

City of Calgary
Manchester Area Re-Industrialization:
Precedents & Case Studies

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Introduction

Since the end of World War II cities have witnessed much of their industry migrate to their outer edges, lured by cheap land and speedier access to highways. Compounded with the effects of globalization, cities have also seen much of their industry, especially manufacturing, end up overseas. As industries flee the inner cities, they often leave behind derelict buildings sitting on top of contaminated soil and water. Many cities around the world have taken it upon themselves to revitalize these blighted areas by mandating brownfield development that often sees the building of new homes, offices and retail outlets. There are many examples around the world though of “reindustrialization.” Not satisfied with conventional brownfield redevelopment, some cities are attempting to bring industry and housing together. As many forms of industry become cleaner and less polluting, the need to segregate them from residential neighbourhoods is becoming less of a concern, as opposed to during the Industrial Revolution when the health of residents made the segregation of land uses absolutely necessary.

This paper will examine six cases where cities have attempted to integrate housing and industry into a sensible and attractive arrangement. These examples are:

1. DUMBO, New York City
2. Granville Island, Vancouver, British Columbia
3. The City of Emeryville, California
4. Kalundborg, Denmark
5. Daedeok Techno Valley, South Korea
6. The Transparent Factory, Dresden, Germany

Framework

In order to understand and analyze the case studies that we found we attempted to focus on recognizing which aspects of the cases had the greatest impact on the development and implementation of the projects studied. By breaking down the variables we were able to better analyze the areas that will have the greatest importance in regards to precedence and transferability to the Manchester Industrial Park in Calgary, Alberta. The process of narrowing down the framework was a difficult task as there were a number of features that appeared to shape these very difference cases. Precedence cases of areas that had a mix of residential and

industrial land uses were limited in number and difficult to obtain. This report highlights a variety of case studies that can be used in understanding mixed use industrial development could be implemented in the context of Calgary and the Manchester site. To categorize each case and clarify what was the most important information to be considered in Calgary we focused on four variables that will be outlined below.

First it is extremely important to understand the history and context of the site. The place identity of the area and its role within the city is extremely important in understanding why regeneration occurred, what drove it, and how it was implemented. Each one of the cases presented show very different drivers of change and reasons why growth occurred. These drivers were very informative in understanding if transferability into the Calgary context is possible. Some drivers that were noted from the cases included the market forces and community initiative. It was also noted that who and how these projects were funded became a significant factor that needed to be outlined on a case-by-case basis. This second variable is important in showing the importance and alternative options that have been seen in the other precedence studies. Thirdly, land ownership is probably one of the most important factors identified as it plays a huge role in how redevelopment will occur. It is also extremely important when understanding the functionality and possibility of implementing a successful eco-industrial park.

It also became clear that recognizing what outcomes and benchmarks of success were established in each case was an important aspect of this precedence study and is the fourth variable we identified. The focus was on documenting the types of land uses that are located within each site, the level of integration, as well as how successful the cases were based on the goals and expectations set during the planning process. This is particularly interesting when analyzing cases that hoped to promote an eco-industrial system as well as economic growth. The framework for analysis that was created allowed each case to be presented based on the factors that appeared to be the most significant in influencing transferability into Calgary.

Case Study Matrix

Cases	Industrial	Residential	Commercial	Brownfield Redevelopment	Planned Development	Private Investment	Government Involvement	Community Involvement	Ecological Considerations
DUMBO, New York	√	√	√	√	√	√		√	
Granville Island, Vancouver	√	√	√	√	√		√	√	
Emeryville, California	√	√	√	√	√	√	√	√	√
Kalundborg, Denmark	√			√		√			√
Daedeok Techno Valley, Korea	√	√	√		√	√		√	√
Dresden, Germany	√	√		√	√	√		√	√

As these examples will show, there are many ways that cities are attempting to integrate residential and industrial land uses. The above matrix was used as a way to compare the case studies discussed below. The purpose of this matrix is to analyze what are some of the key characteristics of the cases presented. It provided an important tool in understanding how each of these cases can be described. It was also used as a way to determine the four key variables that were noted above.

Case #1: DUMBO, New York

HISTORY AND CONTEXT OF THE SITE

The Down Under the Manhattan Bridge Overpass (DUMBO) is a historic neighbourhood in the Brooklyn borough of New York City. In approximately 1.5 square miles a combination of residential, retail and commercial spaces are bordered by the East River waterfront, the Navy ship yards and historic Brooklyn Bridge (Figure 1). Formerly an industrial area, the history of the community is focused on the manufacturing of products such as paper boxes, steel wool and paint (DUMBO NYC). But post war decline in manufacturing had left the area derelict. No one wanted to go there and no taxi driver would enter the area (Fung 2007). While there are still some small-scale industrial, warehouse and light manufacturing operations in the eastern part of DUMBO, most of the buildings were empty. Lots of loft space and the low rents in the area attracted a population of artists and low-income families who made DUMBO their home. The historic warehouse buildings were converted into residential lofts and artist studios. Once the

area gained a reputation as a hipster enclave, it began attracting high-end private residential and commercial development.

DEVELOPMENT & MODES OF FUNDING

Over time, developers such as Two Trees Developments Corporation who had received little support from the city for re-development strategies persevered and when investment capital from the private sector gained momentum DUMBO has been transformed into a revitalized, mixed-use community. What was once an organic and gradual change in the re-development of the DUMBO area is now a

planned approach with Two Trees leading the way. Gentrification is identified by the squeezing out of individual artists who cannot afford the increase in rents but some of the art galleries are finding homes in the new commercial use areas.

