East Midlands Development Agency Sustainable Physical Development Guidance

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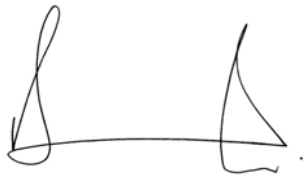
Foreword

The East Midland's Regional Economic Strategy (RES) aims to promote sustainable economic well-being and help to bring about a 'Flourishing Region' for all. The contribution of an efficient, innovative and sustainable construction sector is central to addressing key challenges and helping achieve this aim.

As the lead Regional Development Agency (RDA) for the construction sector, East Midlands Development Agency (*emda*) has worked closely with Government and industry to develop the Common Minimum Standards (2006), the Construction Commitments (approved by RDAs in spring 2008) and the joint industry and Government Sustainable Construction Strategy (June 2008). In line with its ambitions for a flourishing region, *emda* now expects all construction projects that it funds, or provides land for, to deliver these commitments.

This guidance – for partners, clients, developers, designers and contractors – sets out *emda*'s minimum expectations and standards for all projects involving building design and construction elements. In this fast moving field, our aim is to support partners perform as sustainably and efficiently as possible, supporting innovation to reduce costs and increase profitability, thus aiding the sector's performance over the long term.

Signed



Dr Bryan Jackson OBE
November 2008

1. Sustainable physical development

emda's overall objective is to promote sustainable economic development; within this a key part of our delivery is *emda*'s investment in construction and physical development projects – our capital investments are expected to exceed £70 million a year over the next three years. This investment is an important part of how we can influence and work cooperatively with the region's construction sector to deliver socially inclusive growth within environmental limits. *Box 1.* shows the kind of involvement that *emda* has in physical development projects.

While the detail is inevitably complex, the principles are simple:

- Minimise energy demand throughout the project's life
- Use the right technologies
- Minimise waste
- Design for use
- Engage with the context for the project.

Sustainable physical development should not only take as little as possible from the environment but also make best use of local natural resources and contribute to the surrounding community.

This guide sets out *emda*'s expectations and standards for all physical development projects seeking *emda* funding. For those projects at the early design stage, please refer to the Public Realm toolkit where relevant.

emda advocates best practice approaches to the design, decision making and procurement aspects of construction, such as the Office of Government Commerce's (OGC) **Achieving Excellence in Construction** initiative and use of Urban Design Review Panels. We expect that any physical development project using RDA support will demonstrate a best practice approach across the range of areas set out in *Box 2*. *emda* is a signatory or the Strategic Forum for Construction's **Construction Commitments** (see Box 2) and we encourage others to sign up also.

In terms of delivering projects *Section 3* offers guidance and case studies illustrating how standards can be met. The current suite of guidance available can be found in *Annex 2.* This will be updated as best practice evolves. It should be noted that this document represents *emda*'s minimum expectations and standards – specific legal requirements and project specific issues will be addressed during contract negotiations.

Box 1: *emda*'s support for physical developments

Land remediation	• Brownfield Land Action Plan (BLAP) • Site remediation • Coalfields programme
Improving the quality and supply of employment sites	• Site provision and related infrastructure • Invitations to apply for grant funding from time to time, regionally and subregionally • Previously developed land and buildings
Innovation	• Exemplar buildings
Regeneration	• Urban regeneration • Waterways projects • Regeneration at intermodal facilities • Public Realm Toolkit
Property management and partner support	• Management of *emda* owned or controlled assets • National Coalfield Programme • Support for key delivery partners
Business support programmes	• Business Link – business advice and resource efficiency • Innovation networks (iNets) • University led initiatives

Box 2: Sustainable Construction Strategy – Construction Commitments Principles

Procurement and integration	Commitment to people	Client leadership	Sustainability	Design quality	Health and safety
A successful procurement policy requires ethical sourcing, enables best value to be achieved and encourages the early involvement of the supply chain. An integrated project team works together to achieve the best possible solution in terms of design, buildability, environmental performance and sustainable development.	Valuing people leads to a more productive and engaged workforce, facilitates recruitment and retention of staff and engages local communities positively in construction projects.	Client leadership is vital to the success of any project and enables the construction industry to perform at its best.	Sustainability lies at the heart of design and construction. A sustainable approach will bring full and lasting environmental, social and environmental benefits.	The design should be creative, imaginative, sustainable and capable of meeting delivery objectives whilst at the same time capturing local requirements and aspirations. Quality in design and construction utilising the best of modern methods will ensure that the project meets the needs of all stakeholders, both functionally and architecturally.	Health and safety is integral to the success of any project, from design and construction to subsequent operation and maintenance.

Source: Construction Commitments – www.cic.org.uk/strategicforum

Why does *emda* encourage sustainable construction?

Encouraging sustainable construction helps to ensure that the significant investments that *emda* and its partners make in construction and physical development generate the maximum economic, social and environmental benefits.

The built environment is one of the largest contributors of carbon emissions (according to Defra statistics, housing accounts for around 27% of UK emissions and non-domestic buildings account for nearly 20%). Sustainable construction practices can have a major impact in cutting carbon emissions, as well as contributing to other environmental priorities such as water efficiency, waste reduction and enhancement of natural habitats.

