



REPORT OF THE NICOLE Workshop: Redevelopment of sites – the industrial perspective

14 to 15 June 2007

Akersloot, The Netherlands

www.nicole.org

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r³ Environmental Technology Limited
www.r3environmental.com**

NICOLE (*Network for Contaminated Land in Europe*) was set up in 1995 as a result of the CEFIC “SUSTECH” programme which promotes co-operation between industry and academia on the development of sustainable technologies. NICOLE is the principal forum that European business uses to develop and influence the state of the art in contaminated land management in Europe. NICOLE was created to bring together problem holders and researchers throughout Europe who are interested in all aspects of contaminated land. It is open to public and private sector organisations. NICOLE was initiated as a Concerted Action within the European Commission’s Environment and Climate RTD Programme in 1996. It has been self-funding since February 1999.

NICOLE’s overall objectives are to:

- Provide a European forum for the dissemination and exchange of knowledge and ideas about contaminated land arising from industrial and commercial activities;
- Identify research needs and promote collaborative research that will enable European industry to identify, assess and manage contaminated sites more efficiently and cost-effectively; and
- Collaborate with other international networks inside and outside Europe and encompass the views of a wide a range of interest groups and stakeholders (for example, land developers, local/regional authorities and the insurance/financial investment community).

NICOLE currently has 141 members. Membership fees are used to support and further the aims of the network, including: technical exchanges, network conferences, special interest meetings, brokerage of research and research contacts and information dissemination via a web site, newsletter and journal publications. NICOLE includes an Industry Subgroup (ISG) – with 27 members; a Service Providers Subgroup (SPG) with 41 members; 55 individual members from the academic sector/research community; and 18 members from other organisations, including research planners, non profit making organisations, other networks, funding organisations. Some members are involved in both the ISG and the SPG. For further general information, further meeting reports, network information and links to contaminated land related web sites, please visit NICOLE's web site: www.nicole.org.

Membership fees are currently 3,500 EURO per year for companies (1,750 EURO for smes), and 150 EURO per year for academic institutions. For membership requests please contact:

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- the members of the Organising Committee: Markus Ackermann - DuPont, Switzerland; Reinier Besemer – Dura Vermeer, the Netherlands; Ian Heasman - Taylor Woodrow Developments, UK; Natalia Hoogeveen - DHV, the Netherlands; Jeroen Kattenberg – ERM; Tamás Madarász - University of Miskolc, Hungary; Hans Slenders - Arcadis, the Netherlands; Elze-Lia Visser-Westerweele – NICOLE Service Providers Group AND John Waters - ERM, UK with the overall assistance of Marjan Euser (General NICOLE Secretariat).

Executive Summary

The restructuring of European economies, including the migration of manufacturing to Asia, has resulted in many underused, derelict and contaminated industrial sites. At the same time land demand, principally lead by housing, has made many of these urban sites into attractive assets. The owners of these sites would like to realise the value of these assets and at the same time avoid any future risk of liability. Developers/constructors use the uplift in land values to decontaminate previously developed land, provide development platforms and clean cover layers, and build the necessary infrastructure, while at the same time generating returns and managing risks. Municipalities and local communities look to local economic, social and environmental regeneration and to provide for a sustainable future. The sale, decontamination and redevelopment of post industrial land are vital to all these stakeholders needs.

The workshop was divided into four sessions:

- Drivers for redevelopment of sites for government – municipality – industry – redevelopers
- Management of liability
- Case studies
- Tools and communication

The workshop also included an interactive game session on site redevelopment.

The following comments have been drawn from the concluding session of the workshop and from comments invited from NICOLE Steering Group members, the meeting organisers and speakers in the weeks following the workshop, and also from comments kindly sent in by a number of delegates after the workshop.

Brownfield redevelopment brings a wide range of benefits for sustainable development, for example:

- Environmental benefits: management of environmental risks, substitution for greenfield sites and for soft end restorations benefits for biodiversity and opportunities for non-food land use such as bioenergy
- Economic benefits: uplift in site value, commercial activity from the remediation and redevelopment process, uplift in value of surrounding land, and for residential and industrial end uses establishment of ongoing economic activity
- Social benefits: over time the removal of blight and stigma, improved amenity – especially for soft end restoration, opportunities for community involvement and the development of local pride.

Brownfield regeneration is therefore a vital and energetic sector which underpins the economic, social and environmental renewal of urban communities. Development releases funds that can be used to deal with the historical legacy of contamination issues in a way that no other land use can. Several papers showed how taking an integrated, as opposed to sequential, approach to site investigation, risk assessment, remediation and redevelopment could add value to a project and increase its profitability, and even unlock projects initially thought of as uneconomic. Other routes to increasing value and facilitating brownfield redevelopment suggested included the concept of regenerating small sites as a cluster or parcel, and also negotiating rezoning of land, particularly towards residential use where redevelopment revenues are generally greatest.

Conventional wisdom is that fear of the transfer of liabilities for possible future environmental problems is a major barrier to brownfield redevelopment. These liabilities might arise because risk management was inadequate in some way, because new knowledge might uncover new problems or that legislation might change in the future. This is seen as a particular problem for US brownfield transactions where the federal legislation means that “potentially responsible parties” have perpetual liability. To a lesser extent fear of liability may be a barrier to brownfield redevelopment for industrial site owners in Europe, but in this case because the contractual transfers of liability possible in most Member States are, in effect, only as robust as the organisation to which they are transferred. Several strategies are important in limiting the scale of liability problems. First and foremost is the need for

quality in environmental risk assessment and management to provide as reliable a basis as possible for decision making. Also important is working with reliable partners, partners that will be business in the long term to support any indemnifications or warranties that they offer. Where this is not possible, or where residual concerns remain, environmental insurance can offer an important enabling tool, although several NICOLE members felt that the 10 year policy limit was insufficient for their needs. It was suggested that a NICOLE working group might offer an opportunity for discussions between industrial and developer problem holder members of NICOLE to work towards resolving the concerns over assuring a clean exit for vendors in brownfield redevelopment transactions, better quality assurance for land remediation and improving confidence in mechanisms for liability transfer, including environmental insurance products.

Gaining these benefits is not necessarily straight forward. A major complicating factor is the perception of risk, or perhaps more accurately hazard. Local communities may perceive that a site is best left undisturbed rather than undergoing a remediation process that will expose new hazards. Perception also impacts many organisational stakeholders, because those working in an organisation may have limited knowledge and/or confidence in risk management, or because that organisation perceives that its clients have limited confidence in risk management. For example, a housing developer may stipulate excavation and removal based remediation solely to facilitate onward sale of houses, even if this is a more expensive or indeed less sustainable remedial approach. Perception also causes problems of blight or stigma surrounding a former brownfield to persist for a period, even after the site has been remediated and redeveloped. In other words blight can be “sticky”. Brownfield redevelopment is a broader activity than remediation, and objections to risk assessment and remediation works may in fact be precipitated by objections to the proposed redevelopment rather than as a consequence of purely environmental concerns. The only real way to address these concerns is via a public and open process of engagement with all stakeholders legitimately interested in the brownfields project in question.

Perception is, however, a fickle thing. It would be misleading to say that communities are always unwilling to accept redevelopment and risk based remediation, or indeed that blight is “sticky”. For example, location is often a much stronger factor in preferences for house buying, and an attractive and/or historic location may be highly sought after.

While this workshop included case studies that encompassed “soft” redevelopment to parkland or habitat its main focus was on built redevelopment. A number of industries manage large tracts of land that are not immediately suitable for housing or industrial use. Non-food applications such as bioenergy, fibre or bio-feedstock represent a major re-use opportunity for these sites, replacing a long term maintenance cost with a neutral cost or possibly a revenue stream; as well as bringing many wider sustainable development advantages.

Economic activity, attractive to inward investment and population growth appear to underpin brownfield redevelopment. In locations with little growth and/or falling populations there are few economic incentives for brownfield regeneration. This may be a particular problem in countries that were behind the former Iron Curtain where state owned industry has disappeared, and little infrastructure exists to provide access to and from areas of economic growth. These countries may have brownfield problems that extend on a regional basis which require a national, and perhaps EU, effort. The example of Bilbao shows what can be achieved when there is a clear political will to deal with brownfield dereliction on a regional scale. It is worth noting that the EU contribution to the regeneration in the Bilbao region appears to have been less than 10% in an overall sense, and that innovative approaches to planning, zoning and releasing land value played a key part in facilitating the region’s regeneration.

The full report provides summaries of the papers given, along with a discussion based on points raised during the meeting, and comments from a number of delegates after the meeting.

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1 Introduction

The restructuring of European economies, including the migration of manufacturing to Asia, has resulted in many underused, derelict and contaminated industrial sites. At the same time land demand, principally lead by housing, has made many of these urban sites into attractive assets. The owners of these sites would like to realise the value of these assets and at the same time avoid any future risk of liability. Developers/constructors use the uplift in land values to decontaminate previously developed land, provide development platforms and clean cover layers, and build the necessary infrastructure, while at the same time generating returns and managing risks. Municipalities and local communities look to local economic, social and environmental regeneration and to provide for a sustainable future. The sale, decontamination and redevelopment of post industrial land are vital to all these stakeholders needs.

In his introduction to the workshop, the NICOLE chairman Johan de Frayes noted that this is the second NICOLE workshop focusing specifically on brownfield issues. The first on “Unlocking the barriers to the recovery of soil and rehabilitation of contaminated land” was held in Sofia, Bulgaria, during 2004. Johan reminded delegates how this identified a “pentagon” of barriers to brownfields re-use: contractual, perceptual, financial, legislative and technical (see Figure 1). Workshop delegates felt that legislative and technical barriers were the dominant factors, in particular legislative barriers. This concern is borne out in the proposed draft for the Soil Directive where a number of uncertainties that might impede brownfields re-use, including how the land status report and inventory might be used, how remediation is (or is not) linked to risk management concepts of source and pathway control., and how the suggested future harmonisation of technical approaches to risk management.

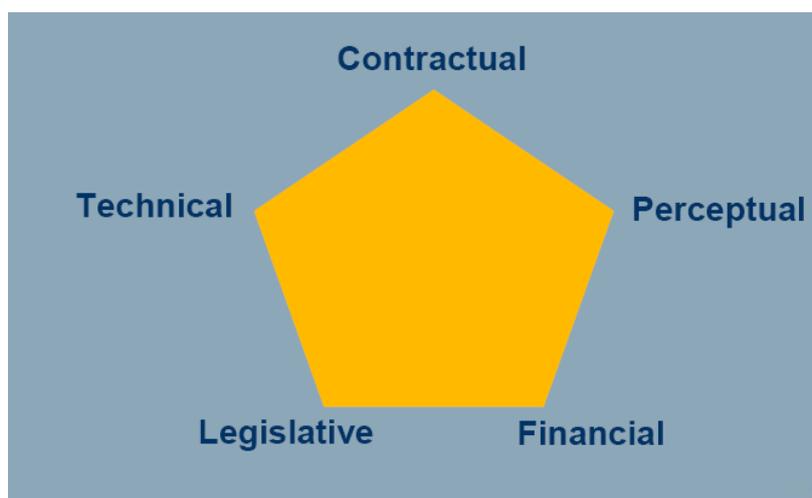


Figure 1 The ‘Pentagon’ of Barriers

This NICOLE workshop examined the various drivers for redevelopment of former industrial sites. We will also learn what will be the impact of the EU Soil Framework Directive on the redevelopment, and how to manage liability. This will be illustrated by cases in Hungary, Spain and the UK.

The workshop was divided into four sessions:

- Drivers for redevelopment of sites for government – municipality – industry – redevelopers
- Management of liability
- Case studies
- Tools and communication

The workshop also included an interactive game session on site redevelopment.

This report provides summaries of the papers given, along with conclusions based on points raised during the meeting, and comments from a number of delegates after the meeting. Table 1 provides a list of other recent NICOLE publications.

