
**SOUTH
AYRSHIRE
COUNCIL**

**SUSTAINABLE
DESIGN
GUIDE**

**FOR USE IN BUILDING
PROJECTS**

May 2009

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Acknowledgement

Thanks to the City of Edinburgh Council for the use of their design guide on which this guide is based.

1 INTRODUCTION

WHO IS THIS GUIDE AIMED AT?

This South Ayrshire Council Guide is aimed at Clients and Building Professionals. Clients are defined as Council departments. Building professionals are defined as Council design and maintenance staff and all external design consultants and related services involved in Council building projects, this also includes Contractors.

WHAT TYPE OF PROJECTS?

Any Council building refurbishment or new build project irrespective of size or scale (this could range from refurbishment of a public toilet to the building of a new school).

THE PURPOSE OF THIS GUIDANCE

This Guidance document has been produced to assist the Council client departments in identifying many sustainability features of benefit in good design. It will assist building professionals by providing a systematic approach to many key sustainability issues including amongst others, energy, water and material specification etc. The Guidance provides sources of further information and contacts.

WHAT IS SUSTAINABLE DEVELOPMENT?

The concept of sustainable development first came to prominence in the 1960s and early 1970s with the realisation that existing development patterns were not delivering the benefits expected and if anything were having detrimental impacts on the environment.

The most famous definition of sustainability is the Brundtland Commission that states that sustainable development is:

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

Sustainable development is thus development on a local, national and international level which ensures that we provide all in society with their social, economic and cultural needs while avoiding damage to the environment either in the short or long term. It is about the efficient use of resources – human and natural in a long term strategic framework.

WHY HAVE THIS GUIDE?

South Ayrshire Council published its vision document in February 2008¹.

“Our vision is to establish South Ayrshire as the most dynamic, inclusive and sustainable community in Scotland”

By using the Guide all Council staff and external consultants involved in Council building and construction projects can help to make South Ayrshire a more sustainable community.

The Council is working with the Scottish Government to reduce its contribution to the problem of Climate Change and adapt to its consequences. It agreed to the seven commitments of Scotland’s Climate Change Declaration² in 2007.

¹ <http://www.south-ayrshire.gov.uk/news/2008/publications/VisionDocument%2008%20R.pdf>

² <http://www.south-ayrshire.gov.uk/sustainabilityforum/publications/Updated%20climate%20change%20delcaration%20April%2008.pdf>

In 2008 the Council published its Carbon Management strategy and Implementation Plan³ which has the objective of reducing our emissions by 20% by 2012/13 from a 2005/06 baseline. In the longer term we would like to contribute our fair share of emission reductions of the Scottish Government's target of 80% reduction by 2050. Most of our existing buildings and any new ones will still be in use at this time and so should be as energy efficient as possible to help meet this ambitious target.

HOW TO USE THIS GUIDE?

This Chapter sets out the key principles underpinning the Guide, key issues for the client and designer, some advice on project briefs and output specifications and how to use the checklist.

Principles for the Sustainable Design and Construction Guide:

- Go Beyond Minimum Requirements

This is both possible and realistic. Many elements of good design go beyond what is required as acceptable and safe practice. Going beyond Building Regulations can distinguish between good quality sustainable design and "off the shelf" development.

- Seek environmentally sustainable solutions through innovative thinking.

Innovation is fundamental to sustainable development – we cannot rely on standard solutions for new buildings – it's not sustainable. This applies to both the client and designer. Innovation however does not always have to be over-designed technical fixes either – simple innovative solutions are often the most sustainable.

- Involve stakeholders at the earliest opportunity.

Sustainable design doesn't happen by chance. All members of the design team need to be involved. Consultation with clients, end users, occupiers etc can result in a more optimum solution by assessing the client's needs and requirements. Conversely it also allows the client the opportunity to brief the design team to ensure that sustainability expertise exists.

- Take the long-term view.

The use of life cycle analysis and whole life costs are crucial elements of sustainability

- Build in flexibility

Future proofing, adaptability to change and purpose are critical to long term sustainability.

What we build now may have a different purpose in 60 years time.

- Incorporate sustainability criteria in the specification.

Sustainability in design offers many benefits but it must be embedded in the specification to be finally seen in the design and construction

Whether refurbishment or new build, these principles should be applied to all stages of the project including the choice of site if required, the design of the project, the procurement of materials including all stages of the supply chain, and including decommissioning, demolition and construction.

The checklists cover a wide range of issues and requirements although they are not fully comprehensive. Not every checklist issue will always be required or relevant – it will depend on the individual project. However the checklist has been designed in such a way to ensure a systematic "matrix" style approach to each topic.

The checklist should be used electronically with the Design Team editing each issue adding space as necessary to type an explanation as to why a particular item was not relevant to the project.