Sustainable construction practices also provide opportunities for local employment and skills, economic inclusion, health, education, local community and neighbourhood benefits.

Adopting higher building performance standards earlier than legislative requirements provides regional businesses with national and international market opportunities. Sustainable construction practices also frequently represent financial best value, by reducing lifetime costs of building maintenance, energy and occupancy.

It is recognised that meeting *emda*'s standards may have some initial cost implications for the projects to which they apply. Additional costs will depend on site conditions, scale and market conditions all of which affect the actual cost out-turn of a project. However, evidence from recent studies by Cyril Sweett for Building Research Establishment (BRE), English Partnerships and the Housing Association now Homes and communities Agency show that the additional costs are modest. Some sustainability features will be cost neutral or cost beneficial for developers (e.g. waste minimisation and energy efficiency), while others may increase costs between 3% and 7%. Studies by estate agents show that additional costs of up to 10% can be recouped through a rent or purchase premium.

Sustainable construction is central to delivery of *emda*'s objectives and those of the Regional Economic Strategy. *emda* expects major physical development and construction projects to generate inter-related economic, social and environmental benefits – see *Box 3*.

What *emda* expects from physical development projects

Theme	
	Will ensure the **right** development in the **right** place because the proposal: • Is supported by the appropriate evidence and fits with national, regional and sub-regional policies • Contributes to the delivery of, and continues to aid delivery of, sustainable economic growth
	Will create suitable employment opportunities for the region and new residents it aims to attract to the area because it has**:** • Considered the local labour market • Considered the skills available in the area • Matched new potential employment opportunities with existing skills • Attracted new 'high skills' jobs to the area • Considered encouraging the creation of social enterprises as part of the development • Considered how it can encourage and assist local workless and disabled people back into employment
	Will maximise the extent that *emda*'s project spend benefits the local supply chain, supports businesses in the region and supports regional sustainable procurement
	Is developed in partnership with local partners to address the issues and aspirations of all.
	Will build on training and skills opportunities in the region and for local communities and under-represented groups (e.g. mature workers, black and minority ethnic (BME) groups, incapacity benefit claimants, migrant workers) because the proposal has: • Considered the skills sets in the area and is working with partners to encourage and create opportunities for local people to train for the new jobs to be created • Considered the training opportunities in the development phase and is looking to establish a skills academy or make other suitable arrangements to provide training

Social development	Will ensure that buildings, processes, and amenity provision are sensitive to the needs of the local community and will impact positively overall on services and reduce 'stress' on current provision because the proposal has: • Considered the current social infrastructure (e.g. education, health, community centres, sports facilities) and ensured sufficient provision either exists or will be made • Considered how increased needs generated will impact on local communities and how issues will be addressed • Ensured that any new provision will be available to existing communities in the area • Has registered with the Considerate Constructors scheme
Transport	Will ensure that transport provision is sensitive to the needs of the local community and will impact positively on the area's transport provision and links and reduce 'stress' on the current provision because the proposal has: • Looked at all current transport links in the area and there is sufficient provision and links or new links and services will be provided • Considered how traffic/transport generated by the development will impact on local communities and current infrastructure and that any issues will be addressed • Considered and made provision for appropriate alternative forms of transport
Rural/urban	Is developed with consideration of the surrounding rural areas and ensures that specific needs and requirements are addressed

Creating local jobs and skills:
Meden Valley Making Places (MVMP)

MVMP, a not-for-profit company involving the Homes and Communities Agency, *emda* and Bolsover and Mansfield District Councils is revitalising the former coalfield towns and villages of Creswell, Market Warsop, Whaley Thorn, Shirebrook, Pleasley and Mansfield by developing a good mix of high quality homes to rent or buy.

At Shirebrook five run down properties have been refurbished with eco-friendly measures (solar panels for heating water, photo voltaic panels for electricity, rain water harvesting for supply to toilets and outside taps and full insulation dry lining by Groundwork Creswell's trading arm, Cresta). These houses will be for sale on the open market. The development offers opportunities for local unemployed young people to gain valuable training and work experience. Groups of six trainees at a time undergo a 13-week training programme, which equips them with construction skills.

They also get health and safety training and the opportunity to obtain a Construction Skills Certification Scheme (CSCS) card, the industry standard to work on construction sites.

The MVMP also delivers wider sustainable development benefits such as reducing crime and vandalism and improving health.

Involving the local community in planning:
Meden Valley Making Places (MVMP)

An interim evaluation published in November 2007 found that much of MVMP's success in meeting its ambitious compulsory purchase targets has resulted from good practice in community involvement during master planning and MVMP's work in supporting and relocating tenants. Local people have been trained in crucial elements of the delivery process – such as assessing preferred development partners. Eighty percent of residents are extremely positive about their experience. The project demonstrates how a strong organisation, with good management, coordination and community involvement has been able to deliver decent homes in half the time of similar projects elsewhere and with considerably better value for money than initially expected.

Involving the local community in planning:
Attenborough Nature Centre

The success of the Attenborough Nature Centre – which has attracted 160,000 visitors in its first year, including 5,000 school children – demonstrates how, by working in partnership and engaging with the local community, planning problems can be overcome. The partnership which spans the private, voluntary and local government sectors has enabled the Wildlife Trust to secure a broad portfolio of funding support and the open nature of the planning stage has resulted in a high level of local support including a large number of volunteers for long term management of the site.