Table 1 Selected NICOLE Publications from 2004

2007	NICOLE Position Paper (2007) Comments on the Proposal for a Directive of the European Parliament and of the Council on Waste. NICOLE, TNO, Appeldoorn, Netherlands. Downloadable from www.nicole.org
2007	NICOLE Position Paper (2007) Concerning European Commission Communication “Thematic Strategy for Soil Protection” COM(2006)231 final (“strategy”) & Proposal for Directive of the European Parliament and of the Council establishing a framework for the protection of soil and amending Directive 2004/35/EC (“directive”). Available from NICOLE Secretariat, TNO, the Netherlands. http://www.nicole.org
2006	Report of the NICOLE 1996-2006 Ten Year Network Anniversary Workshop: Making Management of Contaminated Land an Obsolete Business - Challenges for the Future. 5 to October 2006, Leuven, Belgium. See http://www.nicole.org/publications/library.asp?listing=1 , and <i>Land Contamination and Reclamation</i> , 15 (2) 261-287
2006	<i>NICOLE News</i> 2006 issue, www.nicole.org/publications/library.asp?listing=9
2006	Report of the NICOLE Workshop: Data Acquisition for a Good Conceptual Site Model 10 – 12 May 2006, Carcassonne, France . See www.nicole.org/publications/library.asp?listing=1 , and <i>Land Contamination and Reclamation</i> , 15 (1) 94-144
2006	Report of the NICOLE Workshop: The Impact of EU Directives on the management of contaminated land, 1-2 December 2005, Cagliari, Sardinia, Italy. See www.nicole.org/publications/library.asp?listing=1 and <i>Land Contamination and Reclamation</i> 14 (4) 855-887
2005	NICOLE Report: Monitored Natural Attenuation: Demonstration and Review of the Applicability of MNA at Eight field sites, http://www.nicole.org/publications/library.asp?listing=5 (summary). The full report can be ordered from the NICOLE Secretariat
2005	NICOLE Report: The Interaction between Soil and Waste Legislation in Ten European Union Countries sites, http://www.nicole.org/publications/library.asp?listing=7 (summary). The full report can be ordered from the NICOLE Secretariat
2005	<i>NICOLE News</i> 2005 issue, www.nicole.org/publications/library.asp?listing=9
2005	Report of the NICOLE Workshop: State of the art of (Ecological) Risk Assessment, 15-16-17 June 2005, Stockholm, Sweden see http://www.nicole.org/publications/library.asp?listing=1 and <i>Land Contamination and Reclamation</i> 14 (3) 745-773
2005	Report of the NICOLE Workshop: Unlocking the Barriers to the Recovery of Soil and the Rehabilitation of Contaminated Land. 15-16 November 2004, Sofia, Bulgaria see www.nicole.org/publications/library.asp?listing=1 and <i>Land Contamination and Reclamation</i> 14 (1) 137-164
2004	NICOLE Booklet Communication on Contaminated Land, www.nicole.org/publications/library.asp?listing=2
2004	<i>NICOLE News</i> 2004 issue, www.nicole.org/publications/library.asp?listing=9
2004	Report of the NICOLE Workshop: <i>Sediments and sludges: an issue for industry?</i> , Frankfurt, Germany see www.nicole.org/publications/library.asp?listing=1 and <i>Land Contamination and Reclamation</i> 12 (4) 379-400
2004	Report of the NICOLE Workshop: <i>NICOLE Projects Reporting Day</i> , Runcorn, UK - see www.nicole.org/publications/library.asp?listing=1 and, <i>Land Contamination and Reclamation</i> 12 (3) 286 - 308

2 Presentations

Update on NICOLE; Implications of the Soil Framework Directive for Brownfield Redevelopment, Johan De Fraye, Honeywell, Belgium / NICOLE Steering Group & Working Group Leader Soil

The mission of NICOLE is to enable European industry to identify, assess and manage industrially contaminated land efficiently, cost effectively and within a framework of sustainability. Within that mission its ambition is that contaminated land managed should be risk based. NICOLE has limited resources, but within these supports a sound scientific basis for risk based land management. It also supports: technology development, best practises and evaluation tools, intelligent policy, communication and sharing knowledge.¹

Examples of NICOLE technology and science initiatives include (1) a project examining the sustainability of natural attenuation of aromatic compounds, being carried out by Bioclear, the Port Authority Rotterdam, and Shell Global Solutions; and (2) chairmanship of the Groundwater Working Group of EC Water Framework Directive implementation drafting group, being carried out by Wouter Gevaerts (Arcadis). The EC has subsequently requested that NICOLE provide the vice-chair of the drafting group on risk assessment. Policy and legislation interests include NICOLE Working Groups tracking the Waste Framework Directive revision (led by Ian Heasman, Taylor Woodrow) and drafting of the Soil Framework Directive (led myself to date). Position papers on both have been published, and are available for download on www.nicole.org. Other technical working groups in NICOLE include: ecological risk assessment (led by Bertil Grundfelt – Kemakta); monitored natural attenuation (led by Roger Jacquet - Solvay); groundwater (led by Wouter Gevaerts) and an emerging group looking at characterisation (led by Derk van Ree – Geodelft). The Waste Framework Directive impacts how soils can be re-used and a range of other EU legislation may create civil or criminal liabilities for companies and their officers.

Drivers for the Redevelopment of Sites

Fitting it all together - the way forward - Government drivers, Paul Syms, National Brownfield Advisor, English Partnerships, UK

English Partnerships is a national regeneration agency reporting to the Department for Communities and Local Government. It is the government's specialist advisor on brownfield land for the National Brownfield Strategy for England. It is the interface with Government's other land use policies. Not all countries and organisations share the same definition of brownfields. In the UK the generally accepted understanding is that the term 'brownfield' relates to land that has previously been the subject of human development, other than agriculture or forestry, and that use has come to an end, or is likely to cease within the foreseeable future. In other words not all brownfield land is contaminated and not all contaminated land is brownfield. The current UK Government policy is that contamination issues should be dealt with through the process of redeveloping land. Enforcement procedures should only take place where there is significant possibility of significant harm (SPOSH). Its focus is therefore to encourage voluntary remediation of contaminated sites. A number of incentives provide support for contaminated land remediation, including financial reliefs: the *Land Remediation Scheme*, *Land Remediation Relief* and a Landfill Tax exemption. Brownfields rehabilitation is also supported by policy targets that direct local planning policies, for example, at least 60 per cent of new housing is to be provided on previously developed land.

¹ The remainder of this talk has been included in the report introduction section

The Landfill Tax Exemption² is regarded as a ‘boon’ to the development industry, but could possibly be phased out in the medium term. It offers relief from landfill tax for site materials being directed to landfill. The exemption requires a report from a consultant that confirms that remediation is the best option to remediate the site. 28 days notice is required, and there is no guarantee of success. Many consultants take the view that there are not many ‘tried and tested’ treatment based alternatives available, at least not options acceptable to end users or investors, who require certainty that residual contamination does not remain. Landfill Tax exemption also has a role to play in stimulating re-use of brownfields but with a reservation. The tax exemption may inhibit the use of alternative/innovative technologies. Waste Acceptance Criteria, introduced as a result of the Landfill Directive, require pre-treatment to reduce bulk or toxicity prior to landfill disposal, and so may be a means to introduce changes. For example the exemption could be limited to the to pre-treated residues. Landfill tax collected from contaminated soil under a changed regime could be used, at least in part, to support technology developments and remediation of the most problematic sites.

Land Remediation Relief (Contaminated Land Corporation Tax Relief) is available for the remediation of contaminated land. It only applies to land that that is contaminated but the definition is not as stringent as that of the Part IIA guidance for regulatory determination of contaminated land. The tax relief is not immediate but follows filing of annual accounts. It has been exploited very successfully by a small number of consultants. Land Remediation Relief is fundamental to the success of the National Brownfield Strategy but there are some reservations about proposed revisions to it. For ‘in use’ or latent brownfield land, the revised LRR scheme as proposed does not help the ‘innocent polluter’ in the form of occupiers with no legal liability to remediate or otherwise return sites to use. A proposed link to planning permission may rule some sites that would be used for public open space or be assisted in returning to an acceptably ‘natural’ state.

The UK takes a pragmatic approach to contamination and land reuse. Land is seen as a valuable national resource that is in limited supply. The legacy of more than 200 years of industrialisation cannot be reversed overnight, or even in a few years, it will take decades. Action is taken where it is needed to reverse, or prevent, significant harm, otherwise issues are tackled as they arise via planning controls which take full account of environmental impact arising out of land reuse actions.

The need for a comprehensive brownfield strategy, to tackle the problems of long-term brownfield land was first identified in 2002. English Partnerships was set the task of preparing a strategy in the Sustainable Communities Plan in 2003. An interim report, “Towards a National Brownfield Strategy” was published in September 2003. This comprehensive review concluded that only around 11 per cent of brownfield land was available and suitable for redevelopment. Since then English Partnerships worked to further assess the nature of the barriers to reuse and to formulate a workable strategy. The National Brownfield Strategy³ for England was launched at a workshop in December 2006.

The over-arching principles National Brownfield Strategy are:

- Redevelop first, paying heed to guidance on biodiversity and flooding
- Focus efforts on urban land in towns and cities with infrastructure capacity
- Take account of full environmental impact when remediating sites
- When redevelopment is unsustainable take steps to make sites safe and tackle blight
- Apply highest design standards compatible with the economic viability of the site
- Make brownfield reuse decisions in context with the “Respect Agenda” (i.e. in line with local community wishes).

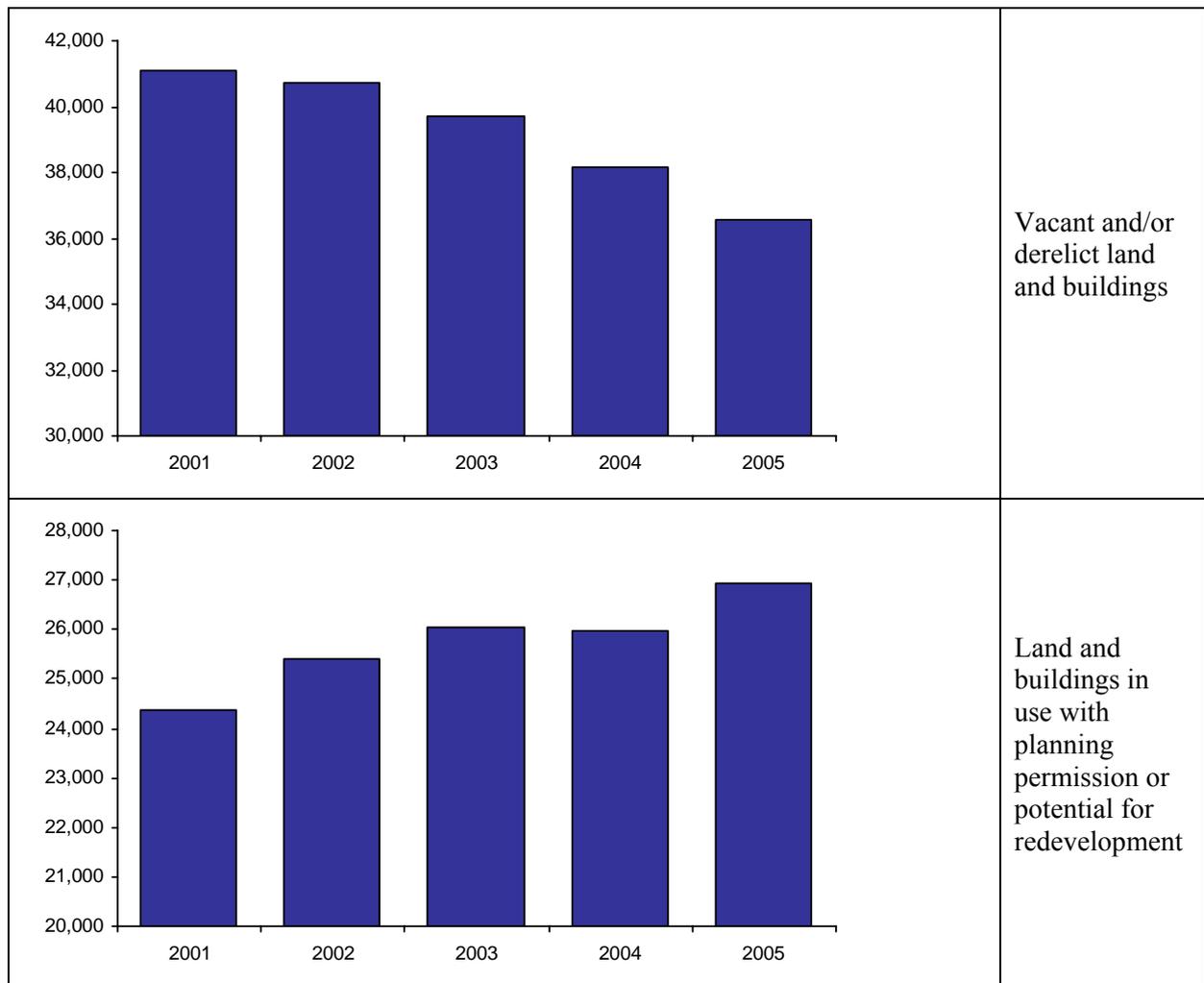
The National Land Use Database (NLUD) provides the background data to the Brownfield Strategy. It is based on returns from local authorities, 95% of whom file a return. The data indicates that derelict and vacant brownfield land in England occupies 29,447 hectares (down 4.2 per cent on 2005),