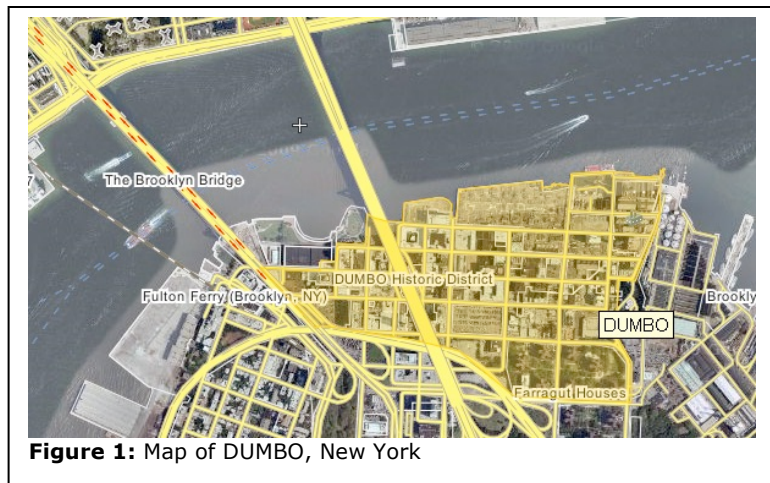


Figure 1: Map of DUMBO, New York

LAND USE & OWNERSHIP

There is a concentration of businesses focused on the culinary industry in DUMBO's commercial areas. Restaurants and specialty food shops such as gourmet chocolate and fine wine shops are abundant. Home furnishings stores are also helping to create a design district feel to the area coupled with various design firms opening offices here. High tech companies are rounding out the bulk of the commercial office development by starting up or re-locating their offices from Manhattan. High rents on the island are making it increasingly difficult to maintain downtown offices but the proximity of DUMBO to Manhattan makes it a more appealing location. In fact, Two Trees Development is offering the first one to two years of residency rent free in an attempt to both attract business and help them be successful in the longer term. Once rents kick in they will still be considerably lower than one might expect in other trendy neighbourhoods such as SoHO and NoHO in Lower Manhattan just across the river (Strager 2001). Some light

industrial uses such as woodworking, printing and furniture manufacturing (Plan NYC n.d.) are still present in the DUMBO area rounding out the trio of mixed-use development.

DUMBO is a very family-oriented community and becoming known for its arts and culture scene. Bargemusic is a floating musical venue, one among many other music-related festivals, shops and performance areas (DUMBO NYC n.d.). Residential apartments range from mid-level income homes to luxury condos but recently passed re-zoning initiatives have included the development of affordable housing units as well (Plan NYC n.d.). Two parks and green spaces are under development and contain playgrounds for children including the Brooklyn Bridge Park (Figure 2). The Brooklyn Bridge Park Conservancy organizes several stewardship events and education programs throughout the year, including nature programs and environmental education (Brooklyn Bridge Park Conservancy n.d.). The Archway is an important landmark to the citizens of the community. It is a 45 foot high tunnel paved with Belgian block and connects the two sides of the Manhattan Bridge. Previously used for storage of scrap metal it has now been cleaned up and used for community gatherings and outdoor events (DUMBO Improvement District n.d.). Two Trees Development Corp. is also planning a major waterfront redevelopment with retail and entertainment

venues. The DUMBO Improvement District is an association largely responsible for overall community health and vitality by reporting on news, organizing clean streets programs and promoting the community through information available from its office and community website.



Figure 2: Brooklyn Bridge Park

OUTCOMES & BENCHMARKS FOR SUCCESS

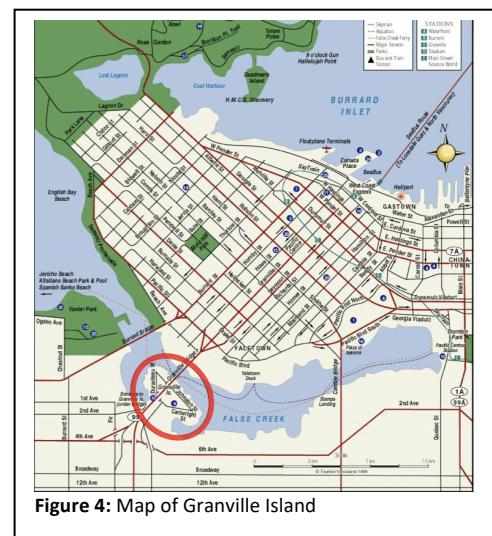
The success of the DUMBO community can be attributed to the City planning and development relaxations, commitment by private developers and a strong sense of community by the

residents who care about what happens in their environment. Strictly speaking, loft style apartments are not permitted by the New York City code but due to the severe lack of residential space available this is rarely enforced (The Municipal Art Society of New York n.d.). Now that the Two Trees developer has such strong financial backing the City has agreed to re-zoning requests to aid the revitalization of this prime location. The number of community associations and public information available indicates that residents are actively involved in community and political events and advocate for smart growth and development.

Case #2: Granville Island, Vancouver BC

HISTORY AND CONTEXT OF THE SITE

The case of Granville Island is an example of urban waterfront regeneration (Figure 3). The area has a rich industrial history, which has been maintained despite its redevelopment as a tourist based mix use development. This site lies on the south bank of False Creek within the City of Vancouver, located within close proximity to the downtown core (Figure 4). It is a 35-acre (14.2 hectare) site that despite its name is no longer an island. Historically Granville Island was referred to as 'Industrial Island' and during its industrial prime in the 1920's it was home to lumberyards, saw mills, a cement factory, machine shop and other uses associated particularly with Vancouver's primary and port-based industries (Gibson and Hardman 1998). During the 1960's the area fell into decline, buildings became derelict and the area became a relative eye sore to the rest of the city.



During this time the National Harbors Board owned the island and was leasing plots to individual industries. Over the next decade and with the announcement of Vancouver being named the host city for Expo 86 the city and the Government of Canada began to see the potential for redevelopment of the area. The main Expo site and infrastructure was concentrated in the False Creek area and the Granville Island's proximity to this area now made it an important commodity. Granville Island proceeded to transform into a prime tourist location with well-integrated land uses and a focus on arts and culture.