BREEAM Excellent:
B&Q warehouse facility, Worksop

The rate of change in achieving the Building Research Establishment's Environmental Assessment Method (BREEAM) Excellent has really accelerated in the past 18 months. By the end of 2008 more than 170 buildings countrywide had achieved this standard.
In the East Midlands B&Q Properties have developed an 878,000 square foot warehouse facility – one of the largest of its kind in Europe — at the former Manton Colliery, Worksop. The site was remediated by *emda* at a cost of £4m, through the National Coalfields Programme. It was then sold to DIY store B&Q for redevelopment. B&Q were determined to show that sustainable design could be applied to large industrial facilities by achieving BREEAM Excellent.

B&Q Manton Wood Distribution Centre

The £30 million project was completed in 50 weeks. It includes a complex automated sorting system in the high bay warehouse, and comprehensive staff welfare facilities in the 50,000ft² office block including a catered canteen, a gym and a training/learning room. In addition to achieving excellent internal energy efficiency sustainable design features outside include a balancing lake to manage drainage on the site, noise bunds and acoustic fencing to shield local residential areas from noise created by the facility
The site lay dormant for nearly 10 years following the pit's closure; B&Q's re-use of the brownfield land has brought economic development to the area and is eventually expected to provide 1,200 jobs for local people.

2. *emda*'s Sustainable Construction and Design Standards

emda actively supports Government and industry's Sustainable Construction Strategy commitments and, to this end, has developed a focused set of standards and specialist guidance for partners delivering physical development projects with the support of *emda (shown in Box 4)*.

emda expects all projects to adhere to the OGC Achieving Excellence in Construction (AEC) initiative, which encompasses many of the Common Minimum Standards within its best practice principles for managing and delivering construction projects. For major regeneration projects, *emda* also expects applicants to consider how they can maximise wider economic and social benefits to the area (see *Box 3*).

In the future applications for *emda* funding will need to reflect the steady improvements indicated in *Box 7*.

Box 4: *emda*'s Physical Development Standard

1.	All construction projects shall be carried out in accordance with the **best practice** principles set out in the **OGC Achieving Excellence in Construction initiative**.
2.	The appraisal of procurement options and the selection of the preferred project scheme must take into account **whole life value**.
3.	Clients are to **pay all monies due promptly** and in any event within the contractually required timescales.
4.	All projects are required to comply with Construction, Design and Management (CDM) legislation. Project clients are to have in place systems to **collect and analyse health and safety performance data** for all projects on which they have a duty of responsibility.
5.	Clients are to include within all their contracts involving construction that their scheme is registered with a suitable site management scheme such as the **Considerate Constructors Scheme** and to comply with the appropriate code of practice.
6.	Clients are required to include a contract clause requiring that all members of their supply teams who are workers or regular visitors to a construction site are registered on the **Construction Skills Certification Scheme (CSCS**) or are able to prove competence in some other appropriate way.
7.	An appropriate environmental assessment process such as **BREEAM or CEEQUAL appropriate to the size, nature and impact** of the project must be carried out on all projects. All new build projects are required to achieve **BREEAM Excellent** and all refurbishment projects are required to achieve **BREEAM Very Good**.
8.	All timber or timber products including timber used for temporary works are to be purchased in accordance with the **Government's timber policy**.
9.	Any new build project must fall into the **upper quartile of energy performance for the building type**, except where specific operational requirements prevent this. This equates to at least 6 credits in the energy section of a BREEAM 2008 Assessment.
10.	Site waste management plans are to be prepared for projects of more than £300,000 (excluding VAT) and to include targets for waste reduction and recovery based on an assessment of the likely composition and quantity of waste arising; and identification of the most significant cost-effective options for improvement.
11.	*emda* requires a minimum of 15% of the total value of materials used to be derived from recycled and reused content in products and materials selected.
12.	All developments which include **housing** are required to comply with, or exceed, the relevant **Code for Sustainable Home (CSH)** level as applied by the Housing and Communities Agency along with associated Housing Quality Standards. Funding applications up to 2013 will need to reflect the 'escalator' nature of the Code for Sustainable Homes (see *Box 5*).

(incorporating CMS, RDA Sustainable Construction Strategy and Energy White Paper 2007 commitments)

emda's additional requirements

As well as the standards set out in *Box 4* above, ***emda*** funded physical development projects are required to meet additional requirements relating to:

- **Design quality**
- **Carbon reduction**
- **Waste and materials**
- **Transport**
- **User satisfaction and comfort**
- **Whole life costing**
- **Biodiversity**

Design quality

High quality design – sometimes called 'place making' – can help to make places distinctive, in which people can have pride and enjoy living and working. All projects should take design quality into account.

***emda* expects:**

- Projects likely to have a 'significant[1]' impact on an area (or seeking more than £1m investment from emda) should be submitted to the Regional Design Panel for review
- Smaller projects to include a Design Statement prepared by a qualified professional (e.g. an architect).