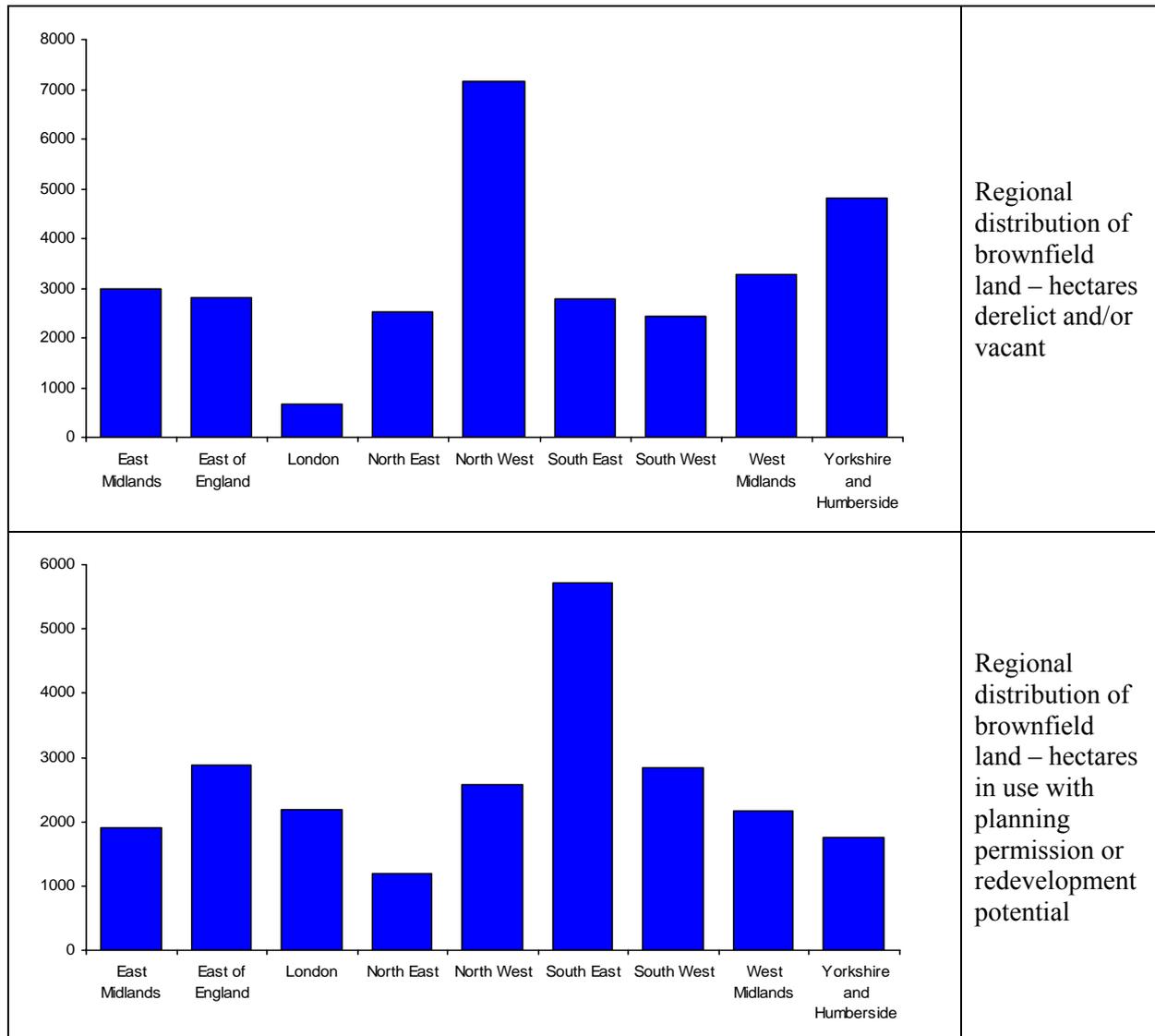
² <http://www.hmrc.gov.uk/tips/waste-disposal.pdf>

³ <http://www.englishpartnerships.co.uk/brownfieldstrategy.htm> and <http://www.englishpartnerships.co.uk/publications.htm#brownfieldrecommendations>

largely concentrated in the West Midlands, North West, Yorkshire. Much has remained unused since 1998 or earlier owing to physical problems and market failure. Brownfield land ‘in use’ is land with planning permission for development or identified as having a potential development. It may be in transitional use, for example as car parking. Such land occupies 23,231 hectares (up 3 per cent on 2005). This land is more evenly distributed, but with significant concentrations in London and the South East. It is generally comprised of smaller sites, often with status unchanged since 1998. Overall vacant and/or derelict land and buildings has decreased since 2001, while the amount of land and buildings in use with planning permission or potential for redevelopment has increased, as illustrated in Figure 2.

Figure 2, Sample Summary Statistics for NLUD Land Use Data (2006)





The National Brownfield Strategy will be implemented via the development of Local Brownfield Strategies. English Partnerships will work with the RDAs, local authorities and other agencies, to facilitate the preparation of Local Brownfield Strategies. Approximately 30 will be prepared, drawing on experience gained from pilots, including a comprehensive approach to all 34 London Boroughs. The strategy recognises the particular problems of dealing with small sites which can be uneconomic to reclaim. The dereliction of these sites may be causing economic and/or visual blight, but they are too small to reclaim on their own even with modern technologies. Conversely landfilling may be too costly or environmentally unacceptable. The CLUSTER project focuses on integrating the remediation of small sites via on-site treatment hubs. There also brownfield sites with a lack of development potential. Restoration and long-term maintenance of these sites is important to deal with economic and visual blight. English Partnerships will assist local authorities in finding the most appropriate solutions

English Partnerships recognises eleven Phases of redevelopment (PODD):

1. Preparation
 - Inception
 - Feasibility assessment
 - Site assessment

- | | |
|-------------|---|
| 2. Options | Options assessment
Working design of preferred option |
| 3. Design | Detailed design
Regulatory and planning
Legal Property and funding |
| 4. Delivery | Financial appraisal
Works procurement and execution
Sales and marketing |

It has provided detailed guidance in the *Brownfield Guide for Practitioners*⁴. This book covers fundamentals (definitions, problems, extent); returning brownfield land to use (common barriers, biodiversity, partnerships, pollution, recording information); the regulatory framework (planning, environmental, Europe, taxation); taking a phased approach to redevelopment; treatment licensing and case studies.

Brownfield revitalisation - the roles and the motivation of a city, Thomas Zügel, Municipality of Stuttgart, Germany

Stuttgart is a metropolis of about 590.000 inhabitants. It covers an area of 207 square kilometres, 50% of which is settled and 25% forest area. Around 25% is used for leisure or agriculture. The former freight site Stuttgart Bad-Cannstatt occupies 22 ha in the centre of the city near its new football stadium, and is therefore a major leisure and residential opportunity. The site had lain under-utilised for some time, occupied by a number of businesses (see Table 2) which had prevented the initiation of development. In 2004 the City of Stuttgart had bought the site in support of a bid for the 2012 Olympics for €40 million. The City of Stuttgart has subsequently initiated a major brownfield regeneration project for the site which has been linked with the EC Interreg project “Revit”, which is supporting technical help and some redevelopment tasks including the demolition of a number of old buildings on the site⁵.

Table 2 Tenants and Subtenants at the Bad-Cannstatt Site

Sector	Number	%
Hauliers (Transport and Storage)	9	52.9
Trade (Import and Export)	4	23.5
Handcraft	0	0
Services	0	0
Gastronomy	0	0
Material Recycling and Trading	3	17.7
Others	1	5.9
Total	17	100

The main tasks for the preparation of the site were the relocation of the businesses listed in Table 1 who had become tenants to the City of Stuttgart; and the demolition and remediation works, including dealing with unexploded munitions remaining from World War 2 bombing; and the overall site master-planning.

⁴ Available from www.englishpartnerships.co.uk/publications

⁵ <http://www.revit-nweurope.org/>

The existing businesses at the site employed in the region of 460 people and the protection of these enterprises and their employment was an important political imperative. This was managed in part by adopting a phased approach to the redevelopment planning, taking into account when tenancies ran out, so that some sectors of the site were redeveloped first. This process was facilitated by financial inducements to allow businesses to reduce their tenancy and assistance with relocation. Tenancies were reduced from 2016 to 2006-8. Approximately 10 ha of the site will have been vacated by 2008 ready for the first phase of construction. Of particular note was the relocation of three scrap businesses to Stuttgart Harbour on land also owned by the City.

The City has assumed responsibility for remediation costs including demolition of various buildings, some of which contain hazardous materials such as asbestos or are contaminated by heavy metals and/or toxic organic compounds. The area containing the site was heavily bombed during World War II and may therefore contain unexploded ordnance. The costs of clearing the surface to a depth of 2.5 m have been reduced from €15.7 million to €3.1 million by phasing clearance so that it takes place immediately before redevelopment work. So far no bombs have been found.

Brownfield redevelopment in the US: opportunities and pitfalls, Evan van Hook, Honeywell, USA

There are approximately 500,000 brownfield sites in the USA. Brownfield development has intrinsic sustainable development advantages. It replaces greenfield development. It eliminates derelict land and its blighting effect on communities, and the redevelopment can be used to create positive community benefits (for example parks for areas historically under-served for green space). Also, redevelopment of brownfields in historically dense areas near existing public transportation and other infrastructure encourages denser and more mixed land uses, tending to reduce vehicle miles traveled, with attendant air pollution, greenhouse gas and congestion benefits. Finally, positive financial or community proceeds from a successful brownfield development may provide the incentives needed to mobilize resources to get cleanups moving. The remediation approach adopted should be the most economically effective means that achieves reliable protection of human health and the environment: *remediation is not a punishment* but a means to an end. Avoiding overspending on remediation frees budget for other uses.

Policy makers have a number of tools for encouraging brownfield development. Subsidiarity is important, decision making should occur as locally as possible. Financial incentives can be used to address the barriers that have stopped a brownfield site from having been re-used already. However incentives need to be carefully targeted: for example, tax relief or other incentives should be scaled to the scope and costs of the remediation that is actually completed. Incentives can also be targeted to other public goals, such as the use of “green building” principles in the redevelopment. Other incentives besides financial or tax benefits can also be important, for example, streamlining the regulatory process or providing dedicated agency personnel to oversee beneficial brownfield projects to ensure they move quickly and smoothly. Key to all incentives is an underlying assumption that the cleanup will be fully protective and appropriate for the anticipated end use.