Key Issues for the Client

³ <http://www.south-ayrshire.gov.uk/environment/publications/Action%20plan%20v5.pdf>

- Build sustainability into the entire process and from the earliest stages – this is not difficult to do.
- Allow time for consultation with key stakeholders and end users – this may be a group of staff or clients.
- Ensure that the design team have the necessary sustainability expertise or at least understand the issues and are committed to meeting sustainability objectives.
- Set clear sustainability requirements and objectives within the design brief or output specification.
- Hold an initial workshop/meeting/ seminar with all parties to be involved including maintenance staff.
- Become an informed client. Contact the Council’s Sustainable Development Unit if you require any advice or assistance.
- Ensure the project brief includes sustainability.

Key Issues for the Design and Maintenance teams

- Become informed. Sustainability is becoming more mainstream. There are many sources of information in the Guide that provide further details on individual topics.
- Demonstrate to the client genuine commitment to sustainability issues as well as expertise.
- Advise your clients on the benefits of sustainability. Has the design been developed on environmentally friendly and ecologically sound principles?
- Ensure your design team understand the issues.
- Involve maintenance staff in any project discussions.
- Deliver the project in a sustainable manner and maintain it.

Writing Project Briefs

Clients should use the Guide as a means to draft project briefs that incorporate sustainable development. A key feature in achieving sustainability in the design and construction stages is that the client has a well developed view of what it wants and this is clearly stated in the output specification.

The following checklists are a guide to some of the items that should be considered in sustainable design. They are not comprehensive. Clients and designers should use the checklist PRIOR to the start of each project and agree on the issues to be incorporated. Some of the items may be easily ‘ticked off’, while others are more of a prompt to consider further action. In each case however, the checklist should be used electronically with an ‘Action taken’ column completed providing explanations as to why a particular item was not relevant or included in the project. If an action is deemed to be relevant then a brief description of what action has been taken should be recorded along with where more details or evidence can be found.

2 LANDSCAPE & BIODIVERSITY

Biodiversity can be defined as "the whole rich variety of life that surrounds and sustains us". Since the principal threat to all urban habitats is development, maintaining and enhancing biodiversity must be a critical objective of any sustainable development from the outset. Careful consideration of the building form, landscaping and construction site management can protect wildlife and habitats as well as providing a pleasant environment. Although biodiversity encompasses all forms of plant and animal life and their habitats, it also has an important role in achieving some of the human aims of sustainable development such as better management of water, lower energy use, less pollution and more attractive and comfortable urban areas.

The council has developed a Wildlife strategy⁴ and a Biodiversity Action Plan⁵ that are key documents to refer to for further information.

CHECKLIST

GENERAL

Item	Checklist Action	Action Confirmed
1	Always consider planting schemes when planning any site work.	
2	Commission professional staff e.g. landscape architect, ecologist	
3	Make sure you know which are the key protected species of flora and fauna	
4	Involve the local community in new initiatives to create habitats and wildlife corridors.	
5	Ensure that you have read and understand the Ayrshire Biodiversity Action Plan together with South Ayrshire Council's Wildlife Strategy and other relevant documents e.g. SPP 11 & NPPG14.	
6	Liaise with all relevant council staff as well as the client before commencing any work.	
7	Develop site-specific requirements for the contractor and ensure that the contractor submits plans required	

DESIGN

Item	Checklist Action	Action Confirmed
1	Identify and remediate any contaminated soil during and following construction.	
2	Use any existing natural features to develop a design which is specific to that site.	
3	Consider using a green roof to enhance biodiversity.	
4	Design for enhancement & mitigation of biodiversity e.g bat roosts (boxes or bricks), bird boxes into the development	

⁴ <http://www.south-ayrshire.gov.uk/LocalPlan/wildlifestrat.htm>

⁵ <http://www.south-ayrshire.gov.uk/community/LBAP/>

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| 5 | Incorporate SUDS (sustainable urban drainage systems) into the design (see the Water chapter).e.g. retention ponds, porous paving |
| 6 | Include sensible access for maintenance (where necessary). |
| 7 | Avoid grading the site to a uniform slope for ease of construction and development. |
| 8 | Consider how plants can be used to influence site conditions such as microclimate e.g. by providing shade or windbreaks; a noise barrier; air quality |
| 9 | Plan how to best use existing wildlife corridors, such as riverbanks, railway cuttings and parks to increase biodiversity and where possible enhance these by either designing in new corridors and or linking to green spaces. |
| 10 | Consider the use of unbound materials or uncemented surfaces, where appropriate, to encourage biodiversity e.g ornamental walls |

