



BROWNFIELD REGENERATION: WATERFRONT SITE DEVELOPMENTS IN LIVERPOOL AND COLOGNE

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Submitted 13 Jul. 2010; accepted 02 Nov. 2010

Abstract. The regeneration of brownfields has recently gained prominence due to greenfield land restrictions as well as their potential to promote the urban renaissance. On the examples of Kings Waterfront in Liverpool and Rheinauhafen in Cologne the paper aims to evaluate how brownfield regeneration practice compares, given that local, national and European bodies have invested significant amounts of time and expenditure to the revitalisation of sites. The literature review provides a background to the issues which need to be overcome for developments such as Liverpool's Kings Waterfront and Cologne's Rheinauhafen to become a success. In order to determine the state of current brownfield practice in Liverpool and Cologne, we explore the public opinion and information from specialists in the field. The study shows that, if exploited correctly, brownfield sites can provide a catalyst for economic growth in the inner city areas where they once have been deprived. Finally, studied cities were found to contain many examples of best practice with regards to brownfield sites situated on rivers. These successful schemes could be used to reignite the regeneration of other world cities.

Keywords: brownfield, greenfield, regeneration, sustainability, development, waterfront.

1. Introduction

The redevelopment of urban brownfield sites has become a key part of the planning policy directed to support urban regeneration. The necessity for reusing the land and buildings in the currently unexploited former industrial, commercial, transport, military and etc sites has gained a new level of urgency amongst governments and developers in the light of fast growing world population environment, and the need for urban compaction and rescuing the greenfield (Cooper *et al.* 2002; Adams, Watkins 2002; Bagaen 2006; Couch, Karecha 2006; Dixon *et al.* 2006; Paiders 2008; Stähle 2010).

Nowadays, it has become critical that brownfield sites are developed in a sustainable way and this policy is strongly supported in UK (Department of... 2000; Dair, Williams 2006; Williams, Dair 2007). Several examples on how brownfields are regenerated with sustainability as a main focus in the policy agenda can be found in the English cities of London and Manchester (Raco 2005; Raco, Henderson 2006).

In Europe, the concept of sustainability has been efficiently integrated into brownfield regeneration through the EU projects RESCUE (Regeneration of... 2009; Pahlen, Glöckner 2004) and CABERNET (2009), which aim to facilitate new practical solutions for the sustainab-

le regeneration of industrial brownfield sites. German cities of Cologne, Hamburg, Frankfurt, Hannover and Berlin highlight how the Federal Government had regenerated its deindustrialised cities. While for example in Ireland, Cork dockland has been re-developed as part of European Capital of Culture programme (O'Callaghan, Linehan 2007). English cities have faced a number of difficulties as their European counterparts to regenerate areas of industrial blight and were "the subject of an extensive variety of urban policy initiatives over the past 30 years" (Couch *et al.* 2003). Some of these as other cities of EU remain dominated by inner city brownfield and under-developed sites.

The reuse of brownfield land has become one of the major catalysts in the residential housing development and cities modernization, especially in most industrialised countries, i.e. UK and Germany. The redevelopment of brownfield sites has also ensured the possibility to clean contaminated land providing a habitat for the flora and fauna. As summarized by Pahlen and Glöckner (2004), brownfield regeneration supports all three constituents of sustainable development: economic, by generating business development and employment in often deprived areas; environmental, by removing contaminants and hazards of the former industry and saving undeveloped greenfield; and social, by improving neighbourhoods and

living environment of urban areas (Zavadskas *et al.* 2009; Maliene, Malys 2009; Craig, Lemon 2010). Successful brownfield regeneration in industrial cities is also likely to stimulate the development of sustainable communities (Maliene *et al.* 2008b; McDonald *et al.* 2009; Mitkus, Šostak 2009; Medineckiene *et al.* 2010).

This paper aims to investigate how the current brownfield regeneration practice in Europe's de-industrialised cities leads to the creation of sustainable and high quality developments, assisting in the urban renaissance. The similarities and differences in brownfield regeneration practice in Liverpool's Kings Waterfront and Cologne's Rheinauhafen are compared. The impacts that regeneration projects have had on each city and its public are assessed.

Brownfield regeneration in UK and Germany

Over the last decade the definition of "brownfield" has expanded to the meaning that includes not only contaminated land but all previously developed land (PDL) available for reuse with or without intervention (Alker *et al.* 2000; Ganser, Williams 2007). These developed land sites are abundant in many major cities due to Europe's twentieth century industrial legacy. 66,000 ha and 500,000 ha of brownfield land available for development has been identified in UK and Europe, respectively, by the UK National Land Use Database (Thornton *et al.* 2005; Oliver *et al.* 2005).

At present, the brownfield regeneration is evolving and, besides CABERNET (Concerted Action on Brownfield's and Economic Regeneration, Oliver *et al.* 2005), the REVIT project and English Partnerships, which have recently examined brownfield policies and practices across most EU countries, few studies comparing Europe's main cities exist (English Partnerships 2003; Moss 2003; Bagaen 2006; Franz *et al.* 2008). Since the de-industrialisation mainly occurred in the 1970–90's, the majority of literature, which is fairly recent, and the field, which is constantly evolving, provide much debate especially when national and international policies are updated (Álvarez 2009; Zacharias 2010).

The EU Commission also makes specific reference to England & Germany when describing the RESCUE project (European Commission 2005; Regeneration of... 2009), which is just one of the initiatives being put into place to help tackle this issue. It has been noted that the majority of Western European nations have invested considerable resources in recording the scale and nature of their brownfield's (Oliver *et al.* 2005).

In UK, the Urban White Paper (Department of... 2000) and the Sustainable Communities Plan (Office of... 2003) outlined how to improve our urban areas and better reuse PDL in order to contribute to the desired urban renaissance and the pursuit of sustainable development. Regional Development Agency (RDA) and English Partnerships (EP) are the Governmental bodies helping to secure and regenerate the areas hit by dereliction. Recent EP figures shows that a 60% target of new

homes being built on PDL has been achieved which positively affects the countryside and those towns and cities that have benefited from regeneration (English Partnerships 2008).