Helpful tools include:

- **Commission for Architecture and the Built Environment (CABE) Design Quality Indicators** – uses a non-technical questionnaire to focus on functionality, build quality and impact. The process can be used throughout the life cycle of a development including briefing, mid-design, ready for occupation and use. See www.dqi.org.uk/DQI/Common/DQIOnline.pdf
- **Lifetime Homes Standards** – set out 16 design features that together create a flexible blueprint for accessible and adaptable housing, which aims to increase choice, independence and longevity of tenure. Meeting this standard ensures that developers will meet Building Regulations Part M (Part M, Access to and use of buildings) – www.lifetimehomes.org.uk

[1] Any project which is likely to have a major visual, social or economic impact on its immediate setting as a result of its scale, position or intended use. In some cases relatively low cost projects – such as a visitor attraction in a small village – would meet these criteria.

Carbon reduction

Carbon emissions arise from how a building uses energy and how it is built. In order to meet UK carbon emission reduction targets, buildings need to use less energy through a combination of building design, orientation and energy efficiency measures, by using energy from renewable resources such as wind, solar, ground-source heat and biomass and decentralised energy generation and combined heat and power.

emda expects:

- All new build projects to score at least 6 points on the energy section of 2008 BREEAM to demonstrate that the building achieves energy efficiency in the upper quartile for a building of its type
- Applicants will be expected to report savings achieved over and above Part L of the Building Regulations via the BREEAM process

Helpful tools include:

- BREEAM pre and post construction assessments
- A renewable energy toolkit produced for London but applicable to other locations http://www.london.gov.uk/mayor/environment/energy/renew_resources.jsp
- British Property Federation's LES-TER tool which helps owners and tenants manage energy of buildings in use http://www.les-ter.org.uk

Waste and materials

The construction sector generates more than one third of the country's waste materials, but only half of construction and demolition wastes are currently reused or recycled within the sector. The industry is the largest resource user in the UK consuming some 400 million tonnes of resources each year, equivalent to five tonnes of virgin materials per person in the construction of new buildings.

The more efficient use of materials can make a major contribution to reducing project costs and environmental impact, by increasing efficiency, reducing materials bills and reducing burden on landfill. This can be achieved by implementing mechanisms for the specification of materials with a high recycled/reclaimed content and effective waste strategies for minimisation and management.

***emda* expects:**

- Where applicable, a pre-demolition audit to appraise the potential to maximise recycling and reuse of materials in line with guidance published in the Institute of Civil Engineer's (ICE) Demolition Protocol and Waste and Resources Action Plain (WRAP) best practice.
- A Waste Minimisation Strategy to be prepared that considers the implications of design, procurement and logistics on waste and the opportunities for reduction and sets performance targets.

Helpful tools include:

- **WRAP's Net Waste Tool** calculates recycled content and forecasts waste stream quantities and provides 'quick win' opportunities
- **WRAP's Site Waste Management Plan Template** provides a best practice, easy access template for projects

Design quality:

Upton sustainable urban extension

Since 2001 Homes and Communities Agency, Northampton Borough Council and the Prince's Foundation have been working with developers to deliver an urban extension in Northampton which will achieve the highest standards for sustainable urban growth.

The Upton Design Code (2003) sets very high standards for design quality and materials while also requiring that all 1,020 dwellings, the community centre, school and commercial facilities will achieve EcoHomes Excellent or equivalent. Affordable housing (22%) is also 'pepper-potted' across the site. The scheme has won numerous awards for its high quality design.

EcoHomes

Energy efficiency:

East Midlands Business Innovation Centres

The £4m Turbine at Worksop was established by ***emda*** and partners Nottinghamshire County Council, Bassetlaw District Council, the Alliance SSP and European Regional Development Fund (ERDF) in 2005 as part of a network of i-centres to provide state-of-the-art, cost effective, business accommodation in areas lacking suitable office and workshop space for innovative businesses.

The Turbine has 45 office units and four innovation workshops housed in a building which contributes to carbon reduction through its high efficiency boiler, high levels of insulation, natural ventilation, solar water heating, photo voltaic electricity generation and energy producing wind turbine. It also incorporates recyclable materials, rain water and waste material recycling and organic landscaping. Tenants are encouraged, facilitated and supported to be as environmentally friendly in their operations as possible.

The Turbine

Low carbon housing:
Upton sustainable urban extension

Developers at Upton are required to achieve EcoHomes Excellent and are encouraged to take a variety of approaches to achieving carbon reduction targets. These include very high insulation and energy efficiency standards and a variety of renewable technologies including solar thermal and photo voltaics, wind turbines and wind cowls (for ventilation), ground source heat pumps and biomass community heating systems. The site showcases six 'zero carbon' houses designed by Bill Dunster architects ZedFactory.

In addition, a large site with 165 units demonstrates how affordable homes built to Design for Manufacture (DfM) cost targets can also incorporate high environmental performance. The flats and houses have been built for £60,000 (+10% to achieve EcoHomes Excellent) and incorporate solar thermal and photo voltaic tiles, rainwater harvesting and green roof technologies.

Barratt Homes were able to sell two bed flats for £140,000k – comparable to local market prices for a standard two bed flat. Early home owners and tenants report significant savings in their energy bills compared to houses built to Building Regulations standards.