LANDSCAPE

Item	Checklist Action	Action Confirmed
1	Conserve and or enhance any ecological attributes which have been identified and whenever possible address any ecological deficiencies	
2	Develop and or enhance habitats e.g. ponds / water ; wildflower meadows; log piles / standing deadwood	
3	Where appropriate, use plants as barriers instead of fences.	
4	Try to include a high proportion of native species in landscape designs and source all plant material and seed from as local nursery stock as possible.	
5	Use bare-rooted plants rather than containerised ones (planting time critical for bare – root material)	
6	Aim for easily maintained planting schemes using plants which are not prone to pests or diseases.	
7	Advise the client on the location of any invasive species and the possibility of re-colonisation from adjacent sites.	
8	Only use peat-free composts for planting and maintenance.	
9	Use minimum cultivation techniques prior to sowing.	
10	Avoid using large areas of high maintenance short mown lawn / grassland. Design a variety of grass areas with different maintenance range of grass	

SITE PROTECTION (DURING CONSTRUCTION)

Item	Checklist Action	Action Confirmed
1	Consider how to protect specific flora and fauna.	
2	Time works to avoid protected animals' breeding seasons.	
3	Restrict access to areas where disturbance might be caused to watercourses through pollution.	
4	Avoid soil loss and any sedimentation of adjacent waterways.	
5	Ensure a plan is in place for site clearing and grading and handling/storage of topsoil.	
6	Provide and maintain protective fencing to prevent habitat damage.	

MAINTENANCE

Item	Checklist Action	Action Confirmed
1	Reduce frequency of cutting and keep cuttings on the lawn surface.	
2	Use mulching materials or under-seeding to control weeds.	
3	Shred green waste and use as mulches.	
4	Minimise the use of herbicides and pesticides, using 'eco-friendly' varieties where possible.	
5	Use farmyard manure and or other natural fertilisers rather than man made	

3 TRANSPORT

Growth in traffic is causing increasing problems locally and nationally. To address these problems South Ayrshire has developed a Local Transport Strategy (LTS)⁶. Transport causes many other problems in addition to congestion. In the UK, transport accounts for about 30% of all energy consumed. At present, most of this energy comes from fossil fuel and has a direct impact on climate change. The most popular form of transport – the car – is less energy-efficient than trains, buses or bicycles. The Local Transport Strategy strives to encourage people to choose more sustainable forms of transport, thereby reducing the negative impact on the environment. More sustainable transport improves air quality, physical and mental health, and also provides opportunities for social interaction and enriching urban experiences. At the level of building and urban design this means the routes for movement (and for rest) should be integrated. New layouts must be redirected from the needs of the car to those of pedestrians and cyclists, with connections allowing direct access to public transport, mixed uses, and open and public spaces.

CHECKLIST

GENERAL

Item	Checklist Action	Action Confirmed
1	Ensure that you understand the Sustainable Transport objectives of South Ayrshire Council.	
2	Liaise with all relevant other council staff as well as the client before commencing any work.	

TRANSPORT AND URBAN DESIGN

Item	Checklist Action	Action Confirmed
1	Prioritise walking, access to public transport and cycling when considering transport on a site and connections to a site.	
2	Ensure that display space for public transport information is provided in the design.	
3	Provide low maintenance, safe and secure cycle storage areas.	
4	Provide on-site showers and lockers for cyclists.	
5	Develop mixed-use schemes which reduce the number of trips which need to be made.	
6	Design routes which are attractive and which reinforce the character of the place, including well-designed, coordinated signage.	
7	Integrate new developments into existing transport routes, making the most of the existing infrastructure.	
8	Consider shared use of paved surfaces for landscape, pedestrians, bicycles, car movements and parking, as well as for uses such as children's play when not in use.	
9	Consult with Planning to discuss the possibility of car-free schemes.	
10	Create convenient, direct and safe routes for pedestrians with convenient pedestrian links to public transport.	

⁶ <http://www.south-ayrshire.gov.uk/council/transport/index.htm>

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| 11 | Try to connect to existing cycle networks, and ideally, separate cycle routes within the development. |
| 12 | Consolidate service, pedestrian and automobile paths in order to minimise costs, improve efficiency and centralise rainwater runoff. |

MAINTENANCE

Item	Checklist Action	Action Confirmed
1	Conduct regular inspections and log defects to ensure prompt maintenance.	
2	When carrying out maintenance, consider the embodied energy in the replacement options.	
3	Keep hedges and trees lining pavements suitably trimmed to ensure pedestrians have safe passage.	
4	Ensure that cycle routes are clear from obstacles and that signage is clean and visible	

CHANGING HABITS

Item	Checklist Action	Action Confirmed
1	Prioritise parking for cycles, then pool / share cars.	
2	Request travel plans from developers/occupiers in line with Council Policy.	
3	Provide charging points for electric cars/bikes.	