In spite of this, the problems still exist and thousands ha of brownfield land are still available for development (Thornton *et al.* 2005). More than 20% of brownfield land is situated in the 9% most deprived areas of the UK (Liverpool included) and the extent of brownfield's was still growing at 7 ha per day in 2004 (Thornton *et al.* 2005). Liverpool has a significant amount of further brownfield land supply which is policy compliant and the city council seeks to achieve 90% PDL target for new housing which indicates the scale of the clean up operation (Liverpool City... 2009).

In Germany, the Federal Government has promoted the reuse of industrial, military or railway wasteland in inner cities with mixed-use, environmentally sound, cost and space-saving types of construction. The urban development and policy of Germany has a history of brownfield regeneration since the 1970's and constantly drives urban renewal at Federal, Lander and Municipal level.

Between 2000 to 2004, the average daily greenfield land consumption in Germany was 115 ha (van der Valk, van Dijk 2009). More than 80% of this land consumption is used for residential housing. At the same time, the number and extent of brownfields (approximately 128,000 ha) was still growing (Bundesregierung... 2004). As a consequence, the national sustainability strategy has been developed recently aims to reduce the greenfield consumption to 30 ha per day by 2020, to increase priority for the internal city development and brownfield redevelopment, and to introduce the brownfield management approaches on local and regional levels (Nuisl *et al.* 2009).

Current issues restricting brownfield regeneration relate to what purpose brownfield land should have as a result of the switch from manufacturing to services, as well as how best to clean up heavily contaminated sites to make them adhere to the principles of sustainability. This point is backed up by Vanheusden (2003) who notes that the reluctance to redevelop on brownfield sites is due to the uncertainty regarding the risks they pose.

Despite that EU countries have invested heavily in sustainable brownfield development, there is still a need for a more holistic approach and method of best practice, e.g. the proposals for local brownfield strategies as part of the national brownfield strategy (Koll-Schretzenmayr 1999; Thornton *et al.* 2005). One of the main obstacles in brownfield development is its unattractiveness to developers, de-contamination that is required, providing a long-term strategy for its use and cost-effectiveness which often renders sites unviable. On the other hand, EU brownfield incentives such as the EU structural funds have been criticised for being distributed to support brownfield redevelopment without necessarily considering whether the development is sustainable (Thornton *et al.* 2005).

2. Methodology

In order to sufficiently analyse the current state of brownfield regeneration practice in Liverpool and Cologne, comparative case studies were carried out. Liverpool's and Cologne's two flagship waterfront developments were chosen as these developments were of similar size, type and function. Each project was evaluated on the basis of the following factors: partnerships, funding, issues, protection of heritage, design, benefits and sustainability.

Questionnaires were an integral part of the study and helped gather quantitative data (i.e. the specific data that can be quantifiable and subsequently analysed and compared) regarding the public's opinions and awareness towards each development. However, the last question was open-ended and sought a personal opinion of each development adding a qualitative aspect. Random members of the public were asked questions designed to answer the aims and objectives of the study most sufficiently.

50 questionnaires were translated from English into German and conducted along the promenade at Cologne's Rheinauhafen from mid June – July 2008. Respondents were asked to complete 17 questions. A further 50 questionnaires were conducted in Liverpool at the Kings Waterfront development between April, May and August 2008. Since the Kings Waterfront contained some different developments (e.g. Echo arena and Conference centre) than the Rheinauhafen (e.g. offices and museums) and was less completed in time of investigation, Kings Waterfront questionnaire consisted of 12 questions and had somewhat less of details on sustainability and renewable energies compared to those of the Rheinauhafen. To compensate for this, contact was established with higher number of agents involved with the Kings Waterfront and this way making it possible to compare the sustainability of these two brownfield developments more fairly.

Between May and August 2008, primary data was collected via telephone and email from a number of sources with an interest in my topic to find out their opinions on current practice. The EP, Liverpool Vision, Bovis Lend Lease, Liverpool City Council (LCC) and Liverpool ACC were contacted with regards to the Kings Waterfront development. The Cologne City Council, Rheinauhafen-Koeln.de, HGK and Pandion developers were contacted for Rheinauhafen information. Each organisation was asked questions relating to Brownfield Regeneration Practice in the UK and Germany.

An appraisal of the Strengths, Weaknesses, Opportunities and Threats (SWOT) was also used as part of the initial case study area analysis. This helped to point out the obvious weak and strong points visible within each development which could then be backed up by hard evidence.

3. Results and discussion

Liverpool and Cologne have recently invested heavily in the regeneration of land within their historical docklands,

released as a consequence of structural changes in the economy. These sites had remained under-utilised, with adverse social, economic and environmental consequences and their revitalisation provides excellent examples that can be followed.

Liverpool and Cologne were selected for this study, since both are port cities that have experienced massive infrastructural changes in recent times. Both have suffered problems with image and thus large-scale regeneration has been implemented. Both waterfront case studies have close a relationship as these two cities were once renowned for their shipping industry and since its decline, have had to implement strategies for the reactivation of once prosperous areas. Significantly, both brownfield sites are excellently located and could well decide how successful each city's regeneration strategy is. The case studies from both cities will therefore provide more of a focus for analysis and interpretation into the current standard of practice which commonly entails flagship of mixed-use developments.

