

CLARINET

Brownfields and Redevelopment of Urban Areas

A report from the Contaminated Land
Rehabilitation Network for Environmental
Technologies

Brownfields and Redevelopment of Urban Areas

Report prepared by Working Group "Brownfield Redevelopment" of the Concerted Action "Contaminated Land Rehabilitation Network for Environmental Technologies" (CLARINET), funded by the European Commission, DG Research, under the Environment and Climate Programme and co-ordinated by the Austrian Federal Environment Agency.

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FOREWORD

This report is the result of working group "Brownfield Redevelopment" of the network CLARINET (Contaminated Land Rehabilitation Network for Environmental Technologies), a project funded under the Environment and Climate Programme of the European Commission.

CLARINET provides an interdisciplinary network on the sustainable management of contaminated land in Europe, analysed key-issues in decision-making processes and identified priority research needs on technical, environmental and socio-economic topics. The network brings together the combined knowledge and expertise of academics, national policy makers, government experts, consultants, industrial land owners and technology developers from 16 European countries. Key objective of CLARINET was to identify the means for the effective and sustainable management of contaminated land in order to

- ensure the safe (re-)use of these lands

- abate caused water pollution

- maintain the functionality of soil and (ground-)water ecosystems.

CLARINET focused on the basis of currently applied risk-based procedures for land management in European countries, aiming to evaluate the current state of the art and to stimulate scientific collaboration on identified research needs in Europe.

To yield an integrated approach within the project, several interlinked working groups were identifying problem and solution related aspects for contaminated land management. The following themes have been addressed:

- Brownfields Redevelopment

- Impacts of Contaminated Land on Water Resources

- Remediation Technologies and Techniques

- Human Health Aspects

- Risk Management and Decision Support

Furthermore, one working group aimed to stimulate collaboration between various R&D Programmes on a European level.

Based on the identified state-of-the-art in these areas, integrative concepts and recommendations for tackling contaminated land problems have been investigated, taking the different approaches in the European countries into account. Needs for further research have been identified.

The individual working group results contributed in developing an overall conceptual framework for sustainable management of contaminated land (Risk Based Land Management). This concept is also available within this series of publications.

Martin Schamann

Federal Environment Agency, Austria

On behalf of the CLARINET Steering Committee and members of the network.

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1 SUMMARY

Across Europe, the presence of derelict land is a subject of concern in many countries. Brownfield sites present particular challenges to national and regional policy makers in terms of bringing the land back into beneficial use and in terms of cleaning up contaminated land and groundwater. While contaminated land management is aiming at the management or elimination of risks, the primary objective of brownfield redevelopment is the reuse of the land and the reintegration of the properties into the economic cycle. In this respect successful brownfield redevelopment policies and strategies particularly need the combination of environmental approaches with spatial and urban planning approaches to be integrated into policy approaches and vice versa. To provide such a link between disciplines and issues, the Working Group „Brownfield Redevelopment“ within the wider CLARINET project examined this in depth.

Brownfield sites present complex problems, including the contamination of the land. However, there are many much wider aspects that need to be considered and integrated into action to achieve effective solutions. The political, social and economic context of brownfields becomes clearer through analysis of related aspects in these areas, such as:

- Breakdown of economics,
- Problems in attracting new investors,
- High unemployment rate,
- Adverse effects on urban life,
- Decline of tax income for the communities,
- Social conflicts,
- Consumption of greenfields.

Dealing with brownfields in this broader sense also means dealing with the different interests of a variety of stakeholders, including regulators, investors, land owners, developers, consultants, academics, community groups, technology providers and the financial sector. The Working Group „Brownfield Redevelopment“ therefore agreed that the integration of disciplines by means of working in partnerships towards the overall objective of land reclamation is essential.

The review of national approaches for the redevelopment of brownfields in Europe made quite clear that the problem has been recognised in particularly industrialised countries and actions have been taken. However, such action may not always be based on a national strategy but rather relates to single or regional efforts to cope with the issue. It appears that the legal frameworks in many countries have not yet sufficiently integrated the needs arising from the viewpoint of environmental protection / restoration with the viewpoint of spatial and urban planning. In many countries there is still no specific emphasis on the reuse of brownfields in the urban and spatial planning regimes. Many planning systems are geared towards the devel-

opment of undeveloped land (greenfield) instead of formerly developed land (brownfield). Hence, the overall conditions for investments on greenfields are mostly more beneficial than on brownfields.

Additionally, integration and co-operation is needed at the administrative level which is responsible for the enforcement of policies. If there is no implementation of the interdisciplinary principle in administration and if planning divisions, environmental divisions and economic promotion divisions do not establish administrative interfaces, the long timescales for brownfield redevelopment may not significantly improve. National governments and other central organisations can support this task by means of national training programmes, national funding and by providing assistance for the establishment of appropriate conditions at the regional level.

The Working Group „Brownfield Redevelopment“ have made a number of recommendations and identified research tasks for the future. These relate to policy recommendations and specific suggestions for research that would be desirable on an international level in Europe. Recognition that there is a lack of existing tools and guidance has been essential for the identification of such needs. Their availability would greatly assist in promoting and developing solutions to deal with the challenges of brownfield redevelopment. The key recommendations are structured along the topics of policy and programmes, future use and planning procedures, site preparation and technical procedures and economic viability. They encompass the main factors which are required for determining the success of specific brownfield projects.

With the checklist on land recycling which is annexed to this report, the Working Group „Brownfield Redevelopment“ provides a tool that can support the management of complex brownfield projects. It has been analysed for validity related to common European procedures for approval and other legal matters, land planning and environmental protection. Municipalities and project managers may use this list for further adaptation according to their specific needs and conditions.

Finally, the work and the progress of work in this Working Group made very clear that exchanging information on existing experiences is vital for the development of new solutions. Co-operation and information exchange along different national and sub-national legislative and policy frameworks for urban, economic and environmental sustainability is an important element to deal with the complex challenges of brownfields. This will present further opportunities to turn brownfields from a problem to a future resource and to change a potential threat into an asset.

2 INTRODUCTION

In any discussion of sustainable management of contaminated sites it is clear that the particular issue of “brownfield” sites, or “brownfields”, needs to be considered. Brownfield sites are not necessarily contaminated – the term “brownfield” was initially introduced in a general sense to describe sites which had been previously in use, to contrast them with “greenfield” land which had not previously been used for development. The term is usually related to the need to consider whether the land can be reused. However, as much of the former use can be industrial use, this consideration of reuse does lead to the need to address problems of contamination.

The redevelopment of brownfield sites, therefore, presents a particular set of circumstances in terms of dealing with contamination. The key issues relating to land contamination are that;

- contamination may be a technical barrier to reuse;
- concerns about the risk (real or perceived) from contamination inhibit investment in the land;
- the cost of dealing with contamination adds to other economic burdens on regeneration of land affected by former industrial use;
- the interface of the policy and legal framework for dealing with land contamination with the policy and legal framework for land regeneration can be complex;
- there are much wider issues relating to the regeneration of land which has previously been used for industrial or other purposes – these can present additional complexities in terms of dealing with the contamination issue.

However the successful reuse of brownfield sites, which addresses environmental, economic and social needs in a sustainable way, can provide a positive way of dealing with the legacy of land contamination.

THE WIDER ISSUES FOR LAND MANAGEMENT

As the main reason for the emergence of brownfields is economic structural change and the decline of traditional industries, brownfield land is coupled with a severe loss of jobs and, as a direct consequence, the decline of the neighbourhoods around such sites or even of whole cities. In this context, it is commonly recognised and documented (e.g. by OECD 1998) that the presence of brownfields has adverse effects not only on the environment, but also on the economic and social health of a region.

There is increasing evidence at the international level of policies focussed on the need to reuse brownfield sites for future urban development. However current practice in many industrialised countries still involves a significant level of development on greenfield sites. In Germany, alone, an estimated 129 hectares per day of greenfield land is lost for building purposes. Urban sprawl and the spatial separation of different land uses are ongoing and lead to an increasing need for mobility of the public. In addition there is ongoing consumption of greenfield sites for housing, retailing and industry. Mechanisms for re-integrating brownfields into the property markets may

help to shift development back to central urban locations, which are generally considered to provide a more sustainable built environment.

Brownfield redevelopment is a complex process faced by the number of different actors and interest groups involved in the decision making process. Brownfield redevelopment is a common component of environmental restoration, land use planning and economic policy. The presence of urban brownfields in particular is a challenging issue for national, regional and local stakeholders in terms of;

- revitalisation of former industrial sites in the urban and regional context;
- remediation of the environment;
- reintegration of rehabilitated sites into the economic cycle.

Brownfield redevelopment in the context of sustainability and Risk Based Land Management

In the context of scientific discussions it is necessary to define the link between contaminated land management and brownfield redevelopment. Although contaminated land is a common problem on many brownfield sites, contaminated land management does not represent the full scope of objectives and components of brownfield redevelopment. Political and scientific discussions on contaminated land management in the past have often focused primarily on environmental problems. The management and the elimination of environmental risks according to the use of the site is the core objective of contaminated land management. This risk management is possible, although not necessarily desirable, without revitalisation of the site in an urban and regional context or reintegration of the site into the economic cycle in a sustainable way. From an overall policy perspective there are consequently several aspects in relation to brownfields that need to be considered and combined by means of political, scientific and technical solutions.

Polluted sites that endanger human health or ecological health, or damage natural resources, are an environmental problem. On the other hand, derelict land, whether or not it causes any immediate risk may be considered as a spatial planning problem, with specific economic and social implications. From an overall viewpoint the example of brownfield redevelopment represents a subject of real sustainable dimensions. It tackles environmental, social and economic issues, which are the main aspects of sustainability. As a result the major trend in policy development is to address environmental issues and spatial planning issues simultaneously. Efforts to develop such integrated approaches have also resulted in a shift in attention of policy makers from the assessment of problems to the formulation of solutions that will meet the needs of society in a sustainable way. The CLARINET approach to combine both issues is proposed as Risk Based Land Management (RBLM).

RBLM acknowledges the need for decision support tools, which may vary from straightforward information about the advantages and disadvantages of various options to formalised weighting systems. RBLM is a tool to manage both the risks of the site and the needs for spatial planning. RBLM seeks to:

- combine the requirements for risk reduction and land use;
- combine the needs from the perspective of the site as well as from the perspective of the environment;
- address the full context and process of land management in a sustainable way.

CLARINET WORKING GROUP „BROWNFIELD REDEVELOPMENT“

The growing awareness of Brownfield issues across European countries provided the impetus for the establishment of a specific Working Group on brownfield sites – Working Group „Brownfield Redevelopment“ – within the wider CLARINET project. The provision of a link between, on the one hand, contaminated land issues and, on the other, spatial and urban development issues, was one of the core objectives of CLARINET. The focus of the work conducted has been on the evaluation of best practice approaches in brownfield redevelopment across Europe, and the identification of research and development needs. At the same time, the Working Group „Brownfield Redevelopment“ has also attempted to identify tools that are already available, that may help to overcome current obstacles to the effective and efficient redevelopment of brownfield sites.

This report documents the results of the work of CLARINET Working Group „Brownfield Redevelopment“. It was compiled from the output of working group discussions, the feedback from several questionnaires plus additional evaluation of literature, case studies and expert interviews.

Annexed to this report are Country specific information (Annex 1) and a Check List on Land Recycling (Annex 2). The country specific reports are structured along the issues of:

- Country profiles
 - extent localisation / types of brownfield;
 - policy / programmes / actors;
 - legal regulations;
 - gaps and obstacles,
- Inventories of selected brownfield projects, and
- Contacts and Literature.

This information has been compiled during the work of CLARINET Working Group „Brownfield Redevelopment“ and for each country reflects the key topics in a national context.

The Checklist on Land Recycling is a tool to support the management of complex brownfield projects. It encompasses 50 questions that address the elements of key fields of action in the area of land recycling. The questions have been derived from an original set of 68 questions which have been developed as part of a German R&D project (based on the findings obtained in project evaluations). The Working Group „Brownfield Redevelopment“ modified and adopted the questions to be compatible to the legal and planning systems in participating countries across the European Union. They are designed to cover

all central issues of a typical project and to reflect the common procedural patterns for land recycling projects, in combination with recommendations given on how to optimise the process.

3 GENERAL APPROACH

The general approach of CLARINET Working Group „Brownfield Redevelopment“ was to investigate national backgrounds in the context of brownfield redevelopment across Europe, examining policies, programmes and projects within these countries.

The principal approach for the analysis was based on the assumption that the success of complex brownfield redevelopment projects depends highly upon a number of interconnecting factors. Considering the complexity as a whole, no factor in this relational network dominates the other – they have a co-ordinated effect.

As a basic background for more detailed investigation, the following influencing factors for brownfield redevelopment projects are regarded as essential:

- Future use
- Site preparation
- Economic viability
- Legal framework

A tetrahedron, which represents the connection and interdependency of four equivalent factors can be used to illustrate the relationship of these key factors for brownfield redevelopment (Illustration 1). It further illustrates that the factors must co-operate to achieve a balance. The ‘Tetrahedron Model’ was therefore adopted by CLARINET Working Group „Brownfield Redevelopment“* as an illustrative tool to describe the dynamics of the complex processes and projects that are integral to brownfield redevelopment.

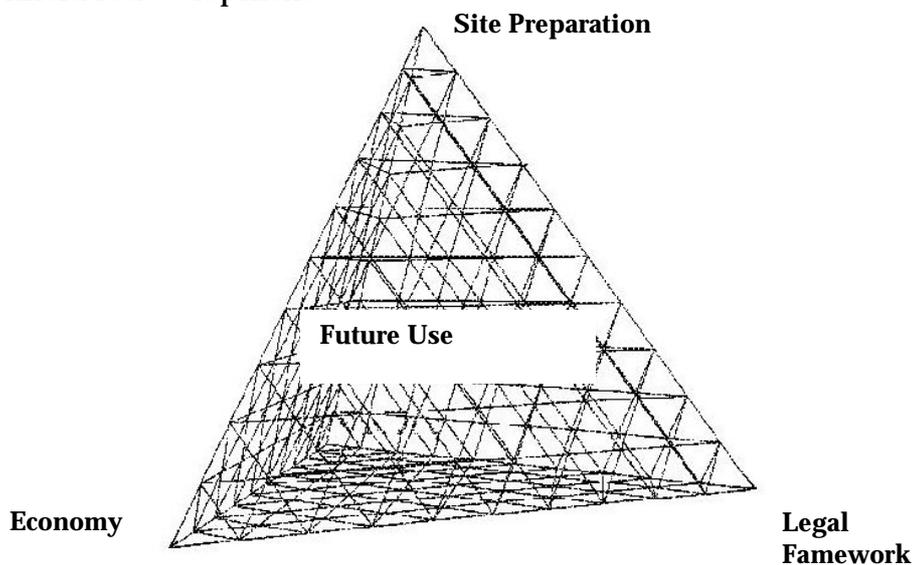


Illustration 1: The tetrahedron model

* It had been originally developed by the Federal Environmental Agency of Germany and provides the basis for the check-list tool. (UMWELTBUNDESAMT, 2000)

The future use aspects can also consider some of the social dimensions, and the site preparation includes the need to ensure that the site is not causing harm or pollution of the environment.

4 BROWNFIELDS IN EUROPE

4.1 Types and definitions

Brownfields are a multi-faceted phenomenon, and any type-related classification cannot be more than a tool for analysis. Some countries have adopted terminology to describe the scope of brownfield redevelopment. As outlined in the annexed country specific information and in chapter 6.2, there are approaches for definitions in France, the Netherlands and the United Kingdom. They mainly describe the scope of brownfields according to specific national perspectives using the terms “dereliction”, “modified use”, “rehabilitation”, “re-use”, “regeneration” and “revitalisation”. There are no common terms across the European Union that precisely define what brownfield sites are. This makes direct comparison of the problem and of policy initiatives difficult.

Systematic considerations about appropriate criteria to classify brownfields have been particularly made in the UK (ALKER, 2000). Such criteria that can be applied to whole sites or parts of sites are mainly based on the characteristics that describe the current status of the site, like vacancy, dereliction, contamination, partial occupation or partial utilisation. Further criteria that are suitable to assist the classification of brownfield sites are the previous use, the ownership situation and the size of the site.

Information on previous use is important to estimate the type and extent of potential contamination of the site. It allows an estimation of the costs for site preparation depending on different reuse options and related construction design needs. For example the large derelict coal and steel sites in Europe require measures that are quite different from those required for small-scale derelict textile sites in inner-city mixed areas.

As far as site ownership is concerned, the scope ranges from big private and public industrial corporations, for example in coal, iron steel, and power generation industries, government bodies and publicly owned companies, to small private enterprises in secondary industries. These various ownership situations lead to different conditions for acquisition, funding and further use options, e.g. revitalisation funding commitments for public or private owners.

For the purposes of this work, CLARINET Working Group „Brownfield Redevelopment“ has agreed on the following definition, which is intended to describe the full context of the environmental, economic and land use issues that are involved:

Brownfields are sites that:

- have been affected by the former uses of the site and surrounding land
- are derelict or underused
- have real or perceived contamination problems
- are mainly in developed urban areas

require intervention to bring them back to beneficial use

4.2 Extent of the problem

In most European countries the existence of brownfields has been recognised as a problem. However, the term brownfield has been used in different contexts to mean slightly different things. The survey undertaken by the CLARINET Working Group „Brownfield Redevelopment“ within the participating countries resulted in a variety of information about both brownfields and contaminated sites (see table 1 and figure 1).

Meanwhile, most countries systematically collect information on the number of contaminated or potentially contaminated sites. The figures received indicate a quite good awareness of the problem in Europe. The contaminated land data gathered within the Working Group „Brownfield Redevelopment“ match very well with other international data releases, such as those from the European Environment Agency (EEA).

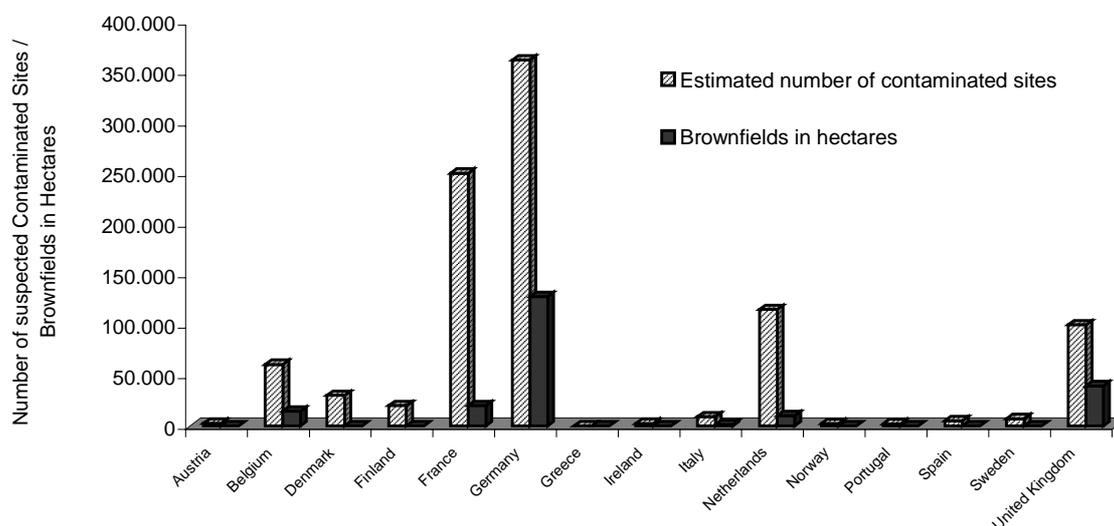


Fig. 1: Brownfields and Contaminated Sites in Europe

Only a few countries have made surveys or other activities to specify the extent of the brownfield problem in terms of estimating the total size of land that is covered. Traditionally industrial countries provided figures regarding the extent of brownfields on the national level. For example, in Germany 128.000 hectares, in the United Kingdom 39.600 ha, in France 20.000 ha, in the Netherlands between 9.000 and 11.000 hectares, and in Belgium / Walloon about 9.000 hectares of brownfields were estimated or identified. For the Flanders region of Belgium, the scope of brownfields has been characterised by the number of known unoccupied business accommodation sites, which adds up to 4000. In early 2001 5.500 ha of brownfields was estimated in the region of Flanders. Italy, which allocated a brownfield density to the industrialised North of the country provided a regional figure for the Province of Milan where a surface area of 1260 hectares is estimated to be brownfields.

For other countries, like Greece, Austria and Denmark the problem of brownfields is identified as relevant, but there is no data available yet.

Table : Brownfields and suspected contaminated sites in Europe

	Suspected/potential contaminated sites	Brownfields in hectares	Regional Concentrations	Sources
Austria	2.500	n.d.	Mur-Mürz-Furche, Linz, Vienna	Umweltbundesamt Wien, 2000
Belgium	5.528 (Wallonia) 53.000 (estim./Flanders)	9.000 (Wallonia) 5.500 (Flanders)		GEHAT, Université Bruxelles, 2000 ; EEA, 1999
Denmark	30.000	n.d.		Danish EPA, 2001
Finland	20.000	n.d.	Helsinki	EEA, 1999 ; Finnish Environment Institut, 2000
France	200.000 – 300.000(estim.)	20.000	Nord-Pas-de Calais, Lorraine, Rhône-Alpes	EEA, 1999 ; Ministère de l'Environnement, 2000
Germany	362.000	128.000	Eastern Germany/ Berlin, Ruhr Area, Saar Region	Umweltbundesamt Berlin, 2000
Greece	n.d.	n.d.	Lavrion/Attika (mining), Aliverion Evoia (lignite mining)	Ministry of environment, 2001
Ireland	2.300 (estimated)	n.d.	Dublin area, Cork area	Env. Protection agency, 2000
Italy	9.000	1260 (Milan Province)	Lombardia (Milan Province), Piemonte, Veneto, Campania (Naples/Bagnoli), Calabria (Crotone)	EEA, 1999; anpa, 2001
Netherlands	110.000 – 120.000 (estim.)	9.000 – 11.000		EEA, 1999; Environmental Ministry, 2000
Norway	2100	n.d.		
Portugal	2.000	n.d.	Lisbon / (chemical-Industry), Norte (Textile), Porto (Metal)	Lab. Nac. de Engenharia Civil, 1998
Spain	4.900	n.d.	Madrid, Basque country, Asturias, Catalonia	Ministerio de Medio Ambiente, 2001
Sweden	7.000	n.d.	n.d.	EEA, 1999; OECD, 1998
United Kingdom	100.000 (estimated)	39.600	Mersey Tyneside, Yorkshire Midlands, South Wales, Scotland, London	DOE, 1993

5 INTERNATIONAL PERSPECTIVES OF BROWNFIELDS

Many countries recognise that the presence of brownfields is a complex problem that goes far beyond single economic, environmental or urban and social concerns. A variety of stakeholders are involved and they have different perspectives and different needs. A number scientific and practical elements are recognised and are in use, but practical solutions for the redevelopment of brownfields need to be multidisciplinary, including environmental science, engineering and technology, spatial and urban planning, information science, law, sociology, economics, political administration and regulation. Consequently, the problem of brownfield redevelopment, especially in inner-city locations plays an important role in initiatives, policy and research outputs of several international institutions. They are part of European and International research and policy activities in the context of spatial planning, economic and environmental restoration and social and technical science. Some activities are outlined below.

5.1 European Commission

By defining the economic conditions in the common market and exercising sectoral control – such as for the coal, steel and ship building industries – the European Union has stimulated structural change and economic modernisation. On the other hand since the 1970s many industrial sites have become derelict. As a consequence, European Union regional development, environmental protection and recent urban initiatives show a strong focus on brownfields as a key element in spatial development.

Typical instruments of the European Union include:

- directives (legal framework);
- analysis and recommendations on policy themes;
- research, demonstration projects or training;
- financial support (essential via the structural funds of the Union), grants and allowances.

As far as the revitalisation of derelict industrial sites is concerned, to date direct financial support of projects by the European Regional Development Fund (managed by the REGIO directorate general) is the main instrument used.

The *European Regional Development Fund (ERDF)* is intended to compensate the greatest regional imbalances within the Community. For target regions this in general comprises funds for the rehabilitation and revitalisation of derelict industrial sites under different programmes. In addition to Community funding schemes, sector-specific “Community Initiatives” support structural change in traditional industrial regions. These programmes directly initiated by the Commission in co-operation with the national and regional governments, are limited in time and content. This is

in particularly true for the programmes "RESIDER" for steel sites, "RECHAR" for coalfields, "RENAVAL" for ship building sites and "RETEX" for textile industry sites. Taking into account the increasing urban problems in European metropolitan areas the "URBAN" initiative focuses on wider regeneration projects. In the context of these special programmes, considerable funds are often provided for the rehabilitation of brownfield sites.

In 1992 the first community funded research study on iron and steel brownfield problems was published by the European Commission and the Association of European Regions of Industrial Technologies (RETI) (COMMISSION EUROPEENNE, 1992). This study outlines urban development, ecological and economic aspects of the problem. The extent of brownfields from coal and steel industry in western Europe alone was estimated to be approximately 200.000 hectares (including opencast lignite mines). A catalogue of recommendations submitted to the Commission underlined the needs:

- for an integrated strategy for derelict land;
- to draw up a definition of derelict sites;
- to quantify, inventory and describe derelict land;
- to provide financial efforts for the Community;
- to develop a system of gradual treatment;
- to ameliorate risks;
- to encourage applied research projects. (COMMISSION EUROPEENNE, 1992)

In October 1998 the European Commission adopted the Communication *Sustainable Urban Development in the European Union: A Framework for Action* (COM(98)605), setting out objectives for urban areas and a range of existing and proposed actions to address these. A more strategic and integrated approach to urban issues at European level has been adopted. Urban problems are going to remain high on the European agenda, with enlargement of the EU bringing new challenges. As part of its contribution to maintaining the focus on urban policy development, DG Environment decided to re-launch the Urban Environment Expert Group and to set up a series of Working Group „Brownfield Redevelopment“s to explore areas of policy in which there may be scope for further action by the Commission. Brownfield issues play a major role in the context of sustainable land use (EXPERT GROUP on the Urban Environment, 2000). The European Commission will adopt the report in 2001.