Construction waste recycling:
SEVille housing development

Woodheads, builders of the SEVille housing development at Sherwood Energy Village, are developing and trialling resource efficiency practices, and are managing to recycle around 80% of the material. All materials for this project will be sourced locally and wherever possible the local labour force will be used. All major waste streams will be segregated and recycled as part of the onsite waste management procedures, thus yielding significant savings.

Resource efficiency:
Marriott Construction

Marriott Construction (part of the Kier Group) is working with EDS, the global technology services company at its Wavendon Campus Redevelopment on a shell (£19.2 mn) and fit-out (£5.8 m) project. As a result of a pre-demolition audit undertaken with the East Midlands Construction Resource Efficiency Club opportunities were found to minimise waste on site and to segregate and recycle waste (e.g. using crushed aggregate and salvaged timber). Recycling is undertaken by contractors Shanks and Yorkshire Waste Management. A highly motivated project manager who believes in the benefits of recycling has been key to the success of the scheme. Tenant recycling opportunities are also being discussed.

Other pilot schemes by the Resource Efficiency Club include plasterboard recycling, buying bespoke plasterboard, pallet take-back schemes and water minimisation. Research by Envirowise suggests businesses involved could stand to save an average of 0.35% of turnover by adopting systematic waste minimisation across their businesses – and in some cases savings would be as high as 1.7%. If savings were rolled out through their businesses core members could be saving £2.5 m.

Transport

Schemes should think about how they can make the most effective use of transport methods other than private cars. This may mean public transport, bicycles, walking or car sharing or pooling. The scheme should make best use of these alternatives. This will reduce congestion, pollution and CO_2 emissions, lower long term business travel costs, and help employees to be healthier, fitter and more productive.

emda expects:

- Green travel plans to be prepared for projects in specific locations, as required by the *emda* project manager, and to form an integral part of all large scale development proposals.

Helpful tools include:

The Department of Transport provides guidance on workplace travel plans –
http://www.dft.gov.uk/pgr/sustainable/travelplans

Whole Life Costing

Government requires value for money in all public-sector construction projects to be evaluated on a whole life cost (WLC) basis. The new international standard, **BS ISO 15686-5 Buildings and Constructed Assets – Service Life Planning – Part 5: Life Cycle Costing (2008)**, provides a common basis and standard terminology and guidance on life of assets and appropriate discount rates.

emda expects that:

- Applicants apply whole life costing to all construction projects with total costs (i.e. *emda* and non-*emda* funding) of £5m or over
- Projects with lower total project values should consider applying whole life costing. This needs recording when it is considered relevant because of the nature of the projects' risks and opportunities.

For projects over £5 million applicants should supply – as a minimum – construction costs, maintenance, operation, occupancy and end-of-life costs. In assessing costs, applicants should use the most appropriate data sources – whether or not they are in the public domain – and record their origin. Relevant risks and uncertainties associated with costs should also be provided, and if necessary, sensitivity analysis should be applied.

Helpful tools include:

Whole life costing (OGC Guidance), which can be found at www.ogc.gov.uk/documents/CP0067AEGuide7.pdf

Box 5: What is whole life costing?

Whole life costing involves assessing the total cost of a building throughout its life - that is, the cost of design and construction, the long-term operational and maintenance costs and the costs associated with disposal. It is a method of economic evaluation which takes account of all relevant costs over a defined period, adjusting for the time value of money in the form of a net present value (NPV) or internal rate of return (IRR).

The two most common ways in which whole life costing is used in the UK construction industry are for generating a cash flow forecast over a given period of time, and for evaluating different options for achieving a given design and construction requirement.

Whole life costing may be applicable for:

- A single asset or whole building
- An element of work – e.g. a roof
- A system – e.g. a heating system or a component such as a boiler

Box 6: Why is whole life costing important?

Operating and maintenance costs of a building often outweigh the initial construction investment over a relatively short period of time. In the context of a building's lifetime, the construction costs are unlikely to be more than 2% - 3% of total costs, compared to the costs of running a public service which will often constitute 85% of the total. Design costs are likely to be only 0.3% - 0.5% of the whole life costs, and yet it is through the design process that the largest impact can be made on the 85% figure. So the use of whole life costs can inform design and construction decisions and help to achieve long-term value for money, as well as promoting benefits such as energy efficiency and reduction of carbon emissions. Whole life costing is an important tool for demonstrating the long term sustainability of a development and justifying potentially higher upfront costs of exemplar buildings.

User satisfaction and comfort

User satisfaction and comfort is concerned with the performance of a building in terms of the people who actually use the building on a day-to-day basis.

User satisfaction:
Nottingham Science Park extension

No. 1 Nottingham Science Park is a striking and innovative development of flexible units by Blueprint, an East Midlands property regeneration partnership, opened in Summer 2008. It provides 42,000 sq ft of units for science, technology and R&D companies giving them space to expand, innovate and work collaboratively. The site's close proximity to The University of Nottingham stimulates opportunity for a two-way flow of research and jobs for the best graduates.

The building is designed to be environmentally sustainable incorporating a brown roof for insulation and biodiversity, biomass heating system, natural ventilation, camouflaged undercroft parking, optimised use of natural light, recycled and sustainable building materials and high energy efficiency standards. Thermal and energy efficiency measures are expected to make units significantly cheaper to occupy than less sustainable counterparts.

