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The importance of liability for the redevelopment of brownfields : the developers view

Daniel F. Chachakis

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ABSTRACT

THE IMPORTANCE OF LIABILITY FOR THE REDEVELOPMENT OF BROWNFIELDS: THE DEVELOPERS VIEW

**by
Daniel F. Chachakis**

The thousands of former industrial properties lying vacant in New Jersey are an economic challenge for all areas of government. If these properties are, or are perceived to be, contaminated then they are labeled Brownfields. An important question is whether the threat of liability for contamination by prior owners is a current cause behind the failure of developers to acquire and redevelop Brownfields in the State of New Jersey.

The goal of this work was to discover if there is a link between liability and the developer's decision making process. How important is the liability factor? Fifty-seven variables were examined in a survey that was sent to developers. The responses were ranked to discover the most critical concerns for the developers overall and by categories. Analysis revealed that the presence of an end user was the most critical factor, along with other factors related to profit. Long term liability exposure was also a concern, one of many on the critical concern list. The thesis concludes with recommendations for policy initiatives to assist with the redevelopment of Brownfields in New Jersey. The recommendations include the use of community development plans to attract end users, and the use of government programs to improve developer profit. These latter include reduce delay, preparing infrastructure and developing voluntary cleanup programs. The promotion of a Brownfields law to provide guidance is also suggested.

**THE IMPORTANCE OF LIABILITY FOR THE REDEVELOPMENT OF
BROWNFIELDS: THE DEVELOPERS VIEW**

by
Daniel F. Chachakis

**A Thesis
Submitted to the Faculty of
New Jersey Institute of Technology
in Partial Fulfillment of the Requirements for the Degree of
Masters of Science in Environmental Policy**


Department of Humanities and Social Science


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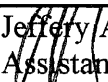
APPROVAL PAGE

**THE IMPORTANCE OF LIABILITY FOR THE REDEVELOPMENT OF
BROWNFIELDS: THE DEVELOPERS VIEW**

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This thesis is dedicated to
My wife Marcy Jo and my children, Kevin and Christopher

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CHAPTER 1

INTRODUCTION

1.1 The Problem

This thesis investigates one of the major problems facing urban areas today – the reuse of industrial property. There are thousands of abandoned industrial properties lying vacant in the New York and New Jersey metropolitan area, with over 17,000 in New Jersey alone (Cohen, et al, 1994). Many of these sites are not being redeveloped because they were industrial and are or are perceived to be contaminated. These properties are now known as Brownfields. According to the EPA (1998) Brownfields are abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination.

Brownfields have other problems associated with them, especially if the properties are abandoned. Such sites become a strain on municipal resources. Brownfields cost cities lost tax revenues along with additional money for cleanup, maintenance, demolition, rehabilitation and higher insurance and mortgage fees. They can be fire hazards and sites for disposal of household rubbish and hazardous waste through dumping. Contaminated sites are a threat to public health (Page and Rabinowitz, 1994). They may also be occupied by the homeless and can become crack houses for drug users (Greenberg, et. al., 1992).

1.2 The Objective

The goal of this thesis is to identify problem areas from a developer's point of view and recommend policy changes at the state and federal level. This thesis looks at developers

who choose to develop Brownfield sites and those who choose to bypass such sites. The thesis evaluated fifty-four factors that influenced their decision. The thesis examines policies enacted within New Jersey designed to address both environmental and Brownfields problems. Developers may be willing to trade profit, location, or other factors for liability protection. The thesis addresses current issues for developers and looks to the future to discover the next roadblock to Brownfields redevelopment. Finally this thesis establishes whether or not liability is a significant factor for developers that causes them to choose not to build in urban areas.

1.3 Background

1.3.1 Industry and Cities

Brownfields developed because, as Kahn (1995) pointed out, toxic substances are present in the production processes that create our economic goods and in the economic goods themselves. Toxic substances found their way into buildings, soils, and landfills across the United States not by design, but because there was never a great understanding of what toxic substances were and what they could do to humans and the environment. It is these contaminants that must now be identified and removed during the Brownfields site assessment, investigation, and remediation process.