DEVELOPMENT & MODES OF FUNDING

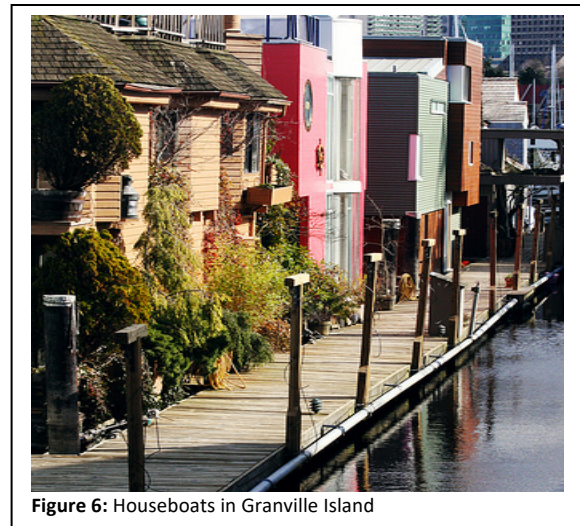
In the 1960s the National Harbors Board, an administrative body that controlled the business and service operations in all major Canadian ports, leased land to individual businesses and industries in Granville Island as well. In 1970's the City of Vancouver asked the Board to limit extensions of such leases to one year in preparation for the redevelopment of the area. Through Federal Government initiatives and the support of South Vancouver MP Ron Basford the Canada Mortgage and Housing Corporation (a crown corporation) proceeded to buy out the remaining leases for cash value. The island became the responsibility of the Canada Mortgage and Housing Corporation who at the time were also involved in the other False Creek developments that were occurring. The Canadian Government provided a grant of \$25 million to rebuild infrastructure, purchase leases, renovate derelict buildings and generally revitalize an industrial environment that had undergone of decline. The historical context, proximity to the water, and marine experience of the area were important aspects of the redevelopment plan and the goal was to preserve as much of these as possible. Much of this preservation was a result of the desired marketability and attraction of the area. Some new infrastructure was required, though preservation of old buildings was done whenever possible to maintain authenticity of the above mentioned historical character.

LAND USE & OWNERSHIP

Grandville Island does provide a mix of industry, residential and commercial activities. It is also an area of recreation, leisure and a popular tourist attraction. Though the area has a huge focus on arts and culture through a review of literature it can be argued that artists do not actually find this a space they associate with (Ley 2003). This is due largely to the cost of housing in the area, a focus on place marketability, and the perceived theme park nature of the area. These

factors act as a deterrent to many in the arts community to take up residents in this area (Ley 2003). Below is a brief outline of the land use of the area:

- Mixed use area with arts and crafts workshops, performing arts, restaurants, retail outlets, offices, a hotel and residential accommodation, largely in refurbished buildings.
- 260 businesses and studios and 2600 people are employed on the island
- The Granville Island Public Market is a well known landmark on the island. It was opened in 1979 in an historical building (Dennis 2010)
- Industrial uses are still represented: Cement factory & machine shop (Figure 5)
- Grandville Island Brewery
- First Nations art gallery, Emily Carr Institute of Art and Design, British Columbia's institute for advanced education in fine art, media and design make up cultural institutions found on the site
- 4 star hotel
- Significant number of permanent residential homes found on the island including 2/3 storey houseboats (Figure 6) as well as other more conventional homes including a number of condominiums
- The residents and other stakeholders form the Granville Island Trust, which advises the Corporation about management of the area.



OUTCOMES & BENCHMARKS FOR SUCCESS

The success of the Granville Island regeneration project is based largely on the economic development and activity that was promoted through redevelopment. The project came in under budget as only \$19-20 million of the \$25 million provided was used (Gibson and Hardman 1998). The development was not an instant process but allowed for interaction with stakeholders and those leasing the land. As mentioned above the Granville Island Trust is an outlet for local residents and stakeholders to voice their concerns and recommendations to those that have ultimate control of the land and area (figure 5). It has been estimated that currently the Island generates over \$215 million in economic activity each year (Spaces 2010). Success is also attributed to the land coming under single ownership at an early stage and management of the area strongly influenced by residents and stakeholders. Some barriers and limitations to success include as mentioned the lack of authenticity and theme park marketability that detracts the artist community from living in the area despite the heavy association to arts (Ley 2003).