3.1. Kings waterfront in Liverpool regeneration

Kings Waterfront (formerly Kings Dock, adjacent to the Grade 1 listed Albert Dock, remained a derelict eyesore since its closure in 1972 (Fig. 1A) and the Merseyside Development Corporation turned it into an uninspiring car park (Fig. 1B), which functioned up until the late 1990's. It covers 14.6 hectares and for some time was the largest undeveloped site in the City Centre. The site is owned by the national regeneration agency EP. Through investment from a number of agencies, the realisation of a strategic plan for an "international visitor destination with world-class facilities" was finally put into action on this important site. The public organisations (EP, LCC, EU Objective 1, Liverpool Vision, North West Development Agency (NWDA)) and private partners (Bovis Lend Lease, Birse Civils, McAleer, Rushe, Artisan) came up with the Kings Waterfront's, a £390 million mixed-use development that offers office, retail, leisure, community and open space uses. Work began in 2005 on the 50,000 square meter site and the Kings Waterfront became open to the public in January 2008 (Fig. 1C).

As a result of this project leisure and conference facilities have been developed. This included 10,600-seat arena (Echo Arena), 3,600 square metre multi-purpose hall, 1,350 seat conference auditorium with associated breakout rooms, 1,600 space multi-storey car park, Central public plaza (25% of site), 1,800 residential housing units, and two 3-star plus hotels with 442 rooms.

3.1.1. Funding

The whole project was only possible because of the EU Objective 1 funding as Liverpool's GDP is below 75% of the EU average and the package provided the final part of the funding. Dereliction Aid wasn't an option because no derelict buildings were present on the site but this factor helped speed up the redevelopment. Also, private investment was crucial for the redevelopment of the brownfield. The total cost of the arena, conference facilities, car

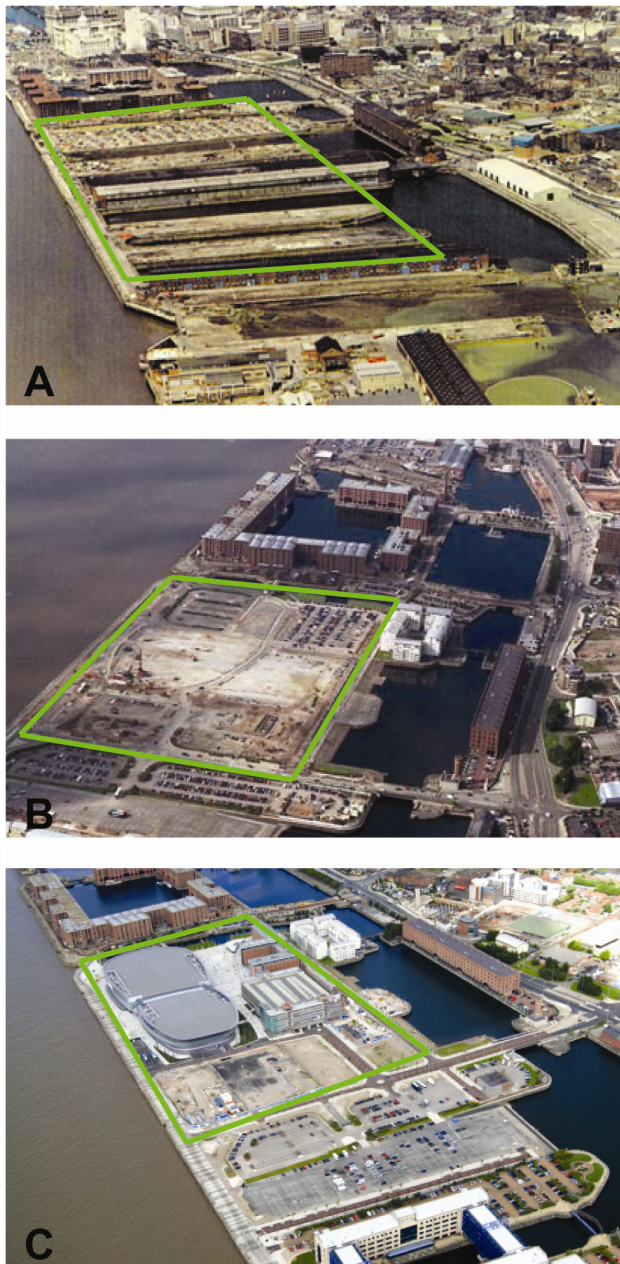


Fig. 1. Kings Waterfront development. A. Kings Dock in the 1970s. B. Kings Waterfront September 2005. C. Kings Waterfront with Arena and Convention Centre (ACC) in September 2008. Area of development shown in bright green quadrangle. Source: MCC (A and B) and Jefferson Air (C)

parcs and public spaces landscaping was planned to be around £140 million. However, additional private-sector developments on adjoining land, including the residential and commercial blocks, pushed the redevelopment of Kings Waterfront to the £390 million mark.

3.1.2. Issues

As the site had some contamination from industrial use it was only marginally viable. This was one of the main reasons why the economic return of the site had to be guaranteed.

The Kings waterfront has been open to the public for over 6 months and has proved to be successful with help from the Capital of Culture publicity in 2008 but it remains to be seen whether this trend continues. A significant number of people also believed that residential/leisure development should have taken part around quays, as was the case in a successful Hamburg waterfront development.

3.1.3. Heritage and design

From 1980 the Kings dock became infilled and used as a car park for a number of years. As no visible historical structures remained on the site after the quays were removed, the only real concern was that the surrounding heritage buildings were not jeopardised in any way (i.e. Albert Dock, Three Graces).

The design of the ACC (the centrepiece of the development) needed to complement the heritage buildings while still providing a modern, sustainable complex rivaling that of Manchester's MEN Arena. The height of the ACC is also sensitive to the Albert Dock but the L-shaped hotel design has caused more controversy.

3.1.4. Benefits

Besides providing a much needed arena, the development itself is designed to provide mainly economic benefits as the city council widely promote economic regeneration which is hoped will lead to population growth. 2200 jobs (as well as 430 construction jobs) and \$7 million in visitor spending per year are the predicted economic outputs. The hotels are also beneficial as the city has lacked 4 & 5-star hotels. Much of regeneration of Liverpool City Centre has been largely property-led with the hope of boosting the economy and the Kings Waterfront was no different. Two new markets were created with the ACC catering for the entertainment and conference industries.