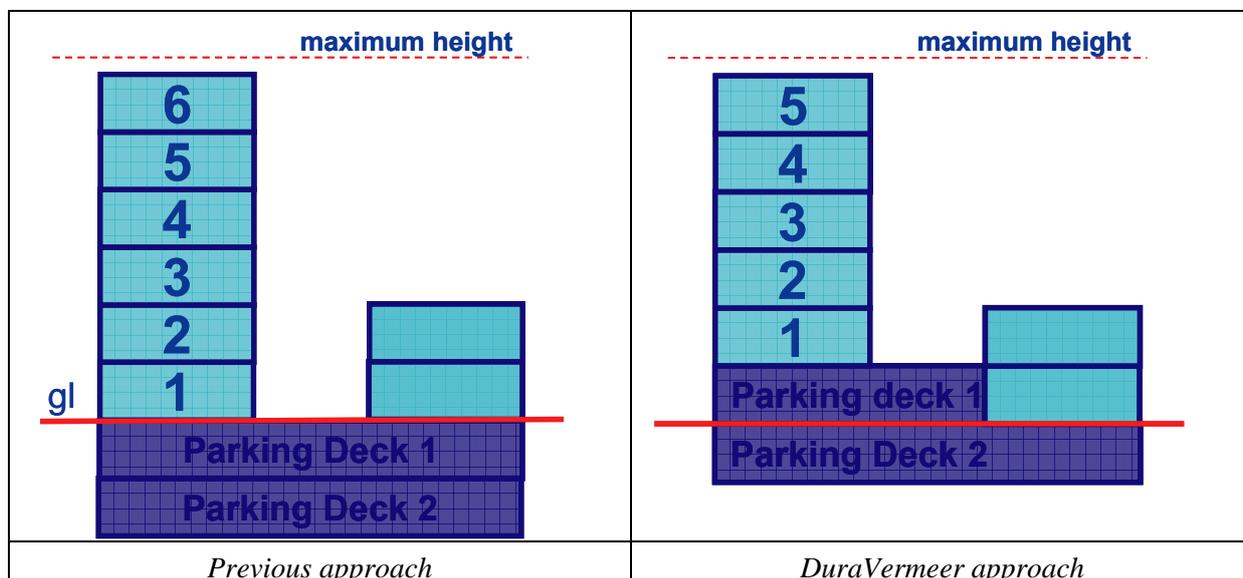
Another significant policy tool that can facilitate brownfield development is a “cluster” approach,” which allows for coordinated remediation and redevelopment of closely situated brownfields as an alternative to the traditional individual site-by-site approach. “Clustering” allows the environmental agency to provide coordinated oversight that can increase the overall efficiency of multiple cleanups, and allows the planning agency and the redeveloper to take a coordinated planning approach that allows the clustered sites to be redeveloped on an integrated schedule with complementary uses. This cluster approach is described in more detail in *The Challenge of Brownfield Clusters: Implementing a*

Multi-site Approach for Brownfield Remediation and Reuse, New York Environmental Law Journal: 12 N.Y.U. Envtl. L.J. 111.⁶

Brownfield redevelopment – a real estate perspective, Reinier Besemer, DuraVermeer , NL, and Bas van de Griendt, Bouwfonds MAB Development, The Netherlands

This talk includes two perspectives: that of a construction company, DuraVermeer; and that of a property developer, Bouwfonds MAB Development. The core business of DuraVermeer as a construction company, as it relates to brownfield land is to construct and remediate. So for this company the emphasis is on the restoration “production” process, and soil pollution as the challenge. The core business of MAB as a property developer is to develop and invest. Its primary interest is in location, and it sees soil pollution as an obstacle. These can be significant differences in perspective even if the two companies are working together on the same project. However, significant advantages can be gained from integrating remediation and redevelopment strategies, as illustrated in the following example of two sites in close proximity to each other in Zaandam near Akersloot. The former “SIGMA” paint-works was to be developed by Dura Vermeer for 200 units of housing, and a neighbouring site on an island in the River Zaan was developed by Bouwfonds MAB Development for 500 units. A number of schemes proposed for apartments on the SIGMA site had failed to be accepted, mainly because the remediation strategy suggested was not commercially viable. A major factor in this was a height restriction on the development project, and suggestions involving two basement levels which would generate significant amounts of contaminated soil. DuraVermeer took the approach of integrating its strategy development for remediation and redevelopment. It proposed a plan with one less floor of apartments, see Figure 3, which reduced the need for subsurface excavation and so reduced the remediation costs.

Figure 3 Alternative Development Strategy for the “SIGMA” Site



One model for integrated thinking has been described as “MR€”, where “M” stands for environmental modelling, “R” stands for spatial modelling (in Dutch) and € for financial modelling. Environmental modelling reflects the concerns of problem owners and consultants; spatial planning reflects the concerns of municipalities and financial modelling depends on the real estate market. However, no

⁶ This article is available from the following link:
<http://www.law.nyu.edu/journals/envtlaw/issues/vol12/1/12n1a5.pdf>

matter how good a cost benefit assessment, if there is no market there is no project. It is probably not wide to think in terms of a brownfield market, the market is actually the wider property market.

Brownfields re-use is of major importance in the Dutch residential property sector. The estimated requirement for new houses is 900,000 by 2020. 40% of these are to be supplied in existing built up areas: reconstructing existing housing and the redevelopment of former industrial areas. There are 500 to 1,000 “orphan” contaminated sites in the Netherlands, it is possible that these represent a market opportunity for the provision of housing.

Management of Liability

Overview presentation: how to manage liability, –Marjolein Visser, Boekel De Nerée, The Netherlands

Relevant factors in managing soil pollution liability include national legislation, European and international legislation, when the pollution took place, awareness of the (kind of) pollution, risks of the pollution, kind of liability: civil, administrative, or criminal liability. Civil law varies from country to country. Many liabilities can be controlled contractually, but there are usually compulsory legal stipulations concerning issues such as wrongful acts and unjustified enrichment. International deals need to consider international private law and the contractual choice of applicable law and dispute settlement.

Dutch examples of civil law applied to contaminated sites include:

- Article 176, paragraph 1 Book 6 Dutch Civil Code (DCC) (“Burgerlijk Wetboek”) which stipulates that the operator of a dump is liable for damage arising before or after the closing of the dump as a result of pollution of the air, water or soil by the substances dumped there before the closure
- Article 176, paragraph 3 Book 6 DCC which stipulates that if, after the damage has become known, another person becomes operator of the refuse dump, the liability for the damage remains with the person who was the operator when this became known. Also after the dump is sold, the first operator remains liable if damage was known before the sale (Note the right of recourse against buyer can be regulated contractually)
- Article 75 Soil Protection Act (“Wet bodembescherming”) which applies to pollution occurring after 1-1-1975. Under this Act authorities can recover (some) costs regarding serious polluted soil research and decontamination from the person whose unlawful act caused the contamination or damage of the soil and who therefore - in the absence of an agreement - is liable for the consequences thereof pursuant to civil law
- Article 75, paragraph 3 Soil Protection Act deals with unjustified enrichment, if profits are unjustified, costs may have to be paid the back to the authorities.

Civil liabilities may be off-loaded via contractual agreements, but the scope for doing this varies from country to country. Some aspects may carry ongoing commitments in successive property transfers.

Administrative law relates to specific contaminated land regulations and depends on national legal system. In the Netherlands it encompasses enforcement, orders and permitting.

Criminal law also depends on national legal system and encompasses administrative fines/ offences/ crimes for a criminal act: (e.g. in the Netherlands contravention of the duty of care in respect of soil, under Article 13 of the Soil Protection Act). The accused may be a natural person or a legal person (e.g. a business).

Two new Directives impose liabilities: Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage; and the *proposed* Directive on the protection of the environment through criminal law. The fundamental principle of the environmental liability Directive is that an operator whose activity has caused the environmental damage or the imminent

threat of such damage is to be held financially liable, in order to induce operators to adopt measures and develop practices to minimise the risks of environmental damage so that their exposure to financial liabilities is reduced. This Directive does not apply to:

- Cases of personal injury, to damage to private property or to any economic loss and does not affect any right regarding these types of damages.
- Damage caused by an emission, event or incident that took place before April 30th 2007.

Damage to land encompasses any land contamination that creates a significant risk of human health being adversely affected as a result of the direct or indirect introduction, in, on or under land, of substances, preparations, organisms or micro-organisms. An operator includes any natural or legal, private or public person who operates or controls the occupational activity or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of such an activity has been delegated, including the holder of a permit or authorisation for such an activity or the person registering or notifying such an activity. The operator is obliged to:

- take preventive measures
- take restoration measures, in collaboration with competent authority if required
- bear the costs of these measures

The competent authority can recover costs of restoration incurred from the operator who has caused the damage or the imminent threat of such damage. Member States may adopt stricter measures

The proposed Directive on the protection of the environment through criminal law includes a range of sanctions including fines and imprisonment. Criminal convictions can also have wider impacts, for example exclusion from particular commercial activities. Those liable may be natural persons or legal persons. Offences must be committed intentionally or with at least serious negligence, for example, in case of an unlawful discharge, emission or introduction of a quantity of materials or ionising radiation into the soil, which causes or is likely to cause death/ serious injury/ substantial damage to the quality of the soil.

Developer's perspective (how NOT to pick up liability), Ian Heasman, Taylor Woodrow Developments, UK

When a developer assesses the redevelopment potential of land his first thoughts are on Master Planning, planning permission and financial viability. He understands that when dealing with brownfield land there may be other challenges including clearing the site of contamination and old structures and foundations. However, depending upon environmental liability transfer provisions and environmental law, there may be a 'basket' of other challenges including taking on responsibility for historic off site contamination, permits and consents associated with former processes, and in some cases even personal injury liability from claimants whose health was damaged when they worked at the site.

Taylor Woodrow has learned that the redevelopment of brownfield sites can be associated with unexpected situations. In 2005 a local authority in the West Midlands of England said that Taylor Woodrow was responsible for contamination under a housing estate and suggested a voluntary remediation. The history of the site was that from 1937 it operated as a sand and gravel pit. The void was filled with waste, including metal refining wastes. The site was bought from the local authority in 1979 with planning permission for housing⁷ and subsequently developed. The company that built the scheme was acquired in 2001 by Taylor Woodrow. The local authority carried out an inspection of the site in 2002 and determined it as statutorily contaminated in 2005. The local and national press gave the site a high profile and directed most of its criticism towards the local authority. Contamination levels found were compared with UK *Soil Guideline Values*. Attention was focused on properties where these values were exceeded. There were significant disagreements between Taylor Woodrow and the Local Authority regarding the technical assessments conducted for determination, as well as

⁷ with no conditions, e.g. for remediation

the legal position. After close to two years of dialogue, the local authority agreed it would not pursue Taylor Woodrow for the clean up costs. It has since received Public Sector funding for action on the site.

From a developer's viewpoint liabilities associated with working on a brownfield site can be considered across time. There are historic liabilities: the legacy risk of materials left on site after remediation and the possibility of retrospective liabilities imposed by legislation. There are current liabilities, operational risks; and there are future liabilities. Future liabilities can result from changes in legislation or financial reporting requirements and also from the changing state of knowledge, e.g. scientific evidence of harm from something previously unknown or considered innocuous. Liabilities also exist in space, for example, from contamination on site, and contamination migrating off site. Liabilities may result from effects on human health (e.g. for workers, residents, people off site), on water resources, ecology and property. Liabilities can become manifest in several ways, obviously direct costs, but also disruption to project timescales and the impacts of negative publicity with resulting damage to reputation, brand and share price.

The legal position in the UK is that for most statutory liabilities the polluter pays principle is in force. From a developer's perspective this often means the vendor. Property transfer in the UK is based on contract law and thus operates on the principle of *caveat emptor* or *buyer beware*. This means the vendor provides no guarantee as to the state and condition of the land. Hence the purchaser may take on liabilities. These two principles at first glance might appear to be contradictory. In practice they are not but they do create a situation which is complex where liability can "flow" between stakeholders. The regulator would initially identify the liability of the polluter (vendor). The vendor seeks to reduce liability by transferring liability via *caveat emptor* and/or by provisions in the contract with the purchaser and/or by seeking an indemnity. The purchaser will seek to manage the liabilities from the vendor through a variety of mechanisms discussed below. The purchaser may also have a statutory liability as a 'knowing permitter' if s/he is aware of environmental risk and has the power and ability to intervene. This complexity means that each situation must be looked at on its own merits in terms of statutory liabilities, contract law, indemnities, knowledge about the true state and condition of the land, actual level of technical risk and other factors.

The scale of liabilities is always subject to uncertainty. Over time gathering information may reduce the scale of this uncertainty but cannot eliminate it for several reasons. Firstly, there are fundamental measurement uncertainties in any site investigation, the regulatory position is often complex creating its own uncertainties, and there may be systematic uncertainties – for example a neighbour refuses to allow access to sample a plume migrating off site. Poor professional practice can exacerbate uncertainty. Examples of data limitations that Taylor Woodrow has encountered include: information offered is based on an inadequate sampling strategy, an incomplete range of determinants, an adequate period of monitoring and poor documentation / cursory risk assessment that uses out of date sources or has not been conducted for the purposes Taylor Woodrow is interested in purchasing for (residential development).