OTHER RELEVANT EXAMPLES

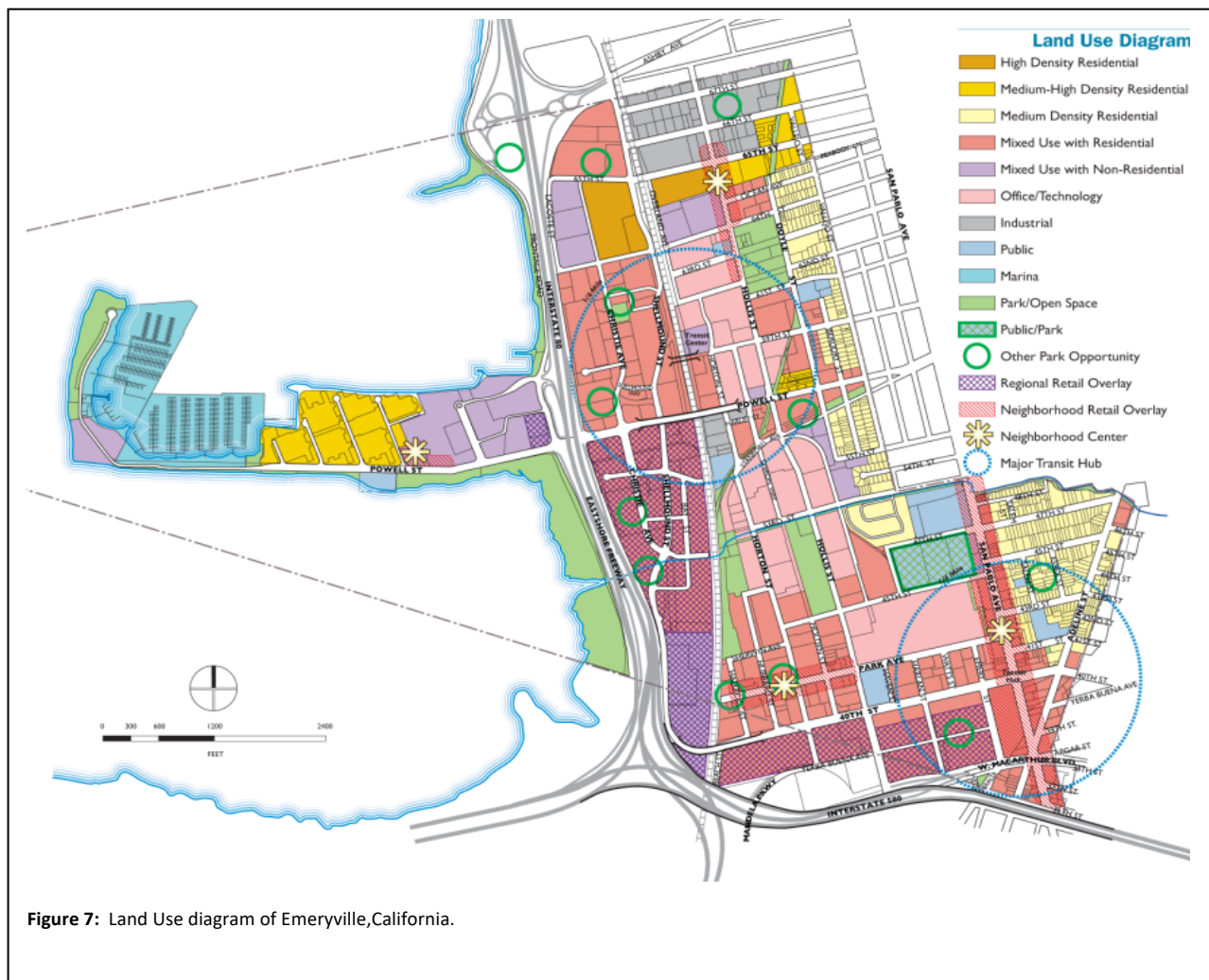
- Heritage Regeneration – Castlefield, Manchester UK (see also Gibson & Hardman 1998)
 - Main Land Use – Leisure/Tourism – Housing – Offices – Film Industry
 - Was a shipping hub based along the Manchester canal system textile industry
 - Regeneration agencies – Central Manchester Development Corporation (1988 – 1996), Manchester City Council
 - Management agency Castlefield Management Company

Case #3: Emeryville, California

HISTORY AND CONTEXT OF THE SITE

Emeryville is located on the east side of San Francisco bay opposite the city of San Francisco, northwest and adjacent to Oakland and south and adjacent to Berkeley. According to the city's website, it is the smallest city in California and has an estimated population of around 10,000 inhabitants. The area of the city is only 1.2 square miles or 3.1 square kilometres. From a transportation standpoint, Emeryville is ideally situated at the eastern end of the San Francisco Bay Bridge at the confluence of major interstate highways. It has an Amtrak station and close proximity to a BART (Bay Area Rapid Transit) station.

Despite its small size, Emeryville has a coloured past. Incorporated in 1896, the city saw rapid industrial development throughout the first half of the twentieth century. Major industrial facilities included a paint factory, an iron works and, by the 1930s, a steel mill. The city gained the reputation as being “the rottenest city on the Pacific coast” because of gambling and other “questionable” activities (City of Emeryville, 2010a). During the Prohibition era it was home to a number of speakeasies and bootleg operations. Emeryville, with its solid industrial base, flourished until industry abandoned the city beginning in the 1960s.



DEVELOPMENT & MODES OF FUNDING

Fearing a precipitous decline, the City of Emeryville filled in a portion of the bay and development of the 1,249-unit Watergate apartments began around 1970. The Watergate singlehandedly increased Emeryville's population by 38.5%. With the Watergate came more development in what is known as the Bayfront area between the highway and the railway. Three warehouses were converted into the Emeryville Public Market, a ten-screen cinema was built and hotels and office buildings were added. During the 1970s, artists sought abandoned industrial space for studio and living space. The arts continue to be important in Emeryville and there are a number of public art installations. The influx of wealthier residents, however, was soon reflected in the makeup of the city's administration. By the end of the 1980s the city established a new direction that called for more mixed-use development.

The Loma Prieta earthquake in 1989 irreparably damaged the Amtrak station in West Oakland and so Emeryville constructed a station that would become the fifth busiest station in California, serving over half a million passengers a year. Private investment poured in as Emeryville continued to remediate polluted post-industrial land. Bio-tech firms established facilities and Pixar studios found a home on a campus-like setting on Park Avenue in the south of the city. The first IKEA store in northern California opened for business in 2000 which greatly increased vehicular traffic in Emeryville. The past decade has been the development of more destination retail integrated with residential units (City of Emerville, 2010a).