3.1.5. Sustainability

It has been noted how the UK Government has set up "several initiatives to promote both energy saving and renewable energy use, but none of them focuses specifically on brownfield sites" (Thornton *et al.* 2005). This doesn't mean to say that the EU hasn't imposed regulations to ensure that flagship developments as the Kings waterfront are sustainable. The main emphasis is to enhance the urban fabric and provide a new use that will enhance the growing economy of this area of the city. But the ACC also produces half the CO₂ emissions of a traditional building and will get its energy from green sources such as rain water harvesting from the roof of the venue as well as 5 wind turbines. Green assessors using the Building Research Establishment Environmental Assessment Method (BREEAM) have given the ACC a rating of 'very good' underlining its green credentials. As a drawback, the transport access to the Kings waterfront has been criticised and the questionnaire will be used in the paper to rate the public's opinion of the available transport. Also, the large amount of granite used for paving and landscaping of the Kings waterfront has been

imported, which is regarded as an unsustainable method of construction.

Following the project evaluation, we performed the SWOT analysis. The summary of this analysis is shown in the Table 1.

3.2. Rheinauhafen in Cologne regeneration

Since the opening of the Rheinauhafen harbour, in 1898 the former bustling goods transshipment location has gone from a derelict eyesore to a new highlight in urban planning according to Rheinauhafen (2009). Fig. 2 illustrates the history of development along the harbour.

Similarly to the Kings Waterfront, the site is an important part of Cologne’s revitalisation and reurbanization of urban areas and the biggest waterfront project in Germany, which is quite significant with Hamburg and Bremen being the principle ports of Germany. The site has been designed as a vibrant mix of housing, work and culture and is within walking distance of Cologne city centre and extends about approximately two kilometres until it reaches Südstadt. Since regeneration commenced, the area is already having positive effects on the property’s use in the cultural, commercial, and residential sectors (Rheinauhafen 2009).

The development covers approx. 15.4 ha of land and 5.7 ha of water. It is set for completion in 2010 and it is expected to provide offices (146,000 square meters) including 3 Cranehouses and further 6 office buildings, 700 residential housing units (63,000 square meters), underground car park, museums, leisure and retail units, and creates 2,500 jobs. The planned total cost is estimated at 650 million euros.

3.2.1. Funding

The project was greatly aided by the three-year NORISC project (Network Oriented Risk-assessment by In-situ Screening of Contaminated sites) launched in January 2001 (NORISC 2009). The project was intended to promote the revitalisation of contaminated sites in urban areas and the whole city of Cologne benefited from this innovative risk assessment, which reduced the time and cost for investigation, redevelopment and remediation. Many of the Rheinauhafen constructions made good use of partnership-oriented co-operation for example the KAP am Südkai. All planning work, for instance, was completed before construction work commenced. Unlike the Kings Waterfront, the Rheinauhafen was not part-funded by the city council of Cologne but rather by heavy private investment from firms such as Microsoft & Pandion. LEG, the once public but recently privatised development company also renovated heritage buildings. The owners of the site, Hafens & Freight Transportation of Cologne Corporation, sold-off the majority of the site to private developers but it was public-private partnerships that decided how best to redevelop the site.

3.2.2. Issues

Similarly to the Kings Waterfront site, there were other issues besides sustainability and heritage protection in the Rheinauhafen development. The high unemployment rate, low quality surrounding housing areas, lack of green spaces and social problems were other major concerns. The site was marginally viable and had the added issue of the remaining derelict structures which adds to the decontamination costs and the resulting high rehabilitation costs and reduced real-estate value (Thornton *et al.* 2005). This is one reason why 14 years after the initial plans, the Rheinauhafen is only just nearing completion.

Table 1. SWOT analysis of Kings Waterfront

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"> - Waterfront Location; - Main tourist destination; - World Heritage status; - Plenty of open space created; - Generation of employment and economic development; - Waterfront has been modernised; - Conference and event markets are now catered for; - Tourism has been boosted; - A dynamic mix of uses is offered; - Minimal energy demand and renewable energies on site; - Dukes Dock pedestrian bridge has improved accessibility to Albert Dock; - No adverse impacts on local neighbourhoods - High urban design quality; - ACC has a BREEAM environmental rating of very good. 	<ul style="list-style-type: none"> - Limited modes of transport – no tram system after failure of Merseytram scheme; - Restrictive regulations – heritage buildings have put restrictions on design of developments; - Arena cannot accommodate the biggest events like the Manchester Evening News Arena; - Retail facilities can’t compete with Liverpool 1 shopping centre; - Open space but limited green space created; - Local rock not used for paving, imported granite; - No considerable benefits for local neighbourhoods. 	<ul style="list-style-type: none"> - Space to expand; - Linkage to nearby Paradise Project; - Capital of Culture status will advertise the development; - Creation of a 24-hour economy?; - New structures have a longer life cycle; - Creation of a tram system increasing modal split. 	<ul style="list-style-type: none"> - Competition from Manchester; - EU Objective 1 funding has ceased. How will future funds be raised?