In reality the commercial position is that the profitability of a brownfield redevelopment is benchmarked against the full value of a greenfield development. The money that can be bid for a brownfield site is this greenfield value minus the development build costs and minus "abnormals". The "abnormals" include the remediation cost, and any other additional costs, e.g. geotechnical, legal and administrative. "Abnormal" costs are impacted by the transfer of liabilities between vendor and purchaser and any indemnities offered. This is a delicate calculation. Over-costing the abnormalities means that the purchaser may under-bid and so lose the site to a competitor. Conversely, under-costing the abnormalities means that the developer will lose profit margin or may turn in a loss for the site. The calculation is made more difficult as it must be made in limited time in a highly competitive market, based on limited data. Furthermore transfer or liability provisions are often agreed at an early stage. Some practical examples of financial impacts include:

- remediation cost over-run
- previously unidentified contamination

- remediation not carried out to specification
- contamination migrating from an adjacent site.

There are a range of mechanisms that can reduce liability risks. These include:

- using the best quality service providers (e.g., consultants, contractors)
- price reduction (higher uncertainties are associated with lower bids)
- retention of purchase funds in case of unanticipated site problems
- insurance and bond based solutions.

Table 3 summarises the risk situations that a developer purchasing brownfield land might face

For vendors, such as industry groups divesting, transfer of liability may not be effective in the long term unless the purchaser is able to demonstrate its ability to maximise land value, be reliable in its management and development of the site and be an enduring entity. This last point is important. If the organisation to which liability is transferred falls out of existence then liabilities may revert to the vendor.

Table 3 Developer Liability Risk Management

	Moderate Liability Transfer	Onerous Liability Transfer
Low Technical and Commercial Risk	Proceed with standard technical and legal reviews	May be able to accept onerous legal provisions if confident in technical appraisals and / or environmental risks are low
High Technical and Commercial Risk	Focus on technical solutions: use of consultants and contractors	Proceed with caution: thorough legal and technical solutions are needed

Managing liability, the US perspective, Dwight Bedsole, Dupont, USA

DuPont is a major international company operating in 70 countries with 60,000 and annual revenue of \$30 billion per year. It is an old company which began in 1802 making explosives and expanding in the 20th century into chemical and energy industries and now biochemical / biological industries. Even though DuPont followed all operating standards at the time and incorporated the best of available technology, its operations have never the less impacted the environmental condition at some of its sites. To address these issues DuPont has spent \$1.5 billion since 1989 and has a direct interest in brownfield development.

Successful brownfield redevelopment requires the support and involvement of all market segments: developer, municipality, regulator, property owner and financial institutions supporting the transaction. Each should strive to understand the issues in the other segments and work collectively to remove barriers. In the US liability issues present the greatest challenge to brownfield development for major industry (i.e. industry with “deep pockets”). Hence, generally speaking brownfield transactions in the US that involve property transfers are largely between organisations with “shallow pockets” that are not considered targets for tort litigation.

The Superfund legislation in the USA has brought benefits, but also some unforeseen problems, in particular that of *perpetual liability*, i.e. the responsible party is responsible forever and there are no contractual of financial mechanisms that remove this liability. This creates two primary concerns for responsible parties:

- 1) Regulations dealing with contaminated land are subject to change over time. If a remediation project is carried out that complies with current regulations it is still possible that additional

remediation will be required at some point in the future, for example as a result of changes in standards, advances in knowledge, changes in requirements rendering existing engineering controls such as containment inadequate. Furthermore, if the site is sold the responsible party will still be liable for failures by the new site owner to operate remediation systems correctly.

- 2) The US is litigious country and responsible parties will retain a long term risk from litigation under Common Law through tort⁸. Large companies attract litigation regardless of real injury. Lawsuits claiming personal injury, property devaluation and medical monitoring only require the detection of the presence of a substance, no causation needs to be proven. While ideally all sites should be remediated to allow unrestricted use, in practice this is possible only for a few sites. Rarely will a remediation approach remove all traces of contamination.

Consequently, for major companies like DuPont which are potentially responsible parties, properties with long operating histories and complex remediation issues are rarely able to be remediated to other than restricted use applications. This means that DuPont has to rely on *all* future users to properly manage the site to limit any exposure to contamination remaining on site. This duty has to last forever, for all owners. Forever is a long time, and raises the question should divestiture take place, which has the negative consequence of perhaps impeding the re-use of land.

Mechanisms to minimise the potential impact of regulatory and litigation concerns or risks vary from State to State. Divestiture of brownfield properties with only slight residual contamination may be facilitated by deed restrictions (property covenants) to restrict use of the land and water resources. However, not all States allow deed restrictions to be passed to successive owners, and there is a concern in others that records of deed restrictions are not maintained into the future. It may be possible to negotiate an indemnification from the site purchaser / developer. However, the long term viability of this indemnity is limited to the corporate lifetime of the purchaser. In addition, the purchaser may try and pass the indemnification to a shell company rather than the parent, which removes its usefulness. The purchaser can accept responsibility of any future changes in use, which may require further environmental risk management. However, this responsibility may not be passed on to successive owners. Residential housing has the greatest profit margin in the USA, hence the successive owners might be householders.

An alternative approach is that the Potentially Responsible Party carries out remediation and retains the freehold for the sites, and develops the sites via long term lease agreements that allow it to retain control over risk management measures, and limits redevelopment to commercial and industrial use. This approach has had limited success because of greater developer interest in the more profitable housing sector and little or no interest by developers in developing via long-term lease agreements..

Currently discussions are underway in the USA to find a broader solution to the problem of perpetual liability. This could be based on a federal government trust fund created by an act of Congress and recognised as a non profit, federally chartered fund. For sites remediated under federal or state clean-up programmes the owner could pay a fee to transfer future liability to this fund on a voluntary basis. Additional fee transfers could cover transfer of liability for long term stewardship of risk management controls and institutional controls such as deed restrictions. The non-profit and federal nature of the scheme proposed allows for broader and longer term protection than insurance products and at less cost. The scheme does not limit the opportunity of individuals to make claims (e.g. under tort) and fits with the polluter pays principle, where the polluter would pay *one last time*.

⁸ Damage, injury, or a wrongful act done wilfully, negligently, or in circumstances involving strict liability, but not involving breach of contract, for which a civil suit can be brought

Case Studies

Case Bilbao, Pierre Menger, IHOBE, Spain

Like some other regions in European countries, the Basque country underwent industrialisation in the 20th century, with in particular the development of the steel and metal production and other heavy industry. Over many years the industrialisation process greatly affected landplanning and urban development. As in other industrial areas of Europe, the industrial crisis of the 1980's left a legacy of historic contamination that is estimated to have created around 6000 potentially contaminated sites, along with a social and economic crisis in the region. 22% of the total number of potentially contaminated sites were localised the by the Bilbao Estuary. 32% of the total surface of the Bilbao Estuary area may be occupied by potentially contaminated activities (active or abandoned activities)

This in turn has created an imperative for urban and economic redevelopment of degraded abandoned and obsolete industrial areas. This was recognised in policy from the 1990's in the Basque Country which was a pioneer at national level in this field. Since its beginnings the contaminated soils policy has developed by learning from the experience from European leading countries, stimulating the collaboration with other institutions, adapting knowledge and know-how to local conditions. Implementation in the Autonomous Basque Region has been carried out by the Department of Environment and Landplanning of the Basque Country and the Environmental Agency (IHOBE).

Urban redevelopment has now taken place over 65% of the contaminated land area of the Bilbao Estuary. In 1987, the municipality of Bilbao elaborated its first *General Urban Development Plan*. This highlighted opportunities for the urban redevelopment of brownfields, identifying the issue that they were, owned by different public administrations. "Bilbao Ría 2000" or "Bilbao 2000 Estuary" is a non profit organisation created in 1992 to co-ordinate brownfields redevelopment. It unites state institutions like the State Society for Soil Promotion, the Bilbao Port Authority, two public railway companies and local institutions like Basque Government, the Provincial Council of Bizkaia, the city councils of Bilbao and Barakaldo with the aim of rehabilitating degraded or industrial areas in decline.

Bilbao Estuary 2000 was funded by its members with €1.8 million and the shareholders of the organisation, all public organisations, also ceded their land situated in Bilbao. In parallel the municipalities designated the land (e.g. from industrial to housing) so giving it a higher value. From there on Bilbao Ría 2000 has invested in the urbanisation of the areas and sold it to private entities. As the land is situated in strategic areas that are undergoing urbanisation, this selling creates revenue which is reinvested in rehabilitation of further brownfields or other actions for developing the Bilbao metropolis. In addition, the organisation benefits of EU subventions that currently provide around 9% of its budget.

Major projects include:

- The redevelopment of former steel works at Bizkaia" to residential and industrial use, with rehabilitation of the estuary banks as leisure areas. Contamination problems that needed to be dealt with included heavy metals, mineral oils and PAH from both the industry and from a wide range of waste materials that had been used to rise the height of the site which was in the river flood plain. Remediation included soil washing and cement based stabilisation of residues. Total investment in site risk management was €2 million.
- The Bilbao Exhibition Centre (BEC) was inaugurated in 2004 and is used for business, sporting and leisure purposes. It is built on former brownfield, and required the excavation and removal of 5,300 m³ of material, 30% of which was soil contaminated by residues of lindane production from a near by factory. These residues were transported to a confinement cell contiguous to a landfill rehabilitation project close to the site.

- The municipality of Erandio carried out one of the first site investigations on the area in 1993. The site was an area where pyrite ashes, a by-product of sulphuric acid production, were processed to recover zinc, copper and other metals. The rehabilitation project was an initiative of another of the institutions that plays an important role in the rehabilitation of contaminated soils in the region: SPRI-LUR. SPRI-LUR is a public society of the Department of Industry, Commerce and Tourism of the Basque Government. Its objective is the revitalisation of the industrial sector by promoting and managing soils and buildings for industrial use in the Basque Country. The restoration of this site contributed to the creation of 93 companies and 823 jobs. Further it acted as a catalyst for initiating several other similar Private Sector led restoration initiatives in neighbouring areas.
- Another initiative of SPRILUR, carried out in the municipality of Barakaldo, is on part of a 31 ha site, where a range of different industrial activities took place, including production of sulphuric acid and fertilizers, shipyards, demolition of ships and energy production in a thermal power station. A tar distillation company is still active in the area and is associated with PAH contamination of soil and groundwater. Currently, site investigations have been completed, but further progress has been stalled by disagreements over cost sharing.
- Restoration of the “Pastilla de Altos Hornos de Vizcaya” in the municipality of Sestao. has been a complex project because of the high density of potentially contaminated industrial sites in the area. Different parcels of land are in different phases of the processing, investigation, demolition, rehabilitation or construction for the new planned use. Regeneration is intended to create new economic activities for the naval sector and other strategic activities like those related to the construction of parts of wind power plants, as well as closer to the urban centre, constructing social dwellings and other public infrastructures.
- A public/private collaboration of Bilbao Ria 2000, with VISESA, a public real estate developer for social dwellings, the municipality of Bilbao and several private estate companies is carrying out a mixed use residential development (for private and social housing) of a former municipal waste disposal site in void space created by iron ore extraction. Residential development is also taking place on the site of a former plastics factory under private finance. Contamination in the area also includes residues from lindane production used in embankments. Around 11,000 m³ of contaminated soil will be excavated, removed and placed into a confinement cell. The dumping of lindane production residues has affected more than 50 sites in the Basque Country. Many projects have been affected by this problem, one of the most important being the extension of the Bilbao Airport. Two confinement cells have been built to store lindane contaminated soils, one in the in the municipality of Barakaldo (capacity 412,000 m³) and the other close to the airport (capacity 110,000 m³). Financing of these facilities was provided by agreements between the lindane producer, the EC, municipalities, developers (and for the airport) AENA.
- Three major projects are underway in Bilbao. Zorrozaurre is a peninsula located on the Nervion river, an attractive part of the city. It has a complex brownfield configuration, with an area of 29 ha on which 61 potentially contaminated sites have been identified due to very diverse activities. A range of institutions and stakeholders are involved in the project, including the Port of Bilbao, The Provincial Council of Bizkaia, The City Council of Bilbao and three major landowners. Two proposals have been made (1) A residential area of around 5,500 dwellings and offices, and (2) a counterproposal, headed by an neighbours association, to convert this area into a peninsula without cars, an “eco area”. Urban planning is expected to be completed in 2007. No timeframe has yet been set, but the redevelopment is expected to take in the region of 20 years. A new leisure facility has been built on a former shipyard, the “Euskalduna Congress and Music Palace”. And, finally the Guggenheim Museum, which is certainly the most famous place in Bilbao, which resulted from a collaboration between the Basque Government, the Provincial Council of Bizkaia, the City Council of Bilbao andf Bilbao Ria 2000. Since its inauguration in 1997, this museum has been a strong driving force for the urban and economic regeneration of the River Bilbao and also a model in the Basque Country.