5.2 US-Environmental protection agency (EPA)

The EPA's Brownfields Economic Redevelopment Initiative, as outlined in the brownfields Action Agenda, is designed to assist states, communities, and other organisations or individuals in assessing, cleaning up, sustainably reusing and preventing future brownfield. (EPA, 1998) The EPA recognises that a major impediment to enduring environmental and economic health is the inability to achieve sustain-

able redevelopment. Therefore, the ultimate success of the brownfield initiative is contingent upon a project's ability to stimulate sustainable environmental restoration and economic development.

As part of the national brownfields initiative, the EPA has awarded co-operative agreements to states, cities, towns, counties, and tribes to demonstrate pilot studies. These should test brownfields assessment models, direct special efforts toward removing regulatory barriers without sacrificing protectiveness, and facilitate coordinated public and private efforts at the federal, state and local levels. These Pilot Project grants are intended to be a catalyst to the sustainable redevelopment of brownfields sites. This is accomplished by providing public funds to stimulate local government organisations into creating the impetus and maintaining control of the project process and outcomes, providing technical support during the early stages of a project, and inducing private capital investment. By addressing these needs through a series of demonstration Pilot Projects, the agency is striving to develop the knowledge, experience, and public confidence required for continued implementation of future brownfield projects at the local community level (EPA, 1998).

5.3 OECD's Territorial Development Service

The OECD Service brought together four distinct areas of policy research that had a common interest in the territorial concept and that can suggest, jointly and separately, innovative policy responses. These are the Group of the Council on Rural Development, the **Group on Urban Affairs**, the Local Economic and Employment Development (LEED) Programme, and the Working Party on Regional Development. The Territorial Development Service offers a way for the common experiences and outlooks of these four groups to be brought together in a collaborative effort to articulate the new territorial concept through individual and joint projects and activities.

The Territorial Development Service is concerned with giving practical assistance to governments so that they are able to focus sectoral policies in relation to territorial context, encouraging the creation and development of locally driven initiatives for economic development, and integrating the two approaches into a coherent strategic approach. The Service seeks to combine the best elements from a variety of complementary territorial development strategies. The top-down and exogenous development strategy often emphasised by government-led regional development policies is important as a tool for reducing territorial disparities.

With support from the US Environmental Protection Agency, the Working Group „Brownfield Redevelopment“ on urban affairs undertook a comparative study of the economic outcomes of efforts to regenerate urban brownfields in several countries (EPA, 1998). The main objective of the study was to assist governments to develop sustainable policies and methods for achieving sustainable brownfield redevelopment with positive economic outcomes and benefits to society.

The report (*OECD, 1998*) highlighted:

- insufficient information concerning the number of brownfields and vacant sites in cities, and about the economic, social and environmental outcomes of redevelopment;
- the contradictory practice of permitting greenfield development whilst attempting to redress the serious environmental, economic and social problems associated with urban brownfield;
- the inflexibility of policy and legislation which inhibits the redevelopment of brownfield sites.

6 NATIONAL BACKGROUNDS

This section describes the key features of national backgrounds of brownfield redevelopment across Europe in relation to policy and programmes. The members of the CLARINET network have assisted in the provision of information for this analysis. Additionally, literature reviews and expert interviews have been conducted. More detailed country specific information is attached to this report in annex 1.

6.1 Policy - an overview

Over the past decades the “brownfield” issue has been a particular topic of discussion in the traditional industrial regions of Europe. Today many European cities are affected. Although the underlying conditions are different, there are derelict industrial sites in the traditional industrial centres and in metropolitan cities like London and Barcelona, as well as in peripheral locations such as the Brandenburg lignite fields. The different conditions have led towards different strategies and programmes to support redevelopment. However, three typical categories can be identified and characterised.

Traditional industrial areas

As a result of the massive decline in industrial jobs in the coal, steel and textile industries at the beginning of the 1980s, governments had to actively promote structural change in industry. Comprehensive strategies and programmes of derelict land revitalisation have been developed, particularly in the traditional industrial regions of the United Kingdom, France (Lorraine, Nord-Pas de Calais) and Germany (Northrhein-Westphalia). (FERBER, 1995).

Due to the dominance of the coal and steel industries in these regions very large sites, having a low land value and high rehabilitation and decontamination costs are left derelict. Here, governmental intervention was essential as property market forces alone were not robust enough to solve the problem. Since the beginning of the 1980s in the UK, France and Germany, initiatives have been developed which favour a regional derelict land policy and specific derelict land recycling programmes. These initiatives were triggered on the one hand by increasing awareness of the negative economic and ecological effects of the derelict sites and on the other by recognition of the positive development potential for such sites.

In the UK, Germany and France, regional, national and European funding was provided to initiate derelict land recycling programmes in traditional industrial areas, projects effectively paid for by tax revenues. As it was clear from the beginning that significant finance would be required for a long period of time, funds had to be concentrated on specific initiatives.

Special programmes were started because:

- the tasks required in terms of urban development, structural policy and environmental policy were very complex and required a cross-sectional approach;
- it was evident that the existing actors would have implementation problems, i.e. in particular the affected municipal administrations. On their own, municipalities would never have been able to handle such large derelict sites, due to insufficient resources (both experienced personnel and funding), difficulties in establishing a workable framework accounting for the different needs of municipalities and weakness in their powers to enforce rehabilitation procedures on landowners;
- the increasing importance of open space protection which placed limits on “greenfield” industrial developments.

Initial objectives related to structural policy are also central to all the case studies reviewed. Brownfields are often identified as an obstacle to investment. However for many municipalities they also constitute an important economic development potential, although one which is difficult to mobilise. Most of the special programmes reviewed also offer approaches to solving urban development, social and ecological issues. These include:

- restricting greenfield consumption by re-using brownfields;
- functional and design improvement of the affected urban structures by eliminating the derelict sites and associated measures aimed at general urban renewal;
- preserving the architectural heritage of the industrial revolution by finding new uses for historic industrial buildings;
- increasing the skills of unemployed people by derelict land recycling, via the creation of employment opportunities;
- improvement of environmental quality, e.g. by encapsulating or removing contaminated soil and restoring the landscape distorted by industrial use.

A closer look at the individual projects shows that in practice different regional strategies exist:

In Northern France, for instance, derelict sites were primarily removed to restore an attractive outer appearance to the region and thus attract private investors to newly developed industrial “greenfield” sites. In this context, use of the recycled areas and the removal of contaminated material were coincidental.

Ecological rehabilitation has been a successful theme for the Ruhr area. Here ecological damage is remedied by combining ecological necessities with economic objectives. The aim was to develop environmentally friendly industry and to mobilise areas that can be re-used by industry. Thus the “necessity” resulting from the discovery of extensive contamination on the areas bought up by the property fund was turned into a “virtue”, although the rehabilitation of these areas had not been identified as an aim when the property fund was set up (LEG, 1999).

Classical objectives of economic development – attraction of inward investment, for example by the establishment of business and industrial parks, job creation, etc. –

have been at the centre of policy in the UK for over 30 years. These programmes have been accompanied by ecological improvement in areas damaged by former use. In recent years, there has been new emphasis on the reuse of brownfield sites for much needed housing land.

To summarise, whilst structural policy aims are still dominant in all programmes, ecological objectives have increased in importance. Special programmes are becoming more focussed and increasingly account for the interactions taking place on the “brownfield redevelopment” issue. In addition, it was essential in some regions, notably the coalfields of South Wales and Asturias, to address the physical hazard presented by the historic imposition of industrial activity namely, land instability caused by mine wastes.

Growing Metropolitan areas

The structurally strong metropolitan areas in the European Union are characterised by a dynamic land market in the wake of the growing service sector. Industrial uses dating back to the 19th century are subject to displacement pressure and have been moved to peripheral areas during the urban sprawl process. Together with existing large-scale railway and harbour infrastructure facilities, the urban areas are subject to re-use pressure that is in some cases reinforced by speculative land banking.

The interest, use and ownership conflicts resulting from such a situation lead to large areas of derelict land in urban areas. Thus brownfields have been identified in most European cities. The strategies to deal with this focus on urban planning with large-scale projects being driven by architectural competitions, master plans and investor planning. Specific brownfield problems, like the presence of contamination, infrastructure requirements and the specific underground conditions for construction purposes, are often inadequately considered. This can lead to considerable difficulties, failure of strategies to deliver effective and sustainable regeneration and on occasion, complete project failure.

Less attractive “brownfields” in peripheral locations with low property market values are often insufficiently used. Intermediate uses have become a serious problem for urban development in the areas concerned.

Rural areas

Rural areas within the EU also contain individual derelict sites, some of which are extensive in area, which may be very significant for the municipality concerned. These are mainly connected with past agriculture, forestry or mining. These activities may have been undergoing a consolidation process resulting in the abandonment of many sites. Recently, many former military sites have been released to the market due to tremendous political change and related political relaxation. The municipalities affected by such processes are often unable to solve the problems presented by abandoned sites and are reluctant to develop revitalisation activities. The necessity to develop strategies and programmes is also often not recognised on regional or na-

tional level. This means that these areas are simply left as they are, unless funds are provided from the European Regional Development Fund.

6.2 Specific national and regional programmes

Although there is increased political awareness of brownfield issues, to date many European countries and regions do not have any specific programmes supporting brownfield redevelopment. Although funding from economic, environmental or urban programmes is generally available, it often has had to be integrated into a land management policy at a local or regional level.

Contaminated land programmes have been set up in many European countries. Most of them have established a public budget in order to finance major clean up measures. (EEA, 1999; CARACAS, 1998). Specific schemes for brownfield rehabilitation exist in France (Nord-Pas de Calais, Lorraine), Germany (Northrhein-Westphalia), the Netherlands and the United Kingdom. Schemes in preparation are registered in Spain and Flanders.

Activities at the programme level have to take account of constraints and requirements such as time scales attached to land acquisition, land valuation difficulties, and legal matters, along with the technical and economic risks for the developer. Based on general policy considerations programmes also need to set priorities for individual projects and objectives.

In **France** brownfields are defined as “...space previously been developed that are temporarily definitively abandoned following the cessation of activity; and, that need to be reclaimed for a future use. They can be partially occupied, derelict, or contaminated”. Long-term policies and programmes exist in the traditional industrial regions piloted by Lorraine. Since the 1980s, and in the context of the national “contract de plan” – funded by the state, region and the EU -specific brownfield reclamation programmes have been developed. It was important to create a new economic foundation and modernise urban and infrastructure layouts, which had been exclusively geared to the former industrial use. Altogether, 3.350 ha of derelict industrial land was treated between 1987 and 1998. Due to the regional dominance of derelict land, a joint intervention of national, regional, and local actors was necessary. At the beginning it was clear that it would not be possible to immediately find new uses, the strategy developed in 1986 concentrated on the rapid improvement of the ecological situation through large-scale landscape treatment. Preparation of the land for new uses, which involves much higher costs, is a medium and long-term task. Therefore, all efforts were focussed on overcoming the negative image caused by derelict land. The programme priorities were based on:

- the first, and simple priority of rapid identification of derelict land;
- the establishment of a regional development agency;
- a clear and comprehensive methodology - „requalification sommaire“;

- adequate and regular funding;
- a partnership of all parties involved;
- support for the preparation and development of derelict land for the implementation of leading projects with regard to the development of the agglomeration.

Ordinary "re-qualification" ("requalification sommaire") is clearly preferred if any after-use project could be defined. The derelict land strategy known as "Remise en état" contains:

- demolition as well as clearing work in the area;
- construction of terraces and planting , enclosing or the planting of screening trees;
- construction of recreational paths;
- where necessary, treatment of contamination using all legal instruments to make the polluter pay.

Subsequently, the properties are to be managed on a regional level and in individual cases left to the free property market. The executive body of this part of the programmes is the regional development agency, the "Establishment Public Foncier de la Métropole Lorraine" EPML, 1996). EPML had been entrusted with the realisation of this strategy. Since 1970 EPML, which has been created by the central state in order to implement land policies with local authorities, has been undertaking planning and developing tasks.

Due to financial support by the state, the regional council, the agency itself and the European Fund for regional development, it was possible to mobilise a total of 800 million FF between 1986 and 1997, in order to implement the new derelict land policy. By 1997, 3.350 ha of derelict land had been treated. Two thirds of the money came from the Lorraine Region, the French State and the EPML. One third came from the EU. All in all, 97 locations in 109 communities were treated. Since treatment, 30 % of the sites have been re-used for economic purposes, 22 % remain available, 17 % used for parks, 27 % designated for nature and 4 % developed for housing. Due to the strong position of EPML, the industrial land owners were persuaded to sell their property at favourable prices. At the same time, partial sales of attractive and unencumbered properties directly by the owner was prevented.

The strategy chosen was exemplary as it succeeded in linking the interests of the private property owners, the community and other actors in the framework for a coordinated regional master strategy. The regional stakeholders are co-operating in a common network with research activities and international services.

In 1998, the Federal Ministry for the Environment in **Germany** published the Draft Environmental Programme with a set of political objectives: The following relate to brownfield redevelopment:

- rehabilitation of industrial sites and elimination of hazards to human beings and the environment;
- reintegration of rehabilitated sites into the economic cycle;

- reduction of land consumption from a current 120 hectares per day (status 1998) to 30 hectares per day by 2020.

Various development agencies have developed regional brownfield initiatives in the Federal states, for example the "Landesentwicklungsgesellschaft Nordrhein-Westfalen" (LEG,1999). By establishing a Property Fund in 1982 the region has made the redevelopment of brownfield sites and disused buildings central to its policy of creating an integrated urban development model. The activities of the Property Fund go beyond the establishment of new attractive business parks. They include:

- the accumulation of wide experience in the economic framework and prudent dealing with contaminated and derelict sites;
- placing quality targets in urban construction before purely economic considerations, whether it is the architectural plans for the commercial building itself, or surrounding landscaping and recreational areas and facilities;
- preserving industrial architecture which had been abandoned and which bears witness to the history of the industrialisation which was so important to this state;
- safeguarding monuments such as the coalmine Zollverein XII in Essen or the Landscape Park in North Duisburg, which are now becoming new tourist and cultural attractions within the Ruhr area.

Until the late 1990's 2.400 hectares in 178 locations have been purchased. Of these, 971 hectares have so far been rehabilitated, developed and placed on the market. 61% of the developed business sites have been sold. This is a significant success given that there are many other sites available on market. Many brownfield redevelopment projects have been part of the International Building Exhibition (IBA) at Emscher Park. The exhibition was completed in 1999. The IBA aimed to provide overall impulses for the ecological, economic and social restructuring by providing new landscape schemes, brownfield reconversion e.g. for technology centres and innovative housing schemes.

Since the German reunification specific brownfield problems emerged in the new German states. High greenfield consumption promoted by tax incentives met the decline of industry and military conversion. The high stock of brownfields e.g. 18.000 ha in Saxony, is widely seen as a major handicap for the urban and economic restructuring. The region of Saxony began in mid 2001 with a new integrated and interdepartmental brownfield redevelopment program funded by the European Union. The project is testing a stepwise approach investigating technical options including cost optimisation for the interim management of brownfields (demolition and conservation of buildings, management of risks and interim landscaping).

In the **Netherlands**, urban brownfield sites are defined as "*...areas in towns and cities where in the past industrial activity has taken place, but which have since fallen into disuse (MINISTRY OF HOUSING, 1998)*". In such areas there is often a combination of a weak social, economic and spatial structure. The position of these inner city sites can be strengthened by restructuring and urban economic development. The Dutch have fewer and more specific issues with brownfield sites in comparison to other coun-

tries, due to the long planning tradition in the Netherlands and the relatively high demand for space in urban areas. The Netherlands uses an integrated approach, meaning that efforts are made to produce a coherent solution drawing from various policy sectors and from different administrative levels. The result is a policy 'patch-work quilt', in which central government, the provinces and the municipalities have very different responsibilities and tasks.

The investment costs needed for urban regeneration can largely be met from the resulting benefits. Government policy tends to leave it to the private sector to tackle urban areas. It will no longer bear the brunt of investment costs. Where the costs are not fully covered by the benefits, the government will provide a safety net, but even then, it will have a supporting rather than a leading role. The government's contribution will generally be directed towards increasing amenity value and the attractiveness of the areas concerned as places to live, work and do business.

There are several governmental grant schemes to cover the shortfall in funding for redevelopment projects often linked to various policy programmes. For example: BELSTATO urban renewal fund (approximately NLG 800 million – 363 million EURO per year available over the period 1990-2005). A number of other specific sources of funding are also available. These generally are linked to a particular characteristic or a component of the project concerned. Schemes such as StiREA and subsidies granted under the major cities policy are intended specifically to promote commercial activity in cities. A multiplicity of specific activities which strengthen the economic structure of cities would qualify for subsidies, such as the construction and revitalisation of industrial estates, shared industrial premises and developing commercial property in deprived areas.

A single project can often obtain funding from a number of different financial schemes that relate to different aspects of the plan. For several years the government's environmental policy has been directed towards "external integration", i.e. encouraging other policy sectors to accept greater responsibility for the environment and the costs associated with the environment, especially where relevant to sectorial development or implementation. Many sectorial policy documents and programmes have already included provisions for the clean-up of contaminated land in their project cost estimates. This is the case, for example, for StiREA, the urban renewal fund.

The Soil Protection Act includes provisions relating to the costs of cleaning up contaminated land. A total of about NLG 500 million (227 million EURO) is available each year. Where a site is severely contaminated and is deemed to be environmentally urgent, the clean up is assumed in principle to be the responsibility of the parties concerned. It is firstly the party who caused the contamination, and otherwise the owner/leaseholder, who is responsible for investigating the problem, drawing up remediation plans and carrying out the necessary measures (and who also bears the costs). If the party who caused the problem or owner/leaseholder refuses to carry out the necessary remedial work, the government can resort to coercion. The government will act as safety net and carry out the work itself only where the clean-up is not performed or where the case is environmentally urgent. In some cases it is a

public body which has caused the contamination or which owns land, and which therefore has to bear the costs of clean up. The provinces are responsible for co-ordinating soil clean up activities under the Soil Protection Act. In their soil clean up programmes the provinces indicate which sites will be tackled from the government budget each year. However, the number of sites requiring clean-up far exceeds the available budget. In practice this means that only urgent projects are tackled quickly under the Soil Protection Act. Priorities for tackling sites based on environmental criteria often do not correspond with the desired planning regime for the development of urban brownfield sites. In order to resolve this problem, municipalities can, with the agreement of the province, start projects in advance of Soil Protection Act funds being made available if they cover the initial financing. This possibility is limited however, because no guarantees can be given in advance about the size of future budgets and grants.

In the **United Kingdom** significant government programmes promote and support brownfield redevelopment. These can be split into four types of programmes:

- Spatial planning;
- Technical support;
- Financial support; and
- Direct development by public bodies and agencies.

The system of “town and country planning” promotes brownfield redevelopment largely by inhibiting or preventing development projects on greenfield sites, and by making brownfield land available for development. This is brought about by a hierarchy of:

national planning policy (set out by national government in Planning Policy Guidance notes);

- regional planning policy (set collectively by local government bodies in the region and the Regional Development Agency), which also includes overall “structure” planning for the region;
- local structure and development plans (set by the county and district councils) which make zoning decisions for the future use of particular areas of land in the area, and
- individual decisions on applications for planning permission (made by local planning authorities) which normally should conform with the relevant development plan.

Of particular relevance is a new requirement, set out in Planning Policy Guidance Note 3 **Housing** (DETR 2000b), for a “sequential test” for new developments. This test means that before allocating any greenfield land for new housing projects, a local planning authority has first to satisfy itself that there are no suitable and available sites in the area which have been previously developed.

Technical support takes both “pro-active” and “re-active” forms. On the “pro-active” side, national government and other private sector led groups fund research and de-

velopment, and the development of “best practice” advice to assist the development and construction industries in working on brownfield sites.

On the “re-active” side, the focus is on removing factors that might inhibit brownfield redevelopment. This work includes:

- research and development on the application of new remediation techniques and technologies;
- confidence-building initiatives with the financial and property sectors;
- setting out a system of liability for contaminated land;
- reviewing the licensing system for land remediation activities, and
- wider policy development on issues such as “land assembly” for larger development projects, and changes to the system of compulsory purchase by public authorities.

Brownfield redevelopment is eligible for direct and indirect public sector financial support where this is necessary to achieve social and economic policy objectives. This support can take a number of different forms, such as:

- grant aid, either for particular elements of the costs of development or as “gap funding”;
- support for loans, including payment of interest and guarantees;
- other guarantees, e.g. income stream guarantees, support for warranty purchase;
- partnership projects with risk and profit sharing, and
- tax incentives, e.g. 150% tax credit for cost of site clean up as part of redevelopment projects and a proposed cut in property sales tax in areas of social and economic disadvantage.

Direct funding is generally provided by national government through arms’ length public sector regeneration agencies – English Partnerships and the network of Regional Development Agencies in England; the Welsh Development Agency; and Scottish Enterprise. In some cases, the funding is provided through local authorities, either directly from national government or via the national or regional regeneration agencies. In addition to these national sources of funding, other projects receive support through Objectives 1 and 2 of the European Regional Development Fund and other structure funds (such as RECHAR and RENAVAL).

Funding regimes available in England to support brownfield redevelopment have recently been the subject of scrutiny by the EU in terms of compliance with state aid regulations and EU competition policy. These regulations place strict limits on the geographical availability of financial support for private sector development, and also on the amount of support for any individual project. Some regimes have been approved by the European Commission, others are being submitted for approval.

The public sector regeneration agencies and local authorities also carry out “direct development” projects of the following kinds:

- fully worked-up developments;

- preparing “development platforms” for subsequent development by the private sector;
- more simple “site clearance” projects and
- providing roads and other infrastructure on or near potential redevelopment sites.

In common with other Member States, the UK has implemented Integrated Pollution Prevention & Control legislation (IPPC) which partly addresses brownfield prevention by placing an obligation on industry to restore land to the condition prior to the regulated use.

Some smaller countries deal on a regional level with brownfield programmes, like Flanders in Belgium and Ireland.

Recent changes in the Organisation of Town and Country Planning of **Flanders**, has resulted in a spatial planning system that covers the whole region of Flanders. Zones reserved for industry, farmland, housing, etc, have been defined. This plan has resulted in restricted areas for industrial purposes and has therefore stimulated the remediation of contaminated sites.

The Department of Environment and Local Government (DELG) makes policy on the environment in **Ireland**, with the EPA offering technical advice on relevant issues. Since 1986 the DELG has developed and implemented an Urban Renewal Scheme that provides measures for a planned, integrated and focused approach to urban renewal. The urban renewal scheme must address the physical, economical, social and environmental regeneration and rejuvenation of urban areas. The scheme gives financial incentives for developers to develop brownfield sites in urban areas. Under the guidelines for the 1998 Urban Renewal Scheme local authorities are responsible for the selection and prioritising of sites and key developments to be included in Integrated Area Plans (IAP's). In selection and prioritisation of sites, local authorities must identify areas where there are substantive barriers to redevelopment. Priority will be given to areas in cities and towns with strong urban characteristics where the greatest concentrations of physical decay, social and economic disadvantage occur. Where a local authority designates an area for inclusion in the scheme, this must be justified on the basis that such financial incentives are required to overcome identifiable, substantive barriers to development. Contamination constitutes a potential barrier to development.

In other countries the decision-making processes are dominated by the site-specific approach handled by responsible authorities. For example in **Norway**, the pollution control authority prioritises the handling of cases where buildings and construction is planned on contaminated sites by providing permits incorporating environmental criteria. These are structured to allow sound solution, but also with sufficient consideration of economic issues.

Some countries, like **Austria** have no central governmental plans for supporting brownfield redevelopment, but single programmes in specific regions are more common. For example, the City of **Vienna** has initiated specific local programmes. Since the development of peripheral urban development zones needs both time and

substantial financial means, the use of existing unused spaces is given priority. These urban areas are often partially equipped with infrastructure. The capitalisation of the land can support many of the companies in their restructuring activities, and their use makes no inroads into existing green spaces. In order to exploit those sites in important areas for town planning, the City of Vienna uses two funds, the Vienna Business Promotion Fund (WWFF) for industrial and commercial spaces and the Vienna Land Provision and Urban Renewal Fund (WBSF) for housing space. The funds are involved in the purchase, division and provision of sites, with tasks not strictly differentiated between the two funds. Their activities also include the distribution of subsidies. Co-operation between urban planners, the funds and the developers run smoothly, although decision-making is not always easy. There are several examples of targeted development of unused commercial, industrial or infrastructural sites in Vienna. They differ widely in size, planning and implementation.

In **Portugal**/Lisbon, the area of the EXPO98 site is the single programme supported by public funding.

In **Greece** specific programmes supported by the Ministry of Environment concern the area of Lavrion in Attica, the "Thriassion Pedion", and the industrial area in the Assopos river valley. Greece is planning to develop policies including special guidelines for reclamation and rehabilitation.