4 BUILDING ENERGY

The burning of fossil fuels to provide energy for human activities produces greenhouse gas emissions, which are already having a negative impact on the world's climate. In response to this problem, the Kyoto Protocol was agreed in Japan in 1997. This international agreement aims to reduce developed countries' emissions of greenhouse gases. The Scottish Government has a target to reduce emissions by 80% by 2050. South Ayrshire Council has responded to these national and international challenges by producing its own Carbon Management Strategy and Implementation Plan with the target of reducing energy consumption in Council properties by 20% by 2013 (based on 2006 levels). The checklists aim to encourage clients and designers to think about the issues relevant to energy efficiency in buildings, and to adopt sensible integrated strategies. This should enable designers to help achieve the Council's carbon targets, by producing more energy-efficient buildings, with lower energy consumption.

CHECKLIST

GENERAL

Item	Checklist Action	Action Confirmed
1	Ensure that you have read and understand the Energy Efficiency Strategy of South Ayrshire Council.	
2	Liaise with all relevant other council staff as well as the client before commencing any work.	
3	Familiarise yourself with relevant regulations, policies and guidelines.	

PERFORMANCE STANDARDS

Item	Checklist Action	Action Confirmed
1	Consider use of a labelling scheme e.g. BREEAM	
2	Use Government benchmarks such as BRE or Carbon Trust performance targets e.g. kWh/m ² .	

DESIGN FOR COMFORT AND PRODUCTIVITY

Item	Checklist Action	Action Confirmed
1	Design buildings for thermal comfort in all seasons - (18° to 19°C in Winter, up to 27° or 28°C in Summer as per BRE Best Practice).	
2	Ensure that sufficient volumes of good quality air are available.	
3	Maximise the use of natural daylight by providing windows and rooflights of the appropriate size and in appropriate locations.	
4	Minimise glazing on north-facing areas and maximise glazing on SW and SE areas, taking into account security and privacy issues.	
5	Control glare by providing diffuse light and installing blinds.	
6	Ensure that a comfortable visual environment is provided for all, but especially for computer users, with no glare and no unwanted reflections in screens.	
7	Consider the installation of sunpipes in areas such as stairwells where it may not otherwise be possible to introduce natural light.	

THE BUILDING ENVELOPE AND BUILDING ELEMENTS

Item	Checklist Action	Action Confirmed
1	At construction, implement insulation standards which exceed building Regs by 20-25% unless other qualities of the building preclude this.	
2	Ensure that the building envelope is tightly sealed and is pressure-tested to prove performance.	
3	Ensure that windows are energy-efficient. Generally a U value of at least 1.2W/m ² K is recommended.	
4	Locate and size windows and roof lights so that they provide high levels of daylight and reduce the need for artificial lighting.	
5	Consider the use of insulating shutters to reduce heat loss from glazed areas at night.	
6	Consider installing photovoltaic panels in roofs.	
7	Consider installing solar thermal panels.	
8	Consider the use of a green roof to aid insulation and for grey water storage.	
9	Where possible use natural ventilation, with only minimal mechanical assistance if necessary.	
10	Eliminate or minimise the need for air-conditioning by integrating a system of natural ventilation, control of solar gains, and use of the thermal mass of the building.	
11	Meet any cooling requirements using environmentally friendly mechanisms such as bore holes and the 'coolth' of the ground.	
12	Ensure demand for heating is reduced by providing good insulation, good building seals and using designs which make use of passive solar gain.	
13	Specify the most energy-efficient appliances and fittings.	
14	Specify energy-efficient boilers, including condensing boilers.	
15	Specify biomass boilers where feasible	
16	Specify the most energy-efficient lighting available according to its required function.	
17	Implement regular cleaning schedules to prevent dust accumulation on light fittings.	
18	Plan to replace any lamps before their efficiency deteriorates towards the end of their life-cycle.	
19	Take account of the way in which light fittings distribute light.	
20	Consider how to provide safe access for cleaning and maintenance of light fittings.	
21	Consider the colour rendering properties of light fittings where necessary.	
22	Consider the use of highly reflective wall coverings to increase lighting efficiency.	
23	Install appropriate control fittings for the dimming or switching of lights as appropriate.	
24	Design switching arrangements which encourage users to turn electric lights off when daylight is sufficient.	
25	Avoid large clusters of switches (BSRIA recommends no more than 4) so that a user cannot light dozens of lamps with one switch of the hand.	
26	Ensure that the maximum distance, in plan, between a light fitting and its switch, is no more than 3 times the height of the light fitting above the floor.	
27	Label every light switch clearly.	

28	Provide enough light switches in the room to suit its function and use.
29	Draw up a commissioning scheme early in the design stage.
30	Plan regular meetings to review commissioning schedules.
31	Incorporate elements into the design which facilitate commissioning, for example, self-balancing valves and purpose-built commissioning modules.
32	Consider the possibility of off-site construction of modular building systems where there is the potential for significant repetition in a building.