RESCUE project sustainability objectives used as guidelines (Regeneration of... 2005, 2009)

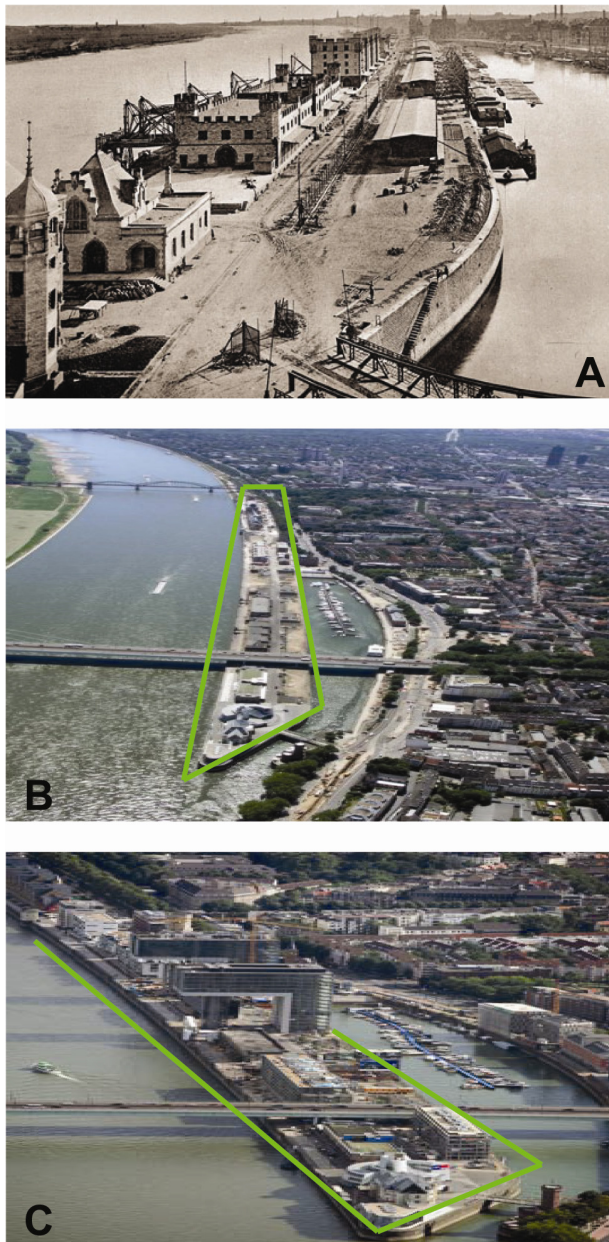


Fig. 2. Rheinauhafen development. A. Rheinauhafen in 1897. B. Rheinauhafen before redevelopment started. Planned area for development shown in bright green quadrangle. C. Rheinauhafen in 2008. Sources: historical archive (A), Clearpix (B and C)

Another separate problem was transport which proved to be a major problem to solve. The traffic is heavy in the area and slowed the development process. To overcome this, the main roads were widened so the development didn't impact too greatly on the traffic and vice versa. Also, the site is threatened by floods and this was the reason for the innovative car park flood system.

It was also important to ensure that progress was made on the entire site and that parts of the Rheinauhafen weren't left derelict while others prospered.

3.2.3. Heritage and design

Many features of the old harbour remain such as original cobble paving, old sections of rails, and restored harbour

cranes, one of which was incorporated into the KAP am Südkai construction. This led city mayor to describe the area as "a new city quarter with a past".

The design of the Rheinauhafen site is an eclectic mix of historical and modern architecture with lots of evidence of refurbishment and renovation of port buildings. It has been ensured that the area should "not lose its original harbour character" and it is the 3 Cranehouses that are the most outstanding buildings and although very modern, their design symbolises the harbour cranes which they have replaced. The Bench also offers a new dimension to the area with its futuristic design, although some people find the diversity of solitaires disturbing and not compatible to that historical site. Therefore, this study seeks to highlight the general opinion of the new architecture.

Also, where the Kings Waterfront had to ensure that it didn't impact on the view of the Albert Dock and Three Graces, the Rheinauhafen had to take into consideration the view towards Cologne's Dom Cathedral. Many of the buildings, e.g. the Baufeld 21, have kept the industrial brick or steel facades which help combat against noise pollution from train and car traffic.

3.2.4. Benefits

The mixed-uses of the site offer tourism and commercial industry as well as housing and recreational facilities. As the site is now an attractive location with the removal of industrial blight, commercial investors are more willing to base themselves in the city making the aim of creating 2,500 jobs a realisation, and sets of new apartments are already the most popular apartments in the Cologne. The urban fabric has been enhanced and the museums will benefit from the removal of derelict eyesores. The economy of Cologne should be boosted by the heavy commercial investment and a large area which once gave a negative image of Cologne, now presents a confident and vibrant one.

3.2.5. Sustainability

Sustainable development is part of Federal Building Code goals on general planning in much the same way as UK government have set guidelines. HOCHTIEF are one of the main contractors on the site and are one of the founding members of the German Sustainable Building Council whose aim is to further the cause of sustainable construction and operation of buildings. The Rheinauhafen makes use of renewable energies on some buildings such as solar panels (7 mountains apartments), lighting and wind power.

The interesting feature of this development is that as the area is prone to high tides, the underground car park is fitted with flood gates and the ventilation system intakes furnished with bulkheads to guard against extremely high water levels, which has the added benefit of supplying the offices with cool air. However, the development hasn't been successful with energy saving architecture.

Another positive aspect of the project sustainability was the recycling of existing buildings, as Rheinauhafen has retained as much heritage build as has been built.

Following the project evaluation, the SWOT analysis has been performed. The summary of this analysis is shown in the Table 2.

4. Development comparison and discussion

Brownfield regeneration has become a key focus of policies in the UK, Germany and other developed countries. It has been prompted by the thousands hectares of brownfield land, much of which presents severe environmental challenges and is situated alongside some of the most deprived communities of these countries. Bringing this land back into active use has become critical in rapidly growing human population environment. This situation is

now recognised and taken to new level of awareness by policymakers and developers.

The present study explores the current brownfield regeneration situation in Europe with particular focus on the UK and Germany and surveys the progress of practice so far. The research in the paper is based on the analysis of case studies on Kings and Rheinauhafen waterfront developments in Liverpool and Cologne. By using the SWOT analysis is demonstrated that both German and English developments have had similar aims. While, the key similarities and differences between Kings Waterfront’s and Rheinauhafen’s brownfield regeneration schemes are summarised in the Table 3.