The development won the Design-Led Project of the Year Award at the Midlands Property Awards in July 2008.

No1 Nottingham Science Park - Blueprint

Biodiversity

In line with Section 40 of the Natural Environment and Rural Communities (NERC) Act, *emda* expects to see the conservation of biodiversity at the heart of projects that we support. *emda* requires project applicants to take full account of opportunities to conserve biodiversity and to minimise and mitigate any potentially negative impacts. This may be as simple as phasing construction or cutting grass less often for the benefits of wildlife. Actions to enhance biodiversity can include providing opportunities for new habitat creation on site. Practical low cost measures include designing sites to enhance ecological corridors, incorporating green roofs, boxes and other external features such as ponds or planting for wildlife. In some cases necessary engineering features – such as Sustainable Urban Drainage Systems (SUDS) – can be specifically designed to enhance biodiversity and landscape quality.

emda expects:

- As a minimum, projects should ensure no net loss of regional biodiversity; and,
- Where practicable undertake biodiversity enhancements in line with the Regional Biodiversity Strategy priorities and good practice guidance on integrating biodiversity into projects.

To demonstrate compliance with *emda's* standards, applicants are required to respond to the questions shown in *Annex 1 - emda requirements on the Biodiversity Duty (NERC Section 40).*

Helpful tools include:

- Biodiversity By Design – A guide for sustainable communities, by the Town and Country Planning Association – – www.tcpa.org.uk/downloads/TCPA_biodiversity_guide_lowres.pdf
- BREEAM manuals – 'Land Use and Ecology' sections
- A developers guide to biodiversity – How to incorporate biodiversity into your development, by Surrey County Council – www.surreycc.gov.uk

Designing for biodiversity
Attenborough Nature Centre

Opened in 2005 by Sir David Attenborough, the Attenborough Nature Centre is a unique eco-building providing rooms, education facilities, interpretation, a nature shop and café. It has been designed and constructed using sustainable practices, materials and methods and incorporating renewables.

Avoiding negative impacts and enhancing biodiversity were integral to the project. Construction was phased over 18 months to minimise the impact on nesting birds, and Mitigation work, because of the building's location in the floodplain, has been used as an opportunity to create a range of new wildlife habitats including new ponds for dragonflies and insects, new islands for wetland birds and new reed beds as nesting areas for birds such as sand martins. The site includes a special education area with a pond, bird feeding stations and a sensory nature trail. Phil Songhurst, Attenborough Nature Centre's General Manager said: "Opportunities to build sustainable projects should always be grasped. The priorities should be to secure sufficient funding and to ensure the commercial viability of the project once it is up and running. Careful use of renewable technologies and a minimal need for ongoing maintenance help these issues."

Attenborough Nature Centre

Integrating biodiversity in scheme design:
Sustainable Urban Drainage Systems

At both Upton Sustainable Urban Extension and Sherwood Energy Village an integrated Sustainable Urban Drainage System (SUDS) controls flood waters and is a crucial aspect of the design providing greenspace, amenity and enhancing biodiversity.

Green infrastructure enhancing a development's value:
Nottingham Science Park

Nottingham Science Park's buildings are set in a very high quality external environment. A boardwalk of giant wooden lilies, suspended over a wetland habitat, connects the park to the adjacent nature reserve, the university lake and a wild flower meadow. Ecology and the open space between buildings have been designed to provide a living and breathing environment that will create a clean and healthy atmosphere and enhance the site's biodiversity. A good example of sustainability features providing interesting design opportunities, the publicly accessible boardwalk forms part of the park's sustainable urban drainage system (SUDS), reducing run-off from buildings on the park and limiting water flows (and therefore flood risk and energy usage) to the sewer network. The buildings and setting are intended to sustain the natural environment, add value to the creative processes of occupiers and reduce operating overheads.

3. Delivering projects - working with *emda*

The overall process for the development and delivery of *emda*-funded physical development projects is illustrated in *Figure 1*. *emda's* project application process is in two stages: An Expression of Interest and a Full Application

Figure 1: Sustainable physical development requirements in *emda* project development and delivery process

1.	**Expression of Interest form** • Confirmation acceptance of *emda* sustainable construction standards • *emda* biodiversity requirements • Guidance highlights sustainable development priorities
2.	**Full Project Application and Appraisal form** Demonstrate how projects will meet: • Sustainable construction standards • BREEAM Excellent/ Code for Sustainable Homes level 3/4 • BREEAM Very Good for refurbishment • 15% recycled content of materials • 6 BREEAM points in energy section • 40% of BREEAM biodiversity points • Sustainable procurement approaches • Apply Whole life costing (for projects over £5m • Review by Design Review Panel ('significant' projects)
3.	**Legal and contracting**
4.	**Monitoring (targets and dates)** • Carbon savings (tones of CO2 emitted per annum) • BREEAM score / Energy Performance Certificate rating at design and completion stages
5.	**Exit** • BREEAM and other targets evaluated
6.	**Evaluation** • End of project • Post-occupancy evaluation may be required

Stage 1: Expression of Interest

No specific targets need to be met at the Expression of Interest stage because projects are typically at an early stage in development. However, all projects involving built environment elements and/or land use changes should be aware of *emda's* sustainable construction requirements and confirm that:

- At full appraisal stage, the project will comply with or exceed relevant Common Minimum Standards and RDA Sustainable Construction Commitments.
- At Full Appraisal stage, the project will comply with Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006 Biodiversity Duty.

