Town Centre. The standards set in the SQBP will result in improved air quality and increase accessibility for all.

The partnership will aim to continue improvements to bus infrastructure and public transport information systems. A considerable amount of investment has already been made in terms of upgrading and renewing public transport interchanges, including pleasant and attractive waiting places with increase information on public transport services.

Renfrewshire
Council