Table 2. SWOT analysis of Rheinauhafen

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"> - Location – links Südstadt and city centre; - Reuse of existing buildings and infrastructures; - Modernisation of waterfront - Museums provide footfall to area; - Developers based on site - Unique design of flagship buildings (The Bench, Kranhauses); - Luxury housing created; - Tourism has been boosted; - Car parking is underground avoiding eyesore; - Minimal energy demand and renewable energies on site; - Recycling of existing building materials; - Low on-site water demand; - Cars, cycles, S-bahn trains provide modal split; - 2,500 jobs created; - No adverse impact on local neighbourhood; - Generation of employment & economic development. 	<ul style="list-style-type: none"> - Housing not affordable for the general public; - Noise pollution from industry operating close – by museums; - Lack of greenery; - No considerable benefits for local neighbourhoods; - Restrictive regulations – Dom Cathedral has put restrictions on design of developments (i.e. height); - The time taken to redevelop the whole area. 	<ul style="list-style-type: none"> - May promote 24-hour economy – bars & restaurants; - Computer gaming and office industries can develop further; - New structures have a longer life cycle. 	<ul style="list-style-type: none"> - Poor views of Deutz side of Rhine; - Is gentrification being promoted (i.e. Luxury apartments); - Weather – High winds may affect footfall.

RESCUE Project sustainability objectives used as guidelines (Regeneration of... 2005, 2009).

Table 3. Summary of similarities and contrasts of Kings Waterfront’s and Rheinauhafen’s brownfield regeneration schemes

Similarities	Contrasts
<ul style="list-style-type: none"> - Modern, attractive and safe areas have been created and the questionnaire results prove this statement. - Developments are sustainable but only certain aspects of each can be applied elsewhere as examples of best practice (i.e. Rheinauhafen’s flood protection system). - Heritage has been respected in terms of design of new build. - Renewable energies have been implemented without great success. - The mixed uses (tourism, recreation, commercial, living) highlight the dynamic nature of brownfield regeneration schemes. - High-profile of landmark buildings have ensured high design standards. - Limited housing type (Apartments). - Developments are catalysts for economic growth. - New services and facilities enhance the urban fabric. - Excellent utilisation of waterfront location. 	<ul style="list-style-type: none"> - Open space has been preferred to green space at the Rheinauhafen in contrast to the more balanced utilisation of space at the Kings Waterfront. - Existing tourism has been diversified at the Kings Waterfront but ignored at the Rheinauhafen. - Kings Waterfront’s success depends on Liverpool ACC whilst the Rheinauhafen has a more diverse mix of tourism, commercial and cultural facilities. - Innovative and eclectic architecture at the Rheinauhafen in contrast to the Kings Waterfront’s conventional new build. - Underground car parking at the Rheinauhafen allows more uses to be concentrated at the site compared to that of the Kings Waterfront. - The Rheinauhafens new services and facilities are more exclusive to the upper classes than that of the Kings Waterfront which are aimed at everyone. - Funding differed with the Kings Waterfront relying on public sector investment and the Rheinauhafen on investment from private sector organizations.