Brownfield redevelopment status and lessons from Northern Hungary, Tamás Madarász, University of Miskolc, Hungary

Northeast Hungary bordering Slovakia and Ukraine is among the least developed regions in Europe. Its population of 1.2 million people is decreasing. The major city in the region is Miskolc. In the 1980's its population was 210,000, it is now 185,000. Before the collapse of the "Iron Curtain" the region contained a range of heavy industry centred on the towns of Miskolc, Ózd, Salgótarján including deep coal mines, smelters and chemical plants. These industries were privatised in the 1990s but were unable to compete and closed despite a number of government subsidies. Industries passed through a range of ownership and were asset stripped. This presentation focused on brownfield in Miskolc, Ózd and Almásfüzitő.

A survey of brownfield sites in the North-East Hungary region was carried out by the Bay Zoltán Foundation conducted in November 2005. This identified nearly 150 sites occupying an area of 2,600 ha. One of the key concentrations of sites was in the Miskolc area, particularly from two former steel industry sites, which at their peak employed more than 20,000 people. Several studies have been carried out to develop coherent approaches to brownfield redevelopment. These studies all agree in one point, that the chances for future, long term industrial use are very low. The large sites have been divided into complex patterns of ownership and use since the 1990s by chaotic ownership patterns. Some parcels of land have been traded 5-10 times in the last 15 years.

The Lenin Steelworks in Miskolc occupied an area of 160 hectares and employed 15,000 people in the 1980s. The first facility in was established in 1770. In 1870 blast furnaces were brought onto site. Steel production began in 1879 and alloy steel in 1975. The facility became 1950s Lenin Steelworks and privatisation started in 1989. Around 140 small companies now operate on site, varying from the original metal industry to animal food packaging to a small service and leisure businesses. The site itself consists of highly contaminated industrial land, with ruined buildings and waste disposal sites. Redevelopment ideas for the site have included attracting environmental industry on site exploiting locally available cheap labour costs (2006), or as a technical museum and recreational park (2005). However the complex ownership and limited economic activity in the region means that there is neither motivation nor resources for redevelopment. Miskolc may have missed its opportunity to secure inward investment as it had no adequate road transport infrastructure linking it to the capital, Budapest, which is the economic hub of the country until completion of a motorway link in the past decade. By then inward investors were already looking further East, for example to the Ukraine.

Local action used brownfield land at Ózd to create a business park. Today 50 businesses employ 1000 people on site. The brownfield land was formally a steelworks which occupied 45 ha area. It was the major employer, employing 13,000 people employed in a city with 40,000 citizens. Following the collapse of this industry in the 1980's local businesses established the Ózd Industrial Park project to create jobs and provide stewardship for the site. An site investigation was carried out as part of this process which identified metal and hydrocarbon contamination, but no budget was available for remediation. 20 ha of the site was bought from the state by local businesses to establish the business park. Subsequently in 2002 the national Environmental Authorities declared the new owners liable for remediation costs.

Brownfield land in Almásfüzitő is related to an aluminium smelter, which deposited red sludges on gravel terrace sites bordering the Danube. The smelter was privatised in the 1990s, and this included an obligation on the new business to provide a surface covering for the disposal sites. Surface cover approach taken used a readily available local solution, which was based on applying a 1 m layer of a mixture of coal power plant ash and hazardous wastes in a controlled manner over the waste site. Soil cover was then added and vegetation planted. The activity has been licensed by the Hungarian environmental inspectorate for several years. A new piece of legislation enacted in 2000 required environmental and human health risk assessments to be carried out for the site and its remediation, including that previously permitted. The findings of this assessment were that the surface cover was a

viable solution for containing environmental threat from direct contact and migration of dust. However, it did not address the movement of contamination through the subsurface from what were unsealed deposits.

Brownfield redevelopment in the Northeast of Hungary is hindered because of the poor economy and falling population of the region so that there is no driver for redevelopment / regeneration: there is no market demand. Regeneration is further hindered by the attitude of the State which wants to shift its liabilities to the Private Sector. Mega-sites with fragmented ownership/operation and abandoned land created by a chaotic privatisation process are difficult to manage in a strategic way.

Rezoning, remediation and redevelopment of a former manufacturing site in West London, UK, John Waters, ERM, UK

This case study describes the remediation and redevelopment of a former Honeywell site 5 km north of Heathrow in West London, UK. The site, known as King Sturge, began operating in 1936 as the English Metal Powder Company. The site suffered a major fire in 1970 and was rebuilt in 1971 with addition of anti-corrosives and specialty chemicals manufacturing. The site was acquired by Honeywell and in 2001 operations ceased. Site investigation and risk assessment took place over 2001-3, followed by demolition and remediation 2004-5 and sale and redevelopment over 2006-7. The site area is 9 ha, of which 5 ha was classified as industrial land and 4 ha as Green Belt (i.e. protected open space where no redevelopment is possible). The site is an island, bounded to the north by the Grand Union Canal and the south by a small river. Access to the site is via an old narrow bridge which is a protected monument. While the local authority had zoned the land as industrial, its poor access limited its industrial development potential, but not its potential for residential use. In addition, residential re-use would develop greater site value. In fact the uplift in value (\$15 million) was greater than the likely increase remediation costs from industrial to residential end use. Figure 4 shows the final site redevelopment plan, agreed with the local authority.

The strategic objectives of the brownfield development project were therefore: effective risk management of environmental issues, to maximise real estate value and to eliminate liabilities. To achieve this it would be necessary to: rezone site from industrial to residential, identify site remediation strategy which satisfied Honeywell risk management standards and met UK regulatory requirements, optimise cash flow impact, and keep the project on schedule. ERM's role within this project was to carry out:

- Detailed site investigation
- Quantitative risk assessment
- Regulatory negotiation
- Proposed rezoning site from industrial to residential use
- Active collaboration with property consultant to achieve rezoning
- Turnkey remediation

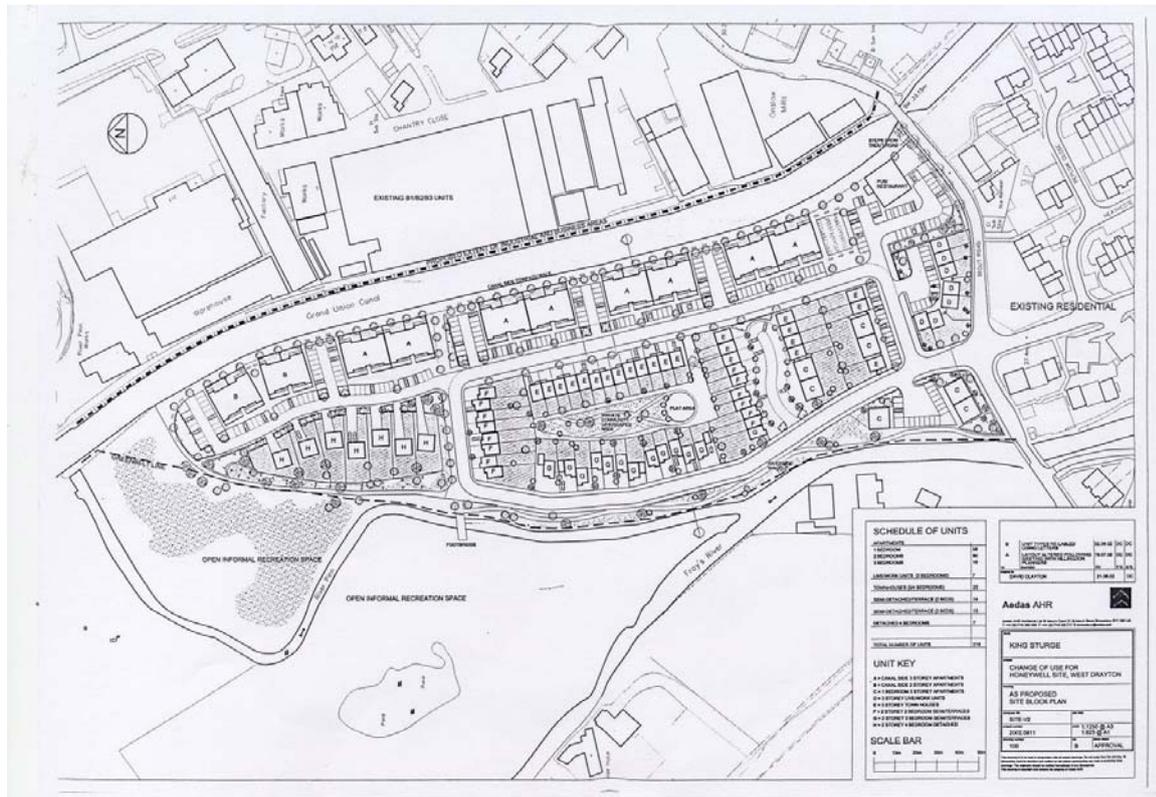
The site investigation and risk assessment found that contamination was associated with bulk storage or use, and that there was evidence of free product in the subsurface. Typical contaminants were: aromatic solvents (toluene, xylene and ethylbenzene); chlorinated solvents and their breakdown products, C21-C35 petroleum hydrocarbons, PAHs, and metals. There was evidence of microbial degradation of the organic contaminants. The risks identified were potential risks to human health via direct contact and indoor air inhalation and contamination of the underlying aquifer.

The risk management strategy included planning measures so that houses with gardens would only be built in areas where residual contamination was unlikely, and a combination of source removal and pathway management remediation actions. Source removal included decommissioning and demolition⁹, excavation and removal of metal contaminated fill and use of dual phase vacuum

⁹ Demolition was phased to support the land use rezoning strategy

extraction (DVPE) to remove free product organic contaminants. This was enhanced using *in situ* steam heating using steam already produced locally off site. Pathway management included use of monitored natural attenuation, and *in situ* biodegradation to deal with remaining pockets organic contaminants of using Hydrogen Release Compound (HRC®). Residual vinyl chloride was treated using Oxygen Release Compound (ORC®).

Figure 4 King Sturge Development Plan



The thermally enhanced DPVE increased subsurface groundwater temperatures to 60-90°C. Pumping used to lower the water table to expose impacted soil in the capillary fringe. The system was operated for around 3 months. During this time 2,000 kg of chlorinated solvents (TCE, Cis-1,2 DCE and VC) was removed. Extraction was switched off when the cumulative mass recovery curve flattened. Extraction was followed by soil and groundwater sampling as a validation for regulatory sign-off against risk based site specific target levels. The site took three months to cool. The thermal DVPE route was taken as the project required that remediation should be completed within 12 months. The additional costs (\$300k) of the *in situ* heating were more than compensated by the improved project cash flow. The steam heating was supported by a number of fail-safes to prevent accidental release of volatilised organics to atmosphere. Firstly the capacity of the extraction process was ten times that of the steam injected, and, secondly a back up extraction system on a stand by generator was provided in case of failure of the main system. The project was the first full-scale use of steam enhanced DPVE project in UK.

The site was then transferred to the developer who installed soil venting, vapour barriers and brought in clean fill. Honeywell retained the right to monitor subsequent risk management measures (e.g. capping and vapour barriers). Construction on the site is now underway. Overall the restoration and re-use of the site has generated wider value than financial return alone, including: an increase in affordable housing; an increase in the local/regional tax base; and excellent public relations for Honeywell.

Tools and Communication

Environmental insurance – protecting assets and unlocking value, Simon Johnson, Managing Director, Global Environmental Partners, UK

Environmental insurance is a valuable tool especially when used as a part of an overall risk transfer programme. New products and product developments will extend the use and value of environmental insurance to meet the demands of new regulations.

There are four principal risks that can create liabilities:

- o Technical – will risk management run on time and on budget;
- o Legal and regulatory – will the application (or even the nature of) regulations change in the future;
- o Contractual – arising from warranties, indemnities etc; and
- o Financial – project cost over-run.