In Italy and Spain brownfield redevelopment is partly relevant under contaminated land programmes. **Italian** public funds are available for a number of listed sites defined as "sites of national interest" and are directed at contaminated sites with special features (e.g. location, extension, heavy contamination, economic and social stresses, urgency of redevelopment) that locally might justify a 'brownfield' label. Some examples of these are Porto Marghera (Venice), the Bagnoli and Crotona sites. This is only the first part of a complete list to be expanded in the future on the basis of regional inventories and national governmental provision. The initial budget for rehabilitation of these sites is 500 million Euro, to be shared amongst fourteen sites. In 1997 five programmes for redevelopment of urban areas (P.R.U.) were started in the municipality of Milan involving a total surface of 160 hectares, previously occupied by brownfields. Up to now only a part of the remediation works is achieved with the construction of 4300 housing units, 4 urban parks, commercial and productive areas currently in progress. Around 700.000 Euro are invested, mainly by private companies.

In **Spain**, the existing National Plan defines a 10-year period in which 132.000 million pesetas (793 million EURO) are provided by the government to the Autonomous Regions in order to address identified problems deriving from contaminated land.

6.3 Conclusion

The review of national approaches for the redevelopment of brownfields in Europe made quite clear that the problem is clearly identified in many countries and action

has been taken. However, such action may not always be based on a national strategy but rather relates to single or regional efforts to cope with the problem. Taking a broad view across Europe, there is a general need for development of effective support systems for programme management for urban brownfield regeneration. It is however unlikely that a single model for the European Union would be sufficient. The general overview also indicates that in urbanised areas, in many cases, the costs for redevelopment will exceed the benefits. Therefore metropolitan regions will need focused programme support, including different models for funding.

7 BROWNFIELD REDEVELOPMENT IN PRACTICE / PROJECT PROCEDURES

Brownfield project practice in Europe demonstrates a range of different approaches in specific urban and economic contexts. Within the work of CLARINET Working Group „Brownfield Redevelopment“ some selected case studies have been subject to further evaluation. They are listed in table 2. By analysing planning methods, technical solutions and funding systems from examples across Europe, common problems and solutions, as well as general research needs can be identified. Data sources consist of project information from CLARINET members, general literature, database and published international projects.

7.1 Future use/Planning procedures

Determination of the after-use on former brownfield sites is one of the key elements for the success of a project. In general considerations of after-use operate at two levels: strategic land-use planning and detailed, site specific, planning decisions.

Land-use planning provides the overview that determines the general viability of proposed after-uses and ensures that zoning of after-use is compatible with the surroundings and conditions of the site. As brownfields are often located in mixed urban areas, many traditional industrial regions and cities have given priority to strategic land use planning issues either at the urban level, or sometimes at the regional level (e.g.: Thames Gateway/ London, IBA Emscher Park/ Germany, Mission du Bassin Minier/ France). The German Ministry of Transport, Building and Housing is evaluating the possibilities for “Strategic land management” in metropolitan areas as a tool for urban or regional area based brownfield redevelopment policies. Site specific decisions should be integrated with the general needs of public investment and private property sector.

Table 2: Project Examples

Country	Projects	Size	Former use	Project profile	References
Austria	Tar and Linoleum Factory, Brunn am Gebirge	21 ha	Linoleum factory	Conversion of the tar factory into a business park and a residential area	CLARINET (2000)
Belgium - Flanders	Former coal mines (6 sites in Limburg province)	1200 ha	Coal mining	The coal mining activities in Flanders were finished between 1986 and 1992. Due to this closure about 20.000 miners lost their jobs. In view of the creation of new economic activities there was a need for rehabilitation and redevelopment of the former coal mines sites. Immediately after the closure, demolition of the installations started. Soil remediation and re-stauration of some buildings was carried out. Six years after the closure of the last site, each coal mine site has got a new designation. Total cost: ca. 125 million €.	Van Dyck & Wille (2000) OVAM & TECHNUM (in preparation)
Denmark	Chemical factory, "Soyakagen, Copenhagen	17 ha	Chemical factory	The former factory was situated at the harbour in Copenhagen. The area is being converted to a housing and business area, with 1100 flats and 2-3000 jobs. The total cost of remediation 10 -12 M. Euro. The area is seriously contaminated with heavy metal e.g. mercury.	
Finland	Disused sawmill site in the old industrial area of Penttilä, Joensuu	37 ha	Sawmill	The urban sawmill and industrial tip in the city of Joensuu in the Eastern part of Finland. Planned to transform into a residential, business, recreation and community area.	CLARINET (2000)
France	Lille Tertaire, Lille Steel works, Pompey, Lorraine	3.8 ha 89 ha	Textile factory Steelworks	Multi - storey textile building with good architectural quality was transformed into offices and restaurants by a private developer. Development of a new business centre and interim land management for future development	CLARINET (2000) EPML (1996)

Table 2: Project Examples (continued)

Country	Projects	Size	Former use	Project profile	References
Germany	Research and innovation centre – Gelsenkirchen	7 ha	Steelworks	The old Thyssen steel factory was transformed into a science and business park.	Lutze, A. (1990).
	Völklinger Hütte, Saar	120 ha	Mining and steelworks	The Völklinger Hütte is a historic inner-urban steel area in the Saarland. In 1994, the Völklinger Hütte was registered on the UNESCO world heritage list. Today it is a centre for art, industry and culture. It also houses an industrial museum	Clausen, W. (1991)
	Hüls AG, Bottrop	41 ha	Chemical and coking industry	Has been converted to a mixed use area including residential area, business area and parks. The project has been supported by the European Regional Development Fund (ERDF). Project was started in 1996 and is expected to be completed in 2001.	HochTief Umwelt GmbH, 2001
Greece	Former mining area, Lavrion		Mining	Lavrion is a historic mining area. Contaminated soils are an issue here due to uncontrolled urban development. Redevelopment strategies include new clean industries in connection with an Industrial and Technological Research centre, development of port facilities, and local tourism based on the remnants of industrial archaeology.	CLARINET (2000)
Italy	Municipal Gas Production / Bovisa gasworks, Milan	42 ha	Gasworks	This project started in February 1997. The objective of the redevelopment is the requalification of an abandoned industrial area to new public functions.	CLARINET (2000), A. Milani, Milan Municipality:
Netherlands	Wolfsdonken's Hertogenbosch	20 ha	Mixed industrial area	De Wolfsdoken is an derelict industrial area in the West of the centre of Hertogenbosch. The estate is very mixed in character, containing small and large, modern and outdated businesses.	CLARINET (2000)
	Céramique Maastricht	23 ha	Ceramic industry	The Ceramique site is situated at the edge of downtown Maastricht between the historic quarter of Wyck and the Randwyck commercial centre	CLARINET (2000)

Table 2: Project Examples (continued)

Country	Projects	Size	Former use	Project profile	References
Norway	Mo I Rana		Coal Mining	Mo I Rana is a former coal mining refinery site, located in the North of Norway. Following its closure in 1987 it was sold to the municipality by the Ministry of Trade and Commerce. The objective of this project is the remediation of the contaminated site together with its redevelopment, to achieve positive economic uses to reinforce the local community.	OECD (1998)
Portugal	Area of Seixal Chemical industry, area of Estarreja		Metal and steel industry Mixed industries	One of the important brownfield sites in Portugal - Lagoa da Palmeira. Formerly used for smelting, steel and chemical industries, there is mixed land contamination. Estarreja is located between Porto and Aveiro in the coastal fringe. This area is an industrial area with problems of contamination of soils and waters. The main uses are related to the chemical industry.	CLARINET (2000) CLARINET (2000)
Spain	Steel works in Langreo, Asturias	30 ha	Steelwork	Transformation of the former steel works into a new industrial estate and qualification centre.	CLARINET (2000)
Sweden	Norrköping		Textile	Norrköping is a former textile manufacturing city. Conversion of the industrial landscape into a dynamic urban centre is promoted by the City of Norrköping, with support from the European Union. Future uses include: Campus Norrköping university; information technology and knowledge oriented companies; cultural and residential facilities.	OECD (1998)
United Kingdom	Brynbach Park, South Wales	600 ha park 15 ha lake	Mining	A former coal mining area which was subject to extensive opencast coal extraction and tipping. The site has been reclaimed for recreational use, including the provision of a 15 ha lake. The project provided a critical element for the regeneration of the surrounding area.	Richards (1993)

The wide range of different after-uses in the selected case studies detailed in Table 2 reflects quite specific considerations for the needs of urban and economic systems. In general, the focus on industrial after-uses of the 1980s has changed towards the mixed and flexible after-use concepts of today. For example:

- After 90 years of industrial usage the 21 hectare Tar –and –Linoleum –Factory site in Brunn am Gebirge, Austria was transformed into a modern business park;
- The 42 hectare Municipal Gas Production-site in Milan (Bovisa Gasworks), Lombardy Region of Italy, was redeveloped into a university campus, a recreational area, parks and a residential area;
- The 37 hectare inner urban, old sawmill site of Penttilä, Finland, is planned for conversion into a residential area, a business and recreation area and a community area;
- The 23 hectare centre of ceramics industry since 1850, Maastricht, Netherlands. This is situated between the historic quarter and the new commercial centre. The site has been transformed into office buildings;
- De Wolfsdonken, Netherlands is an obsolete industrial estate that lies to the west of the centre of Hertogenbosch. The estate occupies an area of some 20 hectares, and is very mixed in character, containing older and modern businesses, both small and large. An academy of art is also located on the site. Overall, the area has been neglected. The low intensity of site usage is reinforced by the presence of burnt-out buildings belonging to one of the companies. The site is also subject to contaminated soil and groundwater, noise nuisance and odours;
- With the decline of the former industry during the 1970s in the old textile manufacturing city of Norrköping, Sweden, a planning objective was determined to convert the industrial landscape into a dynamic urban centre. Today a university campus with 6000 - 7000 students, information technology and knowledge oriented companies have located on the site. Existing buildings have been extensively re-used. for cultural and residential uses;
- A former coal refinery site, located in Mo I Rana, a small town in the north of Norway was sold to the municipality by the Ministry of Trade and Commerce following its closure in 1987. Mo I Rana's economy relied on heavy industry until the 1980's when both the coke and steel plant closed. At that time it was accepted that the site was severely contaminated and so it was agreed that the department would cover clean-up costs. Local authorities, national government and the private sector partnered the initiative which comprised the remediation of the contaminated site together with its redevelopment to achieve positive economic uses for the local community. Consequently several new industrial plants have located on the site providing large numbers of jobs;

However, some mixed-use projects have failed because of insufficient planning control systems:

- In the traditional mining region of Lavrion, south-east of Athens, Greece (where silver and other metals have been processed since the 7th century BC, followed

more recently by the chemical industry, power production and other industries) the economic crisis in the 1990s lead to rapid de-industrialisation. Several strategies have been devised for the revitalisation. These include a new clean industries and technological research centre; development of port facilities to serve the Cyclades Islands; and local tourism with industrial archaeology. Unfortunately this has resulted in an uncontrolled urban development with mixed land uses e.g. residential, recreational and agricultural activities where contamination risks have been insufficiently considered;

From this experience, and recognising the complexity of brownfield projects, it is clear that site-specific planning and assessment are integral to the proposed after-uses of the site and vice-versa. Planning and site assessment are interactive processes to ensure that constraints and aspirations are effectively addressed and proposals are thus appropriate for the site. Compared to “greenfield projects” the planning activity requires a wide information basis to define the location, size and distribution of all retained features including historical buildings and infrastructures. Often infrastructural links with surrounding land are not appropriate to the new use and need to be improved. Specific planning aspects like landform, drainage and vegetation have to be integrated at an early stage of the planning phase. One current method of working in an integrated manner is the development of a masterplan prior to starting with formal planning procedures. (e.g.: Ceramics, Maastricht).

In this process stakeholder participation and community involvement represents a major element in urban brownfield regeneration projects. For example, in the UK voluntary organisations such as “Groundwork UK” play a major role in reclamation projects for conservation and preservation of green spaces in an urban context. The local community has deep influences on the brownfield redevelopment process, particularly in the development of a masterplan process, zoning decisions and the choice of levels of cleanup and acceptable risk.

Increasing importance has been given towards preserving the industrial heritage as an element of brownfield redevelopment projects. For the first time in 1994 the UNESCO listed a former steelwork-site “Völklinger Hütte“, Saar-region, Germany as a UNESCO world heritage site. Many new projects try to incorporate their industrial heritage in their conceptual outline for future uses, e.g.:

- technology and “start-up-centres“ using former industrial buildings for specific image and advertising purposes (e.g. Technology Center Oberhausen; Industriepark Langreo / Asturia);
- former warehouses in city centres that are transformed into loft apartments. (e.g. Lille, France) ;
- leisure centres and garden festivals on former brownfields are integrating industrial buildings and technical installations (e.g. South Wales; Steelwork Meiderich / Duisburg, Germany);
- as a locality for industry-museums (e.g. Barcelona, Spain).

This transformation of industrial heritage buildings requires specific architectural, engineering and legal knowledge and new qualification profiles for the building industries are appearing. Nevertheless conservation and refurbishment of industrial buildings to reuse is often costly compared to demolition and reconstruction. The legal protection of heritage law and related funding covers only a small amount of buildings of specific architectural or historical interest. These schemes are often too restrictive in providing support for a more flexible change of use of former industrial buildings.

7.2 Site preparation / technical procedures

Brownfield redevelopment requires expertise from a number of different technical disciplines, which need to be effectively integrated to achieve a valid assessment of feasibility. Decisions have to be made on such issues as;

- how to manage or treat any contamination problems;
- whether to dismantle or reuse existing buildings and infrastructures;
- the influence of any naturally developing ecology.
- Development of techniques, and procedures to address all aspects has been progressing for a number of years, particularly within the traditional industrial regions of Europe.

The need for an integrative planning and technical approach is demonstrated by the case example of **Lavrion**, 60 km south-east of Athens, an area with 10.000 inhabitants. It is a historic mining area with activities dating back to the 7th century BC. Modern-day mining and metallurgy, focused on lead recovery, started again in 1864 and was the main activity up to the 1950s, when several other industries were established in the area (textile, chemicals, power production etc). The crisis in traditional industries in the early 1990s resulted in rapid de-industrialisation. Lavrion has had to face dramatic environmental problems. Mining and metallurgical activities for more than 2.700 years have resulted in the generation of millions of tons of toxic and hazardous waste, deposited all around the city. Moreover, uncontrolled urban development has expanded on the top of these wastes, with mixed land uses, i.e. residential, recreational and agricultural activities. Natural processes and systematic use of wastes in several construction works have resulted in the widespread contamination of soils. Further development of this area could only be achieved by an integrated environmental, economic and spatial planning approach supported by all the relevant actors.

Several European countries are providing specific guidelines to parts of this process - mainly on contamination **assessment** (CARACAS, 1998). Brownfield investigations and risk assessment incorporates a wide range of technical and ecological aspects.

The site assessment process is based on an integrated approach in order to identify:

- risks to people or to the environment from the site in its present state;

- constraints on the future use of a site, such as poor ground conditions or areas of contamination;
- the opportunities presented by a site, such as ecological or wildlife value or the presence of structures of historical importance;
- buildings and structures which could be put to beneficial use and,
- materials which could be put to beneficial use.

In consequence site assessment and future site use are closely related, and a particular proposed site use will require the investigation of aspects of the site that are specific to the after-use concerned.

The complexity of brownfield sites requires a step by step approach to site assessment according to the specific national regulations (EEA, 1999). A common approach to the initial stages of a phased site assessment will include :

- a walkover survey;
- a desk study, with preliminary investigations;
- detailed investigations and surveys; and,
- analysis of the information collected.

A critical appraisal of the information gathered by the desk study and preliminary investigations enables identification of likely constraints on, and opportunities for the reclamation and reuse of the site. This analysis is used to enable the development of the reclamation proposals to proceed in an informed way, and to include the preparation of broad budget costing. In the European industrial regions the preparation of a reclamation scheme will generally involve a team of people from different disciplines.

In the 1990s rapid advances in the development of techniques for the **decontamination** of chemically polluted soils and associated groundwater have been developed. Environmental disasters, pressure group activities, and national governmental and European policies and legislation, have focused attention on the need for safe options for dealing with potentially toxic wastes and contaminated materials (EEA, 1999). At many contaminated sites a combination of remedial techniques is often the most appropriate way to deal with contaminated material.

The remediation was part of the redevelopment process of a 42 hectares area which is now used as a university campus, a recreational area / parks and a residential area. About 80.000 m³ of soil contaminated by PAH, Cyanide, Lead, Arsenic and Benzene was remediated. In accordance with the Lombardy Region legislation of 1996, a specific risk analysis on the area was performed. Remedial investigation was carried out from 1995 to 1999, with soil, gas and geophysical surveys, drilling, collection and analysis of soil samples and remedial planning. Remediation took place in 2 phases:

- first phase - on site soil washing - 1 year;
- second phase -soil venting in VOC (benzene) localised contaminated area- 3 years.

Groundwater protection was monitored by the installation of 40 sampling bore holes, with monthly measurements of water table level, collection and chemical analysis of groundwater. Groundwater is still slightly contaminated by PAH and ammonia, but sources have been localised.

Nevertheless, contaminated soil presents a major challenge to brownfield developers, and the risks associated with the presence of potentially toxic chemicals in soil and water need to be managed or reduced. For example European legislation on the protection of the water resources is expected to drive clean up of many sites. Each European country has its own approach to the classification and treatment of contaminated sites, and to waste management and disposal practices. Current trends suggest a common approach, where landowners, local authorities, central and regional governments have increasing commitments towards the avoidance and clean-up of contaminated land.

Existing buildings can be a major element of risk in terms of safety and environmental issues, but they also provide potential for brownfield regeneration. Though demolition work is required in many cases, existing buildings can be adapted for new uses when appropriate. Dealing with redundant buildings in the past was often based on low cost demolition strategies where the demolition work was carried out for the scrap value of the materials and machinery, e.g. in the New Länder of Germany in the beginning of the 1990s. These demolition methods have subsequently given rise to problems where unforeseen ground conditions were encountered during site redevelopment, due to buried foundation structures (RICHARDS, 1992). Today in the most western European countries, the rehabilitation of brownfields involves the controlled identification and segregation of materials used in the original construction. An integrated and disciplined approach is adopted and the demolition and site clearance works is carried out as part of a reclamation scheme specifically designed to suit the proposed end-use of the site.

Other specific technical procedures that assist brownfield reclamation are:

- **Pre-closure assessment:** In general the presence of contaminating substance derives from activities and processes which were or may still be carried out on a site. Much information on the location of contamination will be gained from a pre-closure site audit;
- **Remodelling of landforms:** Assessment of achievable landforms requires information on instability, presence of hazardous materials and location of any residual substructures. Other factors include the re-use potential of materials, visual considerations and land use needs or opportunities;
- **The establishment and care of vegetation:** The most successful revegetation scheme matches the establishment of vegetation to the needs of the intended land use. A temporary vegetation cover has been established on some reclaimed sites to enhance their appearance to potential developers and to control erosion prior to development being progressed.

7.3 Economic viability

Information available on the cost and benefits of brownfield redevelopment projects has proved to be very limited. Public and private project developers often cannot or do not provide transparent information about property prices, treatment cost and benefits. Nevertheless in general three different economic types of redevelopment could be identified (BÖRNER et al. 2000).

A: "Self-developing"

These are sites of local and regional importance with high property value and low reclamation costs that have their own dynamic development potential. In most cases the redevelopment implies an increase of the value of the site and there is no need for specific public sector intervention. Hence, the normal planning and administration system can handle such redevelopment sites (MGP, Milan; Lille, Moulins; Ceramics Maastricht).

B: "Passive-developing"

Sites of local and regional importance with a specific development potential but with accompanying risks of development, which therefore require dedicated advice and assistance with planning and funding. In order to achieve this, however, special policy concepts in the shape of public-private partnerships are often developed, since they can be very effective. Risk sharing and co-ordinated planning and financing of projects by public-private co-operation should be seen as an ingenious approach toward this objective (Swawmill/Penttilä).

C: "Non-developing sites"

These are sites without development potential at least during the foreseeable future. These are the most problematic sites in our monostructural industrial regions. A high density of brownfield sites in a certain area and low site values coupled with high site preparation costs do not allow self-sustaining redevelopment. As a result, these sites will not be reclaimed without additional mechanisms to make them viable (Lavrion/Greece; Popey, Lorraine). Some sites require reclamation for ecological, environmental or safety reasons e.g. hillside spoil tips in the South Wales coalfield. Recultivation, interim management and interim greening as "reserve sites" for potential future development is one cost effective strategy in dealing with this large category of brownfields.

Brownfield redevelopment is composed of multiple **cost elements**. The selected case studies tend not to include general cost overviews. Budgets and funding are often restricted to individual parts of the project like decontamination, demolition or equipment and not the whole process. Funding gaps and project failures are the consequence. A general financial package agreed in the initial stages of project development, which includes an agreed allowance for variations in cost because of uncertainties at the outset (a "contingency sum"), would be more able to provide a long-term basis for planning the project and ensure that each phase of development will not be delayed by shortfalls in resources.

Complex planning-related issues, technical problems, conflicting ownership interests and, in many cases, long project implementation periods, coupled with long term aftercare costs can constitute a risk for the viability of many brownfield projects. These risks often translate into uncertainty over the costs of the project. A significant aspect of risk arises from the adequacy of data, and its interpretation, in respect of ground conditions and the extent of contaminated areas.

In terms of **viability**, the most significant shortcoming seems to be a lack of interdisciplinary collaboration (e.g. Flanders /Finland). Many of the projects analysed are carried out without a complete calculation of the overall profitability and without integrated project control. The consequences are non-viable projects, or a too heavy reliance on public money from Government or EU funding.

Valuation methods (determining the value of land) are mostly subject to national regulations and / or professional judgement. In general, they do not necessarily consider any problems specifically related to derelict land, for example the existence of non-reusable buildings or soil contamination. The consequence of this is that owner perception of value, fed by expert opinion, often determines a very high land value that can be unrealistic in the light of rehabilitation costs. Redevelopment therefore often proves to be unprofitable. Specific methods have been developed for valuation of areas from the iron, steel and coal industries in Lorraine, France. Guidelines on valuation of land which aim to make clear whether contamination has been allowed for, have been produced in the UK.

7.4 Legal Frameworks

In Europe over the last 10 years, considerable efforts have been undertaken to solve environmental problems arising from contaminated sites. Legal frameworks have been developed, along with high scientific and technological standards. However, the task of revitalising brownfield sites, including developing effective concepts to bring the land back into economic use still lies ahead.

In practice it is the existing Planning, Water and Environmental Acts that provide the legal framework for the management of urban brownfields. In many countries, most of them focus on environmental aspects of contaminated land management and not on brownfield redevelopment and there is little emphasis on the need for an integration between the environmental, economic, financial and social measures. Brownfield redevelopment however, requires an integrated approach between planning, reuse and clean up legislation. Against this background, many countries underlined the need for more specific regulations for brownfield redevelopment.

The legal framework of the countries evaluated within CLARINET Working Group „Brownfield Redevelopment“ is listed in table 3.

Table 3: Legal framework

Country	Legal Framework concerning brownfield redevelopment
Austria	<ul style="list-style-type: none"> • Building Permits, Industrial Code • Water Act; Land development and zoning plans
Belgium/Flanders	<ul style="list-style-type: none"> • Decree on unoccupied business accommodation • Decree on Soil Remediation
Belgium/Walloon	<ul style="list-style-type: none"> • Regional Planning Act and Building Code
Denmark	<ul style="list-style-type: none"> • Act on Contaminated Soil
Finland	<ul style="list-style-type: none"> • Environmental Damage Act, 1995 • Planning and Construction Act 2000 • Environmental Protection Act 2000
France	<ul style="list-style-type: none"> • Law on environmental permits for industrial sites 1997 • Mining Code for former mines • Civil Code • Urban Planning Code for the redevelopment of brownfield sites in an urban context
Germany	<ul style="list-style-type: none"> • Federal Soil Protection Act 1999 • Regional Planning Acts • Building Code
Greece	<ul style="list-style-type: none"> • Environmental Protection Law
Ireland	<ul style="list-style-type: none"> • Planning and Development Acts 1963 to 2000 • Waste Management Act 1996 • Water Pollution Acts 1977 and 1990 • Building Control Act 1990 • Derelict sites Act 1990
Italy	<ul style="list-style-type: none"> • General law for remediation of contaminated sites, Waste Act 1997 • National contaminated sites remediation plan, Law 426/1998 • Technical regulation for remediation of contaminated sites, Env. Min. Decree 471/1999 • Urban redevelopment programs , Law 493/1993, Min. Decree 1/12/1994, Min. Decree 21/12/1994

Table 3: Legal framework (continued)

Country	Legal Framework concerning brownfield redevelopment
Netherlands	<ul style="list-style-type: none"> • Urban and Rural Regeneration Act 1985, The Soil Protection Act 1987 extended with a soil clean up paragraph in 1994 • Housing law • Spatial Planning Act • Environmental Protection Act
Norway	<ul style="list-style-type: none"> • Pollution Control Act, Plan and Building Act
Portugal	<ul style="list-style-type: none"> • Soil Act, • No special legal regulations concerning brownfield redevelopment
Spain	<ul style="list-style-type: none"> • Law of waste "Ley de Residuos" and "Ley 10/1998, de 21 de abril, de residuos" • Specific laws for the regions Galacia and Catalunya • Special regulations to soil quality issued in an Order by Andalusian regions
Sweden	<ul style="list-style-type: none"> • No special legal regulations concerning brownfield redevelopment
United Kingdom	<ul style="list-style-type: none"> • Town and Country Planning Act 1990 with additional building regulations • Environmental Protection Act 1990; Water Resources Act 1991; Environment Act 1995

8 DEFICITS AND RESEARCH NEEDS

The general context of brownfield redevelopment in the EU is set out in the previous chapters. This context is complex in terms of triggering environmental, economic, social, spatial planning and legal effects. As a result, the scope of recommendations ranges from recommendations for politicians and regulators to recommendations for research and development tasks. In addition, in view of the complex context in an area of policy development, continuous evaluation and assessment of the necessary administrative structures to provide the framework for action on brownfield sites is highly recommended.