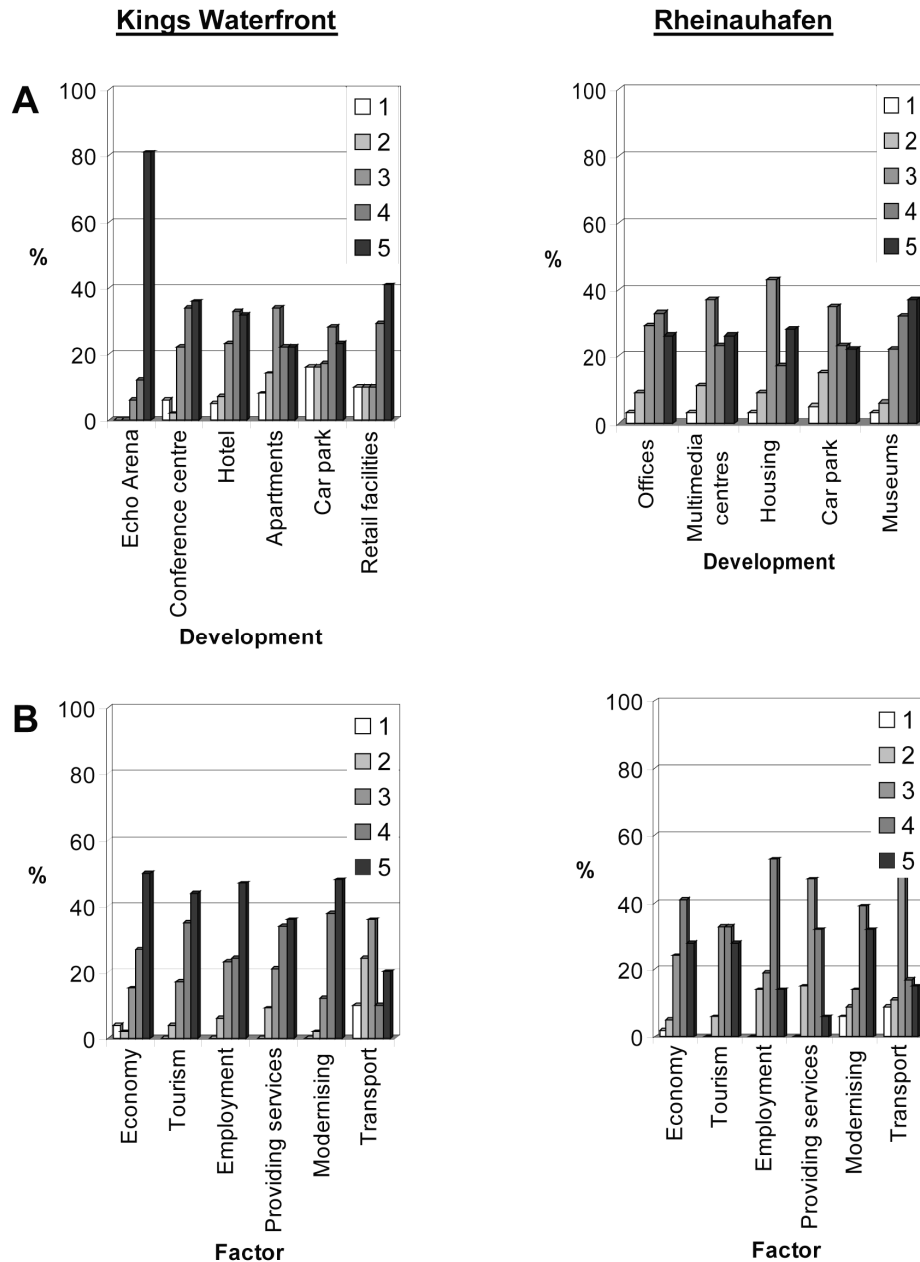


Fig. 3. Public's rating of benefit for each development component. A. How much each of developments will be beneficial to the Liverpool and Cologne cities. B. How Kings Waterfront and Rheinauhafen will benefit to the city in terms of various economic and social factors. 1 = no benefit, 2 = neither benefit nor detriment, 3 = little benefit, 4 = some benefit, 5 = very beneficial

Practice of developments in Liverpool and Cologne has been found to be of a high standard with a multitude of public-private partnerships supporting both developments. A strong economic element is apparent when compared to the environmental and social aims. Despite this, the needs of the English and German public were found to have been met and the Rheinauhafen and Kings Waterfront both acknowledged sustainable methods of construction and operation. The Echo Arena has been found to be the most beneficial development of Kings Waterfront, while other aspects should bring at least moderate benefit to the city (Fig. 3A). On the other hand, the majority of respondents expected that the Kings Waterfront development would boost Liverpool's economy, tourism, employment, modernisation and provi-

sion of services. However, the city transport situation is unlikely to benefit from the development (Fig. 3B).

For the Rheinauhafen the results were far more mixed than the Kings Waterfront with a significant number respondents choosing option 3 (average benefits) and only the museums were thought to have great benefits (Fig. 3A). It should be mentioned that the museums are not part of the new development and have been open for over 10 years so their benefit to the city is already known. Despite this, similarly to the Kings Waterfront results, every component had a more positive than negative response even if some of the German public seemed more pessimistic towards certain aspects of the development.

The liveability of both sites is an important part of regeneration practice as both countries' policies note the

requirement of affordable housing (Office... 2003; Maliene *et al.* 2008a; Federal Office... 2009). Housing in the Kings Waterfront is in within the UK policy guidelines as it is in a “suitable location, which offer a good range of community facilities and with good access to jobs, key services and infrastructure” (Department... 2006; Maliene *et al.* 2008c). 40% of dwellings are affordable and there are a number of reasons for people to live there (retail, leisure, location, attractiveness) but the site is not suited to families and similarly to the Rheinauhafen, the group most suited to living in such a location are young professionals. Therefore, the housing development has failed to some degree as it appeals to a certain kind of person and the type of dwelling is very limited even if policy guidelines have been adopted.

German respondents believed that the economy and employment in the city would benefit to an extent and also that the waterfront had been well modernized (Fig. 3B). However, similarly to Kings Waterfront, transport received a very mixed response with the majority of people seeing average benefits in the surrounding transport infrastructure. Overall, results from Rheinauhafen were not as conclusive as the Kings Waterfront. Generally, the German public doubted that any of the city’s economic and social factors would greatly benefit from the Rheinauhafen.

The public of both cities agreed that main reason for visiting Kings Waterfront is recreation and leisure (nearly 70%). This is not surprising as the Echo Arena and other leisure facilities in developed areas are no doubt the main draw. Very few (less than 10%) were willing to live, work, or use the parking in that area.

The Kings Waterfront development is partly designed as a tourist and recreational destination, thus, it was crucial to know how often people would actually visit it. The Rheinauhafen is different as it already has its two museums and has no aim to further expand the tourist industry in this area.

The results in Fig. 4 indicate that more people would visit the Rheinauhafen on a daily and weekly basis than the Kings Waterfront. It is surprising to note that the significant number of people (18%) would never visit the Kings Waterfront compared to only 2% for Rheinauhafen. These figures don’t support the 24-hour economy that the Kings Waterfront was hoping to attract.

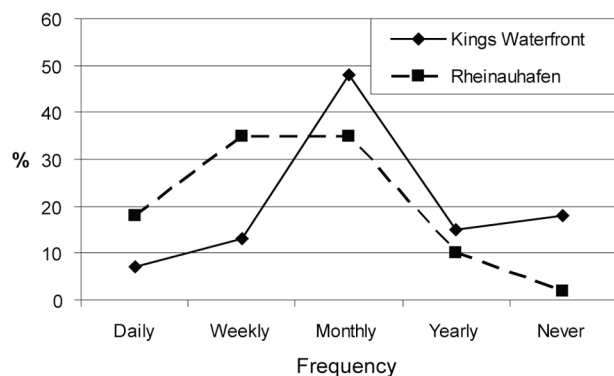


Fig. 4. Frequency of visits to Kings Waterfront and Rheinauhafen

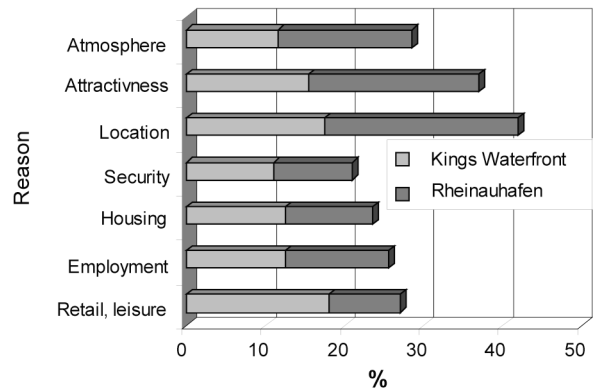


Fig. 5. Reasons that attract public to the Kings Waterfront and Rheinauhafen

The main reason people wanted to live in Kings Waterfront area is predominantly for the retail and leisure facilities and the attractiveness of location (Fig. 5). When compared to the results collected at the Rheinauhafen, there were some similarities in that location (24%) and attractiveness (21%), mattered more than housing (11%) and employment (13%) but retail and leisure would not influence the German public’s decision to live in this location as much as their English counterparts. In both cases, the security was not an issue affecting decision to live in developed areas.