A number of strategies are used in transactions to control liability risks:

- o Retain/take all the risk, maximise sale price/minimise purchase price. Retained risks are transferred or insured. Simple transfer of risks may reduce strength of the recipient's balance sheet and cause it credit and liquidity problems;
- o Contractual transfer - (indemnity/warranty) negotiates 'cost – discount' of transfer within sale price. This may include contracting out liability to a third party. Insurance may be used to protect against failure of contract and residual liability and credit the indemnifier; or
- o Compromise position, whereby parties agree to an equitable arrangement.

Environmental insurance to manage liability risks can be an important tool to unlocking value. They can facilitate transactions by unlocking the deal. The time value of money means that it can improve cash flow and reduce financial costs if a deal can happen more quickly. It can protect the value of a transaction, by supporting the value of assets, the corporate balance sheet, reputation and investor interests. Environmental insurance can add value to a transaction on resale, at the point of sale or transfer and during arbitrage. It can also support a liability free exit from a transaction. The security provided by insurance solutions allows companies to maintain their value and balance sheet and protect themselves from future regulatory developments. It can help maintain liquidity in a transaction (and a business) and retain company financial strength by removing liabilities from balance sheets, for example, enabling borrowing "power" to remain unaffected.

Two broad types of insurance product exist:

1. site pollution liability insurance (SPL); and
2. cost cap insurance.

Site pollution liability insurance policies can last for a maximum of 10 years¹⁰. UK premiums are around £75,000 one-off payment for a policy with a limit of £5 million in aggregate. Limits of indemnity are typically up to £20 million, but could be higher for higher premiums. Policies cover: third party property damage, bodily injury and clean-up – on and off-site; change of law; legal defence costs. They do contain some critical exclusions, but there is some flexibility to these. Policies will exclude first discovery of a new problem. Deductibles (i.e. policy excess) are usually in the range of £25k to £250k. Cost cap insurance is used infrequently as its availability is low and costs high. It is a complicated scheme which basically covers a cost overrun above some self-insured point. It requires a costed remediation plan that is already agreed with regulators and is typically not available for remediation projects less than \$1 million.

¹⁰ While 25 year policies have been offered in the past, current financial markets offer a maximum of 10 years for two reasons: insurers feel that looking beyond ten years is too difficult for calculating actuarial risks; and, secondly because premiums only offer good returns for a 10 year limitation on ability to invest capital.

Environmental insurance can be used for:

- Guaranteed Fixed Price Remediation (GFPR), i.e. insurance backed remediation programmes offered by environmental contractors to clients. The client pays a fixed price and can take comfort from security of underlying insurance. A portfolio policy allows a service provider to insure a parcel smaller individual projects at reasonable cost;
- Liability Assumption where a third party, e.g. remediation consultant, provides an indemnity for either all of part of the risks and liabilities including legal liability and remediation costs and uses environmental insurance to protect itself. This approach is gaining ground in UK and already established in the US; and
- Pre-funded programmes where the insured pays the net present value of the remediation costs and insurance premiums up-front at the start of the project. Funds held in an experience account which pays for the clean-up. A positive balance in the experience account at the end of the project can be commuted, with the insured receiving a rebate and the insurer released from the programme.

Several examples of insurance use follow.

Acquisition example A 3.5 ha site, with a long history of industrial use had been part redeveloped for retail use and had further significant redevelopment potential. Previous environmental investigations undertaken had not revealed significant contamination. However, suspicions remained that hotspots of hydrocarbon contamination, possibly from previous fuel storage, could both remain on-site and have migrated off-site, creating an ongoing pollution liability. The transaction required support to produce defensible and transparent remediation and liability cost estimates, to support the purchaser in negotiating: price (and any discount), contractual indemnity and risk transfer (environmental insurance). Monte Carlo based modelling was used to estimate potential costs of site contamination issues. This encompassed the Total Potential Remediation And associated cost range assuming redevelopment for similar industrial use. Costs included: remediation (suitable for use); additional costs to satisfy regulators; associated legal and technical costs; and cost of using environmental insurance to protect against residual risks and liabilities. The solution adopted an environmental insurance policy taken out in the name of the purchaser and its bank which provided cover in the event that monitoring triggered a requirement for further action by the regulator. The vendor was required to pay the costs of the monitoring until no longer required by the regulator (believed to be 2-years, subject to no issues arising). As a result the purchaser was able to negotiate an appropriate discount (acceptable to both parties) compared with “clean” market value in relation to the prospective remediation costs; and secure an option to purchase cost-cap insurance to insulate against higher than expected remediation costs affecting anticipated development profits. The value gained by the vendor came from resolving the environmental issues that were preventing the larger deal from completing; negotiating ‘fair’ indemnity; and both parties met corporate objective for taking minimum liabilities.

Enabling a transaction A former manufacturing site had been cleared of all buildings but residual contamination from fill materials remained across site along with several hotspots of hydrocarbons. The site was located on fill heavily contaminated with metals. The proposed redevelopment for the site was for warehousing and distribution. The developer had to indemnify the previous (corporate) owner to buy the site and had agreed a sale price with institutional funder on completion. Remediation of hot spots plus encapsulation (engineered cover) of fill was required by the regulator for the redevelopment proposals. Liability was seen as arising from residual contamination in the fill materials and ‘missed’ hot-spots leading to a transfer of indemnity to institutional partner and reducing the investment quality. Environmental Insurance was used to protect the institutional funder against financial exposure to future liabilities and risks of residual contamination on-site and of the site’s previous use. The insurance was used to set against the environmental indemnity as a matching asset to the indemnity liability. This preserved the value and liquidity of the asset in the event of the future sale by the institutional funder (likely to be to another institution); and allowed the institution to use the property as a pension fund investment. Without this insurance no transaction would have been possible. The policy cost was £70,000 for a 10-year cover.

Case Study - Corporate Disposal A large land area (>240 ha) was blighted by the presence of a closed landfill (18 ha) operated by the former owner. The landfill was to be left in current 'safe' condition – not initially available for redevelopment. However potential risks remained of contamination from landfill migrating off-site onto owned and un-owned areas creating future potential for both regulatory and third party actions. The remainder of the area was not suspected of any gross contamination. The vendor wanted a 'clean-exit' via an indemnity from purchaser but was uncertain of the long term financial resilience of the purchaser and its long-term plans for the site. The insurance backed an indemnity. The insurance was negotiated between parties and taken out for ten years on a 'claims made' basis. Both parties were insured. The total Insurance costs including fees was in the order of £180,000 (for a £10million limit of indemnity). However, the insurance conditions included a requirement for some risk management work at the landfill. The insurance facilitated the deal and provided the previous corporate owner (and original polluter) with a 'clean exit' and created new development opportunities across hundreds of hectares previously blighted by the on-site landfill area.

Aspects of the management of the development of brownfield sites, Gordon Bulloch, BAE Systems Environmental, UK

Successful brownfield development is often perceived as more difficult than greenfield development. It presents greater challenges for working within the planning framework. There are extended timescales and greater requirements to consult. It is important to take into account the views of local communities, who may have concerns over health and environmental impacts, fear of the unknown, a lack of empathy with risk based decision making and a wish to avoid any development in their locality. Remediation adds costs to projects and these costs may be uncertain. The remediation work itself needs permitting and possibly planning consent. Finally there is the vexed question of who accept any residual environmental liabilities?

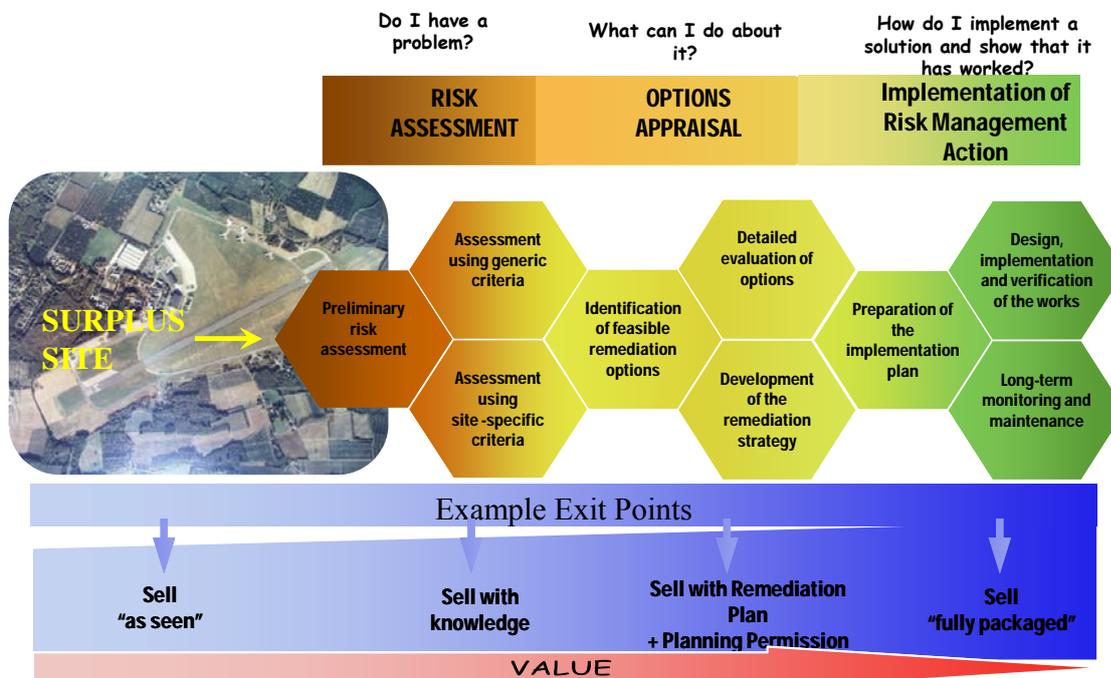
From the point of view of a vendor, e.g. an industrial company seeking to divest land, the goals of brownfield redevelopment are to maximise the financial return on the sale of the land and minimise environmental liabilities to improve the corporate balance sheet; to demonstrate corporate and social responsibility, to build reputation, to be seen to act in an environmentally sustainable way and to return land to beneficial use. The way to achieve value from management of land affected by contamination is via a good quality risk assessment followed by a well planned and executed remediation. These components: risk assessment, remediation options appraisal, and remediation planning and execution should be carried out as an integrated process. It is inefficient and more expensive to do otherwise. The land-owner may divest a site at several stages over a redevelopment pathway as illustrated in Figure 5. These range from divesting a surplus site on a sold as seen basis, at the bottom of the value chain; to selling a fully restored site with increased value.

BAE Systems tends to use the "sell with knowledge" exit point for low risk sites (i.e. after a site investigation and risk assessment have been carried out). For more complex sites selling a restored site can achieve a better revenue for the vendor because it can gain from profitability that would otherwise accrue to the site developer, and it can avoid an excessive development contingency cost for remediation. A slightly more sophisticated approach is to come to an agreement where the vendor is responsible for remediation *after* sale of the site (i.e. the remediation contract is packaged with the sale).

The advantages of selling a remediated site are that all consents have been acquired, work has been completed, verified and if necessary guaranteed: the purchaser can see what they are buying. Remediating after sale as part of a packaged deal has additional advantages of, better cash flow for purchaser, possibilities for accelerating the overall redevelopment for example the site can be remediated whilst detailed planning consent obtained, opportunities for minor variations (e.g. site level changes) possibly saving overall costs and better integration of remediation with site infrastructure works. In addition the purchaser feels in control of the remediation and can conduct their own verification whilst the works are in progress. Important in this is that the packaged remediation

strategy is already approved by regulator through planning consent or condition linked to the redevelopment planning consent.

Figure 5 Contaminated Land Management, The Realisation of Value and Exit Points for Land Owners



Transactions always include liability management. The BAE Systems process for liability management is as follows. The purchaser assumes historical environmental liabilities (as far as legally possible) through an indemnity unlimited in value and time to BAE Systems. The Purchaser gains a 12 year remediation contractor’s warranty for an appropriate limit of liability. When BAE Systems acts as the vendor and the remediation consultant/contractor, it exchanges historical environmental liability in return for giving a remediation contractor’s warranty. Additional warranties for design (site investigation, assessment and remediation design), contractors and to cover future purchasers can be negotiated, and may be supported by environmental insurance products.

Three case studies were presented: a completed development, a development underway and a development at the early stages of planning.