LAND USE & OWNERSHIP

Emeryville – despite its focus on commercial and residential development – still has an industrial base. Industry occupies 14 percent of the land area of the city. Around Hollis Street at the north end of the city, an industrial live/work area has been established. According to the 2010 City of Emeryville General Plan, the area east of Hollis Street has been designated as “light” industrial live/work and the area to the west has been designated “heavy’ live/work. The general plan does not explain what exactly is meant by “light” but “heavy” refers to activities that involve manufacturing, welding and assembly. Unfortunately, whether or not these spaces are actually being used as such is difficult to glean from the plan. Even viewing the neighbourhood using Google Streetview does not convey how development is progressing; the area looks like any other light industrial zone. It is stated in the general plan, however, that unrelated commercial

and retail activities should be located away from the Hollis Street area, thus indicating that the city is serious about the industrial live/work arrangement that has been set up.

OUTCOMES & BENCHMARKS FOR SUCCESS

The city has been criticized for relying too much on sales tax revenue to meet its budget requirements. Unfortunately such an arrangement is all too common in California and as a result 25 percent of the city's tax revenue comes from four large retail centres. The recent economic downturn has resulted in a loss of sales tax revenue of almost 23 percent (Stone, 2009).

Economics aside, the focus of this paper is on industrial/residential integration. Though Emeryville specifically designates industrial live/work zones, there is little information to be had as to whether such a scheme has been effective or not. The general plan was only adopted in October 2009 so as time goes on it should be easier to determine how the land designation has fared.

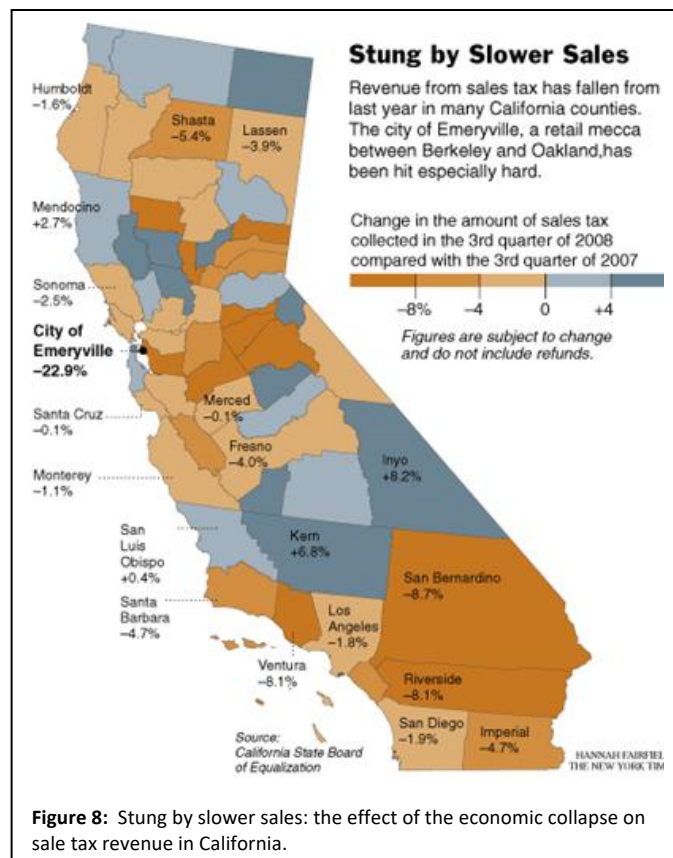


Figure 8: Stung by slower sales: the effect of the economic collapse on sale tax revenue in California.

Case #4: Kalundborg, Denmark

HISTORY AND CONTEXT OF THE SITE

The Industrial Symbiosis (IS) Complex in Kalundborg, Denmark (Figure 9) is a seminal example of the successful implementation of an eco-industrial park. This is an existing industrial area shared by five major companies ranging from an oil refinery to biotechnology to a soil remediation company. Working together the companies decided to find ways to conserve resources, maintain economic prosperity, and minimize ecological damage. The impetus for the collective was based on a limited source of water which all the companies needed to function. According to Jacobsen (2006) “the focus is on water- and steam-related IS exchanges, with a view to evaluating the economic and environmental implications of these exchanges,” (Jacobsen 2006).

Other exchanges such as solid waste and energy are a vital part of the symbiosis effect. The benefits include financial and ecological savings in discharge fees, increased supply and security, operational capability and expansion of production without the obstacle of water shortages in the long term (Jacobsen 2006).