Research and development needs in the field of brownfield redevelopment must be particularly designed to support the decision making process of the stakeholders involved in the process, including municipalities. R&D on brownfields requires much more integration of disciplines working towards the same objective.

CLARINET Working Group „Brownfield Redevelopment“ identified the main deficits and research needs on the basis of the strengths and weaknesses of national approaches and project examples. The aim of the CLARINET brownfield Working Group was to analyse the subject in as much depth as possible, but inevitably this analysis can not be more than a snapshot of the situation in the member states. For the derivation of the recommendations it was important to find consensus about a common interest across the EU avoiding the domination of potentially only national interests. Evaluation considers policy and programmes, future use and planning procedures, site preparation and technical procedures and economic viability.

Furthermore, as part of the discussion process, the Working Group „Brownfield Redevelopment“ identified some more issues that cannot simply be assigned to one of the above areas, some of which were not specifically derived from the project examples examined. They are summarised separately as other relevant and potential topics of interest for the European Commission, to be tackled under their research programmes.

8.1 Policy and programmes

A specific overall deficit in achieving brownfield regeneration is the lack of co-ordination across existing programmes. European, national and regional policies and programmes are lacking both co-ordination between each other and, within each programme, full integration of the economic, environmental and social implications of brownfield redevelopment. This deficit underlines the need for more integrated approaches and more co-ordination as a general task for future action on brownfield redevelopment. Most stakeholders also support a need for more comprehensive understanding. The need for this on the urban and regional level was advocated in discussions about structural fund reform and the formulation of an EU urban development policy (EXPERT GROUP, 2000).

European Community research is one option to provide a scientific basis for testing the success of such integrated project approaches in brownfield regeneration. Key areas for policy investigations are:

- National framework analysis
- Brownfield prevention policies
- Derelict land listings, and
- Strategic land management

National framework analysis

As described in chapter 7, the conditions for brownfield redevelopment show significant disparities between national backgrounds. This applies equally to the stakeholders involved, the planning and legal conditions and the project funding systems and priorities. With regard to ongoing economic integration in Europe, the aim should be to achieve more coherence of brownfield redevelopment strategies. National programme analyses in chapter 6 and project requirements in terms of being flexible and integrative – see chapter 7 - show the need for more regional rather than national approaches.

European Community research could assist policy and programme development by comparative analyses and measures to develop and exchange innovative policy approaches.

The main topics in terms of potential R&D projects to be investigated as part of national framework analyses are:

- Criteria for policy approaches to reduce the number of brownfields in Europe,
- Tools and methodologies to supervise this process, and
- Indicators and monitoring tools for the allocation of effective funding.

Ongoing discussions about regular measurement of sustainability using indicators point out the appropriateness of the development of benchmark indicators for brownfield redevelopment. Regular measurement of such indicators assist policy making on the national and regional level. Indicators to be investigated for their appropriateness, particularly in terms of the availability of background data, are:

- ha/ annum for development for each country or region, normalised by population density;
- costs/ ha for different categories of brownfield remediation including indicators for brownfield land restored for environmental benefit;
- use of brownfield for development: ha/ annum / million population.

Further research efforts should also be put on the use of public funding, taking into account the specific requirements of private land-owners. Issues that merit further research include:

- Development of tools for the handling of betterment on project costs and profits;

- Development of criteria for the establishment and the role of intermediary organisations during revitalisation;
- Development of criteria and priorities for project funding.

A specific new area to be investigated is the transfer of European funding instruments to the Central European accession candidates. Preliminary studies should predict the quantitative and qualitative dimension of the wider issues and thus provide criteria for the intervention of structural funds.

Brownfield prevention policies

The avoidance of the creation of new brownfield sites is a key political issue connected with land management. Manufacturing and production cycles are becoming increasingly rapid with an escalating need for flexibility. This requires the development of strategies and “early warning systems” to avoid future derelict land. The Working Group „Brownfield Redevelopment“ concluded that a combination of incentives and penalties would stimulate effective land recycling and reduce new brownfield creation. The Integrated Pollution Prevention & Control legislation (IPPC Directive) partly addresses brownfield prevention by placing an obligation on industry to restore land to the condition prior to the regulated use (see chapter 6.2).

Key questions for related research projects are:

- Is it possible to avoid future brownfields by reforming the legal / planning system?
- Should legal instruments be combined with fiscal instruments?
- Should these instruments be subject of a European, national or regional initiative?

Research addressing these questions can be combined or incorporated in the analysis of national frameworks. The essential issues for investigation are:

- existing and new legal instruments such as an obligation to reclaim areas (for the landowner or manufacturer) after factory closure (along the lines of mining law regulations or the Walloon planning law);
- the obligation to release land after activity closure in the condition it was before;
- fiscal means such as a specific levy on unused land;
- planning and architectural measures such as flexible design for new commercial buildings.

Derelict land listings

Inventories of derelict land can be used as a tool to support both planning activities and marketing of the site. The lack of integrated data sets about brownfields is one significant obstacle for redevelopment. Environmental regulators as a rule collect data about the environmental situation. Land planning authorities generally do not fully consider the environmental condition.

As shown in the national overviews, derelict land and unused urban areas are, if registered, presently managed at different administrative levels, including environmental authorities, economic development authorities, and planning offices. Due to their individual sectorial perspectives, none of these regimes can provide a wholly effective planning and decision-making basis for brownfield redevelopment. Based on the registers that are available, the development of regional brownfield registers is proposed in order to record constraints and development potential in a systematic way.

Future work in this area could focus on the shape and content of inventory sheets, electronic masks, criteria for the recording of brownfields and methods of collecting and maintaining data for practical application by local authorities and project developers.

Key issues for possible projects are:

- What data are needed for which purpose?
- Data availability and scope of action for their collection?
- Technical issues for the registration (computing)
- Responsible authority for registration?
- Cooperation between authorities
- Maintenance of the databases?

Strategic land management

The need for strategic land management in urban and regional planning has been highlighted recently by the expert group on the Urban Environment, for DG Environment of the European Commission. As a conclusion from programme and project analyses in chapters 6 and 7 it can be stated that best results were achieved in traditional industrial regions. One main reason for the success of projects in such regions, for example Lorraine/France and Northrhine-Westphalia/Germany, was their integration in an overall and strategic land management policy, including

- Ownership issues;
- Concepts for the marketing of former industrial urban areas;
- Control of land use (urban development planning etc.);
- Land use regulations (purchase, appropriation, the right of first refusal for municipalities);
- Interactions with the property market.

Justification of future action in this field is based on recognition that current urban and regional planning structures in European countries have been developed and established in periods of general prosperity together with some focus on the development of new land (greenfields). Dealing with urban brownfields, however, requires integration and flexibility in planning and land management. For the consid-

eration of brownfield issues in strategic land management decisions it is essential to define the scope and dimension of strategic issues for the regions involved.

Key areas to be researched are:

- Definition of strategic land management in a regional context,
- Development of indicators to identify the need for strategic land management,
- Development of criteria for the integration of brownfield policies and programmes in an overall regional land management,
- Evaluation of existing models,
- Identification of the rules for interactions between the property markets and public management systems (Success consists of inter-linked activities on all administrative levels, resulting in a more dynamic character for the property market, particularly in metropolitan areas),
- Criteria for the establishment of regionalised management structures,
- Investigation of potential impacts of property fund models in structurally weak areas with inactive private property markets.

8.2 Future use and planning procedures

The core element of successful regeneration of brownfield sites is the identification of the appropriate after use. This is, as already mentioned, a component both of strategic planning and detailed planning for an individual site. Key issues identified by the Working Group „Brownfield Redevelopment“ are:

- Practices for the early identification of the characteristics of the site and the way in which these can be best integrated into spatial planning decisions,
- Ways of improving community participation in brownfield redevelopment, particularly for example in relation to risk communication,
- Development of methods and skills to respond to the increasing importance of preserving the industrial heritage in brownfield projects.

More specifically the Working Group „Brownfield Redevelopment“ studied effects and benefits of brownfield redevelopment for urban planning issues on the basis of planning systems and project examples in the member countries (see chapters 6 and 7).

Clearly, in most European urban areas brownfields are a relatively new problem for urban planning. Most planning systems and regulations focus from their derivation and philosophy on the management of greenfield development under the precondition of economic growth. As already mentioned, brownfield redevelopment in urban areas needs active interventions and initiatives with a high degree of flexibility in the process. Key questions to be addressed in the near future are:

- Are existing urban planning procedures adaptable to inner city redevelopment policies?

- Integration of demands and proposals for brownfield redevelopment in urban planning procedures , e.g. flexibility and mixed uses?
- How could the involvement of all relevant stakeholders be organised?
- Is it possible by urban planning to raise private funding on brownfields?

In consequence CLARINET Working Group „Brownfield Redevelopment“ concluded on the need for more proactive co-ordination between remediation, planning and redevelopment strategies. A modernised urban planning framework should link all these aspects. Recommendations for further research initiatives include:

- Development of practical tools to supervise and control dereliction in urban development processes;
- Investigation and documentation of current practice in brownfield land reuse, in the context of regulatory and planning procedures, in order to learn from each other and to develop more dynamic and flexible project development, approaches and procedures;
- Investigation and structuring of the profiles and interests of relevant stakeholder groups in order to generate a common purpose for interaction on brownfield developments,
- Investigation of mechanism to influence the property market and public funding to attract financial resources to brownfields reuse;
- Investigation into the phenomena of temporary use and under-use of brownfield sites in order to define life cycles of buildings.

8.3 Site preparation and technical procedures

The technical solutions to the problems of land contamination have been developing rapidly over the last 10 or more years. From the perspective of brownfield application, there is now a clear opportunity to provide greater access to information on these solutions to achieve more impact in this wider area. Technical approaches in some specific areas can be critical to successful management of land contamination during brownfield redevelopment. In particular the need to ensure protection of the environment and to minimise the use of resources can be identified during the initial site preparation phase.

Improved co-ordination of sectorial research and increased transparency of the results achieved are a general recommendation of the Working Group „Brownfield Redevelopment“. The Working Group „Brownfield Redevelopment“ further recommends the stimulation of guidance, new techniques and further assessment of policy and practice in the following areas:

- The management of redundant buildings and infrastructures
- Demolition and recycling
- Contamination management

Redundant buildings and infrastructures

A common feature of brownfield sites is the presence of redundant buildings. These structures represent many types of buildings and former industrial facilities. The traditional approach of project promoters has demanded that the conditions on brownfield sites are close to that expected on a greenfield site, in order to provide total flexibility. This approach can be extremely wasteful of resources but has clear benefits, particularly where the infrastructure has been in place for many years and cannot comply with present day standards. In many brownfield reclamation concepts complete highway layouts, utility service networks and drainage systems are destroyed and replaced by new infrastructure. In the worst case, this may include the disposal of the materials arising from infrastructure removal and the use of primary raw materials to construct replacements.

Further research is recommended to:

- Develop rational criteria for decision making on the fate of these residual structures. Identification and appraisal of all relevant factors influencing the primary decision of whether to retain or demolish the structure;
- Investigate norms and standards at the European level such as building and fire regulations. (These are often based on the construction of new buildings, not considering the existing constraints posed by brownfield conversions);
- Investigate criteria to balance between conservation of buildings under safety aspects;
- Examine safety aspects in relation to contaminated materials in existing buildings e.g. asbestos;
- Development of criteria as to whether redundant site infrastructures should be adopted, modified or removed.

Key questions for potential research projects particularly related to the legal framework are:

- Do current regulations present significant obstacles for the reuse of buildings and infrastructures on brownfields?
- Which are the main requirements of current regulations that hamper reuse?
- Are there legal and technical options to overcome such obstacles?
- Where are the main risks in case of not complying with current regulations?

Demolition and Recycling

Brownfield redevelopment offers the opportunity to adopt sustainable methods of resource management. Demolition requires the controlled identification and segregation of materials used in the original construction. Recently, the UK has developed characterisation methods which assist in the selection of recycling processes and which enable optimal reuse applications for recycled materials - either individually, in combination, or after treatment. The results of these projects demonstrate that recycled materials can be successfully reused in brownfield redevelopment projects.

Such materials include the use of ash and crushed material as road base for new infrastructure. As outlined in chapter 7.2 there are already some practical experiences on the demolition of existing buildings on brownfield sites.

Nevertheless, the Working Group „Brownfield Redevelopment“ identified a lack of guidance and criteria for the selection and assessment of available techniques. Of particular concern were uncertainties related to suitable reuse options for demolition material and economic concerns regarding the benefits related to the use of raw material. The Working Group „Brownfield Redevelopment“ concluded that research, including market studies, and identification and dissemination of good practice in the following fields can provide guidance and substantially assist in stimulating the development of new technologies:

- harmonised approaches for the use of recycled materials in public or private construction projects;
- methods to avoid the spread of contamination during the demolition process;
- financial and regulatory measures adopted by EU member states for recycling and the use of primary raw materials in brownfield redevelopment.
- approaches for the creation and maintenance of demand for recycled materials including technical measures to optimise the economic value of recycled materials;
- innovation in recycling processes and related technical concepts;
- handling of recycling materials on small sites;
- demolition techniques – in particular the sorting and grading of materials.

Contamination management

In most cases, contamination management is an integral part of brownfield projects. It interlinks with liability issues of potential investors and sets the general framework for a spectrum of reuse options at the brownfield site. Appropriate contamination management in a cost effective manner, therefore, is an essential element that also determines the marketing potential of a site. The risk based land management approach that has been developed by the CLARINET project provides valuable assistance to combine the demands for reuse with those for risk management.

One particular factor is that in many cases the redevelopment of brownfield sites is not straightforward because of high cost estimates for expected remediation requirements. As outlined in chapter 7 it frequently happens that projects are in “waiting” positions due to high costs or uncertainties in costs. The realisation of many projects is, as already mentioned, dependent on the availability of funding. Reliable models for cost estimation for remediation would provide fundamental assistance for better management of the redevelopment scheme, reducing unexpected cost variations which will help to keep the project in progress.

The Working Group „Brownfield Redevelopment“ also concluded that integrated practical guidance and improved technical standards on contaminated soil management would help to transfer tools and experience to the brownfield sector. Additionally, the following activities would provide valuable background knowledge:

- technical and economic reviews of decontamination and site rehabilitation technologies;
- databases on case histories of risk assessment and remediation strategies;
- database on re-use schemes of decontaminated soil and raw materials.
- Regarding research and development, key needs for contamination management in the context of brownfield redevelopment are the provision of:
- Tools and guidance to harmonise site management from a planner's viewpoint with environmental risk management.

Tools and guidance to reduce uncertainty and to facilitate cost estimates for redevelopment projects, for example better sampling and analysis procedures and protocols.

Tools and guidance for the re-use of decontaminated materials focussing on (groundwater) vulnerability and target aspects.

8.4 Economic viability

The cost of dealing with contamination and other legacies, together with the wider context of the economic development that relates to brownfield sites, mean that the viability of site and regional projects can be a critical factor. Public funding is often needed to stimulate the investment in brownfield areas.

Planning-related issues, technical problems, conflicting ownership interests and often long project implementation periods, constitute a risk for the viability of many brownfield projects. Managing these risks often depend upon defining the exact costs of the project. As outlined in chapter 7.3 uncertainties with regard to the assessment of the underground conditions and contaminated areas constitute a significant financial risk. In terms of viability, the most significant shortcoming seems to be a lack of inter-disciplinary collaboration (e.g. Flanders /Finland). Many of the projects analysed are carried out without calculation of the overall profitability and without integrated project control. Often funding opportunities could not be used because of the integrated needs of brownfield projects in combining infrastructural, urban and environmental works.

The Working Group „Brownfield Redevelopment“ identified key areas where new tools might assist in enhancing viability:

Development of specific valuation methods to determine the value of derelict land

Methods to determine the value of land are the subject of national regulations and professional judgements. In general they do not consider any problems specifically related to derelict land, for example the existence of non-reusable buildings or soil contamination. The consequence of this is that expert opinion often determines a very high land value which is unrealistic in the light of rehabilitation costs, and therefore unprofitable for project developers. Specific methods for valuation of brownfields have been developed in the UK and in Lorraine. Future activities should concentrate on the development of new evaluation methods for brownfields based

on existing experiences, particularly in the UK and in France. Evaluation protocols could ensure that all relevant factors are accounted for. Such protocols should seek to be accredited by national and/or professional bodies to ensure that they are recognised by all parties.

Insurance models for brownfield projects

The far-reaching economic dimension of the brownfield subject is closely connected with a number of financial and liability risks raising the question about insurance involvement. Liabilities and possible future obligations for the land owner are a major obstacle to brownfield investment. Appropriate products of insurance companies can contribute to minimise risks and stimulate investments to brownfields. There are some products from insurance companies on the market but these are only randomly used. The Working Group „Brownfield Redevelopment“ stated that these products are not yet fully appropriate to meet the specific needs of brownfield redevelopment. The Working Group „Brownfield Redevelopment“ concluded that, based on US and UK models, future research projects should investigate new insurance models. Specific research is particularly needed in defining criteria on the definition of the insurance rates depending on the specific risk situation.

Key questions are:

- What is the definition or “risk” in the context of brownfield redevelopment projects?
- How could risks be evaluated and monetarised?

Cost structures

The lack of satisfactory cost reference systems for brownfield redevelopment is a significant gap for the evaluation of the economic viability. Better information on real costs and better techniques for determining costs and benefits, such as a methodology specifically adapted to the problems involved in brownfield redevelopment, could clarify cost transparency and cost security on a European level.

The key question for research activities in this issue is whether it is possible to define cost structures for brownfield projects similar to those used in the construction industry. Standardised cost catalogues and indicators would be an appropriate tool for early viability considerations and could also be used as a tool for the control of public funding systems.

Tools for Project Management

The achievement of cost-effective and low-risk brownfield redevelopment is the responsibility of the project manager. Many project management approaches for brownfields do not consider the complexities and interactions of all the parties involved in such processes. There is a specific demand for specialised tools and methodologies to manage brownfield projects. For example the development of specific contract forms and guidance on different options for risk sharing for reclamation / redevelopment would be a beneficial tool for the management of brownfield projects. European research and other initiatives can support the development of tools, meth-

odologies and skills for project management. Analysis of existing approaches can provide guidance regarding cost effectiveness and time management of redevelopment projects. It would help to identify gaps and provide assistance for the definition of quality standards for this issue.

The Working Group „Brownfield Redevelopment“ has agreed upon a Checklist on Land Recycling that is attached as annex 2 to this report. This checklist provides an example for such a management tool for the comprehensive analysis of land recycling projects. By applying the checklist, the user becomes more aware of the complexity of such projects and obtains an overview of all relevant issues.

8.5 Other relevant topics for future action

Brownfield redevelopment is a complex issue. The process of brownfield reclamation impacts on a wide number of other topics. Its urban planning dimension means that there are of course close linkages to architecture and urban design questions. Many brownfield sites include old industrial buildings, which require maintenance under the special aspect of preserving the cultural heritage. Also the social environment of the site is affected. On one hand, citizens are frequently concerned about the inconvenience of the redevelopment work as such, but on the other hand, after successful revitalisation, the location benefits from an improved appearance and better social aspects.

CLARINET Working Group „Brownfield Redevelopment“ discussed these cross cutting issues and identified a number of suggestions for future research on an international level. However, CLARINET is a network of mainly environmental experts and was not necessarily in a position to reach firm conclusions on the R&D needs in these related areas. Nevertheless, to document the full content of the Working Group „Brownfield Redevelopment“'s work the essential issues are outlined below.

Urban and architectural design

Successful project practice shows that the planning process should encourage the adoption of a level of urban design practice compatible with the aim of producing a higher quality urban environment. In pursuit of this, creativity in urban, architectural and landscape design is a key issue for the redevelopment of brownfield sites. Nevertheless, due to the critical constraints and potentials of inner city locations, architects and planners need to be specifically qualified in dealing with the complexity of these problems. The objective should be the wider application of best practice experience. Promotion of integrated planning and design practice and the transformation of existing planning tools, by for example architectural competitions, would be enhanced by the establishment of quality standards for sustainability criteria, both within the planning process and within professional qualifications. In the last decade many cities have made significant efforts in revitalisation of former industrial, military or railway land. Quality criteria could be identified by analysing classic project examples of specific aspects of brownfield redevelopment via a comparative desk study.

The following research topics are suggested:

- Investigation of environmental aspects in brownfield redevelopment (saving energy and water, recycling of building materials, integration of green spaces in earthworks, density of buildings...) as basis for common European evaluation methodologies;
- Investigation of time-dimensions for the longer term urban redevelopment process in order to develop early warning systems for future brownfield creation;
- Life cycle assessment of buildings for redevelopment;

Conservation of heritage and culture aspects

The listing of the Völklinger Hütte/ Saarland as part of the UNESCO world cultural heritage in 1994 showed that many buildings constitute valuable cultural heritage(see chapter 7.1). As has been demonstrated by numerous individual projects in Europe, brownfield redevelopment can go far beyond the purely conservation aspects: It can become the nucleus for economic activities in the field of culture. Newly established businesses and innovation centres from the media sector, designers and artists as well as cultural initiatives appear to favour the use of abandoned industrial facilities. It would be worthwhile to investigate if the conservation of industrial heritage buildings can be developed as a driving force for the revitalisation of brownfields

The following research topics are suggested:

- To investigate phenomena on the conservation of heritage and cultural aspects and the associated secondary effects on urban development and employment within the socio-economic research programmes of the EU;
- The development of tools for the classification and maintenance of architectural heritage of industry as major element of adding value to urban surroundings(e. g. International Building Exhibition – Emscher Park).

Social aspects

Socio-economic research activity in the area of brownfields includes the immediate social effects of structural changes, effects from the redevelopment process and participation issues of the public as part of the redevelopment process. Socio-economic research activities on such issues have been undertaken since the mid 1970's. It is recommended to support further research and development activities in:

- Investigation of the long-term effects of economic restructuring in traditional industrial regions. This includes the analysis of demographic factors and social models for the conversion of former industrial complexes e.g. for the application in Eastern Europe, in relation to strategies of brownfield redevelopment projects;
- Incorporating citizen participation to adjust common principles and identify innovative practices that can improve the quality of projects in brownfield areas, and the efficiency of urban governance;
- Improving communication of risks and acceptance criteria for rehabilitation schemes.

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ANNEX 1

Country specific Information

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PREFACE

This annex is a compendium of country specific information that has been compiled during the continuance of the CLARINET project by the Working Group on “Brownfields Redevelopment”. Between the meetings, the members of the working group reviewed country specific documents and consulted additional national experts to accumulate national background information about brownfields. They are structured along the topics:

- Extent /localisation / types,
- Policy /programs / actors,
- Legal regulations, and
- Gaps and obstacles.

This information has been the principal basis for working group discussions and the analyses of national approaches concerning brownfield redevelopment. Extra information for the derivation of recommendations were in some cases obtained from additional sources and literature reviews.

There has been no external examination in terms of auditing the country information for consistency. The information purely reflect the essential issues as they are seen and identified by the country representatives from a national perspective.

Contact persons and relevant literature are listed at the end of each country profile.

AUSTRIA

Extent / localisation / types

Brownfields in Austria are located in the traditional industrial regions often linked with infrastructural dereliction in the metropolis of Vienna. So far, there is no known reliable national data on the extent of brownfields in Austria. Soil loss due to soil sealing is assumed to be some 20 ha/day or 7 – 12 m² /person/day. Between 1991 and 1991 increase of total amount of building area has been 30% on average – up to 50% in western parts of the country.

Projects targeting a systematic identification of potentially contaminated industrial sites revealed that on average 2% to 4% of the industrial sites are abandoned and cover about 2% of urban areas.

Policy / programmes / actors

To date no governmental programmes supporting brownfield redevelopment exist at a national level. Policy makers and the authorities are becoming increasingly aware of the extensive use of greenfield and the existence of derelict land with a potential risk to human health. Therefore, there is an increased interest in their re-use and redevelopment. Issues related to the re-use of abandoned industrial sites are mostly dealt with by local authorities. However, within these authorities competencies for dealing with brownfield-problems are not clearly structured. Due to the lack of general regulations, decisions are made on a case by case basis.

Specific local programmes have been initiated by the City of Vienna. Since the development of peripheral urban development zones needs both time and substantial financial means, the use of existing unused spaces is given priority. These urban areas are often partially equipped with infrastructure. The capitalisation of the land can support many of the companies in their restructuring activities, and their use makes no inroads into existing green spaces.

In order to exploit those sites in important areas for town planning, the City of Vienna uses two funds:

- the Vienna Business Promotion Fund (WWFF) for industrial and commercial spaces;
- the Vienna Land Provision and Urban Renewal Fund (WBSF) for housing space.

The funds are involved in the purchase, division and provision of sites, with tasks not strictly differentiated between the two funds. Their activities also include the distribution of subsidies. Co-operation between urban planners, the funds and the developers run smoothly, although decision-making is not always easy. There are several examples of targeted development of unused commercial, industrial or

infrastructural sites in Vienna. They differ widely in size, planning and implementation.