Waltham Park (completed development) The site was a 140 hectare explosives research and development facility adjacent to the M25 North of London. The decision to close the site was taken in 1987. Outline Planning Permission for redevelopment and detailed Planning Permission for remediation was received 1996. The site was sold to Kier Group plc (Twigden Homes) in 1997 with a packaged remediation contract. The transaction was supported with environmental insurance. Remediation was carried out from August 97 to May 99. Planning permission was agreed for 19.5 ha – commercial, 11.5 ha – residential, with the remainder being parkland.

Royal Ordnance Chorley Site – Buckshaw Village (development underway) The site was a 350 ha ammunition filling factory. The closure of 200 ha was announced in 1993. The site had been used for over 50 years, since World War 2, for the manufacture of a wide range of ammunition. It had 850 buildings (covering an area of 150,000 m²) and 50 miles of roads and walkways. The site is well located for a mixed residential and commercial development and additionally the local authority also

included a requirement to reserve an area for a strategic industrial development. Explosives pose a particular risk management problem for the site, and in gaining the confidence of purchasers. The site has been sold to a consortium of Redrow Homes and Barratt Homes with a packaged remediation contract that includes BAE Systems' specialist knowledge in dealing with ordnance sites.

Royal Ordnance Bishopton (development at the early stages of planning) The Royal Ordnance facility at Bishopton occupies a massive site, 1,000 ha, close to Glasgow airport. The proposed redevelopment is for mixed use with 2,500 new homes, employment and new 500 ha woodland park. BAE Systems Environmental have partnered with Redrow at an early stage to bring forward and integrated remediation and redevelopment scheme and share planning costs. An outline planning application has been submitted for the development, along with a detailed application for the remediation work (which includes an on-site landfill) and a detailed application for new motorway junction¹¹. The scheme being developed will have a very large impact on the locality, both in terms of the closure of the facility and its redevelopment and re-use. Consequently detailed stakeholder consultation forms a major part of the planning process. A working group was set up in 1999 when site closure was announced including a number of stakeholders. Its output was a submission to the regional development structure plan and formed the basis of the scheme put forward for outline planning permission. Subsequently a community liaison group was set up which includes the local council, other local organisations such as unions and churches, local authority councillors, and a residents group, the Bishopton Action Group. The Bishopton Action Group are opposed to the scheme, in large part because they do not want the additional housing it will bring. The liaison group was fully consulted on all planning applications before submission along with statutory consultees (e.g. Scottish Environment Protection Agency, the Local Authority, Scottish Natural Heritage and the West of Scotland Archaeology Service).

NICOLE Interactive Session: The Site Redevelopment Game, Jeroen Kattenberg (ERM) and Natalia Hooegeven (DHV), the Netherlands

The SITE Redevelopment Game (known as SIRE) was developed by Jeroen Kattenberg and Natalia Hooegeven¹². It is a simulation of the redevelopment of a brownfield. Teams try to redevelop a fictional site in such a way that all involved stakeholders agree with a redevelopment plan and the liabilities, risks and costs are known, divided and guaranteed. Each team member assumes the role of a particular stakeholders and team members interact with each other to both try and optimise the brownfield redevelopment and to explore the potential discussions that might arise between stakeholders. "SIRE" is meant to be used as a supportive tool in trainings on contaminated site management for decision makers and environmental professionals.

During a workshop session NICOLE members were challenged with a target of developing a site redevelopment plan for a virtual brownfield. Nine teams played the game, working independently on the same brownfield redevelopment scenario, with the same stakeholder roles in each team. All nine teams accomplished their task successfully by reaching an agreement between different stakeholder groups represented in the game (redeveloper, public and authorities). Each stakeholder had been set confidential goals that it needed to reach during the redevelopment negotiations, and these goals were designed to simulate the same kind of controversies in the game as often occur in the real site planning negotiations:

- The financial constrains caused by the need of investments into the site remediation have a direct impact on the expected redeveloper profits.
- The authority's vision is partially ruling the redevelopment policy.
- The public focuses on mastering negotiation strategies to influence decision making process and achieve their goals.

¹¹ www.bishoptonregeneration.com

¹² The game developers would like to thank the NICOLE members who took part for their participation and input.

The game environment provided an opportunity for the players to experience the complex process of priority definition for remediation technologies application balancing risk reduction and consequent land use type application. The sites being discussed were contaminated with a variety of substances including heavy metals and asbestos, volatile organic compounds and aromatic compounds to create an extra challenge.

The game was finalized with a stakeholder satisfaction assessment that showed a good correlation between goal accomplishment and individual satisfaction level. The game had initiated intensive discussions between the players as well as between the teams. One of the primary targets of the game was to allow the players to look at the process from the perspective of the different roles. This consequentially helped the participants to recognize the main process obstacles / priorities and to find cost effective risk based solutions.

3 Discussion

Brownfield redevelopment brings a wide range of benefits for sustainable development, for example:

- Environmental benefits: management of environmental risks, substitution for greenfield sites and for soft end restorations benefits for biodiversity and opportunities for non-food land use such as bioenergy
- Economic benefits: uplift in site value, commercial activity from the remediation and redevelopment process, uplift in value of surrounding land, and for residential and industrial end uses establishment of ongoing economic activity
- Social benefits: over time the removal of blight and stigma, improved amenity – especially for soft end restoration, opportunities for community involvement and the development of local pride.

Brownfield regeneration is therefore a vital and energetic sector which underpins the economic, social and environmental renewal of urban communities. Development releases funds that can be used to deal with the historical legacy of contamination issues in a way that no other land use can. Several papers showed how taking an integrated, as opposed to sequential, approach to site investigation, risk assessment, remediation and redevelopment could add value to a project and increase its profitability, and even unlock projects initially thought of as uneconomic. Other routes to increasing value and facilitating brownfield redevelopment suggested included the concept of regenerating small sites as a cluster or parcel, and also negotiating rezoning of land, particularly towards residential use where redevelopment revenues are generally greatest.

Conventional wisdom is that fear of the transfer of liabilities for possible future environmental problems is a major barrier to brownfield redevelopment. These liabilities might arise because risk management was inadequate in some way, because new knowledge might uncover new problems or that legislation might change in the future. This is seen as a particular problem for US brownfield transactions where the federal legislation means that “potentially responsible parties” have perpetual liability. To a lesser extent fear of liability may be a barrier to brownfield redevelopment for industrial site owners in Europe, but in this case because the contractual transfers of liability possible in most Member States are, in effect, only as robust as the organisation to which they are transferred. Several strategies are important in limiting the scale of liability problems. First and foremost is the need for quality in environmental risk assessment and management to provide as reliable a basis as possible for decision making. Also important is working with reliable partners, partners that will be business in the long term to support any indemnifications or warranties that they offer. Where this is not possible, or where residual concerns remain, environmental insurance can offer an important enabling tool, although several NICOLE members felt that the 10 year policy limit was insufficient for their needs. It was suggested that a NICOLE working group might offer an opportunity for discussions between industrial and developer problem holder members of NICOLE to work towards resolving the concerns over assuring a clean exit for vendors in brownfield redevelopment transactions, better quality

assurance for land remediation and improving confidence in mechanisms for liability transfer, including environmental insurance products.

Gaining these benefits is not necessarily straight forward. A major complicating factor is the perception of risk, or perhaps more accurately hazard. Local communities may perceive that a site is best left undisturbed rather than undergoing a remediation process that will expose new hazards. Perception also impacts many organisational stakeholders, because those working in an organisation may have limited knowledge and/or confidence in risk management, or because that organisation perceives that its clients have limited confidence in risk management. For example, a housing developer may stipulate excavation and removal based remediation solely to facilitate onward sale of houses, even if this is a more expensive or indeed less sustainable remedial approach. Perception also causes problems of blight or stigma surrounding a former brownfield to persist for a period, even after the site has been remediated and redeveloped. In other words blight can be “sticky”. Brownfield redevelopment is a broader activity than remediation, and objections to risk assessment and remediation works may in fact be precipitated by objections to the proposed redevelopment rather than as a consequence of purely environmental concerns. The only real way to address these concerns is via a public and open process of engagement with all stakeholders legitimately interested in the brownfields project in question.

Perception is, however, a fickle thing. It would be misleading to say that communities are always unwilling to accept redevelopment and risk based remediation, or indeed that blight is “sticky”. For example, location is often a much stronger factor in preferences for house buying, and an attractive and/or historic location may be highly sought after.

While this workshop included case studies that encompassed “soft” redevelopment to parkland or habitat its main focus was on built redevelopment. A number of industries manage large tracts of land that are not immediately suitable for housing or industrial use. Non-food applications such as bioenergy, fibre or bio-feedstock represent a major re-use opportunity for these sites, replacing a long term maintenance cost with a neutral cost or possibly a revenue stream; as well as bringing many wider sustainable development advantages.

Economic activity, attractive to inward investment and population growth appear to underpin brownfield redevelopment. In locations with little growth and/or falling populations there are few economic incentives for brownfield regeneration. This may be a particular problem in countries that were behind the former Iron Curtain where state owned industry has disappeared, and little infrastructure exists to provide access to and from areas of economic growth. These countries may have brownfield problems that extend on a regional basis which require a national, and perhaps EU, effort. The example of Bilbao shows what can be achieved when there is a clear political will to deal with brownfield dereliction on a regional scale. It is worth noting that the EU contribution to the regeneration in the Bilbao region appears to have been less than 10% in an overall sense, and that innovative approaches to planning, zoning and releasing land value played a key part in facilitating the region’s regeneration.

This discussion has been drawn from the discussions within the workshop and from comments kindly sent in by a number of delegates and NICOLE members after the workshop.

4 Concluding Remarks

Brownfield regeneration is therefore a vital and energetic sector which underpins the economic, social and environmental renewal of urban communities. Development releases funds that can be used to deal with the historical legacy of contamination issues in a way that no other land use can.

The existence of a large number of successful initiatives shows that brownfield redevelopment of former industrial land need not be impeded by concerns over the transfer of liabilities, in particular concerns that an industry vendor cannot achieve a “clean exit”. However, a NICOLE working group might offer an opportunity for discussions between industrial and developer problem holder members of NICOLE to work towards resolving the concerns over assuring a clean exit for vendors in brownfield redevelopment transactions, better quality assurance for land remediation and improving confidence in mechanisms for liability transfer, including environmental insurance products.

A major complicating factor is the perception of risk, or perhaps more accurately hazard, both by local communities and by organisations. Brownfield redevelopment is a broader activity than remediation, and objections to risk assessment and remediation works may in fact be precipitated by objections to the proposed redevelopment rather than as a consequence of purely environmental concerns. The only real way to address these concerns is via a public and open process of engagement with all stakeholders legitimately interested in the brownfields project in question.

Economic activity, attractive to inward investment and population growth appear to underpin brownfield redevelopment. In locations with little growth and/or falling populations there are few economic incentives for brownfield regeneration. However, the example of Bilbao shows what can be achieved when there is a clear political will to deal with brownfield dereliction on a regional scale.

Annex 1 List of Participants

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			Czech
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Keuning	Sytze	Bioclear BV	NL
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Swartjes	Frank	RIVM	NL
Syms	Paul	English Partnerships	UK
Thomas	Russell	Parsons Brinckerhoff ESRM	UK
Trivedi	Divyesh	Nexia Solutions	UK
van de Griendt	Bas	Bouwfonds Property Development	NL
van der Graaf	Gert	Municipality of Zaanstad	NL
van Driel	Peter	All-Eco Consult	NL
van Hattem	Willem A.	Port of Rotterdam	NL
van Hook	Evan	Honeywell USA	USA
van Riet	Paul	Dow Benelux BV	NL
Vanneck	Peter	BroCap NV	Belgium
Vegter	Joop	Common Forum	NL
Verbruggen	Louis	MWH	Belgium
Verhaagen	Paul	Grontmij	NL
Visser	Marjolein	Boekel De Nerée NV	NL
Visser-Westerweele	Elze-Lia	NICOLE SPG Secretariat	NL
Waters	John	ERM	UK
Wilton	Bart-Jan	URS Netherlands BV	NL
Wolbrink	Rob	Royal Haskoning	NL
Wrabel	Jens	URS Deutschland GmbH	Germany
Zdanevitch	Isabelle	INERIS	France
Zügel	Thomas	Landeshauptstadt Stuttgart	Germany