The awareness of renewable energies was also researched and it was found that 81% of people were unaware of any renewable methods implemented at the Rheinauhafen and only 17% had some knowledge and those happened to be the renewables visible to them (i.e. Solar panels on apartment roofs). It is clear that the energy-efficiency of these new developments has not been heavily publicised and that the public has a limited knowledge of sustainable methods of construction and renewable energy apart from when it is obviously visible.

The sustainability of each site has been assessed as these brownfield regenerations will have a long-term impact. As results, they were found to be generally within the scope of current policies on sustainable development (Department... 2005; Commission... 1992; Pasakarnis, Maliene 2009).

As renewable energies were found under-utilised at both sites, future developers need to ensure that they are implemented in a similar way to that of areas such as Emscher Park, The Thames Gateway and Greater Manchester which are shown as examples of how brownfields should be regenerated (Raco 2005; Raco, Henderson 2006; Dixon *et al.* 2007).

5. Conclusions

Both developments were found to be important for the future of both cities and in depth analysis has shown that both have the capability to attract outward investment but whether this investment is sustainable can only be postulated. The Kings Waterfront relies on visitor expenditure whilst the Rheinauhafen hopes that the establishment of multinational companies such as Microsoft Germany can

help it compete with the global cities of Berlin, Munich and Frankfurt.

Based on the evidence collected from Liverpool's Kings Waterfront and Cologne's Rheinauhafen, the brownfield regeneration practice is therefore advancing the objective of an urban renaissance but the uniqueness of such sites means there is no single recipe for the success.

Acknowledgement

Authors are grateful to Liverpool and Cologne public and organisations for kind help during this study. LW was partially supported by the international ERASMUS programme.

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NAUDOTŲ TERITORIJŲ ATGAIVINIMAS: KRANTINIŲ APLINKOS GERINIMAS LIVERPULYJE IR KELNE

V. Malienė, L. Wignall, N. Malys

Santrauka

Pastaruoju metu naudotų teritorijų atgaivinimas įgavo svarbą dėl nenaudotų teritorijų žemės apribojimų ir siekiant paskatinti miestų atgimimą. Remiantis Kings Waterfront Liverpulyje ir Rheinauhafen Kelne pavyzdžiais, straipsnyje siekiama palyginti naudotų teritorijų atgaivinimo praktikas, įvertinant tai, kad vietinės, nacionalinės ir Europos Sąjungos atsakingos organizacijos investavo daug laiko ir pinigų į šių vietų atgaivinimą. Literatūros apžvalga suteikia informacijos apie problemas, kurias reikia išspręsti, kad vystymas Liverpulio Kings Waterfront ir Kelno Rheinauhafen būtų sėkmingas. Siekiant nustatyti šiuo metu susiklosčiusią situaciją Liverpulyje ir Kelne, iširta visuomenės nuomonė ir informacija, gauta iš šios srities specialistų. Tyrimas rodo, kad jeigu teritorija naudota efektyviai, jos atgaivinimas gali paskatinti ekonominį augimą vidinio miesto rajonuose, ypač tuose, kurie anksčiau buvo nuskurę. Straipsnyje pateikta pavyzdžių, kaip galima išvystyti naudotas teritorijas prie upių. Šių sėkmingų projektų pavyzdžiai gali būti taikomi kitų pasaulio miestų atgaivinimui skatinti.

Reikšminiai žodžiai: naudotos teritorijos, nenaudotos teritorijos, atgaivinimas, subalansuotumas, vystymas, krantinė.

РЕГЕНЕРАЦИЯ РАНЕЕ ИСПОЛЬЗОВАВШИХСЯ ТЕРРИТОРИЙ: УЛУЧШЕНИЕ СОСТОЯНИЯ ОКРУЖАЮЩЕЙ СРЕДЫ НА НАБЕРЕЖНЫХ ЛИВЕРПУЛЯ И КЕЛЬНА**В. Малене, Л. Вигнал, Н. Малис**

В последнее время регенерация ранее использовавшихся территорий приобретает особое значение в связи с введением ограничений на неиспользовавшиеся ранее земельные территории и с целью способствовать возрождению городов. На примере Kings Waterfront в Ливерпуле и Rheinauhafen в Кельне в статье сравнивается практика регенерации ранее использовавшихся территорий с учетом больших средств, инвестированных на эти цели местными национальными организациями и ответственными организациями Европейского Союза. Обзор литературы по данному вопросу позволил собрать информацию о проблемах, решение которых позволит надеяться на то, что дальнейшее развитие Kings Waterfront в Ливерпуле и Rheinauhafen в Кельне будет успешным. С целью выявить ситуацию, сложившуюся в настоящее время в Ливерпуле и Кельне, специалисты изучили общественное мнение и информацию, полученную из этих областей. Исследование показало, что эффективное использование выделенных средств может способствовать экономическому развитию районов города, особенно обнищавших. В качестве примера успешного развития ранее использовавшихся территорий в статье представлены территории, находящиеся вблизи рек. Примеры этих удачных проектов могут способствовать возрождению других городов мира.

Ключевые слова: ранее использовавшиеся территории, неиспользовавшиеся территории, регенерация, сбалансированность, развитие, набережная.

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