Legal regulations

There is no specific legislation directly assigned to brownfield redevelopment. The following legislation has an influence on handling the problem:

- Building permits
- Aspects of brownfield redevelopment are also considered when granting building permits for any kind of construction.
- Industrial Code
- Among others, the Industrial Code includes provisions for granting permissions for the set up or closure of industrial or commercial facilities.
- Water Act; Austrian Standard for Risk Assessment for Groundwater
- As a consequence of the lack of regulations on soil protection guidelines or regulations stipulating water quality (especially groundwater) are of utmost importance for defining necessary remediation measures.
- Austrian Standard for Risk Assessment for Soil
- Austrian Standard for the use-dependent assessment of soil contamination
- Land development and zoning plans

Dedication of ground for a specific use – especially for industrial or commercial interests – is allocated with respect to regional and supra-regional planning instruments.

Gaps and obstacles

- lack of any specific regulation to handle the redevelopment of brownfields
- lack of regulations for soil quality with respect to specific land-use
- lack of or insufficient co-ordination for granting construction permits in the case of a need for remediation
- the aspect of re-using land is not sufficiently considered in the granting of funds for remediation
- better conditions prevail for investment in greenfield sites
- potential clean-up risks for investors in brownfields.

Further Information

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Literature

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BELGIUM, FLANDERS

Extent / localisation / types

The actual number and size of brownfields in Flanders is not exactly known, but the problem of brownfields in Flanders is as important as elsewhere. Brownfields are not attractive for investors due to the high legal, environmental and financial risks. The use of 'clean' industrial land is cheaper and easier. 4000 unoccupied business accommodation sites are known, however not all of these are contaminated, and only a part of these can be considered as brownfields.

Starting in 1981, the Public Waste Agency of Flanders (OVAM), which is the competent authority for soil remediation, began actions that resulted in the closure of about 250 landfills. In the mid 1980s 10 large sites were selected for remediation. At the beginning of the 1990s, OVAM started a comprehensive inventory of potentially polluted sites. To date, about 6.500 former industrial and landfill sites are listed.

The soil remediation policy in Flanders is based on a tiered approach. The first step was a preliminary investigation that gave a distinction between contaminated and non-contaminated sites. From this comprehensive inventory 970 sites. Nearly half of these posed a risk (489 sites) and required further investigation. 223 sites have been thoroughly investigated of which 94 sites presented a serious risk and remediation is necessary. 60 remediation projects are already approved by OVAM.

10.000 reports on soil contamination have been filed at OVAM to date, as a result of the Soil Remediation Decree (22/2/95). In 40% of these cases contamination was present and a 2 investigation was ordered. 1917 risk assessments have been completed, resulting in 801 sites where a remediation project is needed. In 446 cases, a remediation plan has been introduced by OVAM (*figures to the end of 1999*).

The term brownfield is not defined in Flemish legislation. Based upon the criteria as used by the USEPA, about 30 sites can be considered as brownfield, the largest sites of which are the former coal-mines. 1.600 ha of these areas have been assessed and remediated between 1993 and 2.000, with special employment measures established.

Policy / programmes / actors

OVAM, the Public Waste Agency of Flanders, is the responsible body for the environmental aspects of brownfields. OVAM has a number of tasks concerning waste management including prevention, recycling, imposing environmental taxation, raising awareness etc.

Following the waste decree (article 21/§2,c) and the amendments to this article since 1990, OVAM can also act to enforce the elimination of the waste from enterprises, contaminated soils and disused industrial installations, if it presents a risk to the public and environmental health. After a suitable procedure of declaration of default

conducted by OVAM or the Flemish Ministry, the party is declared in default where they have omitted to undertake the measures imposed, or to carry-out the works prescribed within the required period or time. In such a case, the work is prefinanced by OVAM from a special fund constituted on the basis of environmental taxation. Afterwards legal action is taken to recover the expenses from the liable party.

Apart from OVAM, local authorities (provincial governors and mayors) and the civil protection administration also have the power to take remedial action in specific cases of pollution. In certain other cases the courts may also impose action regarding soil remediation.

Since a rising number of sites were known to present problems of soil and/or groundwater contamination, an efficient and systematic approach was needed to characterise and eventually to clean-up such sites. The following phases were considered in the action of OVAM following the Soil Remediation Decree:

- Addition to the inventory of potentially contaminated sites,
- Preliminary investigation of all available information and limited field work to rank the sites in an order of priority for further investigation,
- Descriptive soil study to circumscribe the extent of the problem and the risk to public health and the environment,
- A soil remediation project to compare the clean-up alternatives and to select the best option,
- Execution of the remediation project, followed by an aftercare phase.

Recent changes in the organisation of Town and Country Planning, have resulted in a spatial planning system that covers the whole region of Flanders. Zones reserved for industry, farmland, housing, etc., are well defined. This plan has resulted in restricted areas for industrial purposes and has therefore stimulated the remediation of contaminated sites.

A project is currently running (under the authority of OVAM) to develop a decision support system for 'Active Soil Management' integration aspects as well as skills for project management. The aim is to generate advice for precautionary measures and land use limitations based on risk assessment, allowing the adjustment of the use of the site to the actual risks caused by soil pollution. As well as prohibiting certain activities on the site, the activities that are still possible without risks are also indicated, along with measures that can be undertaken to allow certain activities pending remediation of the site.

The ministers competent for Environment, Economy and Urban planning, started in 2000 a strategic project on brownfield (re)development. The main goals of this program are:

- the environmental improvement of the sites themselves;
- the reduction in 'development pressure' on greenfields;
- the economic and social regeneration of the surrounding areas.

A task force is responsible for overseeing efforts to redevelop brownfields statewide. The major responsibilities are to evaluate the legal framework and practical procedures, and make recommendations on ways to better promote the brownfield development.

Legal regulation

In Flanders the following legislation relevant to brownfields is in force:

- The Decree on unoccupied business accommodation, which levies taxes on unoccupied manufacturing space. In the case where renovation (including remediation) is planned, exemption is given from taxes for a maximum of 2 years.
- The Decree on Soil Remediation, aiming at contaminated sites, and clean up of all historical contaminated sites before 2036 – in urgent cases before 2006.

According to the Decree on Soil Remediation contaminated land can only be transferred after:

- A remediation plan has been handed in by OVAM (the Public Waste Agency of Flanders),
- A financial guarantee is given to cover the costs of the remediation works,
- An obligation towards OVAM to remediate the site is made.

In specific circumstances, exemptions can be made by the Flemish government.

Gaps and obstacles

- Two years of exemption from taxes for site vacancy is usually too short to finish the procedure of soil remediation following the Decree on Soil Remediation.
- Soil remediation is a complex issue and a lot of industries, citizens and stakeholders need more information and support to deal with it. Better and quicker decisions can be made if communication is optimised.
- A specialised institute for brownfield development does not exist at present. This means that the different parties (owners of polluted sites, investors, remediation firms, governmental agencies) can not collaborate easily.
- Brownfield development is also a broader issue than remediation of a contaminated site and currently there is not much expertise in this matter. Actions are taken on different levels, but there is seldom an integrated approach.
- The Soil Remediation Decree has had an important impact on the transfer of land and the control of industrial facilities. Still, abandoned sites seem to escape this legal system because there is no exploitation or sale. Due to soil pollution, these sites often remain disused or under-used and no action related to the above mentioned legislation will be taken in the near future.

Further Information

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<http://www.brownfields.be> (in preparation)

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BELGIUM, WALLOON

Extent / localisation / types

The Wallonia region is one of the industrial regions in continental Europe. There are approximately 9,000 hectares of derelict industrial land, over half of which consists of former coalfields. Specific legislation has existed since 1978 to facilitate the reclamation of contaminated land for new uses. During the mid-1980s attention was paid to the significant issue of contamination, and an extensive programme of investigation and policy initiatives to identify and remediate sites emerged. The 1978 legislation forces the owners of a derelict site to renovate their properties and contains obligations for rehabilitation. However its essential goal is the improvement of the visual aspect of the site coupled with the reintegration of the rehabilitated site into the economic cycle. Environmental impacts have only been subject to legislation since 1993. A Planning Act also enabled sites to be reclaimed in such a way that they could be assigned a new use, economic or otherwise. At this time a complete inventory of derelict sites on the Walloon territory leading to a priority classification (based on historical data and actual state of the site), was conducted. Of 2,000 recorded sites:

5 % were classified with real risks (RR level) ;

42 % with potential risks (RP level) ;

48 % with likely to be minimum risks (OR level) ;

5 % where more information is needed (Undefined).

Policy / programmes / actors

The risk of contamination on urban and industrial derelict land raised little attention in Wallonia until the mid-1980s. Since then public concern - and governmental care - have been rapidly growing since both parties discovered that, considering the importance of the industrial past of the Region, this was really a major issue at a regional level. A twofold strategy was initiated:

- Firstly, a public body was created to reclaim polluted sites: SPAQUE (Société publique d'aide à la qualité de l'environnement), whose main mission assesses, prioritises and reclaims former waste disposal areas. SPAQUE is now in charge of 17 "priority sites", 4 of which are undergoing reclamation.
- Secondly, the experience acquired in other regions with similar industrial traditions has pointed to the number of problems posed by production sites. This equals, and in some instances, is more serious than those generated by waste disposal areas. Therefore the Walloon Region launched a special research programme focusing on the risk of contamination from former industrial sites.

To assist rehabilitation of sites, the Walloon Region provides assistance in the form of subsidies and loans. If the site operator is a local authority or public operator, this aid will cover 50 % of the purchase cost and the whole of the costs incurred in cleaning

and remediation, excluding the cost of any new structural work. Where a private operator is involved, loans are provided where the Region pays part of the interest.

At the time the Act of 1978 was constructed, there was no requirement to investigate or control the risk of soil contamination. However, in the following decade, the problems encountered in German, Dutch and British industrial areas induced the Walloon Government to add this new concern to its derelict land policy.

Legal regulation

In 1993, because of a highly contaminated site, the authorities were faced with the new problem of pollution potentially generated by industrial activity. The Regional Development Administration decided to entrust ISSeP (reference laboratory) with a preliminary environmental analysis based on soil controls and a complete historical study performed by GEHAT (Brussels University). This regional programme now considers about 35 derelict sites per year. A commission regrouping the related Administration (Regional Development, Environment), ISSeP, GEHAT and invited site owners to discuss the preliminary results and judge the future actions needed for each site i.e. further investigations, remediation and future use.

The Walloon Government is currently reviewing specific regulations on soil contamination and brownfield strategy will be the subject of a particular chapter of any revision.

The legal regulation for brownfield redevelopment only concerns visual aspects and reintegration of the site into the economic cycle, and does not concern any environmental issues. At the moment, this is only covered by the "goodwill" of the related Administrations (e.g. Regional development and Environment) who consider the soil pollution impact. The Regional Planning Act and Building Code (CWATUP) is relevant for brownfield redevelopment and contains obligations for rehabilitation but does not define standards for risk assessment and clean-up. These last points are actually involved in the review. Other regulations are related to waste, which means that each brownfield site could become or be considered as a landfill as polluted soil is considered a waste. This legislation is not adapted to this subject but can be used if necessary to solve difficult cases.

Gaps and obstacles

The main difficulties are:

- A practical difficulty in accurately and exhaustively reconstructing the industrial history of a given site and in localising risk areas with sufficient precision,
- A difficulty of methodological nature in discriminating between situations which present a real risk in the long term, from those where the contamination burden will, in time, be limited by natural attenuation processes,

- The management of the “post-closure period”
- In terms of contamination risk, the most critical period in the life of a site, is the period from the closure of the industrial operation, to the time when it is decided to remediate or re-use the site,
- Two types of problems are encountered during this period:
 - Those associated with negligence, following the progressive and then total discontinuation of the site, in particular the cessation of internal and external controls and maintenance,
 - Those arising from inappropriate zeal in the initial work carried out during the general clearing of the site.
- Economic limitations on a decontamination project

Given the present-day level of knowledge and existing practice in respect of decontamination, it appears that the techniques most commonly implemented remain extremely costly. As regards the financial support of Walloon Region, there is no doubt that only sites or partial sites with a high social or economic value could be decontaminated in the short term.

In the medium term it is hoped that less expensive remediation technologies, currently at the experimental stage, will become more generally used and more effective. In a few years such developments should permit a more thoroughly remediation of sites which are maintained until that time in a state of passive safety. Depending on the individual circumstances, it will be possible for sites of this kind to be cleared immediately of any buildings and then planted or landscaped, in order to eliminate the visual blight they represent.

The major obstacle encountered in brownfield redevelopment is clearly the absence of legal regulation related to soil pollution and risk assessment.

Literature

NOTE: Act of 27 June 1978 concerning the reclamation of abandoned Walloon business sites, incorporated within the Walloon Town and Country Planning Code (Arts, 79 to 93 and 333 to 344). Duly amended in April 1995

DENMARK

Extent / localisation / types

In Denmark, traditional industrial locations are typically located close to harbours in the major cities. Denmark has no legal definition of brownfields and no specific regulation directed towards this issue. Thus, no estimates of the number and extent of brownfields have been conducted.

Policy / programmes / actors

No specific programmes support the redevelopment of brownfield in Denmark. Existing programmes for the renewal of towns do not regulate the use of contaminated areas in the cities, but aim at improving the quality of the existing cities. Remediation of contamination is not a goal of the programme but an element of this is often included in order to fulfil the main objective, that is city development.

Spatial planning establishes a framework for land use and the construction of buildings, roads and other infrastructure, including the way in which existing urban features and landscapes can best be protected. Tasks related to environmental protection are increasingly integrated in the work of spatial planning. Spatial planning in Denmark is carried out at three levels: local and municipal planning in the municipalities, regional planning in the counties and national planning co-ordinated by the Ministry of Environment and Energy.

The Spatial Planning Department prepares a national planning report after each national election. These reports describe the vision of the Danish Government regarding national planning policies and are supported by demonstration projects intended to inspire new solutions and innovative co-operation schemes.

The Minister of Housing and Urban Affairs appointed in June 1999 the Industrial and Urban Committee. The Committee finished its work in May 2001. The committee recommend a number of new initiatives and acts that can strengthen development of sustainable cities in relation to localisation and land-use and suggests that there are made legal basis for creating companies for development of cities taking specifically care where barriers of development e.g. contamination exist. In The Danish Governments national strategy for a sustainable development, June 2001 the committee's idea is supported.

Specific programs for protecting and improving the urban environment

The urban environment and urban development is an important focus of the Spatial Planning Department. They participate in European co-operation to promote sustainable urban development. For example, working to reduce the environmental burden of transport through urban and transport planning.

There are no specific procedures for including contaminated land treatment in city development activities. The Act on Soil Contamination gives the municipalities a possibility of financial support for the remediation of sites that are not included in the county plans for remediation. This can be linked with city development activities, but has only recently been used in practice.

The counties are the authorities responsible for the public funding of remediation according to the Soil Contamination Act. They cannot, however, fund urban development projects, as remediation of contamination can only be financed if it constitutes a risk to groundwater that is already reserved or used for drinking water purposes, or the contamination constitutes a risk to the present land use (i.e. housing, children institutions and public playgrounds). The counties pay the total cost of remediation. The municipalities do not have any budget to finance remediation of contaminated sites. In 1999 the counties total budget for the investigation and remediation of contaminated sites amounted to 235 million DKr.

In practice many projects have been carried out without public funding chiefly at attractive areas located in the bigger cities.

Legal regulation

On January 1 2000 the new Soil Contamination Act came into force, and forms the legal basis for regulation of contaminated sites. Brownfields are covered by this Act. This Act makes it possible for municipalities to contribute to investigation and remediation of contaminated sites. This is expected to further improve the possibilities for the remediation of brownfields.

Brownfields are consequently included in the counties' mapping programmes. If a private landowner wishes to develop a contaminated site (i.e. a brownfield), the county must approve the project in relation to the remediation of contamination before the project can be initiated.

In Denmark valuable experience with this system has been gained and many contaminated sites have been cleaned up by private owners wishing to make use of sites attractively situated within the cities.

Gaps and obstacles

In Denmark it is observed that in periods of prosperity, brownfield redevelopment works very well, whereas when trade is declining brownfield redevelopment is very limited.

Literature

PACTE PROJECT (1997): Environmental Effects of structural change in old industrial cities. Tampere

FINLAND

Extent / localisation / types

The history and structure of industrial development in Finland is different compared to many other European countries. The industry is relative new (mostly developed after the second world war) and industrial locations are quite small and individually situated around Finland (e.g. paper and pulp, wood processing, mining and metal, machine and textile industries). There are not many brownfields compared to many other European countries and there is also not a very big pressure for brownfield redevelopment. One reason for this is that usually there is adequate greenfield land in Finland.

The first investigations of hazardous waste landfills started in the early 1980s and the systematic restoration of contaminated sites began in the mid 1980s. Between 1989 and 1993 the SAMASE project was conducted. Some 10 000 sites suspected of being contaminated were mapped. Their actual environmental and health impacts are being investigated. In Finland no comprehensive research about the number of contaminated industrial sites in inner cities has been conducted. An updating of the original survey of contaminated sites is being made this year and it is estimated that 2001 about 20 000 sites are suspected to be contaminated in Finland.

Policy / programmes / actors

There is no policy strategy specifically concerning brownfield redevelopment in Finland. Policies on urban renewal are integrated into the general planning policy.

The new planning system (*Land Use and Building Act*) came into force on 1st January 2000 and has three levels of land use plan: *the regional land use plan, the local master plan and the local detailed plan*. In addition the Government defines *national land use goals*, which apply to regional structure, quality of the living environment, infrastructure, ecological sustainability and natural and cultural heritage of national importance.



The new system of land use planning.

The regional land use plan transfers national and regional land use goals to land use planning at the local authority level. The plan ensures appropriate regional and community structures, preserves ecological sustainability and provides the proper operating conditions for business and industry. The plan is compiled by a regional council (alliance of municipalities), which is made up of local authorities and confirmed by the Ministry of the Environment.

Within local authorities *the local master plan* is an instrument for guiding and coordinating land use at a general level. It is used to ensure the functionality and economics of the community structure, the accessibility of services, the preservation of natural and cultural values, the quality of living environment and the reduction of environmental hazards. After the plan is constructed, consultations have to be held with the Regional Environment Centre, which ensures that national goals are taken into account.

Local detailed plans, such as town plans are used for regulating building and formation of the physical townscape.

According to suggested *national land use goals* it is necessary to determine that the land is suitable (no risk to human health) for the planned land use. Planned remediation of suspected contamination also needs to satisfy the planned land use. Present land use and operational needs to reduce possible health impacts are also assessed.

The Finnish Ministry of the Environment is responsible for the general development of land use planning. The main aims of the new act in relation to urban development and brownfields are to create a sustainable basis for the development of communities, to improve public participation in area development and to delegate more decision-making to local authorities.

Responsibility of clean up

The Ministry of the Environment is the national authority on environmental affairs, but the Regional Environment Centres make decisions about the individual clean-up projects and set the conditions for the clean-up measures. The polluter has the liability for the remediation in principle and in legislation. In practise, however, the polluter is often resourceless, bankrupt or out of reach. Thus the owner of the real estate has the environmental liability, but often the requirement to restore the site would be unreasonable. In cases where the primary liable party cannot be found, the municipality has the secondary responsibility for risk and remediation.

Even though the majority of remediation work has been financed with private funds, 1/3 of projects are financed by the public sector. Annually government funds used for clean-up projects have been at the level of 6 million Euro and the municipal funds 8 million Euro, a total of 14 million Euro. For the restoration of contaminated soils the annual total expenditure is 34 million Euro. To date more than 600 contaminated sites have been remediated.

Research and development projects

The main purpose of the national SAMASE project was research and development, developing soil guidelines and quantifying the problems posed by contaminated sites. It included an estimation of clean-up costs for priority sites. New waste legislation was drafted simultaneously and the findings of the project were directly applied. In August 1998, the Working Group for Soil Protection gave a report: Objectives in Soil Protection (The Finnish Environment 248). This deals with objectives and the current situation for soil protection in Finland, and gives guidelines for future measures. This includes the implementation of the recommendations of the Council of Europe, to prevent contamination, to establish the remediation need of sites and to clean them up by the year 2015. The importance of prevention and remediation of contaminated sites was acknowledged by this report.

The Finnish Council of State issued a Decision-in-Principle on the Water Protection Targets to 2005 on 19 March 1998 (The Finnish Environment 226). The main goals of the Decision-in-Principle are the reduction and prevention of eutrophication. In addition those contaminated sites which present a risk to water protection, will be studied and redeveloped on a case by case basis.

Legal regulations

In Finland there are no specific legal regulations for brownfield redevelopment. Issues raised by this subject are addressed within the new *Environmental Protection Act* (in force since 1st March 2000).

In the new *Environmental Protection Act* soil and groundwater polluting activities are prohibited, or the soil or groundwater must be returned to its original state so it can be used for any desired purpose. The Act also contains regulations for the clean up of soils.

The *Environmental Damage Act* (in force since 1995) applies to new environmental damage. Other regulations (such as the Damage Compensation Act) are applied to those environmental damages that are excluded by the Environmental Damage Act. The applicable law defines the severity of liability and the conditions for sufficient proof. In this respect the Environmental Damage Act applies strict liability on entrepreneurs. Expanded liability for damages has made it easier for the environmental authorities to recover damage prevention or clean-up costs from the responsible party.

The 1990s saw proposals by committees and working groups for secondary compensation for environmental damage including old contaminated sites. As a result of these proposals a new law came into force in 1998, however it was limited to new incidents. By law the compensation of new environmental damages is funded by charges levied on firms using dangerous chemicals and the restoration of old abandoned sites is funded from the state budget.

The liability questions for remediation issues are complicated, because the legal base is broad and the liable party is often hard to trace. These reasons delay the carrying out of remediation projects.

Gaps and obstacles

- It is not always self-evident as to the correct remediation method. In Finland there are no general criteria for objectives for redevelopment or for acceptable risk evaluation concerning an individual contaminated site.
- Planning and construction decisions are not made by environmental authorities, but by other municipal authorities, that do not have expert knowledge about the redevelopment of contaminated sites.
- Redevelopment is a rather complicated issue at the administrative level. The procedure for granting a permit is slow and complicated and the content of the authority's decision might be unexpected. These facts cause obstacles and hindrances to the realisation of remediation projects. There is a lack of qualified consultants for remediation projects and the quality assurance is often insufficient. The situation is now improving rapidly.
- Liability issues with respect to remediation are still unclear. There have been problems with re-utilisation and final disposal of decontaminated or treated soils, because there has been a shortage of landfills to take the material.
- Development for creating new reception and treatment sites for contaminated soil has been slow because the landowners have been uncertain about the scale of activities that are required by soil clean-up projects. The landowners have also been concerned about the extent to which it is profitable to invest in the infrastructure required for this clean-up activity.
- In principle there is a general financial system in Finland, which could grant partial financial support to the polluters or the real estate owners for these clean-up projects. However, this is not used, due to a lack of money. The active finance system supports only the polluters and the real estate owners who are insolvent.
- If the prior use of the brownfield areas could be more rigorously evaluated, it would make it possible to choose the most cost-effective remediation method. Unfortunately, the history of the areas has not always been fully examined, and this sometimes leads to remediation methods with unnecessarily high costs.

Further Information

<http://www.vyh.fi/eng/fei/fei.html>

<http://www.vyh.fi/eng/landuse/>

FRANCE

Extent / localisation / types

France considers that brownfields are different from contaminated sites. The definition of brownfield site is: “space previously been developed (agricultural, port, industrial, service, processing, military defence, storage or transport); that are temporarily or definitively abandoned following the cessation of activity; and they need to be reclaimed for a future use. They can be partially occupied, derelict, or contaminated.

Brownfield sites are of considerable interest in some former industrial French regions since the 1970s (in particular, Lorraine and Nord – Pas de Calais), and more recently in other regions because of extensive urban development (Paris and Île de France, Rhône–Alpes). Most of the available information on brownfields management (regional procedure, location of brownfields, regional database, examples of sites reclamation, etc.) is provided by the regional authorities.

Different questions have been addressed, related to inventories of brownfield sites, suitability of sites for future use (when sites are not considered as contaminated) or site reclamation according to the regions’ situation (cf. next chapter). In the first approximation, brownfields include about 200.000 former industrial and service sites, and about 200 former mines. The stock of industrial brownfields is estimated at about 20,000 ha. This is concentrated as expected in the traditional industrial areas of the northern and eastern part of the country, especially in the region of Nord-Pas de Calais (9.400 ha) and Lothringen (2.500 ha). Most of these are large sites (more than 10 ha) in suburban or periurban locations. The stock of brownfields has not decreased in the last decade despite of considerable reclamation activities.

Policy / programmes / actors

In France long-term policies and programmes exist in the traditional industrial regions piloted by Lorraine. Since the 1980s, and in the context of the national “contact de plan” – funded by the state, region and the EU -, specific brownfield reclamation programmes have been developed. It was important to create a new economic foundation and modernise urban and infrastructure structures, which had been exclusively geared to the former industrial use. Altogether, 3.350 ha of derelict industrial land had to be treated between 1987 and 1998. Due to the regional dominance of derelict land, a joint intervention of national, regional, and local actors was necessary. As it was clear from the beginning that it would not be possible to immediately find new uses, the strategy developed in 1986 concentrated on the rapid improvement of the ecological situation through large-scale landscape treatment. Preparation of the land for new uses, which involves much higher costs, will be a

medium and long-term task. Therefore, all efforts were focussed on overcoming the negative image caused by derelict land. The programme priorities were based on:

- the first, and simple priority of rapid identification of derelict land;
- the establishment of a regional development agency;
- a clear and comprehensive methodology - „requalification sommaire“;
- adequate and regular funding;
- a partnership of all parties involved;
- support for the preparation and development of derelict land for the implementation of leading projects with regard to the development of the agglomeration.