This sets the basis for *emda's* sustainable construction standards.

Stage 2: Full Application and Appraisal

In the full application all projects will need to demonstrate how they will meet *emda's* sustainable construction standards and the NERC biodiversity duty.

Projects need to comply with Common Minimum Standards and carry out an environmental assessment process appropriate to the size, nature and impact of the project.

- For all new non-residential developments, the BREEAM 'Excellent' rating (Very Good for refurbishments) is required; unless site constraints or project objectives mean that this requirement conflicts with the obligation to achieve value for money (see *Box 7*).
- For civil engineering projects, 'Excellent' CEEQUAL rating, when required subject to considerations of value as above (see *Box 9*).
- For all residential developments Code for Sustainable Homes Level 3 to 2010, and Level 4 to 2010. By 2013 Level 6 (Zero Carbon will be expected.

While *emda* currently expects projects to meet BREEAM Excellent (new build) or Very Good (for refurbishments), legislative and good practice standards are constantly changing and applicants should be mindful that *emda*'s expectations will rise over time as set out in *Box 7*.

Box 7: Improving construction standards to 2013

	2009	April 2010	April 2013
New development:			
Residential (Code for Sustainable Homes)	CSH Level 3	CSH Level 4	CSH Level 6 (Zero Carbon)
Non-residential	BREEAM / CEEQUAL Excellent		BREEAM / CEEQUAL Outstanding*
Refurbishment:			
Residential	CSH/Ecohomes as Guide		
Non-residential	BREEAM / CEEQUAL Very Good		

* This is a forward commitment of ***emda***, subject to approval by *emda*'s Executive Team

Small and heritage projects

For small projects – with a total cost of less than £1 million – or for listed or heritage buildings, a full BREEAM assessment may not be considered appropriate. Applicants will, however, be required to submit a written Environmental Assessment, produced by a competent person. For listed/protected heritage buildings, *emda* recommends using the appropriate BREEAM product, developing a customised version or using English Heritage guidance and/or the services of a competent environmental assessor. Other helpful assessment tools are shown in *Box 11*.

Box 8: What is BREEAM and what does it cover?

BREEAM (Building Research Establishment Environmental Assessment Method) is an assessment model undertaken by an independent BREEAM Assessor which looks at good and best practice for buildings across a wide number of issues including management, energy, water, land use and ecology, health and wellbeing, transport, materials and pollution. There are two BREEAM assessments for new builds: the 'design and procurement' assessment carried out pre-construction; and the post-construction review.

Different BREEAM models are available for offices and homes, industrial units and warehouses, schools, courts and prisons. The building can be assessed using a variety of models. The project applicant should use the model most appropriate for their building type. See http://www.breeam.co.uk/

Box 9: What is CEEQUAL and how is it different?

CEEQUAL (Civil Engineering Environmental Quality Award) is an awards scheme for assessing the environmental quality of civil engineering projects during project specification, design and construction. Like BREEAM, CEEQUAL uses a points-scoring assessment, which is applicable to any civil engineering project. In common with BREEAM it covers use of water, energy, land and ecology and waste minimisation. In addition it covers archaeology, landscape, nuisance to neighbours and community amenity. See www.ceequal.com

Box 10: What is the Code for Sustainable Homes?

The Code for Sustainable Homes became mandatory for all new homes in May 2008 as the single national standard for sustainable homes. The Code has six levels. It sets minimum standards – which are higher than Building Regulations – energy and CO^2 emissions, water efficiency and run-off, materials, waste, pollution, health and well-being, management and ecology. The Government's CO^2 emission targets required for zero carbon new homes policy are equivalent to different levels of the Code with Level 6 equivalent to Zero Carbon Homes. See www.communities.gov.uk

Box 11: Other helpful assessment tools

Policy	Tools/measurements
Overall standards	• Building for Life – A standard for housing quality used by Homes and Communities Agency amongst others which scores housing developments against 20 criteria covering all aspects of sustainability. A minimum score of 14 out of 20 is expected – www.buildingforlife.org • Blueprint provides an assessment framework for schemes based on 16 sustainable development policies related to regeneration, sustainability and design for large mixed use urban regeneration schemes – http://www.blueprint.gb.net/
Design Quality	• CABE Design Quality Indicators – uses a non-technical questionnaire to focus on functionality, build quality and impact. The process can be used throughout the life cycle of a development including briefing, mid-design, ready for occupation and use. For an online guide www.dqi.org.uk/DQI/Common/DQIOnline.pdf
Public realm	• Regeneration East Midland's public realm toolkit. Helps developers to design and appraise performance of high quality public spaces – www.regenerationem.co.uk
Whole Life Value	**Whole life costing (OGC guidance)** –www.ogc.gov.uk/documents/CP0067AEGuide7.pdf
Carbon	• BREEAM pre and post construction assessments • A renewable energy toolkit produced for London but applicable to other locations – www.london.gov.uk • British Property Federation's LES-TER tool is useful to help owners and tenants manage energy of buildings in use. – www.les-ter.org.uk
Waste	• **WRAP's Net Waste Tool** calculates recycled content and forecasts waste stream quantities and provides 'quick win' opportunities – http://nwtool.wrap.org.uk • **WRAP's Site Waste Management Plan Template** provides a best practice, easy access template for projects – www.wrap.org.uk
Accessibility	**Lifetime Homes Standards** – sets out 16 design features that together create a flexible blueprint for accessible and adaptable housing, which aims to increase choice, independence and longevity of tenure. Meeting this standard ensures that you will meet Building Regulations Part M (Part M, Access to and use of buildings) – www.lifetimehomes.org.uk