ENERGY GENERATION

Item	Checklist Action	Action Confirmed
1	For a large residential site, consider the possibility of using CHP or biomass district heating either now, or in the future. Allow space for the ducts and plant rooms needed to support such a system.	
2	Consider providing space within buildings for accommodating small scale combined heat and power systems (CHP) based on fuel cells or on external combustion engines.	
3	Consider the use of solar thermal panels, or provide space for them to be installed in the future.	
4	Consider the use of photovoltaic panels, or provide space for them to be installed in the future.	
5	Consider the use of biomass boilers, or provide space, delivery and storages provisions for them to be installed in the future.	
6	Design in methods for recovering energy from domestic waste, such as methane digesters.	
7	Consider installing wind turbines to provide some of the electrical demand.	
8	Keep abreast of all new energy generation mechanisms, and review how these could enhance energy efficiency performance in planned developments.	

REFURBISHMENT

Item	Checklist Action	Action Confirmed
1	View refurbishment as an opportunity to improve energy efficiency, and consider all the sustainable technologies which are financially viable.	
2	Increase insulation levels, especially in roof areas, using sustainable materials such as sheep's wool, cellulose, flax or mineral wool.	
3	Improve insulation efficiency by replacing windows with sealed units, or by adding secondary glazing where replacement is not possible.	
4	Identify and replace inefficient heating systems with energy-efficient appliances such as condensing boilers.	
5	Identify and replace inefficient light fittings and lamps with energy-efficient alternatives.	
6	Fit dimmer controls and timed switches as appropriate.	
7	Try to replace air-conditioning units with more sustainable cooling methods, such as the use of night-cooling, or borehole water cooling.	

BEHAVIOUR

Item	Checklist Action	Action Confirmed
1	Provide building occupants with simple user guides to help them understand how they can minimise energy consumption through control of lighting heating and ventilation.	
2	Include life-cycle costings in design development.	

FUTURE DEVELOPMENTS

Item	Checklist Action	Action Confirmed
1	Design all projects to be carbon-neutral at some time in the future by providing a strategy of adaption for increasing sustainability over time.	
2	Provide the flexibility for the possible later incorporation of sustainable technologies such as photovoltaics, wind turbines, biomass and Combined Heat and Power Plants.	

5 WATER

With water so readily available from the tap, people tend to forget that a large, energy-intensive infrastructure is required to maintain our water supply. Buildings and construction draw heavily on water supplies and can profoundly influence natural watersheds, affecting both the quantity and the quality of water available. Demand for water can be reduced by as much as 50% in commercial and domestic buildings through a combination of design strategies for plumbing, mechanical systems, landscape design and civil works. South Ayrshire Council spends around £1 million per annum on water and sewerage. This section looks at water in buildings and urban areas, considering how it can be supplied, used, reused and released again within a sustainable framework. An understanding of these issues should encourage council architects, M&E services and maintenance staff to incorporate water efficiency design elements into both new and refurbished buildings.

CHECKLIST

WATER DEMAND MANAGEMENT

Item	Checklist Action	Action Confirmed
1	Ensure water is metered appropriately on-site and consider sub-metering for larger projects.	
2	Ensure all new builds have water meters installed.	
3	Install presence detectors for flush control of urinals	
4	Install leak detection devices and/or conduct regular maintenance checks.	
5	When specifying new taps, consider models with metric outlets to allow for the greatest flexibility in fitting water saving attachments.	
6	Consider the use of spray taps and aerators.	
7	Consider the use of tap controls such as electronic sensor taps and timed turn-off taps.	
8	Consider the use of low-flow shower heads.	
9	Where fittings cannot be replaced, consider the retro-fitting of water saving options such as flow-control valves.	
10	Always compare the energy and water consumption properties of any new appliances.	
11	Specify low flush volume, or dual flush WCs, and provide notices so that people will know how to use them.	
12	Consider waterless urinal models for both new and refurbishment projects.	
13	Consider the use of dry or composting toilets (especially where connecting to a sewage system is not possible).	
14	Ensure appropriate maintenance plans are in place and understood for all alternative forms of WC employed.	