Ordinary "re-qualification" ("requalification sommaire") is clearly preferred if any after-use project could be defined. The derelict land strategy known as "Remise en état" contains:

- demolition as well as clearing work in the area;
- construction of terraces and planting , enclosing or the planting of screening trees
- construction of recreational paths;
- where necessary, treatment of contamination using all legal instruments to make the polluter pay.

Subsequently, the properties are to be managed on a regional level and in individual cases left to the free property market. The executive body of this part of the programmes is the regional development agency, the "Establishment Public Foncier de la Métropole Lorraine" EPML, 1996). EPML had been entrusted with the realisation of this strategy. Since 1970 EPML, which has been created by the central state in order to implement land policies with local authorities, has been undertaking planning and developing tasks.

Due to financial support by the state, the regional council, the agency itself and the European Fund for regional development, it was possible to mobilise a total of 120 million € between 1986 and 1997, in order to implement the new derelict land policy. By 1997, 3.350 ha of derelict land had been treated.. Two thirds of the money came from the Lorraine Region, the French State and the EPML. One third came from the EU. All in all, 97 locations in 109 communities were treated. Since treatment, 30 % of the sites have been re-used for economic purposes, 22 % remain available, 17 % used for parks, 27 % designated for nature and 4 % developed for housing. Thanks to the strong position of EPML, the industrial land owners were persuaded to sell their property at favourable prices. At the same time, partial sales of attractive and unencumbered properties directly by the owner was prevented.

The strategy chosen was exemplary as it succeeded in linking the interests of the private property owners, the community and other actors in the framework for a co-ordinated regional master strategy. The regional stakeholders are co-operating in a common network with research activities and international services.

Legal regulations

No special legal regulations for brownfield redevelopment exist in France. Legal aspects will be covered by:

- Law on environmental permits for industrial sites,
- Mining Code, for the former mines (Code recently modified to take into account the cessation and the abandonment of mine sites),
- Civil Code (liability on harm caused by owned properties),
- Urban Planning Code for the redevelopment of brownfield sites, in the urban context,
- Some specific regulations on historical building preservation and requalification.

Gaps and obstacles

- Definition of liabilities related to soil contamination with respect to the difference between the impact on the environment or health and the re-use of a site.
- Current land planning tools that do not take into account soil contamination (inducing breakdown of reclamation works when pollution is suspected or established).

Further Information

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GERMANY

Extent / localisation / types

In Germany, there is an increasing awareness about the wider brownfields issues. These are frequently discussed as an essential element of contaminated land management. In the last 10 years considerable efforts have been made to solve the environmental problems arising from contaminated sites and a high scientific and technological standard has been achieved in this field. However, the task of revitalising derelict land and of developing effective concepts for bringing the land back into economic use still is a primary task for the future. Presently there are about 362.000 suspected contaminated sites nation-wide. The total resource of brownfields is projected to be 128,000 hectares across the country. The presence of brownfields hamper the economic development in the affected regions as its negative appearance and the risks associated with the environmental hazards are major obstacles for investment. However, at the same time land consumption is increasing and is presently at a rate of 129 hectares per day. This area of land is sealed every day for building purposes. This indicates that there is competition between greenfields and brownfields with respect to attraction of investors for the development of land.

Policy / programmes / actors

In 1998, the Federal Ministry for the Environment in Germany published the Draft Environmental Programme and set the following objectives for brownfield redevelopment:

- rehabilitation of industrial sites and elimination of hazards to human beings and the environment;
- reintegration of rehabilitated sites into the economic cycle;
- reduction of land consumption from 120 hectares per day (status 1998) to 30 hectares per day by 2020.

Various development agencies have developed regional brownfield initiatives in the Federal states, for example the "Landesentwicklungsgesellschaft Nordrhein-Westfalen" (LEG,1999). By establishing a Property Fund in 1982 the region has made the redevelopment of brownfield sites and disused buildings central to its policy of creating an integrated urban development model. The activities of the Property Fund go beyond the establishment of new attractive business parks. They include:

- the accumulation of wide experience in the economic framework and prudent dealing with contaminated and derelict sites;
- placing quality targets in urban construction before purely economic considerations, whether it is the architectural plans for the commercial building itself, or surrounding landscaping and recreational areas and facilities;

- preserving industrial architecture which had been abandoned and which bears witness to the history of the industrialisation which was so important to this state;
- safeguarding monuments such as the coalmine Zollverein XII in Essen or the Landscape Park in North Duisburg, which are now becoming new tourist and cultural attractions within the Ruhr area.

To date 2.400 hectares in 178 locations have been purchased. Of these, 971 hectares have so far been rehabilitated, developed and placed on the market. 61% of the developed business sites have been sold. This is a significant success given that there are many other sites available on market. A lot of hard work is currently being undertaken on a further 514 hectares in order to place them on the market within another two to three years. This applies particularly to the projects for the International Building Exhibition (IBA) at Emscher Park. The exhibition was completed in 1999. The IBA aimed to provide overall impulses for the ecological, economic and social restructuration by providing new landscape schemes, brownfield reconversion e.g. for technology centres and innovative housing schemes.

Since the reunification specific brownfield problems emerged in the new German states. High greenfield consumption with tax incentives met the decline of industry and military conversion. The high stock of brownfields - e.g. 18.000 ha in Saxony became a major handicap for the urban and economic restructuration. In 2001, the State of Saxony started with a new integrated and interdepartmental brownfield redevelopment program funded by the European Regional Development Fund (ERDF) of the European Commission.

Legal regulations

There is no special legislation for brownfield redevelopment in Germany. Legal aspects are covered by the Federal Soil Conservation Act, by Regional Planning Acts and by the Building Code. The Federal Soil Conservation Act came into force on 1st March 1999 with requirements for contaminated land remediation in terms of defining country wide standards for risk assessment and clean-up. The Soil Protection Act gives some guidance on the provision of a clean-up plan and a remediation contract. The Regional Planning Acts and the Building Code include regulations for the unsealing of surfaces, for the restriction of greenfield development and define basic guidance for the careful handling of soil.

Gaps and obstacles

There are a number of deficits in practice:

- Location of business and industry on greenfield sites is easier, cheaper and faster than on brownfield sites, thus more attractive to stimulate investments
- High legal, environmental and financial risks for investors

- Lack of integration of environmental and spatial planning policy and procedures
- Insufficient awareness of already available legal options to enhance the redevelopment of brownfields sites
- No or poor incentives for investors, long term investment risk
- Negative appearance and environmental risks

Further Information

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GREECE

Extent / localisation / types

In Greece there is no official or systematic collection of information and data on contaminated land. Part of this information is currently scattered among various public and private organisations and establishments.

As far as brownfields are concerned, no systematic efforts have been undertaken to quantify this problem, but, due to the lack of heavy industry, the extent of this problem is limited. Areas of traditional industries in the sense of de-industrialization are located in smaller pockets. De-industrialization is a relatively recent phenomenon in Greece. It came about from the late 1980s onwards with the closure of large traditional industries (in sectors such as clothing, mineral extraction, shipbuilding etc.) which were, for certain areas (urban and rural) the main local employer. Due to this decline, there are areas where unemployment levels locally have risen to 30% or more. Such areas have been officially designated as high unemployment areas and get special assistance from the structural funds.

Industry is concentrated in the metropolitan areas of the country: (Athens-Attica 41.8% of industrial GDP, Thessaloniki 16.0% - 1994 figures).

Policy / programmes / actors

Brownfield redevelopment strategies in Greece are today under development. Although there is no national plan for brownfield redevelopment, there are relevant programmes. These programmes are supported by the Ministry of Environment and concern the area of Lavron in Attica, the "Thriassion Pedion" in Attica, and the industrial area in the Assopos river valley (Viotia).

However, some basic principles are included in the recent legislation (1997), regarding the planning and the general guidelines for solid waste management. One important issue in this legislation is the registration and the gradual elimination of sites contaminated due to waste disposal, through their reclamation and rehabilitation.

The Regions (NUTS II authorities) undertake the general urban planning, except for urban planning in Athens and Thessaloniki, where the Ministry of Environment, Physical Planning & Public Works are responsible. The Prefectures (NUTS III authorities) are responsible for the approval of urban studies, in cooperation with the local authorities (Municipalities and Communities).

The evaluation of contaminated land in urban planning is not specified in national legislation. However, they are specified in urban studies, as they are based on scientific data and include environmental investigation as one of their main parameters. Under the Joint Ministerial Decision 69269/5387/1990 ("Classification of

activities into categories, content of Environmental Impact Studies (E.I.S.) etc.”), the responsible authorities, that is the Ministry and other Ministries, the Regions and the Prefectures (depending on the capacity and the kind of activity), examine for every activity all information related to physical and urban planning and land use in the proposed (for a new activity) area of the activity. This examination occurs at the stage of the decision making for the location of the activity and if contaminated land is a factor, it is then taken into account.

In the national operational programme "ENVIRONMENT" of the CSF (III.) the proposed objectives included in the priority sector "PHYSICAL & URBAN PLANNING AND REGENERATION ACTIONS" for the period 2000-2006, are as follows:

- Decentralisation of implemented plans, parallel to an upgrade of the role of the center.
- Promotion of strategic physical planning.
- Completion of urban planning in the new spatial units.
- Improvement of the efficiency of the physical and urban planning.
- Upgrade of the metropolitan center of Athens, of the cities of Thessaloniki, Piraeus and of other urban centers in Greece.
- Implementation of integrated actions for coastal zone protection in tourist areas.
- Implementation of the national policy for sustainable urban development of the cities and settlements, in the framework of the country's fulfillment of relevant EU and national obligations (implementation of Habitat II Agenda).

The European URBAN Initiative funds urban regeneration (including employment creation) projects as well as operational programmes of the Community Support Frameworks (CSF). The new CSF (III) incorporates a policy for urban centres and most regional programmes include town-specific urban development sub-programmes or measures.

Legal regulations

The most relevant legislation includes principally the Environmental Protection Law 1650/86 and two Joint Ministerial Decisions (J.M.D.):

- 69728/824/1996, regarding "measures and provisions for solid waste management".
- 19396/1546/1997, regarding "Measures and provisions for hazardous waste management".

Two other J.M.D.'s. have been recently issued, following the provisions of J.M.D. 69728/824/1996, that is:

- 113944/17.11.97, regarding the "General guidelines for solid waste management policy".

- 114218/17.11.97, regarding the “Framework of specifications and general programmes for solid waste management”.

Moreover, in urban planning, the way that contaminated land should be taken into account is not specified in national legislation. This is specified in urban studies, since their specifications, based on scientific data, include environmental investigations as one of the main parameters. The above legislation does not sufficiently cover the subject of brownfields and there is a need for development of more specific legislation.

Gaps and obstacles

- Insufficient legislation and no specific policy on brownfield redevelopment.
- Environmental, financial and timing risks
- No specific advantages for investors with respect to economic aspects.

Further Information

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IRELAND

Extent / localisation / types

To date no specific national survey has been conducted to identify and register brownfields in Ireland. The Environmental Protection Agency (EPA) undertook a preliminary desk-top assessment of sites that were potentially contaminated. It has estimated that there are somewhere between 1900 to 2,300 sites where historical or current industrial activities may pose a risk to soil and groundwater. These activities include old gaswork sites, waste disposal sites, closed mining sites, old fertiliser plants, tanneries, timber treatment activities, petroleum depots and retail stations, dockyards, scrap yards and agricultural activities such as sheep dipping and the use of pesticides. Most of these sites are generally located in urban areas, around major cities and towns particularly Dublin and around the Cork region.

Policy / programmes / actors

Policy on the environment in Ireland is made by the Department of Environment and Local Government (DELG), with the EPA offering technical advice on relevant issues. Since 1986 the DELG has developed and implemented an Urban Renewal Scheme that provides for a planned, integrated and focused approach to urban renewal. The urban renewal scheme must address the physical, economical, social and environmental regeneration and rejuvenation of urban areas. The scheme gives financial incentives for developers to develop brownfield sites in urban areas.

Under the guidelines for the 1998 Urban Renewal Scheme local authorities are responsible for the selection and prioritising of sites and key developments to be included in Integrated Area Plans (IAP's). In selection and prioritisation of sites, local authorities must identify areas where there are substantive barriers to redevelopment. Priority will be given to areas in cities and towns with strong urban characteristics where the greatest concentrations of physical decay, social and economic disadvantage occur.

Where a local authority designates an area for inclusion in the scheme, this must be justified on the basis that such financial incentives are required to overcome identifiable, substantive barriers to development. Contaminated sites constitute a potential barrier to development.

More recently, the DELG have introduced the Town Renewal Scheme that came into operation in 2000 and aims to revitalise smaller towns. This scheme is similar in nature to the Urban Renewal Scheme and is restricted to towns with a total population density of between 500 and 6,000 people per km². Local authorities are responsible for selection and preparation of Town Renewal Plans. The scheme gives financial tax incentives to develop brownfield sites in towns. Particular attention is directed at measures to regenerate older industrial buildings, which have become under-utilised

or derelict. Designation and tax incentives are only justified where it can be shown that they will assist in overcoming identifiable barriers to the desired development.

Legal regulations

Ireland does not have legislation dealing specifically with contaminated land. However, existing legislation provides a considerable range of powers for dealing with brownfield site redevelopment. These include the EPA Act 1992, the Waste Management Act 1996, Water Pollution Acts 1977-1990, Local Government Planning and Development Acts 1963-2000, Buildings Control Act, 1990 and Derelict Sites Act, 1990. These Acts and associated Regulations are used by both local government and the EPA to control and encourage brownfield site redevelopment.

Depending on the size of a site, the types of contaminants present and the remediation proposed, the developer of a brownfield site may require a Waste Licence from the Environmental Protection Agency or a Waste Permit from the Local Authorities. Large scale industrial activities are also licensed by the EPA, and where historical contamination has been identified, the company may be required by conditions attached to the Integrated Pollution Control Licence (IPC) to investigate and remediate the contamination.

Under the Planning Acts, local authorities can exercise some control in relation to brownfield site redevelopment. Some of the larger urban brownfield sites that are currently under redevelopment in Ireland are being managed as a result of plans specifically designed to encourage redevelopment. Generally, land development acts as a catalyst for brownfield site redevelopment, particularly where the land in question is of potential value from a development perspective.

Gaps and obstacles

Ireland has a relatively low population density in comparison to other European countries. As a result the pressure to develop brownfield sites is also reduced. However, the current economic boom has led to considerable development and clean-up of several contaminated sites in urban areas such as Dublin and Cork. The development of generic guideline values for priority contaminants in soil and groundwater applicable to Ireland are currently underway. These generic guideline values will provide a useful tool to support the redevelopment of brownfield sites in addition to the use of site specific risk assessment.

ITALY

Extent / localisation/ types

The redevelopment of brownfields may affect several urban areas in the Italian territory, with special regard to the north of the country. Regions with the highest number of brownfields are Lombardia, Piemonte and Veneto, due to the strong industrial development of the northern regions in the past decades. In central and southern Italy there are few large industrial plants because the industrial development was focused in the past only in limited areas. Some of those old industrial plants, such as oil plants, chemical plants, steel and iron industries, mining sites, are undergoing total or partial decommissioning and are characterised by brownfield features since they are located next to urban areas and their rehabilitation is strongly linked to social and economic issues. These sites, addressed by a special legislation as contaminated "sites of national interest" may have an area of some hundreds of hectares and are often located close to the Mediterranean coast, at Bagnoli (Naples), Crotone (Calabria), Brindisi and Taranto. Some areas within the large industrial poles are being cleaned up and rehabilitated, but their requalification for a more sensible use, is not always feasible.

On the local scale, even though the Regions are still developing local inventories of contaminated or potentially contaminated sites, it is possible to predict a quite relevant number of brownfield sites altogether. Several industrial sites are located in the proximity of, or within urban areas, and many of them have been abandoned since the 1980s. As an example in the Province of Milan about 150 old industrial abandoned sites of different sizes have been counted, reaching up to an area of 1260 hectares.

Policy / programmes/ actors

No specific government programme for brownfield redevelopment is available in Italy. The only national legal framework regarding this aspect is the National Decree no. 22/1997 (Waste Act) and related implementation Decree no. 471/99 on the clean-up of contaminated sites.

In addition, Law no. 426/98 established public funds for a number of selected sites defined as "sites of national interest" that are relevant contaminated sites with special features (e.g. location, extension, heavy environmental contamination, economic and social stresses, urgency of redevelopment) that locally might justify a 'brownfield' label; some examples of these are Porto Marghera (Venice) and some subareas in the aforementioned Bagnoli, Crotone sites. The original list has been expanded by a recent (2001) decree and the number of "sites of national interest" is now approximately 40.

The initial public budget for rehabilitation of these sites is over 500 million Euro for the next three years.

Local level activities

It is important to underline the increase of local activities on brownfield redevelopment and valorisation promoted by municipalities, local groups and authorities. These actions affected mostly northern cities. The strong urban and industrial development of these cities, such as Milan, suffered from an economic crisis in the '70s, '80s and later, which was followed by the shut down of several industrial plants. The abandonment of these industrial areas was not felt as an environmental issue and urban passivity has predominated until recent times: only in the last few years local government has started to take care of these areas by means of clean up and redevelopment under land planning programmes.

The need for urban spaces, infrastructures and the recent awareness of the importance of quality of life in urban areas, has led to the development of integrated policies and approaches aimed at the sustainable management of these territories. These approaches involve the private sector, communities and public authorities.

Some projects are co-financed by the European Commission e.g.:

- 'Urban Pilot projects' (Municipalities of Genoa and Venice): financing specific programmes of renewal of historical or traditional urban areas.
- 'Municipia' (Municipalities of Terni and Trento): network of towns managing the urban environment.

Most of the European funds dedicated to brownfield regeneration programmes arise from the Structural Funds for old industrial areas and underdeveloped areas, according to the provisions and objectives of the funding initiatives.

Laws and decrees concerning urban regeneration were issued in 1993 and 1994 for financing programs of redevelopment of urban areas carried out by private and public subjects. As a consequence in 1997 five programmes for redevelopment of urban areas (P.R.U.) were started in the municipality of Milan involving a total surface of 160 hectares, previously occupied by brownfields. Up to now a part of the remediation works is achieved and the construction of 4300 housing units, 4 urban parks, commercial and productive areas is currently in progress. About 700.000 Euro were invested, mainly by private companies.

Legal regulations

No specific regulatory framework addresses the complex issue of brownfield redevelopment, besides the legislation and funds generally relevant to contaminated site rehabilitation.

Gaps and obstacles

There are a number of deficits in practice:

- The absence of specific redevelopment programmes,
- Insufficient technical, legal, liability and administrative references,
- Insufficient participation of the public community,
- No uniform supporting programmes,
- No advantages for investors with regard to economic aspects,
- Location of business and industry on greenfield sites is easier, cheaper and faster than on brownfield sites,
- Negative appearance and environmental risks are the major obstacle to investment in brownfield rehabilitation and are a barrier to their re-use.

Further Information

ENI 'Enrico Mattei' Foundation (www.feem.it)

Liguria Region (www.regione.liguria.it)

Municipia Association (www.municipia.org)

International Council for 'Local Environment Initiative' (www.iclei.org)

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THE NETHERLANDS

Extent / localisation / types

Exact figures for the size of the brownfield problem are difficult to find as this is highly dependent on the definition of brownfield. In a study commissioned by the Ministry of Economic affairs, between 9,000 and 11,000 hectares of industrial sites are obsolete in the Netherlands. The problem is important in an urban context, as every large city with an industrial history has brownfield problems.

Policy / programmes / actors

Brownfields are legacies from an industrial past. Some forms of industry became obsolete and the soil problems they created remained unknown for many decades. The discovery of the social and economic impact of dealing with soil pollution became a barrier for the redevelopment of these brownfield sites. As space is scarce in a crowded country like the Netherlands there is on the other hand considerable pressure to redevelop the land. Recourse to greenfield is not possible in many cases because there is no suitable space, but this is also due to the Dutch spatial planning system and policies like "the compact city". Solutions to urban brownfield problems are found by the integration of various policies for urban redevelopment and environmental policies. Incorporating the wishes and expectations of stakeholders such as property developers and interest groups resulted in a number of programmes being developed. Soil contamination is only one of the many aspects covered in these programmes. It is not possible to give a complete description of these programmes here. The 1987 Soil Protection Act (SPA) lays down the statutory requirements for the clean-up of contaminated land. This Act established and defined a duty of care for the soil, imposing a statutory clean-up requirement for contamination resulting from certain industrial activities. The party responsible for causing the contamination is liable for the costs of clean-up, in accordance with the polluter pays principle. In 1994 further regulations were drawn up for cases of contaminated soil. The regulations make a clear distinction between cases where remediation is conducted by the party concerned, and where the authorities have the responsibility.

Policy objectives for redevelopment are given in the following policy plans:

- The policy document 'Housing in the 1990s',
- The supplement to the Fourth Policy Document on Spatial planning (VINEX),
- The VINEX update,
- The National Environmental Policy Plan 3,
- The plan 'Space for the regions',
- The 'Second Transport structure plan',

These plans are at the national level. They provide the basis for further plans at the provincial and municipal level and give rise to subsidies and a number of financial schemes. More (but still not complete) information is given in a document prepared by the Dutch ministry for an OECD study on policies for urban brownfield sites.

Legal regulations

- The Urban and Rural Regeneration Act 1985,
- The Soil Protection Act 1987 extended with a soil clean up paragraph in 1994,
- The Law on Housing,
- The Spatial Planning Act,
- The Environmental Protection Act.

The legal basis is generally sufficient but could be improved. Brownfield redevelopment requires an integrated implementation of these laws but also an integration at the financial level. Whether part of the budget for environmental aspects is spent for spatial planning purposes or vice versa is always a difficult discussion if the question arises when the project is already started. That is the reason why in the Netherlands so much emphasis is placed on integrated planning.

Central government is currently in the process of renewing its soil contamination policy (the "BEVER" project) and revising it to be integrated, decentralised and offer a larger role to the private sector. This change of policy is intended to increase both the societal and environmental benefits, the intention being that the future remediation of contaminated land will be adapted to the future land-use. This will allow a more environmentally sound clean-up-process, while minimising the costs. In addition, the government intends to take financial, legal and fiscal measures to make it more attractive for the private sector to invest in the remediation of contaminated land.

Specific initiatives include the BELSTATO urban renewal fund (approximately 363 million Euro per year available over the period 1990-2005); the Intrafunds of the Ministry of Transport, Public Works and Water Management, and the VINEX covenants (approximately 408 million Euro budgeted for 1995-2005 for contaminated land). In total a sum of 34 million Euro was available over the period 1996-1999 for the Netherlands as a whole, of which one-third was for the four large cities.

Gaps and obstacles

- Financial risks. If these are not spread amongst all interest groups the investment required is often too large.
- Lack of integration of environmental policy and spatial planning policy. (As far as soil clean up policy is concerned this will be solved by the revision that is now taking place. For historical contamination, (before the enforcement of the Soil Protection Act, 1987) clean up will be related to the intended use of the land).

NORWAY

Extent / localisation / types

Brownfield sites are not a problem in Norway. Occasionally such sites emerge but it is not possible to provide any systematic information on these contaminated sites.

Policy / programmes / actors

There are no governmental programmes as such in Norway in support of brownfield redevelopment. However, government money is spent on the remediation of contaminated sites where nobody claims the land, no solvent polluter is known and action is needed to achieve a certain level of safety.

The Norwegian pollution control authority prioritises the handling of cases where building and construction is planned on contaminated sites by giving permits with environmental criteria. These allow sound solutions, with sufficient consideration of the economy within the projects to ensure that they are carried out.

Legal regulations

In Norway there are two laws applicable, neither of them especially developed for taking care of brownfield redevelopment: the Pollution Control Act and the Plan and Building Act. The Planning and Building Act allows the municipalities to loosen or tighten the development pressure on the areas, and the regional authorities to comment on the area planning. In this way the redevelopment pressures are concentrated within urban areas.

Of course this is also a political issue, because there is generally an unwillingness among politicians and the public to expand the borders of urbanisation further into the greenfield areas.

Gaps and obstacles

None identified.

PORTUGAL

Extent / localisation / types

Brownfield problems in Portugal are related to rapid economic change since the accession to the EU. Transformation of industry and relocation is still frequent leading to under-used industrial areas.

Most of Portuguese industry is located in urban areas, close to residential areas. In past decades, the cities have grown and spread to the nearest industrial areas. The co-existence of heavy industry and residential areas is increasing, with several examples of dangerous industries (from the environmental point of view) occurring in the middle of important urban areas. The population is therefore confronted with contaminated sites in these urban areas. This leads to an increased number of community led complaints regarding the potential threats posed by these industries.

For example, BARREIRO is one of worst situations where heavy industry is located in an urban area. Sometimes the problems of soil and water contamination are very important. This is the case with the Seixal area (Lagoa da Palmeira - Siderurgia Nacional) and the Estarreja area. These two areas cannot be considered pure brownfields, but are characterised by underused sites. An important brownfield in Almada, near Lisbon, is a former ship building area planned for residential use.

On the Portuguese mainland, industrial sites are concentrated along the coastal areas, with a focus around the large river estuaries. Mining and extractive industries, whose spoil heaps and residues contaminate the soil and the ground water, are located in the interior of North and South Portugal. Uncontrolled refuse tips exist everywhere, in particular close to the urban centres along the most important traffic routes.