Historically in the United States, land was considered plentiful. Firms would develop property, use it for a time, and move on rather than modernize the facilities. The private market imposed no disposal costs on firms that dumped toxic and hazardous wastes on or into the ground at their sites. Private firms complied with existing laws and attempted to maximize profits (Page and Rabinowitz, 1994). There was little thought to

future consequences, which resulted in abandoned, contaminated properties located in urban areas. These properties were often located in desirable industrial/commercial locations near utilities, interstate highways, railways, water transport and labor pools (Murphy, 1996). Sometimes huge tracts of land were abandoned or underutilized for years and continue to be underutilized in areas such as Newark and New York City. Other abandoned properties were small in size such as old gas stations that developers avoided due to underground storage tanks and possible petrochemical contamination. The scale of the abandonment of the industrial areas of urban America is large, but the reasons behind the abandonment are not the subject of this thesis. It is enough to understand that such properties exist in vast numbers and can be dealt with either in a Brownfields type redevelopment program or, if the contamination and the risks to the public are great, under the programs of the Comprehensive Environmental Response, Compensation and Recovery Act (CERCLA).

1.3.2 New Jersey's Environmental Cleanup Responsibility Act (ECRA) and the Federal Comprehensive Environmental Response, Compensation and Recovery Act (CERCLA)

The beginning of the environmental movement in the 1960s was also the beginning of our attempts to understand the environment and legislate against activities that are detrimental to the environment. Buck (1996) states that environmental movement began with Rachel Carson's book *Silent Spring* published in 1962. The focus was not on land contamination at this point in time. Congress passed the Clean Air Act in 1963 (42 U.S.C.A. section 7401 et seq.), the Wilderness Act in 1964 (16 U.S.C.A. section 1131 et seq.), and the Endangered Species Act passed in 1966 (16 U.S.A.C. section 1531 et seq.).

Then, in 1969, for over a period of eleven days, the Union Oil Company's Platform A in the Pacific spilled over 235,000 gallons of crude oil ruining over forty miles of Santa Barbara's beaches. Five months later the Cuyahoga River in Ohio burned due to the high volume of pollution. Following these disasters Congress passed the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C.A. section 4321 to et seq.), and the Act was signed into law on 1 January 1970 (Buck 1996). NEPA compelled federal agencies to conduct environmental assessments before undertaking major actions and to provide timely dissemination of public information concerning federal plans and programs with environmental impacts in order to obtain the views of all interested parties (Sullivan, 1997). This public participation mandate is continued in the EPA Brownfields Pilot Program, but in an expanded form.

Through out the 1970s air and water pollution control was the main focus of environmental improvement. Acts passed included the Coastal Zone Management Act of 1972 (16 U.S.C.A. section 1451 et seq.), the Federal Water Pollution Control Act (33 U.S.A.C. section 1251 et seq.) in 1972, and the Marine Protection, Research, and Sanctuaries Act of 1972 (33 U.S.C.A. section 1401 et seq.). In 1977 Congress passed the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C.A. section 1201 et seq.). These Acts affect Brownfields redevelopment because they provide criteria, such as surface water criteria or wetland protection/replacement standards, which must be met during a remediation. There are also applicable or relevant and appropriate regulations (ARARs) for CERCLA remediation actions based on those acts and the subsequent regulations.

In 1978, the attention of the public shifted radically towards hazardous waste disposal (Portney 1993). The uncovering of hazardous waste at Love Canal, in Niagara Falls, NY, was an important event that caused people to look in their own back yards for hazardous waste sites. Fears of serious adverse health effects extended to other parts of the country as similar sites were uncovered (Portney 1993). The citizens of the US demanded something be done to remove the hazards associated with such sites.

The first attempt at the Federal level to deal with hazardous waste was the Solid Waste Disposal Act (SWDA) (42 U.S.C.A. sections 6901 et seq.) passed in 1965. The primary purpose of the Act was to improve the state of solid waste disposal methods through planning and regulations. The SWAD was amended in 1976 and from that point forward became known as the Resource Conservation and Recovery Act (RCRA) (Public Law 94-580). The Act established a “cradle to grave” management system to monitor and control the generation, storage, transportation, and eventual disposal of wastes that posed a risk to health and the environment (Portney 1993). The Act established definitions of hazardous waste and four criteria for the identification of hazardous waste - ignitability, corrosivity, reactivity, and toxicity - but left the specific identification of such wastes to the EPA. The Act required firms to identify and manifest RCRA listed items. The Act established minimum technical standards and a permit program for the operation of hazardous waste facilities. The Act also provided for enforcement actions. Amendments that were added in 1984 (Public Law 98-616) expanded the scope and requirements of RCRA. Portney (1993) described the Amendments as the most detailed and restrictive environmental requirements ever legislated. Congress set out specific instructions on the forms that hazardous waste programs should take. The Amendments

provided for more stringent land disposal requirements, waste reduction requirements, corrective action requirements, and land disposal restrictions. However, RCRA and the Amendments were inadequate to address abandoned sites that were contaminated with hazardous materials. RCRA affects the redevelopment of Brownfields by providing definitions of contaminants and proscribing the process for “dig and haul” methods of contaminated material disposal.