Transport	Department of Transport provides guidance on workplace travel plans – www.dft.gov.uk
Biodiversity	• Biodiversity By Design – A guide for sustainable communities, by the Town and Country Planning Association — www.tcpa.org.uk/downloads/TCPA_biodiversity_guide_lowres.pdf • BREEAM manuals – 'Land Use and Ecology' sections – http://www.breeam.org/ • A Developers Guide to Biodiversity – How to incorporate biodiversity into your development, by Surrey County Council – www.surreycc.gov.uk
Climate change adaptation	The Three Regions Climate Change Group has developed Adapting to Climate Change: A checklist for Development as a guide to developers, architects and engineers etc. for adapting developments in anticipation of future climate change – http://www.go-se.gov.uk/497648/docs/167059/AdaptingToClimateChange.pdf
Considerate construction	The Considerate Constructors Scheme provides all the information you will need to comply with the schemes code – www.ccscheme.org.uk
Environmental regulations	NetRegs provides free environmental guidance for the construction industry to help understand how to comply with environmental law and protect the environment – www.netregs.gov.uk

4. Other sources of support for physical development projects

A range of guidance, tools and support is available for physical development projects and sustainable construction, including:

Design:

- Regeneration East Midlands (REM) is the regional centre of excellence for sustainable communities in the East Midlands offering a sustainable public realm toolkit. – www.regenerationem.co.uk
- East Midlands Design Review Panel (EMDRP) is the independent design review panel for the region supporting delivery of sustainable, high quality and well planned buildings and places by providing independent and impartial advice on design. This is a free service provided by Opun the architecture centre for the East Midlands, which is part of REM – www.regenerationem.co.uk
- Blueprint a public private partnership established by *emda*, EP and Blueprint Regeneration partnership to deliver socially responsible development in the East Midlands – http://www.blueprint.gb.net/
- The Building Research Establishment (BRE) have a site packed full of design advice and information see – www.bre.co.uk
- The Commission for the Built Environment (CABE) Spaceshaper is a practical toolkit to measure the quality of a public space before investing time and money in improving it – www.cabe.org.uk
- The Royal Institution of Chartered Surveyors (RICS) offers advice on a diverse range of land, property, construction and related environmental issues. – www.rics.org.uk

Decision making:

- East Midlands Centre for Constructing the Built Environment (EMCBE) provides strategic leadership and works with partners to improve the sectors sustainable construction performance. EMCBE is based at the Innovation Centre in Loughborough. www.emcbe.com
- Office of Government Commerce's Common Minimum Standards give guidance on procurement of sustainable buildings – http://www.ogc.gov.uk/documents/Common_Minimum_Standards_PDF.pdf
- The Environment Agency can provide assistance on flood risks and climate change adaptation – www.environment-agency.gov.uk

Procurement:

- Institute of Environmental Management and Assessment (IEMA) operates a useful general site with a subscription magazine and publications on environmental principles, systems and support techniques – www.iema.net
- Proactive Procurement – provides cost planning, estimations, quantities preparation and resource management to promote procurement of recycled materials for construction
- WRAP provides data on quick win options for recycled content and a toolkit for calculating net construction waste and recycled content (including land reclamation and remediation) – www.wrap.org.uk. The site also provides good practice and case studies.

Specialist business support:

- East Midlands Business Innovation Centre (EM-BIC) is a collaboration of specialist business centres in Nottinghamshire and North East Derbyshire – www.embic.co.uk
- Sustainable Construction iNet - iCON to be based at iHub in Daventry develops opportunities for innovation within the sector – www.eminnovation.org.uk/construction/default.aspx
- East-Midlands Construction Resource Efficiency Club, an initiative with funding from Envirowise to help improve resource efficiency in the construction sector. It generates financial savings, increased profits and environmental benefits through lower carbon emissions, waste generation and energy consumption — www.emcbe.com/resource-efficiency.html and www.responsible-solutions.co.uk/
- The Carbon Trust provides free design advice for buildings over 10,000m^2 in size – http://www.carbontrust.co.uk/
- Energy Savings Trust provides advice for smaller buildings – www.est.org.uk

Business Support:

Business Links East Midlands is a free business advice and support service, available online and through local advisers. Through its Independent Diagnostic and Brokerage service it can help businesses identify resource efficiency savings and independent solution brokers. – www.businesslink.gov.uk/eastmidlands

Annexes for this guide with useful information are available in a separate document.