WATER AND THE LANDSCAPE

Item	Checklist Action	Action Confirmed
1	Integrate water supply and drainage considerations with masterplans and landscape from the earliest stages of development design.	
2	Design landscape using plants which eliminate or minimise	

	irrigation requirements (often these will be indigenous species).
3	Where irrigation is required consider drip-feed and sub-surface irrigation using recycled water or rainwater.
4	Integrate water and landscape considerations to provide suitable habitats for local flora and fauna.
5	Minimise non-permeable paved areas in developments.
6	Minimise areas directly connected to drains.
7	Catch known pollutants at source by incorporating traps and filters into the drainage design. Make sure these traps and filters are cleaned regularly.
8	Consider using 5-15 m wide filter strips for road runoff from areas up to around 2 hectares, where possible locating them at the upstream end of the drainage system.
9	Ensure any filter strip/road boundary does not become blocked by vegetation or sediment.
10	Consider using swales e.g. at the side of wide main roads with relatively low gradients.
11	Ensure the swale grass is mowed regularly to around 150mm to allow the swale to drain water effectively.
12	Consider using permeable surfaces in conjunction with filter drains in areas of high pollution such as large car parks.
13	Consider using infiltration drainage devices such as stone-filled trenches to serve small catchment areas up to 3 acres.
14	Consider pre-treatment for infiltration devices such as filter strips, gullies or sump pits to remove excess solids.
15	Prepare, provide and implement maintenance schemes for any pre-treatment drainage devices employed.
16	Consider the use of detention basins to hold back storm water.
17	Where possible, include small pools at the inlet and outlet of detention basins to act as sumps to collect sediment.
18	Consider the use of retention ponds.
19	Consider incorporating retention ponds, treatment devices and other water features and treatment devices into an integrated landscape design.
20	Ensure plans are in place to regularly monitor and maintain all drainage systems.

WATER HARVESTING AND RECYCLING

Item	Checklist Action	Action Confirmed
1	Consider rainwater reuse for such applications as WC flushing, irrigation and swimming pool top-up.	
2	Ensure that there is no physical connection between the public drinking water supply and rainwater systems, and that all pipes are clearly labelled.	
3	Consider the use of greywater recycling systems.	
4	Do not allow the storage of greywater for more than 48 hours without treatment.	
5	Ensure greywater pipes are clearly labelled and that the requirements of the water bye-laws are met (especially those relating to backflow prevention and accidental cross-contamination between potable/non-potable supplies).	

SEWAGE TREATMENT AND POLLUTION

Item	Checklist Action	Action Confirmed
1	Prevent all wastes with high chemical or biological oxygen demand, or with suspended solids content from entering the effluent stream.	
2	Consider the possibility of pre-treating effluent on site prior to discharging to the sewer.	
3	Consider the possibility of retro-fitting elements to enhance the performance of existing treatment systems.	
4	Check drainage connections to ensure surface water and effluent are discharged to the correct sewers.	
5	Where septic tanks are used, ensure that these are maintained and emptied as necessary.	
6	Ensure that you consider predicted future climate changes when designing developments and landscapes.	
7	Always consult the most recent information to update knowledge on currently available sustainable water techniques and devices.	

FUTURE DEVELOPMENTS

Item	Checklist Action	Action Confirmed
8	Discuss sustainable water strategies with other practitioners in the field and keep abreast of relevant case studies and implementations.	
9	Design in flexibility to allow the installation to adopt more sustainable solutions as they become available.	

GENERAL

Item	Checklist Action	Action Confirmed
10	Liaise with all relevant other council staff as well as the client before commencing any work.	
11	Ensure you understand the Energy Efficiency Strategy of South Ayrshire Council which also covers water management	
12	Consult all relevant laws, policies and guidelines, both local and national before commencing any work.	

6 SUSTAINABLE MATERIALS

The use of basic construction materials such as concrete, steel, timber and glass has profound impacts on both the local and global environment, particularly through the consumption of non-renewable natural resources, and the production of climate-changing carbon dioxide. Therefore, the materials specified for construction and uses in a building greatly affect its long-term sustainability. Importantly, a small number of materials account for most of the energy consumption and hence CO₂ production of our built environment. For a typical house, approximately 75% of the total energy consumed in producing building materials is for concrete, plasterboard, bricks and mortar. Glass, steel, copper and paint account for 13%, and timber 8%. While there remains significant debate over the environmental merits of various materials, there are now some clear means of analysis and comparison. As always in construction, each project is different, thus the focus should be to select appropriate materials for a development rather than identifying absolute ideals. Suitable materials will satisfy the requirements of design, availability, cost and sustainability considerations.

CHECKLIST

LIFE CYCLE ASSESSMENT

Item	Checklist Action	Action Confirmed
1	Assess the environmental impact of all materials from extraction to disposal using a technique such as Life Cycle Assessment.	
2	Familiarise yourself with the BRE 'Green Guide to Specification' rating system.	