Although no consolidated data has been made available about old industrial sites in Portugal, preliminary information is available on the identification and qualification of derelict contaminated or suspected sites. In most cases these concern still active industrial sites, mines and refuse tips.

In total it is assumed that at least 2000 contaminated or suspected sites exist in Portugal as indicated in the preliminary version of the only existing situation report. Nothing is known about the number of uncontrolled refuse tips. It is reasonable to estimate that these number over 2000.

Potentially contaminated and derelict sites are mainly found in the densely populated and industrialised centres along the coast. In the interior of the country, they exist mainly in connection with mining (approx. 300 sites), close to important raw material sources (above all timber) and along the rivers.

The above survey on which all the data is based neither quantifies or qualifies the contaminated areas. No differentiation is made between derelict sites and sites where contamination is suspected. Contaminants are simply characterised in a general way

and roughly assigned to geographical areas. More informative data is not available, although it is believed that improved documentation is in preparation. The present situation in Portugal is characterised by a missing inventory and characterisation of contaminated sites as well as the non-existence of criteria and methodologies for risk assessment and rehabilitation.

Policy / programmes / actors

There is no governmental programme for brownfield redevelopment in Portugal. A single programme was developed in Lisbon, in the area where we now have the "Parque das Nações" (the location of the WORLD exposition of EXPO98). In the Estarreja area several studies have been conducted and the government has accepted the need for remediation of this area. These procedures are in progress and in the near future the enterprises responsible for the clean up will be determined and the work will start. In the future, strategies will be developed for deteriorated and priority areas and for specific situations.

The most important actor at the national administrative level is the "Instituto dos Resíduos" (waste institute) founded in 1997, which is subordinate to the Ministry of the Environment. It is in charge of implementing national policies in the waste sector, the establishment of guidelines and technical codes of practice, as well as the management of areas contaminated with residues or wastes. The centre is also responsible for developing area management strategies, taking into account European and North-American experience. Until the final establishment of national standards, the "Preliminary Canadian Environmental Criteria for Contaminated Areas" have been used on a provisional basis (e.g. for the EXPO98 area).

Further institutions subordinate to the Ministry of the Environment, or working for the Ministry and directly or indirectly involved in area management issues, are:

- Instituto da Aqua (Hydrological Institute),
- Instituto de Meteorologia (Meteorological Institute),
- Instituto de Promoção Ambiental (Institute for the Promotion of Ecology).

The Ministry of the Environment itself is the supreme supervisory authority with regard to ecological implications in connection with area management. On an interdisciplinary basis, it watches over compliance with the environment related regulations during all administrative and executive acts. The Ministry for Regional Planning and Public Administration deals with all planning related, legal and administrative processes accompanying area management. As the supreme planning authority, it is among others responsible for the control and approval of municipal urban development planning, i.e. the most important planning procedure for area management projects.

On the brownfield sites as such, the municipalities concerned are in theory the most important actors alongside private or public investors. However, there is no

practicable experience of any significant derelict land or industrial site recycling project with the exception of EXPO98. In the case of the world exhibition, the privately owned areas were taken over by the Government owned EXPO company.

For the above-mentioned reasons, private actors have not played any significant role so far. While there is considerable private investment in area relevant projects, these never concern the problem cases but only urban areas in high quality locations free from contamination (e.g. new construction in Amoreiras and Chiado in Lisbon) or subsidised prestigious projects (e.g. construction of the new Tejo-bridge “Vasco da Gama”).

The EXPO 98 initiative

The first comprehensive, successfully implemented and best-documented project is the development of the EXPO98 area in Lisbon. In order to provide a suitable framework, laws were specifically passed for this project, which define the area of intervention, secure regional planning measures and grant special tax allowances. The task consisted of decontaminating a 340 hectare land area on the Tejo river and returning it to a new use. The original structure was characterised by oil refineries, warehouses, a sulphuric acid factory, dumps and degraded residential quarters. The measures were planned for the period 1993 - 2008:

- Discontinuation or relocation of old industrial activities,
- Area remediation,
- Construction on the area of the world exhibition,
- Strengthening of local foundations for housing, living and employment functions,
- Development of commercial, cultural and leisure time activities,
- Enhancement of competitiveness and the outside representation of Lisbon and Portugal.

In the final stage, the following results are expected:

- 10,000 dwellings with 25,000 inhabitants,
- 16,000 new jobs,
- 64 ha residential area,
- 8.5 ha “clean” industrial site,
- 22.7 ha traffic areas,
- 80 ha public park,
- 120 ha green spaces and public places,
- Culture and leisure time infrastructures,
- Recovery of the river banks and the harbour areas as public spaces.

Soil remediation was based on the excavation and encapsulation of the contaminated material in landfills, separated according to the type of contamination. An

international consortium was charged with planning and risk assessment. This remediation phase is completed. As far as the general response and financial revenue is concerned, the world exhibition was not able to meet expectations. The effects on the development of the overall urban project remain to be seen. Further projects in Portugal have not progressed beyond the preliminary survey stage.

The “Specific Programmes for the Development and Ecological Rehabilitation of Estarreja” (PEDRAE) is a combination of several projects. One of them, ERASE, deals with the remediation of contaminated industrial sites in Estarreja.

- For the remediation of the Palmeira Lagoon, the type and degree of contamination is being studied.
- The Petrogal project is studying the type and degree of contamination associated with two refineries, five fuel storage depots and 100 petrol stations owned by the Government-owned oil company.
- The Metalimex project is involved in planning for the clean-up of an area contaminated by aluminium production residues.
- All projects are financed by the Government or co-financed by the EU, without polluter participation.

Portugal’s EU accession in 1986 created the financial preconditions for the necessary intervention, i.e. means were allocated from the cohesion fund. At the same time more stringent political and legal standards were introduced by Portugal’s adoption of EU standards.

Legal regulations

Environmental protection and correct regional planning are tasks of the Portuguese state, guaranteed by the Constitution (Art. 9 d, e and 66).

Soil protection is covered in Art. 278 1 and 279 1(a) of the Penal Code (Código Penal), non-compliance is subject to punishment.

Numerous laws deal with soil, but do not directly concern ecological issues. The Soil Act (Decreto-Lei N° 794/76 of 1976, amended in 1979, 1980, 1984) regulates soil use in terms of economic, agricultural and urban development aspects. Further laws about soil use or soil protection are:

- Lei N° 68/93 of 1993, amended in 1997, concerns municipal agricultural fallow land and common lands,
- Decreto-Lei N° 117/94 of 1994 concerns the approval and establishment of scrap and waste iron yards, excavated waste material and construction waste landfills, and storage areas for solid fuel,
- Decreto-Regulamentar N° 31/95 of 1995 concerns the designation of preferential areas for clay and sand extraction,

- Decreto-Lei N° 239/97 of 1997 regulates the collection, treatment and removal of wastes and bans the burying of waste,
- Decreto-Lei N° 446/91 of 1991 is the only law that establishes a direct relationship between soil and contamination. It is related to the spreading of sewage treatment sludge on agricultural areas.

The Environmental Framework Act (Lei de Bases do Ambiente, Lei N° 11/87) of 1987 "...defines the foundations of environmental policy..." with reference to the Portuguese constitution (Art. 1). It obliges the state and citizens to behave in an environmentally compatible way and threatens punishment for non-compliance. What is important in this context is that the polluter-pays principle is laid down in law, not just with regard to a general liability but also with a commitment to restore the *status quo ante*. Based on this Environmental Framework Act, numerous other laws and regulations were adopted, dealing with waste, sewage, noise, agriculture, and also with specific cases of a regional or topic-related nature. In this context, the soil is often referred to as an endangered substrate that should be protected, however it is never a central issue.

In 1998, the "Framework Regional Planning and Urban Development Act" (Lei N° 48/98) entered into force. Art. 14 1 subjects land use to the principles of national planning, sustainability and careful use of resources.

Gaps and obstacles

Area recycling or area management are almost unknown concepts in Portugal and are not a prominent issue in a country that has used comprehensive regional planning for less than a decade. This is partly due to the rather relaxed situation in the real estate market (with the exception of central locations) coupled with the fact that intensive industrialisation did not start before the middle of the 20th century.

Other gaps include:

- Insufficient awareness by the public and the entire public administration on all levels,
- Inadequate specific legal instruments,
- Inadequate funding,
- An underdeveloped political will to implement measures,
- Insufficient human resources, and
- A fragmentary level of information.

In the short and medium term, Portugal must create the legal and structural framework for the management of contaminated areas. For this it will be necessary to create a typology (establishing an official land register, classification and hierarchy) for contaminated areas; to define evaluation criteria; and to determine land reference values. Research and development projects that will help introduce risk assessment methods and soil remediation technologies are also needed.

SPAIN

Extent / localisation / types

The regions in which there is a significant presence of brownfield sites are those in which there has been development of industrial activity, specifically related with the mining industry. At present, these industries have ceased their activity. Sites are often located close to urban areas and are difficult to redevelop. The most extent areas are:

- Asturias
- Cartagena
- Basque Country

The National Inventory for Contaminated Land was published in 1993, in which approximately 18,000 industrial sites were identified as potentially contaminated. In a first phase risk evaluation, 4,532 of these sites were selected as potentially contaminated. These sites consisted principally of industrial sites and landfills, 52% of which were located in urban areas. Both private and public owned sites were included in this inventory, from which a first inspection was followed by a basic preliminary investigation, in order to identify those sites which would be characterised at a later date.

In 1995, the second phase of the study increased the number of potentially contaminated sites to 4,900. Since 1995, the Autonomous Regions have been compiling an inventory of their territory, in order to obtain the total number of sites which could be potentially contaminated. Determination of sites that requires a detailed study in order to characterise the potential risk, taking into consideration the possible future land use, is also taking place.

In response to an acute demand for action, the "Secretaria de Estado de Medio Ambiente y Vivienda" (State Secretariat for Environment and Housing) developed the National Plan for Remediation of Contaminated Soils (Plan Nacional de Recuperacion de Suelos Contaminados). This aims to characterise 1650 additional sites and conducting 275 remediation projects. Estimated 400 Million Euro are necessary for capital expenditure by the Ministry of Environment and a similar quantity will be required by the Regional Government.

The sites were characterised as follows:

- Almost all of the sites are not up to statutory (legal) standards, 59 % are often inaccessible lands.
- 27 % of the sites are located in urban areas, 26 % on open spaces (fields), 21 % on protected areas, 14.5 % on unplanned areas designated for development and 11.6 % on programmed building land (or construction sites).
- 60 % of the sites present a threat to groundwater.
- Minerals, heavy metals and hydrocarbons are the most important pollutants.

- 61 sites were given priority as short-term remediation projects, because of the threat to groundwater, exceptionally high environmental risk and their proximity to urban centres.
- 85 sites were scheduled for medium-term rehabilitation soils. The remaining 128 sites are scheduled for a long-term remediation, because they do not present any direct threat to the environment.

When all these regional inventories are completed they will be centralised in the Ministry of Environment and will be available on the EIONET network.

Policy / programmes / actors

In Spain, there is no specific programme of aid for the regeneration of brownfield sites. Current important initiatives to redevelop brownfield sites are ongoing in areas of abandoned mine sites and metal industry processing. Redeveloping areas includes:

- Asturias disused former coal mines and steelworks.
- Murcia; S.E., of Spain, the area near Cartagena - La Unión, in Sierra Minera. Here there are several lead and zinc mines as well as metal foundries and chemical facilities, the majority of which are no longer operational.
- Navarra
- Basque Country
- Huelva, in Andalucía; especially the pyritic area in the Tinto River

The lead battery plant of Tudor, in Zaragoza was redeveloped some years ago into a big shopping centre, after the site was remediated.

The National Plan for the Rehabilitation of Contaminated Land, approved in February 1995, could overlap with brownfield redevelopment but limits its action and financing to the renovation of public owned land. Both the Ministry of the Environment and Autonomous Regions finance 50% of the cost of these actions. However, the majority of the contaminated and brownfield sites, are owned by the private sector.

It is possible for the Autonomous Regions to provide incentives to the private sector in terms of providing credit to meet remediation costs, which have to be repaid over a period of between 10 to 15 years. This repayment has to be guaranteed by a bank endorsement or by an agreement in which the administration can benefit from the income generated from the remediation and re-use of the land. The State Administration can participate in these financial operations, financing 50% of the amount provided by the Autonomous Regions. The National Plan defines a 10-year period in which 800 million Euro are provided by the Government to the Autonomous Regions in order to address identified problems derived from contaminated land. In-conjunction with the 10-year National Plan, the Government has signed bilateral agreements of co-operation with each Autonomous Regional Government in order to efficiently co-ordinate the site investigations and

remediation projects. 1,650 more sites should be assessed with 275 contaminated sites remediated by the year 2005, in addition to the 61 priority categorised sites.

Financing

The capital expenditure for the realisation of the above mentioned plan is estimated as 800 million Euro. 50 % of this is to be born by the Autonomous Governments; the remaining 50 % have to be financed by either the Ministry of Environment, within Central Government or from the Cohesion Funds.

Resources are distributed between 4 programmes:

- Identification of potentially contaminated sites and characterisation (15 million Euro)
- Remediation of projects (70 million Euro)
- Execution of Projects (680 million Euro)
- Monitoring (35 million Euro)

Actors

The former "Ministerio de Obras Públicas, Transportes y Medio Ambiente" (the Ministry for Public Works, Transport and Environmental) was an important actor at the national level. This office founded as a consequence of an expected increased demand in the national plan to deal with industrial waste, predicted in 1990, the state owned company EMGRISA (Empresa para la Gestión de Residuos Industriales, Sociadad Estatal).

EMGRISA is responsible for:

- Management, treatment and recycling of all kinds of industrial waste
- Consultation and provision of technical equipment to the industry to minimise waste production
- Introduction of environmental management systems and environmental audits.
- Remediation of contaminated land
- Qualification and quantification of industrial wastes
- The development and realisation of preventive measures in order to avoid future soil pollution
- The assessment and characterisation of other potentially contaminated sites.

This company co-ordinated the first two phases of the National Inventory of Contaminated Soils. It is also in charge of exploiting the electric power plant in the city of Melilla, a Spanish Autonomous City in North Africa.

EMIGRISA is part of the Group originated by this Ministry of Environment, which is developing the contaminated soil remediation guidelines for Spain.

The plan for realisation of the above named soil quality objectives has different phases:

- Introduction of soil quality standards
- Publishing of a clearance certificate for remediated sites which qualifies the site as suitable for building and industrial settlements
- Creation of minimum legal standards
- Formation of comprehensive technical guidelines.
- Qualification and quantification of industrial waste
- Sewage control
- Oil and waste oil - spillage control
- Preparation of waste disposal plans
- Studies of environmental tolerance

Legal regulations

This recent law on waste "Ley 10/1998, de 21 de abril, de Residuos" considers contaminated land for the first time in a legal context in Spain. Contaminated Land is defined in Chapter V of the said law under Articles 27 and 28. These articles established that the responsibility for the remediation of contaminated land lies with the contaminator and as such, they are obliged to remediate. This is based on the system 'polluter pays'. In Articles 32 to 38, administrative responsibility and the degrees of sanctions and fines are set out.

Art. 3 p defines the term Contaminated Soil as: "soil, which physical, chemical or biological properties are negatively changed through the presence of anthropogeneous substances with damaging characteristics and concentrations, that pose a risk to human health and the environment, according to the defined criteria's and standards of the government."

Art. 27. obligates the regions to compile inventories of contaminated sites and to set up intervention plans. Art. 28 provides the possibility for financial support during the remediation, to the private sector.

The Autonomous Governments also have the authority to develop environmental legislation. Only two regions, Galicia and Cataluna, have legislation that refers specifically to contaminated land, but this is in the context of broader legislation on waste. These laws are:

- Ley 6/1993, de 15 de julio Reguladora de Residuos de la Generalitat de Catalunya
- Ley 10/1997, de 22 de agosto de Residuos Sólidos de Galicia

Both regional laws were published before the national law for wastes, and as such the only Regional Government that has applied the national law with special reference to soil quality is that of Andalusia. An Order issued by the Andalusian Government on December 18th 1998, referred to the Aznalcollar Mine disaster in

which a tailings dam failure in April 1998 caused contamination along the course of the River Guadiamar. This order sets out the background and intervention limits for soil affected as a result of the disaster.

Scientific and regional planning aspects fall under the “ley 6/1998, de 13. de abril, sobre régimen de suelo y valoraciones (Soil planning and Valuation)”.

Gaps and obstacles

- The law with special reference to contaminated land is still relatively recently published.
- Lack of background and intervention limits at a national level. Therefore, it is not possible to penalise polluters and oblige them to decontaminate.
- Further legislative development of the legal framework for dealing with contaminated land, is needed as risk assessment methodology, definitions of background levels, etc., are developed.
- The development of environmental legislation at the autonomous regional level.
- The possible end use of a brownfield site may not coincide with the municipal urban plan and this may hinder brownfield redevelopment.
- The budgets of the Administrations are limited to the clean up of publicly owned property and sites, and to provide incentives to the private sector for remediation.
- The real extent of industrially contaminated sites is possibly greater due to the lack of historical environmental awareness and poor past waste management practices.
- The Autonomous Regions are responsible for environmental management and control. At present, the number of environmental technicians employed at regional and at local level is still very limited, resulting in environmental control and checks that are few and far between.
- Lack of financial resources in general in order to develop and execute remediation programmes.

The regulation for the redevelopment of brownfield sites as it stands today is insufficient for successful regeneration practise. One of the principal reasons is due to the lack of a legal definition for remedial action. That is, the step by step process in which identified contaminated land is evaluated, a remedial plan of action is prepared and executed, and the time scale required for said execution is considered. This is again influenced by the lack of background and intervention limits at a national level.

UNITED KINGDOM

Extent / localisation / types

Any data describing the extent of brownfields need to be explicitly tied to relevant definitions. The question of a definition for “brownfields” is discussed in ALKER *et al.* 2000), which also discusses definitions of other related concepts.

In England, successive Derelict Land Surveys in 1974, 1982, 1988 and 1993 produced relatively firm data for the extent of land which was “so damaged by industrial or other development that it [was] incapable of beneficial use without treatment”. (In this context, “treatment” was taken to include the demolition or clearance of buildings and other structures.) The 1993 survey (DOE 1993) identified a total of 39,601 hectares of derelict land in England. The data separately identify different categories of dereliction such as mining spoil heaps, military land and “general industrial dereliction”, and distinguish between sites in rural, urban and “inner city” areas.

However, this category of “derelict land” does not form a particularly close match with the notion of “brownfield land”, however. First, it excludes some categories that might be considered “brownfield”, including land which has been cleared or reclaimed for development but where the actual development has not yet taken place, and sites which are “under-used” in social or economic terms. Second, it includes land that is unlikely to be suitable for development re-use, in particular minerals working and other sites in rural areas. (Half of the “derelict” land in the 1993 English survey was in rural areas.)

In 1998, a new project was started to produce a “National Land-Use Database” (NLUD). The primary purpose for the first phase of this project was to create a database to assist in the identification of previously-developed sites which might be, or might become, available for new development uses; this can be seen as mapping closely onto the “brownfield” issue. Work continues on populating the database, but interim statistics released in May 1999 revealed that some 33,000 hectares of land had been identified in England which is previously-developed and either vacant or derelict, and which might be suitable for re-development. Differences in data specifications as well as data-capture arrangements in comparison with the earlier Derelict Land Surveys mean that it is difficult to reconcile NLUD data with earlier exercises. Although much of the difference can be explained, there has been criticism from some researchers (eg Urban Mines Ltd and the National Brownfield Sites Project) and from some regional and local government bodies that the preliminary data from NLUD represents an under-estimate of the extent of land which should be included.

Experience suggests that many potential “brownfield” sites would not be revealed by such database or survey exercises. This is because they become “brownfield”, sometimes only for a short period, as their previous use comes to an end. Spatial

planners in the UK refer to this type of site as “windfall” sites, as they are sites which become unexpectedly available for redevelopment.

Across the UK, brownfield sites result from a wide range of former industrial activities. These include mineral extraction, coal and steel production, gasworks, electrical generation, traditional engineering-based activities, transport infrastructure and chemical production as well as a wide range of more minor industrial activities. In 1996, DOE (now part of the Department for Environment, Food and Rural Affairs – DEFRA) published a series of nearly 50 “Industry Profiles”, which provide information on the history of different industrial activities in the UK and identify the likely potential contamination problems to be found on the sites involved. (See www.defra.gov.uk).

Policy / programmes / actors

Policy

The underlying policy aims for promoting brownfield redevelopment include:

- The economic and social regeneration of the surrounding areas;
- The environmental improvement of the sites themselves; and
- The reduction in "development pressure" on greenfield sites.

These aims are reflected in the headline land-use policy objective for the national Government in the UK, which is "to promote a sustainable pattern of physical development and land and property use in cities, towns and the countryside". This objective is backed up by specific "Public Service Agreement" (PSA) targets for 60% of new housing to be provided on previously developed land or through conversion of existing buildings, and for brownfield land to be reclaimed at a rate of over 1,100 hectares per annum by 2004, reclaiming 5% of current brownfield land by 2004 and 17% by 2010 (DETR 2001).

This land-use objective is also specifically linked to a further objective "to enhance sustainable economic development and social cohesion through integrated regional and local action, including the promotion of an urban renaissance".

In 1999, an "Urban Task Force", set up by the national government and chaired by the architect Richard Rogers (Lord Rogers of Riverside), examined the current and potential role of national government and other public sector bodies in urban policy, including the promotion of brownfield redevelopment. The Task Force included representatives of a range of organisations with an interest in urban regeneration and its report, *Towards an Urban Renaissance* (UTF 1999), made a series of detailed recommendations for future action.

The Government set out its own framework of policies and programmes, and responded to the Task Force's recommendations, in an Urban White Paper, *Our towns and cities: the future – towards an urban renaissance* (DETR 2000a), published in

November 2000. This included what was described as a "new vision of urban living", including:

- "people shaping the future of their community, supported by strong and truly representative local leaders;
- people living in attractive, well-kept towns and cities which use space and buildings well;
- good design and planning which makes it more practical to live in a more environmentally sustainable way, with less noise, pollution and traffic congestion;
- towns and cities able to create and share prosperity, investing to help all their citizens reach their full potential; and
- good quality services – health, education, housing, transport, finance, shopping, leisure and protection from crime – that meet the needs of people and businesses wherever they are."

In the detail of the White Paper were specific proposals to "use the tax and planning systems to bring previously-developed 'brownfield' sites and empty property back into constructive use, turning eyesores into assets".

A summary of the Government's overall policy towards contaminated land issues (which overlap with brownfield issues) is set out in DETR Circular 2/2000 *Contaminated Land* (DETR 2000b); this describes the policy in terms of its impact on sustainable development. Although the main focus of the Circular is to set out the details of the regulatory framework for contaminated sites, it also emphasises the Government view that the primary route for dealing with much of the legacy of industrial land contamination will be through redevelopment.

Programmes and actors

At present in the UK, in many urban areas the redevelopment of brownfield sites is largely private-sector led – a very significant proportion of projects take place with very little direct involvement from public bodies and government agencies, except in their roles as “regulators” issuing and enforcing necessary approvals and legal permissions (such as town and country planning). This private sector focus may be the result of a combination of the following four factors:

- The fact that most of the current brownfield land stock is already privately-owned,
- The particular “economic history” of the sites and the industries etc. which were formerly on the land,
- The current state of the national and regional economies, and in particular the demand for land in the areas,
- Conscious political choice by successive national governments.

However, there are also significant government programmes to promote and support brownfield redevelopment. (A description of the history and development of

programmes to support brownfield regeneration is set out in *Effective Regeneration of Brownfield Land in the United Kingdom* (DENNER & LOWE, 1999.)

These programmes can be split into four types:

- Spatial planning,
- Technical support,
- Financial support,
- Direct development by public bodies and agencies.

Spatial Planning.

The system of “town and country planning” promotes brownfield redevelopment largely by inhibiting or preventing development projects on greenfield sites, and by making brownfield land available for development. This is brought about by a hierarchy of:

- National planning policy (set out by national government in Planning Policy Guidance notes),
- Regional planning policy (set collectively by local government bodies in the region, and the Regional Development Agency), which also includes overall “structure” planning for the region,
- Local structure and development plans (set by the country and district councils) which make zoning decisions for the future use of particular areas of land in the area,
- Individual decisions on applications for planning permission (made by local planning authorities) which normally should conform with the relevant development plan.

This structure of guidance cascades the national PSA target for 60% of housing to be on previously-developed land or in converted buildings into more detailed regional and local targets. These reflect different local circumstances, such as the availability of brownfield land suitable for redevelopment. To promote the achievement of these targets, there is a new requirement, set out in Planning Policy Guidance Note 3 *Housing* (DETR 2000c), for a “sequential test” for new developments. This test means that a local planning authority must first satisfy itself that there are no suitable and available sites which have been previously developed before it can allocate any greenfield sites for new housing projects.

As well as their roles in development control, the Regional Development Agencies and individual local authorities also act to promote economic regeneration of their respective regions and areas, seeking positively to encourage inward investment and new development.

Technical support.

This takes both “pro-active” and “re-active” forms. On the “pro-active” side, national government and other private sector led groups fund research and development and

the development of “best practice” advice to assist the development and construction industries in working on brownfield sites.

On the “re-active” side, the focus is on removing factors that might inhibit brownfield redevelopment. This work includes:

- Research and development on the application of new remediation techniques and technologies,
- Confidence-building initiatives with the financial and property sectors,
- Setting out a system of liability for contaminated land,
- Reviewing the licensing system for land remediation activities,

Wider policy development on issues such as “land assembly” for larger development projects, and changes to the system of compulsory purchase by public authorities.