Figure 9: IS Complex, Kalundborg, Denmark

DEVELOPMENT & MODES OF FUNDING

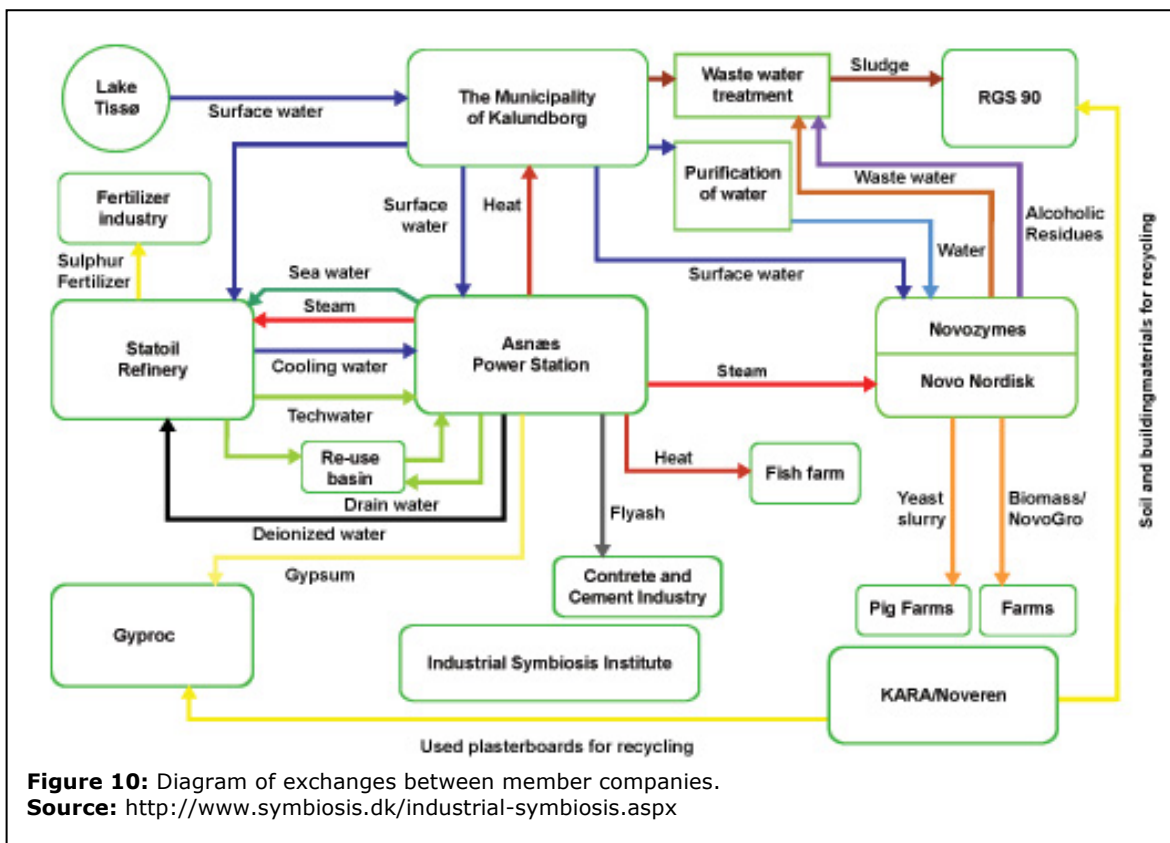
In the case of Kalundborg, “community” refers to the business community. Those groups and individuals that make up the interconnected web of companies serve each other by a cooperative approach to manufacturing and economics. Mutual needs and economic benefits drive the projects and the most successful examples of industrial symbiosis have developed independent from governing incentives. To these companies, finding ways to minimize virgin material inputs, fuel and water savings, and transport cost and time reductions simply make economic sense.

Emphasizing the cooperative nature of businesses has been the hallmark for success. In addition, the town of Kalundborg supplies district heating to its 20,000 residents partly due to

the heat capture from the power plant’s steam production. This saves water from the Lake Tissø and has replaced 3,500 oil furnaces in the town. Water conservation and the re-use of resources make the IS Complex ecologically responsible which, in turn, benefits the greater community of Kalundborg.

LAND USE & OWNERSHIP

Specifically, the web of interconnectedness works as per the diagram in Figure 10. Wastewater from the oil refinery is used in the boiler of the power plant which turns it into steam. It is also used in the desulfurization process which produces industrial gypsum used in plasterboard production. The power plant also produces heat for the town of Kalundborg and steam for the Novo pharmaceutical facility. Additionally, smaller scale industries such as fish farms make use of heating and cooling water while solid wastes like fly ash and wastewater sludge are used as fertilizer on rural farms.



OUTCOMES & BENCHMARKS FOR SUCCESS

Risks to this way of industrial management include the reliability on the connected companies to continue producing their product/by-product and the quality of the product (Dunn 1998). Should one company leave the web, the inputs and outputs for other companies are disrupted. The source for material may force the affected industry to seek new sources defeating the purpose of symbiosis. Depending on what the outputs are, the chemical make-up may not be compatible or usable, creating further problems down-stream.

There are some keystone conditions that have made this a successful case of Industrial Symbiosis. One of the key features is the co-location of the interested companies (Jacobsen 2006). Because the industries are located in an established industrial area the transferability of products and by-products is made relatively easy. Low costs in additional infrastructure and transportation make the idea of sharing resources more attractive. Secondly, mutual economic success is realized through the concepts of industrial symbiosis. The outputs of one industry feed into the inputs of another providing a reliable source of resources. “The indirect economic arguments are [...] associated with long-term strategic planning based on the desire for increased supply security, operational capability, and the expansion of production without the obstacle of water shortages in the longer term.” (Jacobsen 2006). Finally, this process evolved naturally without suggestion from government policy or private sector stimulation. It was a slow and gradual evolution as each part of the web came together. Furthermore, the reason the IS Complex has continued to be successful is largely due to the creation of governing bodies such as the Environment Club and the Industrial Symbiosis Institute (Chertow 2007). This helps to minimize the above mentioned risks.

Case #5: Daedeok Technovalley Case Study

HISTORY AND CONTEXT OF THE SITE

The case study of Daedeok Technovalley located in the city of Daejeon Korea is an example of a Greenfield mixed-use eco-industrial development (Figure 11). This case is Korea’s first attempt at designing and implementing this type of development model. The maturity of the plan and its actual implementation was a very long process and is not well documented. The first attempt at the development was not executed because of the economic decline that occurred in the 1990’s. The second and current plan was later adopted in 2001. The 427.1-hectare site that was originally used for agricultural purposes. This project was part of a larger citywide industrial

development plan that linked exiting industrial areas as well as the Daedeok Science Park. The focus was on creating a high-tech venture business centre for domestic and multinational corporations (Oh, Kim et al. 2005). The ultimate goal was and is to attract educated individuals and families from South Korea's capital city of Seoul. As this was a Greenfield development it was a planned and market driven development. All new levels of infrastructure needed to be created and in a lot of ways this site was treated as a blank slate. The plans show a mixed use environment where approximately 33 000 people will be able to live and work in newly developed housing, offices and factory facilities (Figure 12).



It is

important to note that this case is a very different example from the others presented in this report. This case, as mentioned, has poorly documented results and outcomes. Though it clearly shows how a mixed-use eco-industrial area can be planned and funded. It is also an interesting case, as we will see below, of how the best-laid plans are difficult to implement if the management and targets are not in place.