MATERIALS SPECIFICATION CRITERIA

Item	Checklist Action	Action Confirmed
1	Ensure you are aware with environmental rating schemes and use them to specify the most sustainable materials.	
2	Ensure that all timber specified is FSC accredited or an alternative relevant accreditation and ensure compliance with this policy on site.	
3	Insist that manufacturers provide environmental impact information and check against independent sources where possible (e.g. BRE's Environmental Profiles Database).	
4	Consider the transport, recycling/reuse factors (use locally derived products where possible).	
5	Use more recycled and reclaimed products which have relatively low embodied energy.	
6	Ensure a minimum of 10% (by value) recycled content of the materials used (this is a statutory requirement for projects over £1million but should be ensured on all projects).	
7	Minimise the use of highly processed, embodied energy-intensive products.	
8	Always use safer alternatives where these are available and technically feasible.	
9	Ensure that materials have low biodiversity impact.	
10	Minimise the use of non-renewable materials.	
11	Use robust, removable materials	
12	Specify small, easily-handled components	
13	Use removable fixings such as bolts, screws and clips rather than	

	complex mechanical fasteners	
14	Use homogeneous rather than composite materials	
15	Use layered instead of glued components.	

MATERIALS TO AVOID

Item	Checklist Action	Action Confirmed
1	Avoid any materials which are known to be harmful to human health or to the environment.	
2	Avoid the use of PVC.	
3	Avoid the use of non FSC approved timber.	
4	Avoid the use of any materials containing phosphorous, such as phosphogypsum.	
5	Avoid the use of any materials containing isocyanates, such as polyurethane.	
6	Avoid the use of any materials containing, lead, zinc or copper.	
7	Avoid oil-based paints.	
8	Avoid oil-based preservatives.	
9	Avoid any wood treated with Copper Chrome Arsenic (CCA) preservative.	
10	Avoid the use of chemical Damp Proof Courses.	
11	Avoid the use of non formaldehyde-free MDF.	

MAINTENANCE CONSIDERATIONS

Item	Checklist Action	Action Confirmed
1	Consider maintenance in terms of the building or development's entire life cycle.	
2	Put long term maintenance plans in place at the at the start of a project design.	
3	Always design for maintenance which requires the least materials, transport, energy and subsequent waste.	
4	For refurbishments, replace any unsustainable materials with more sustainable ones wherever possible.	
5	Use removable and re-usable fittings where possible.	
6	Only use materials for maintenance and cleaning which are not known to harm human health or the environment.	
7	Ensure that data and instructions are available for all materials used for maintenance.	

DEMOLITION/DECONSTRUCTION

Item	Checklist Action	Action Confirmed
1	Avoid wholesale demolition, deconstructing instead where possible.	
2	If demolition is deemed necessary, try to remove potentially harmful materials first.	
3	If demolition is deemed necessary, try to re-use the most valuable elements.	
4	Deconstruct buildings in the reverse manner to which they were built.	
5	Sort and separate all materials on site.	

- 6 Re-use or recycle as many materials as possible (refer to the Deconstruction Chart for more details)
- 7 Separate construction and demolition waste at source to encourage re-use and recycling.
- 8 Consider landfill as the last resort.

FUTURE DEVELOPMENTS

Item	Checklist Action	Action Confirmed
1	Design buildings so that they have the maximum possible future materials upgrade potential (e.g. use easily removable components, layer materials instead of glueing them etc.).	
2	Consider using insulating concrete.	
3	Consider using glazing to reflect light up to the ceiling then back into the room to maximise daylight.	
4	Consider using concrete with recycled glass as an aggregate.	
5	Consider using photovoltaic materials.	
6	Use the most efficient types of lighting currently available, including broad spectrum LEDs.	
7	Use the most efficient types of storage materials currently available for energy and hydrogen.	

7 SUSTAINABLE WASTE MANAGEMENT

Construction is the single largest user of material resources in the economy and generates 100 million tonnes of waste every year. Even though around half of this is already recycled (mainly aggregates), there is great potential for the industry to waste less and recycle more. The environmental benefits include reducing landfill or incineration of waste, reducing energy use (CO₂ emissions) and reducing utilisation of finite natural resources and the impacts associated with the extraction of raw materials. Construction companies are also seeing significant cost savings by reducing the amount of waste produced and by implementing waste management plans to recycle as much as possible.

CHECKLIST

THE WASTE HIERARCHY

Item	Checklist Action	Action Confirmed
1	Make sure that you attempt all other higher waste strategies in the Waste Hierarchy before resorting to landfill.	
2	Aim for 'Zero Waste'.	
3	Set up systems to monitor and analyse the processes which contribute to waste in new development or refurbishments.	
4	Monitor product usage to avoid excess ordering.	
5	Buy durable long-lasting goods.	
6	Buy all items in minimum packaging and recycle packaging where possible.	
7	Increase the proportion of recycled to virgin paper in use.	
8	Use mains electricity rather than batteries when possible.	
9	If batteries must be used, specify rechargeable ones.	
10	Buy concentrated products to reduce packaging.	