Financial support.

Brownfield redevelopment is eligible for direct public sector financial support where this is necessary to achieve social and economic policy objectives. In some regions, public sector intervention is essential to ensure redevelopment. Financial support for the private sector can take a number of different forms, such as:

- Grant aid, either for particular elements of the costs of development or as “gap funding”,
- Support for loans, including payment of interest and guarantees,
- Other guarantees, e.g. income stream guarantees, support for warranty purchase,
- Partnership projects with risk and profit sharing.

Direct funding is generally provided by national government through arms’ length public sector regeneration agencies – English Partnerships and the network of Regional Development Agencies in England; the Welsh Development Agency; and Scottish Enterprise. In some cases, the funding is provided through local authorities, either directly from national government or via the national or regional regeneration agencies. In addition to these national sources of funding, other projects receive support through Objectives 1 and 2 of the European Regional Development Fund and other structure funds (such as RECHAR and RENAVAL).

Recent years have seen a slow-down in governmental funding for private sector schemes as a result of legal problems. The European Commission has identified the main programmes involved as “state aids” and therefore potentially contrary to EU competition policy. This means that the programmes – and in some cases, individual projects – have to be approved in advance by the Commission, and also places strict limits on the geographical availability of financial support for private sector development, and on the amount of support for any individual project. New funding programmes are currently being developed and submitted for approval.

Other indirect financial tools have been used in the past – such as tax breaks for development projects in designated “Enterprise Zones”. The 2000 Urban White Paper committed the national government to investigating new fiscal instruments in

particular reductions for properties in economically-disadvantaged areas in the sales tax applied to property (“Stamp Duty”) and tax credits for cleaning up contaminated land. The Finance Act 2001 has taken forward this second idea, allowing companies to offset 150% of the cost of contaminated land remediation against the profits on which they pay Corporation Tax; in some cases, this tax enhanced tax allowance can be claimed as a payable “tax credit”.

Direct Development

The public sector regeneration agencies and local authorities also carry out “direct development” projects of the following kinds:

- Fully worked-up developments,
- Preparing “development platforms” for subsequent development by the private sector,
- More simple “site clearance” projects,
- Providing roads and other infrastructure on or near potential redevelopment sites.

Legal regulations

The main legal control on any development is the system of land-use planning set out in the ***Town and Country Planning Act 1990***. Any development requires specific “planning permission”, which may control not only the location of development, but also the nature of that development and the way it is carried out. Specifically in the context of brownfield redevelopment, the planning permission may contain specific conditions relating to site investigation and assessment and, where appropriate, remediation of contamination. Guidance to planning authorities on “contaminated land” aspects of planning is set out in Planning Policy Guidance note PPG 23 ***Planning and Pollution Control*** (DOE, 1994). This guidance is currently being revised, with a view to the publication of specific planning guidance on developments on land which may be affected by contamination. Brownfield redevelopment projects above a certain size also require ***environmental impact assessments*** as part of the planning approval process.

In addition, the ***Building Regulations***² impose a system of controls over the details of construction of any building. These cover a range of issues from the integrity of the foundations, through to issues such as disabled access to public buildings. They include specific requirements to ensure that buildings and building services are protected from the effects of any contaminants in the ground under the building.

¹ This is administered by Local Planning Authorities, which are usually the municipal or district authority for the area.

² This is administered by “registered inspectors”, who are employed either by the local authority or by an approved private sector body such as the National House-Building Council.

Land remediation activities may need prior regulatory approval under the **waste management licensing system** under Part II of the Environmental Protection Act 1990 (which implements the European Waste Framework Directive) or the system of **Integrated Pollution Prevention and Control** (which implements the directive of the same name)³. Some remediation processes are defined (under the Directive) as “waste disposal” or “waste recovery” operations, and therefore have to be licensed to ensure that they are carried out without risk to human health and the environment. Other licensing regimes may also be relevant in some cases (e.g. the Groundwater Regulations 1999). The Government is currently reviewing the operation of waste management and other controls as they apply to land remediation projects, and may introduce a more specific form of regulatory control in the future.

Although the focus of the main “**contaminated land**” regime⁴ (Part IIA of the Environmental Protection Act 1990) is on the “current” use of land, and it may not therefore be directly relevant to the redevelopment of land (which is about introducing new uses of land), it does have an indirect relevance. It sets a reference standard both in technical terms (defining the circumstances in which future regulatory intervention might be needed) and in legal terms (defining who would be liable to pay for any further remediation) (DETR 2000b). This regime is intended to be complementary to the regime already in existence to protect water resources. The specific regulations under the **Water Resources Act 1995** are likely to apply to brownfield sites.

Other regulations covering particular aspects may also be relevant. For example, **Health and Safety legislation**⁶ covers the protection of workers on construction projects and will have relevance for dealing with hazardous substances.

A more detailed discussion of the relevant legal regimes is given in the Circular on contaminated land (DETR 2000b) and guidance to the construction industry (CIRIA 1997).

A key point is that regulations have been used largely to control how redevelopment takes place on brownfield sites, and not to force it to happen; this aspect has been considered as not being possible to achieve by the use of regulations in the UK.

A further important factor in the UK context is that there is an overall “de-regulatory” culture. Many of the factors that might be subject to control by regulations in other countries – e.g. accreditation of professional advisers, or protocols for sampling or chemical analysis – are not subject to regulations. An

³ In so far as these regimes affect land remediation activities, they are administered by the Environment Agency (EA) in England and Wales, and by the Scottish Environmental Protection Agency (SEPA) in Scotland.

⁴ Administered, in most cases, by local authorities.

⁵ Regulated by the EA and SEPA, as above.

⁶ Regulated by the Health and Safety Executive (HSE).

overview of the effectiveness of efforts to regenerate urban areas generally is provided in the report of the Urban Task Force (UTF, 1999).

Gaps and obstacles

Gaps and obstacles in brownfield redevelopment have been reviewed in the UK by a number of organisations, in particular by the Parliamentary Office of Science and Technology (POST 1998) and by the Urban Task Force (UTF 1999).

Other identified needs include:

Drivers

- Better understanding of the social, economic and environmental factors related to brownfield site redevelopment,
- Ways to quantify and assess the contribution made by brownfield redevelopment to sustainable development,
- Ways to integrate brownfield considerations to other aspects of regeneration, such as architecture and social development,

Integration

- Ways of building confidence in brownfield regeneration, e.g. risk communication methods,
- Tools to promote good practice in brownfield redevelopment, e.g. by demonstration of technologies, better integration of technical approaches with management needs,
- Holistic approaches to management of large areas of brownfield, especially in dealing with regional groundwater issues, and including optimization of the use of land (spatial planning approaches),
- Maximizing the benefits from brownfield site regeneration – e.g. in terms of recycling and re-use of resources on the sites.

Technical aspects

- Cost effective methods for assessing sites for contamination problems,
- Better methods for the evaluation of contamination management technologies, e.g. in terms of practicability, long term effectiveness and their wider environmental and resource-use impact,
- Improved practice for communicating with, and involving, stakeholder groups.

A number of initiatives, including research programmes and projects, are already focused on tackling some of these aspects to promote brownfield regeneration. These initiatives are coordinated by both the private and the public sectors. For example, Professor Paul Syms of Sheffield Hallam University has carried out a survey of over 200 practitioners in brownfield redevelopment, from a range of different professional

disciplines, to identify the main issues that inhibit the release of brownfield land for development. His report (SYMS 2001) includes a number of recommendations.

The Urban Task Force (UTF) highlighted the need for standard reporting about site information (a "land condition record") and for ensuring the right multi-disciplinary skills and experience of key personnel involved in the technical assessment, development of solutions and communication aspects of dealing with contamination.

These UTF recommendations have been taken forward by a working group representing a wide range of stakeholders from the property industry and environmental organisations and professions. The group has developed a standard Land Condition Record (UTF 2000) and, in association with this, a new examination and registration systems for specialist professionals. This scheme – Specialists in Land Condition, SILC – is being managed by the Institute of Environmental Management and Assessment, and is jointly supported by the Chartered Institution of Civil Engineers, the Royal Institution of Chartered Surveyors, the Royal Society of Chemistry, the Association of Geotechnical Specialists and other organisations represented in the "Ground Forum". Start-up costs for the SILC scheme are being funded by the Regional Development Agencies.

For the future, a major issue is the desire from developers for a "one stop shop" approach to licensing – similar to the "concentration effect" in the German Bundes-Bodenschutzgesetz. This was also a recommendation of the UTF. Many of the aspects of the current regulations are already under review – in particular the licensing of remediation activities and the guidance issued to planning authorities.

Further Information

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ANNEX 2

Check List on Land Recycling

Introduction

The present Check List on Land Recycling provides a tool for the comprehensive analysis of land recycling projects. By applying the check list, the user becomes more aware of the complexity of such projects and obtains an overview of all relevant issues. Deficiencies in planning and implementation can be identified and then counteracted by following the recommendations given. The check list thus makes these recommendations accessible for practical use. The questions of the check list have been derived from an original set of 68 questions which have been developed as part of a German R&D project (based on the findings obtained in project evaluations). CLARINET Working Group 1 modified and adopted the questions to be compatible to the legal and planning systems in the countries of the European Union.

Structure of the check list

The check list consists of an introduction including a legend and procedural instructions, sets of questions designed to generate general project data as well as information on factors of influence/fields of action, a list of questions concerning defined elements of a comprehensive economic-viability analysis, and an evaluation matrix which allows a direct evaluation of the answers given.

The general data are intended to enable the user to categorise the project and to allocate it to one of the project phases which land recycling projects commonly undergo.

A comparison of land recycling projects shows that each project goes through specific phases which are the same for all projects irrespective of their type and scope. The process starts with the preparation and planning phase, continues with the execution or implementation phase and ends with the result of the project, i.e. its completion. In the case of complex projects all sub-projects may have to be run through these phases, while the phases of the various sub-projects may not necessarily coincide. As a result, the developer or project manager may have to handle many different phases at the same time and to co-ordinate the results of this work for consideration in the overall evaluation.

The categorisation and differentiation of projects to be evaluated through the check list is based on the following main project phases:

- Initiation and orientation
- Permitting under building law
- Execution/implementation

For each of these phases or milestones, a separate evaluation matrix is annexed to the check list.

The questions included in the check list address the elements of key fields of action in the area of land recycling. They are based on the findings obtained in project evaluations carried out as part of the research project as well as on the recommendations which have been derived from them. The questions reflect the common procedural patterns identified in the research project for land recycling projects, in combination with the recommendations given on how to optimise the process. This ensures that the check list's 50 questions cover all central issues of a typical project.

Data evaluation

The evaluation of the data generated through the check list takes place in a phase-oriented manner. An evaluation mask which varies according to the respective project's planning status, as defined above, is used to identify both the optimal status as well as existing or emerging deficiencies of the project concerned. The user readily obtains an overview of the strengths and weaknesses of a project and can quickly determine whether the progress made meets the minimum requirement for the project phase in question.

The evaluation masks cover all tasks specified in the check list, indicating for each the optimal status as well as different levels of deficiency in the status of the work.

Guidance on the completion of the check list and data evaluation

The check list is filled out like a normal questionnaire. For each question, there are six possible responses (yes – no – in preparation – not necessary – not possible – not known). Upon completion of the check list the responses are copied into the "evaluation matrix" table.

For evaluation purposes, one of the five attached evaluation masks is placed on top of the evaluation matrix, making sure to choose the mask that corresponds to the planning status of the project to be evaluated (initiation phase – planning phase – permitting under building law – implementation – completion).

In the evaluation masks, all responses to the check list are evaluated by way of a hatching code. The hatching codes encompass five evaluation categories: optimal status, non-critical status, critical status, unacceptable status and neutral assessment (task not feasible).

This evaluation system facilitates a qualitative evaluation of the status of a given project. The evaluation mask enables the user to directly recognise whether the actual project management status in the relevant project phase and the various fields of action is optimal or possibly critical.

If a response is shown to fall within the critical or unacceptable range, the user can consult the catalogue of recommendations in which the steps necessary to attain an optimal work status are mapped out for each field of action covered by the check list.

A: General project data

Name of project

Town/community

Region

B. Description of site

Size of site: in m²:

C. Location

Inner-urban

Suburban

Extra-urban/rural

D. Previous use

Existing buildings and installations, proportion of site occupied by buildings

Types of uses of surrounding areas:

E. Planned uses (for land recycling)

Description of the type of new use proposed

F. At what stage of planning is the project ?

(Data-analysis filter to be selected according to the box checked)

Initiation phase (feasibility planning)

Permitting phase (spatial planning, environmental permits)

Execution phase (contract appointment, site works)

G. Present use (status of project)

The site is not used at present

Partial or interim use: _____

Progress made [in %] towards realisation of final (post-LR) use:%

Section A

Options under planning law

Where a local development plan exists:

1. Have zoning decisions under planning law to coordinate post-LR use and the clean-up of contaminated areas been used?

<input type="checkbox"/> Yes	<input type="checkbox"/> Under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

2. Has the proposed use or layout of the site been modified to optimise the treatment cost and time?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

Section B:

Permitting procedures / Integrated permitting/licensing
--

3. Has an analysis of potential legal obstacles been carried out with respect to any special provisions under planning and permitting law?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> Unknown

4. Have the results of this analysis been accepted by agreed to by representatives of government authorities?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> Unknown

5. Has the permitting process been speeded up by a consolidation of different permitting procedures and an integration/coordination of the responsibilities of the various authorities?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> no	<input type="checkbox"/> not necessary	<input type="checkbox"/> Unknown

Section C:**Political framework**

6. Has a land reclamation policy or guidelines been drawn up/approved/accepted by the local government?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

7. Did the developer analyse the local political situation at the beginning of the planning process?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

8. Has the local government clearly expressed the political will to carry out land recycling, has it done so in writing?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

9. Were the project's objectives discussed and co-ordinated with local-government representatives before it was launched?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> yes | <input type="checkbox"/> under | <input type="checkbox"/> Not |
| <input type="checkbox"/> no | <input type="checkbox"/> not necessary | <input type="checkbox"/> Unknown |

10. Has a contact person been designated by the local government who represents or co-ordinates all departments/authorities concerned in dealings with the developer?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> Not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> Unknown |

Section D:**Project organisation - Authorities**

11. Is there a contact person with adequate decision-making powers (planning, environment, promotion of economic development) or a co-ordination unit available on the part of the authorities?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> Not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> Unknown |

12. Has the local planning authority been involved in decision-making?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

13. Has an advisory body been installed, in which all relevant decision-makers are represented?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> Under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> Not necessary | <input type="checkbox"/> unknown |

Section E:**Project organisation - Developer**

14. Has land reuse through reclamation/remediation been made the defined goal of the project?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> Under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> Not necessary | <input type="checkbox"/> unknown |

15. Have the decision-makers necessary to achieve the defined goal been designated at the beginning of the project?

- | | | |
|------------------------------|--|---------------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> Under | <input type="checkbox"/> not possible |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

16. Have these decision-makers been assigned clearly defined fields of responsibility?

- | | | |
|------------------------------|--|---------------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> Under | <input type="checkbox"/> not possible |
| <input type="checkbox"/> No | <input type="checkbox"/> Not necessary | <input type="checkbox"/> unknown |

17. Does the developer check at regular intervals whether the sub-goals that have been derived on that basis are being achieved and orientation towards the overall goal is being maintained?

- | | | |
|------------------------------|--|---------------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> Under | <input type="checkbox"/> not possible |
| <input type="checkbox"/> No | <input type="checkbox"/> Not necessary | <input type="checkbox"/> unknown |

18. Has an individual responsible for performing this check been designated or an interdisciplinary team with clear leader responsible for the project been formed?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> yes | <input type="checkbox"/> Under | <input type="checkbox"/> not |
| <input type="checkbox"/> no | <input type="checkbox"/> Not necessary | <input type="checkbox"/> unknown |

19. Is the project performed by a private legal structure? (Discussion)

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

Section F:

Analysis of overall economic viability / financial risk management

20. Has an analysis of overall economic viability, including the aspects listed in Appendix 1, been performed?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

21. Is this analysis continued in the course of the project to serve as cost-controlling instrument?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

22. Have several use options been considered and their costs calculated?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

23. Has a validation including ecological/contamination aspects been performed?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

Section G:**Valuation****24. Did the methodology used determine the value of site specific brownfield restrictions?**

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

25. Have the findings obtained in other disciplines (notably site preparation) been taken into account in the determination of the value of the site and of the buildings it contains?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> Under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> Not necessary | <input type="checkbox"/> unknown |

26. Has the effect of the presence of contaminants on the site value (either positive, e.g. through minerals recovery - or negative, e.g. through the cost of remediation) been taken into account?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> Unknown |

27. Have the results of site- and building-valuation been taken into account in the analysis of overall economic viability?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> Not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> Unknown |

Section H:**Funding instruments**

28. Was a systematic analysis carried out at the beginning of the project of available funding options?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

29. Have the project objectives been evaluated in terms of their ability to gain best access to available funding mechanism? Has the question been explored whether an optimisation of the project's objectives would enable a more effective use of the available funding mechanism?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

Section I:**Use / Proposed use**

30. Were different alternatives considered in drawing up the proposed use?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

31. Is the planned use and site lay out flexible enough to allow modifications in the event that additional site problems are identified?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

32. Has it been ensured that results from investigations into site contamination are/will be taken into account in the planned use?

- | | | |
|------------------------------|--|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> Under | <input type="checkbox"/> not |
| <input type="checkbox"/> No | <input type="checkbox"/> not necessary | <input type="checkbox"/> unknown |

33. Has a record been made of old infrastructure, underground services etc. according to type, quantity and quality and have the results been taken into account in drawing up the planned use?

<input type="checkbox"/> yes	<input type="checkbox"/> Under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> Not necessary	<input type="checkbox"/> unknown

34. Has a record been made of natural and landscape features, e.g. Protected species, trees according to type, quantity and quality and have the results been taken into account in drawing up the planned use?

<input type="checkbox"/> yes	<input type="checkbox"/> Under	<input type="checkbox"/> not
<input type="checkbox"/> no	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

35. Will the planned project be incorporated into a comprehensive urban development concept?

<input type="checkbox"/> yes	<input type="checkbox"/> Under	<input type="checkbox"/> not
<input type="checkbox"/> no	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

Section J

Marketing / Public relations

Marketing:

36. Has a strategy for site marketing been drawn up?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

37. Has a market analysis been carried out for use in the analysis of overall economic viability?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

38. Have site-related economic risks (cost over runs, lower rental yields) been taken into account?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> Not necessary	<input type="checkbox"/> unknown

39. Does a strategy exist for responding to suggestions and concerns that investors may have concerning the reclamation of an abandoned site?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> no	<input type="checkbox"/> Not necessary	<input type="checkbox"/> unknown

Public relations:

40. Does a strategy exist for responding to suggestions and reservations that citizens and future users may have concerning the reclamation of an abandoned site?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> Not necessary	<input type="checkbox"/> Unknown

41. Have concerns and interests of third parties (neighbours, residents) been determined and taken into account?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

42. Has a conflict-management procedure been instituted to jointly resolve identified conflicts?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section K:

Site reclamation (contamination, underground)

43. Have investigations been carried out to ascertain whether the soil and groundwater is contaminated as a result of previous uses?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

44. Have detailed investigations into the site's history and hydrogeological conditions as well as a detailed hazard assessment been performed to allow a sufficiently reliable estimate to be made of the techniques, funds and time required for site preparation?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

45. Do the reports on the investigations conducted contain basic data for the evaluation of man made fill (made ground) material?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> Not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> Unknown

46. Have the remediation objectives and the planned use been co-ordinated?

<input type="checkbox"/> Yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> No	<input type="checkbox"/> not necessary	<input type="checkbox"/> Unknown

47. Have the remediation objectives been set down in a formal/legal agreement? Has the option of laying the remediation objectives down in formal agreements been utilised?

<input type="checkbox"/> yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> no	<input type="checkbox"/> not necessary	<input type="checkbox"/> Unknown

48. Have the remediation and containment techniques to be applied been chosen in accordance with the subsequent use of the site?

<input type="checkbox"/> yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> no	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

49. Did the analysis of remediation or containment alternatives include the aspect of whether contaminated material arising in site treatment can remain at the site?

<input type="checkbox"/> yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> no	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

50. Did the analysis include the question of whether synergies would be achieved by combining the development and remediation concepts?

<input type="checkbox"/> yes	<input type="checkbox"/> under	<input type="checkbox"/> not
<input type="checkbox"/> no	<input type="checkbox"/> not necessary	<input type="checkbox"/> unknown

1.1 Appendix 1 of the Check-list:

Contents of the analysis of overall economic viability (Investment appraisal)

	Cost in €	€ / m ²
<u>Planning costs</u>		
Project management / control		
Informal planning, invitation of tenders		
Urban planning		
Urban land use planning procedure		
<u>Technical costs</u>		
Surveying		
Expert opinions		
<u>Public policy measures</u>		
Construction geology investigations		
Investigations into site contamination		
Remediation / containment		
Earth moving works		
<u>Other costs</u>		
Site acquisition		
Development		
Compensation and substitute measures		
Marketing		
Financing		
Total		

	Cost in €	€ / m²
<u>Proceeds/Income</u>		
Sale (property / buildings)	<input type="text"/>	<input type="text"/>
Letting (property / buildings)	<input type="text"/>	<input type="text"/>
Material recycling	<input type="text"/>	<input type="text"/>
Interim use	<input type="text"/>	<input type="text"/>
Total proceeds	<input type="text"/>	<input type="text"/>
Funding provided	<input type="text"/>	<input type="text"/>
Balance from costs and proceeds/income	<input type="text"/>	<input type="text"/>

1.2 Appendix 2 of the Check-List

Evaluation Matrix

Legend for complete the evaluation - matrix

Evaluation Matrix – Initiation phase

Evaluation Matrix – Permitting phase

Evaluation Matrix – Execution Phase

EVALUATION - MATRIX

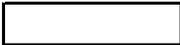
SECTION		YES	NO	Under Consideration	not necessary	not possible	unknown
A	1						
	2						
B	3						
	4						
	5						
C	6						
	7						
	8						
	9						
	10						
D	11						
	12						
	13						
E	14						
	15						
	16						
	17						
	18						
	19						
F	20						
	21						
	22						
	23						
G	24						
	25						
	26						
	27						
H	28						
	29						
I	30						
	31						
	32						
	33						
	34						
	35						
J	36						
	37						
	38						
	39						
	40						
	41						
	42						
K	43						
	44						
	45						
	46						
	47						
	48						
	49						
	50						

Legend for the evaluation - matrix

YES	Task completed
NO	Task not completed
under consideration	Task is under preparation or on the way
not necessary	Task is not necessary due to project specification
not possible	Realisation of the task is not possible although necessary
unknown	No information on task completion available

Meaning of the hatching



	Optimal status of project progress Indicates the tasks and the required status of planning or completion
	Non-critical status Makes clear that a project was recognised, however not suitably solved
	Critical status of project progress Status of work is likely to cause conflicts in subsequent project phases
	Unacceptable status of project progress Identifies areas of conflict, clarifies the chances for implementation and identifies the availability of information
	Achievement not possible at time

EVALUATION - MATRIX: Initiation phase

SECTION		YES	NO	Under Consideration	not necessary	not possible	unknown
A	1						
	2						
B	3						
	4						
	5						
C	6						
	7						
	8						
	9						
	10						
D	11						
	12						
	13						
E	14						
	15						
	16						
	17						
	18						
	19						
F	20						
	21						
	22						
	23						
G	24						
	25						
	26						
	27						
H	28						
	29						
I	30						
	31						
	32						
	33						
	34						
	35						
J	36						
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	40						
	41						
	42						
K	43						
	44						
	45						
	46						
	47						
	48						
	49						
50							

EVALUATION - MATRIX - Permitting phase

SECTION		YES	NO	Under Consideration	not necessary	not possible	unknown
A	1	diagonal		vertical	vertical		
	2			horizontal	vertical		
B	3						
	4		diagonal				
	5				vertical		
C	6						
	7						
	8						
	9						
D	10						
	11		diagonal	diagonal	diagonal		
	12	horizontal	diagonal	diagonal	vertical		
E	13						
	14						
	15						
	16						
	17	diagonal	diagonal	horizontal			
	18	diagonal	diagonal	horizontal			diagonal
F	19			vertical	vertical	vertical	diagonal
	20						
	21						
	22				vertical		
G	23				vertical		
	24				vertical		
	25				vertical		
	26				vertical		
H	27				vertical		
	28				vertical		
I	29				vertical		
	30	diagonal			vertical		
	31	diagonal			vertical		
	32				vertical		
	33				vertical		
J	34				vertical		
	35				vertical		
	36	diagonal			vertical		
	37	diagonal			vertical		
	38	diagonal			vertical		
	39				vertical		
K	40				vertical		
	41				vertical		
	42				vertical		
	43				vertical		
	44				vertical		
	45				vertical		
	46				vertical		
47	diagonal			vertical			
	48	diagonal			vertical		
	49	diagonal			vertical		
	50	diagonal			vertical		

EVALUATION - MATRIX - Execution phase

SECTION		YES	NO	Under Consideration	not necessary	not possible	unknown
A	1						
	2						
B	3						
	4						
	5						
C	6						
	7						
	8						
	9						
D	10						
	11						
	12						
E	13						
	14						
	15						
	16						
	17						
F	18						
	19						
	20						
G	21						
	22						
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	24						
H	25						
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	27						
I	28						
	29						
J	30						
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K	36						
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	50						



Brownfields and Redevelopment of Urban Areas

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sustainable Land and Groundwater Management

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Vienna, Austria

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