DEVELOPMENT & MODES OF FUNDING

As mentioned above this project was a Greenfield development that required all new infrastructure and buildings but also had no existing community. The project adopted a step-by-step development program through three phases (Table 1). This type of approach lowered the

initial investment costs for the developers and was the best approach for this type of high tech venture. The development was made possible through a joint investment project supported by the Hanwha Group, Korea Development Bank and Daejeon Metropolitan City. The project is expected to maximize synergy effects through the advanced management expertise of Hanwha Group, the comprehensive administrative support of Daejeon Metropolitan City and the financial support from Korea Development bank (Kim 2009). The Hanwha Group is responsible for the Daedeok Techno Valley development project and the management and operations support program for residing companies.

Table 1 – Chart of Development Phases

Classification	Area	Business period
1st Phase	924,000m ² (22%)	November 2001 ~ July 2004
2nd Phase	1,584,000m ² (37%)	June 2003 ~ June 2006
3rd Phase	1,749,000m ² (41%)	April 2005 ~ December 2007

Kim, Kihwan (2009). A Potential Paradigm for Sustainable Regional Development: Eco-Industrial Park. KIET Occasional Paper No. 74: 1-85

LAND USE & OWNERSHIP

- Has facilities like industry, distribution and housing but also a mix of recreation, education and cultural facilities
- Many of the cultural and recreation facilities have been put in place as a way of attracting people to the area as one of the key goals of these types of developments is to attract educated people to the area
- DEVELOPMENT PLAN
 - Industrial 32.2%
 - Residential 15.5%
 - Business Site 4.7%
 - Leisure Site 8.4%
 - Public Site 5.2%

- Common public areas 34%
 - Green zones/roads/parks etc
- 8000 apartments, townhouses and free-standing houses with gardens
- Education environment – 8 elementary, middle and high schools

ECO-INDUSTRIAL

One of the main characteristics of this development is the implementation of an eco-industrial system in this area through industrial, residential, and commercial development. “The plan for the area has an environmental and sustainability focus, committed to habitat creation, green space network [...] and passive and active solar energy use,” (Oh, Kim et al. 2005). Below is a list of the key areas the plan is focusing on:

- Energy and materials flow planning
- The goal is to create a partly self-contained energy and material flow system within the site adopting various planning and design strategies
- Grey water and rainwater recycling system with the goal of a reduction in water consumption
- Energy efficient lighting
- Minimizing waste production and resources consumption
- Designing green open spaces where humans, flora and fauna could live together in a symbiotic relationship
- Species and habitat preservation
- Pedestrian oriented system
- Energy efficient buildings – natural ventilation and lighting systems, non-toxic and recycled materials use and rooftop planning
- Symbiotic Industrial Network Construction

The goals of this plan are lofty and admirable but literature regarding this case study notes a number of faults and concerns about how these plans and goals will be implemented and regulated. There is no detail provided on how these goals will be regulated and with the lack of targets, indicators, benchmarks, maintenance and monitoring plans it is difficult to understand how these plans will be followed through. The lack of subsidies and incentives is also evident in these plans likely making it more difficult to get industries involved. How a sense of community

and co-operation in an industry network of this type is developed topic that is avoided. This case is an excellent example emphasizing that planning is only one step towards a functioning mixed use area. There are a number of other factors at play and a vested interest, education and a sense of co-operation are things that need to be realized on more than just paper.

OTHER RELEVANT EXAMPLES (GREENFIELD REDEVELOPMENT)

- **Synergy Park, Brisbane Australia** (see also Roberts 2004)
 - Similar to the Korea example in regards to challenges and barriers of implementation
 - Australia's first attempt at an Eco-Industrial Park
 - Focuses on environmental and sustainability goals

Case #6: Transparent Factory (Dresden, Germany)

HISTORY AND CONTEXT OF THE SITE

Dresden, the capital of Saxony in Germany, is well known for its Baroque architecture and was the centre of a region regarded for the high level of craftsmanship exhibited by its many industries. This craftsmanship was especially evident throughout Saxony in locations such as the porcelain works of Meissen and the clock and watchmakers of Glashütten. Dresden, of course, was disastrously fire bombed by the U.S. and Royal Air Forces between February 13 and February 15, 1945. The resulting fire destroyed much of Dresden's inner city, home to architectural masterpieces such as the Frauenkirche (whose reconstruction was completed by 2005). During the GDR years, reconstruction of the city following World War II was generally slow and what was built followed the socialist realism style. Much was left to repair when Germany was reunified in 1990.



Figure 13: Map of Dresden showing the location of the Transparent Factory.

Reunification of Germany resulted in a skewed economy; the west was an industrial powerhouse while the east – with its obsolete factories – was woefully unprepared for capitalism. To raise the standard of living of the east to match that of the west required an enormous amount of capital. As reported by Reuters (2009), the Halle-based IWH research institute estimates that €1.3 trillion, or US\$1.9 trillion, has been poured from the western economy into the east since the fall of the Berlin Wall.



Figure 14: The exterior of the Transparent Factory.

DEVELOPMENT & MODES OF FUNDING

One post-GDR project was the Transparent Factory in Dresden (*Die Gläserne Manufaktur* in German). It is the final assembly site for Volkswagen’s luxury sedan, the Phaeton. According to the company’s website, first talks took place in February 1998 and the project was approved by Dresden’s city council in September 1998. Volkswagen invested €185 million into the project. Opened to the public on March 19, 2002, and now somewhat of a tourist attraction, the transparent factory was built on the site of a former convention centre and exhibits many environmentally-friendly features.