REDUCE WASTE

Item	Checklist Action	Action Confirmed
1	Specify the most sustainable materials possible at the design stage (refer to the Materials chapter).	
2	Specify and order the correct amount of materials.	
3	Provide appropriate and sufficient on-site recycling facilities.	
4	Ensure site security to discourage waste through vandalism.	
5	Ensure site storage facilities are adequate to store materials without damage.	
6	Consider opportunities for re-using and recycling wastes both on and off-site.	
7	Implement a system of agreed waste allowances with contractors.	
8	If possible, give subcontractors responsibility for purchasing raw materials and disposing of their waste.	
9	Segregate all construction waste on-site.	
10	Refer to the Materials checklist for guidelines on dealing with deconstruction and demolition waste.	
11	Consider using tools such as the BRE's SMARTwaste Waste Management tool.	
12	Get regular reports from the main contractor on the amount of waste coming off site and the amount of this that is diverted from	

landfill.

RE-USING WASTE

Item	Checklist Action	Action Confirmed
1	Re-use waste products and materials wherever possible, using an innovative approach to their function.	
2	Consider whether re-use is possible following repair and upgrading.	
3	Disassemble all products with the minimum of disruption to their integrity.	
4	Re-use waste as close to source as possible in order to reduce transport costs.	

RECYCLING

Item	Checklist Action	Action Confirmed
1	Design residual waste and recycling provision from the outset for all new developments.	
2	Ensure that recycling facilities are sited conveniently to commercial and domestic properties.	
3	Make recycling facilities as accessible and as integral to the development as possible.	
4	Ensure that recycling facilities are sensitively located.	
5	Ensure that recycling facilities are of an appropriate scale and design to minimise the impact on the environment.	
6	Try to provide a bulk room for the storage of bulky items.	
7	Ensure that container servicing is carried out in situ.	
8	Provide space for glass banks, even if the practicality is uncertain at the design stage.	
9	Allocate space for the possible future collection of plastics for recycling.	
10	Consider the use of a subterranean system for recycling, ensuring accessibility by Council or partners fleet.	
11	If recycling containers are sited in car parks, ensure that full vehicle access is made available.	
12	Consider the special needs of recycling facilities for shared ownership buildings.	
13	Introduce as many recycling facilities as possible into existing developments.	
14	Set up emptying, maintenance and cleaning schedules for all recycling facilities,	
15	Monitor the effectiveness of emptying, cleaning and maintenance and improve these processes as necessary.	
16	Site segregated recycling facilities in schools and other public buildings.	
17	Always ensure that recycling bins are clearly labelled.	
18	Always ensure that users are given adequate information on the use of recycling bins.	
19	Encourage local recycling projects to raise awareness in schools and other community developments.	

COMPOSTING

Item	Checklist Action	Action Confirmed
1	Provide compost bins to encourage composting.	
2	Provide information about what can and cannot be composted.	
3	Collect any residual green garden waste regularly, especially during the April to September growth period.	
4	Organise the composting of this waste and its subsequent re-use as a soil improver or mulch.	

8 SOCIAL & ECONOMIC ISSUES

Sustainable design embraces far more than just the environmental issues; there are strong links and interactions between the social, economic and environmental dimensions of all human activity. These connections need to be recognised and considered from the outset if designers are to create buildings that are comfortable, attractive and exciting places for people to use. Well-designed buildings and environments can contribute to improving people's health and well-being, and can promote community safety and urban viability. It is therefore critical that clients and designers develop an understanding of the social contexts of design projects, and take a proactive role in their implementation. It is also important that they appreciate the need for design solutions which are tailored to match the requirements and preferences of the specific community for which they are designing.

CHECKLIST

Item	Checklist Action	Action Confirmed
1	Get stakeholders involved in the design process from the early stages.	
2	Consider the attributes and needs of all the potential users of the building or development.	
3	Refer to all relevant design guidelines, e.g. Disability Discrimination Act, SENDA, RNIB guidelines etc.	
4	Consider the design for future changes of building function e.g. Facilities for babies and young children, space for IT networks, sufficient power points, convenient toilets and wash facilities.	
5	Provide economic and efficient heating systems in public buildings and in any social housing.	
6	Always use sustainable materials and sustainable design to minimise building energy requirements	
7	Design housing to achieve affordable warmth for those on minimum incomes i.e. prevent fuel poverty	
8	Consider the potential of all derelict spaces for leisure and social interaction.	
9	Use brownfield sites in preference to greenfield sites	

9 Contacts and Further Sources of Information

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The Energy Agency for local independent advice on renewable energy and sources of funding available.

energyagency@energyagency.org.uk

Tel: 01292 521896

Waste

The BRE SMARTWaste System is a set of free computer-based tools to help organisations apply the concept of sustainable waste management.

www.smartwaste.co.uk

WRAP offer a number of freely available tools on maximise the recycled content of materials and focus on quick wins at no additional cost and waste minimisation and management .

http://www.wrap.org.uk/construction/tools_and_guidance/index.html

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