LAND USE & OWNERSHIP

Peter Allingham (2008, p. 121) describes the final assembly of the Phaeton at the transparent factory as “interesting and relevant ... because it offers another approach to the combination of

car production and urban development with point of departure in experiential strategy [and] with a keen focus on aesthetics.” The grounds of the transparent factory cover 49,000 m² (527,000 sq ft) and are embedded into the largest urban park in Dresden, the Großer Garten, and across the Stübelallee from the neighbourhood of Johannstadt-Süd. Johannstadt was severely damaged during the Allied bombings in 1945 and as a result was rebuilt in socialist realist apartment blocks amid park-like surroundings (Allingham 2008). The factory is clad in a glass façade and has the same look and feel of a modern art gallery. Volkswagen states that three hundred trees were planted on the site and ponds were added. Sensitive to the residential nature of the surrounding area, Volkswagen employs what is called the *Cargo Tram* to transport car parts from the logistics centre at Friedrichstadt, a neighbourhood of Dresden located on the other side of the old city from the transparent factory. Use of the Cargo Tram means that more vehicles – especially heavy trucks – need not travel on the local road network nor contribute to vehicular congestion. One Cargo Tram carries the same load as three trucks and the transporter uses the pre-existing tracks of the Dresden public tram system. Importantly for the surrounding area, the transparent factory emits no pollution – not air, water, ground nor noise pollution. Even the exterior lights are sodium vapour lamps so as to not affect the insects.

The “experiential strategy” of Volkswagen AG, however, is most evident on the inside of the transparent factory. Obviously oriented towards the wealthy, Volkswagen’s customers can watch their own Phaeton as it travels along an assembly line like no other. The factory floor is made of slats of Canadian maple and the employees wear white – even their gloves. This is what Allingham calls a “three-dimensional branding” strategy. Opinions of such a strategy surely differ but, nonetheless, Volkswagen’s *Gläserne Manufaktur* alludes to Dresden’s history as a historical centre of craftsmanship. Attributed to James Pine and James H. Gilmore, the transparent factory is a “theatre of work” (Allingham, p. 121) and each Phaeton is handcrafted with the assistance of tools that draw power from induction through the floor. To make purchases a more cultural affair,



Figure 15: The cargo tram

customers are enrolled into a program that involves visits to the Semper Opera, the Zwinger Palace and other high-brow cultural must-do's in Dresden (Volkswagen; Allingham, 2008).

OUTCOMES & BENCHMARKS FOR SUCCESS

The transparent factory, as a mechanism of Volkswagen advertising, is successful, but to judge it against more typical auto manufacturing plants would be unfair. It's nestled in an inner city park; it is located next to a residential neighbourhood; and the Phaeton parts that are assembled within its glass walls take a public transportation route to get there. The exterior is striking. Situated in a city that is the epitome of Saxon-style Baroque, but which is also an excellent example of post-WWII, socialist-realist austerity, the transparent factory displays remarkable sensitivity to its surroundings and, additionally, strives to achieve harmony with its surroundings. An example of west assisting east, Volkswagen provided the capital and sophisticated design that has made the transparent factory a benign yet engaging aspect of Dresden.

Transferability

We are able to take portions of each of the case studies and adapt them to the Calgary Manchester redevelopment area. While there is no one solution that will fit perfectly into the Manchester site certain aspects can be taken into consideration for use. Overall we find that cooperation is vital to success. Support among land owners, developers, residents and business owners is what makes a mixed-use development viable. Close geographic proximity is also important for the sharing of resources and energy and for attracting people to the site. Community infrastructure including schools, places to live work and play, and essential services such as water and energy supply must be in place, including transportation and accessibility. Place identity and sense of community are also requirements for a successful mixed-use development. Calgary has a foundation of light-industrial businesses and there is support to develop like businesses, especially in areas that already support an industrial zone. Finally, Manchester's close proximity to the downtown offers numerous opportunities to attract residents and businesses.

Like New York's DUMBO, the Manchester area in Calgary is located in the heart of the city with close proximity to major downtown offices. Both share a history of manufacturing and shipping

services that have dwindled and require revitalization. While Manchester doesn't have the historic buildings, there is potential for a new sense of community to grow out of the area. Low rents would attract new businesses and residents. The growth is likely to be slow, however. Should a major developer see the potential of the revitalization of the area the time taken to slowly gather enough support and capital could take years. In the mean time, zoning relaxations by the City may help attract the first new residents and businesses to the area. It is these players who will work to build the community.

In relation to the Calgary Manchester area, should the City of Calgary decide to include industrial practices within the neighbourhood it ought to consider investigating and seeking out those industries that can contribute inputs and outputs to each other in efforts to reduce the exploitation of virgin materials. The sharing of energy is also an important factor in working together. Energy reserves could potentially be distributed throughout the rest of the neighbourhood in residential and retail ventures adjusting economic strategies for the community. These objectives could be achieved with planning implementations that co-locate these industries and infrastructure planning for distribution.

Important lessons to learn from the Korean case are specific issues of implementation, incentives and the need for management and benchmarks. Without these success is difficult to plan for and regulate. Granville shows the importance of landownership and the early understanding of what the ultimate goals are. The process of creating a marketable and identifiable place is also key as ultimately all these projects are hoping for some form of economic growth and development.

Conclusion

Any redevelopment plan must be carefully planned and be site-specific. Careful consideration must be made to the existing conditions, surrounding environment, adjacent land uses, and transportation infrastructure. There are several examples of successful implementations of mixed-used development including that of industrial facilities although this combination is more difficult to plan successfully because of the public's perceptions regarding noise, pollution and lower property values. Light industrial uses are usually a better fit for a mixed-use development that includes residential areas such as the DUMBO community example. Existing infrastructure

usually requires improvement to ensure accessibility and connectivity. Financing will again vary from case to case and usually includes a mix of public and private cooperative initiatives. Benchmarks and targets need to be set early in the planning process to guide development. Overall, while commercial and residential combinations of mixed-use developments are more common there are precedent that include light industrial uses as well.

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