In 1980, the US Congress passed the Comprehensive Environmental Response, Compensation, and Recovery Act (CERCLA) (42 U.S.C.A. sections 9601 to 9675) to deal with properties that were previously contaminated, especially those that were abandoned. The Act was passed almost exclusively because of concerns for risk to human health without regard for economic and legal issues that would later present themselves as “unintended consequences” (Hird 1994). According to Portney (1993) CERCLA was unique in two respects. It is one of the few environmental laws passed to address past environmental degradation rather than prevent future pollution. Additionally it placed the EPA in a role not only as regulator but also as a hazardous waste engineering firm to actually conduct site cleanups subject to the regulations. The objectives of CERCLA were: to find the nation’s worst chemically contaminated sites and remediate such sites; set up legal and institutional mechanisms to quickly achieve cleanup; and use response funds and enforcement tools to get the job done. The desired impact of CERCLA was to clean abandoned, contaminated waste sites. However, during cost recovery actions the EPA could sue anyone with an interest in the property, past or present, to recover costs of the cleanup. This was allowed due to the strict, joint and several liability placed upon past and present owners and operators as the Act was

interpreted by the courts (Michael, 1995). The liability provisions of CERCLA as interpreted by the U.S. Supreme Court are now accused of being major factors in the development of Brownfields.

CERCLA required the modification of the National Contingency Plan (NCP). The NCP has been present in various forms since it was first promulgated in the Federal Water Pollution Control Act in 1972 (Sullivan, 1997). The NCP now stipulates the process for selecting sites for response, conducting investigatory analyses, selecting appropriate remedies, determining appropriate levels of cleanup, determining who will pay for remedies, and determining procedures for ensuring that a site will pose no risks in the future (Portney, 1993). Much of the remediation process required by the NCP is found in Brownfields remediation programs at the state level.

CERCLA required the establishment of the National Priorities List (NPL). NPL sites are subject to the cleanup requirements of the NCP (Portney 1993). A property listed on the NPL became stigmatized. Developers refuse to consider such properties no matter what the actual type and/or level of contamination and no matter if the contamination was on all or part of the site.

Finally, CERCLA defined an enforcement program. It added a \$1.6 billion fund that could be used to clean up land based sites pending cost recovery actions against responsible parties. In addition it provided a notification procedure for spills and set up an emergency response program (Hird, 1994).

CERCLA was amended in 1986 with the passage of the Superfund Amendments and Reauthorization Act (SARA) (42 U.S.C.S. section 9601 et seq.). SARA expanded the cleanup fund to \$8.5 billion over five years and included a timetable for conducting a

specified number of site studies and site cleanups. It required the completion of 650 remedial investigations/feasibility studies and 375 remedial investigations in the five years following enactment (Portney, 1993). SARA clarified and strengthened enforcement, expanded the role of the public and the State, and provided \$500 million for underground storage tank (UST) removal. SARA in Title III expanded citizen's rights. Title III required the implementation of community planning and right-to-know programs (Portney, 1993). The EPA Brownfields Pilot Program expands the citizen's right-to-know provisions towards a citizen's right-to-participate provision by requiring and collecting data on the best ways to develop community participation.

The first attempt at forcing responsible parties to clean their own sites in New Jersey began with the passage of the New Jersey Pollution Prevention Act (1970, N.J.S.A., Ch. 33) in 1970. New Jersey then passed the Water Pollution Control Act (1977, N.J.S.A., Ch. 74) (a.k.a. the Spill Act) in 1977. This Act was a centerpiece on the state's water quality protection efforts - it mandated permits for all entities discharging into the waterways of New Jersey (Finman, 1998). The next act passed was the Environmental Cleanup Responsibility Act (ECRA) (1983, N.J.S.A. Ch. 330) in 1983. This Act was designed to hold polluters responsible for contaminated properties and prohibited the sale of land until the site was remediated. Later amendments included the 1993 Industrial Site Recovery Act (1993, N.J.S.A. Ch. 13) and the 1998 Brownfields and Site Remediation Act (1998, N.J.S.A. Ch. 278), both of which were designed to facilitate industrial cleanups (Finman, 1998) by providing flexible cleanup standards and limited protection for liability from past contamination. A unique approach in New Jersey is the State Development and Redevelopment Plan (1985, N.J.S.A. Ch. 398). This Plan favors

the development of Brownfields over Greenfields in New Jersey, but it does not have any sanctions or incentives to actually force compliance by State agencies or the private sector.

1.3.3 ECRA, CERCLA and Unintended Consequences

Both ECRA and CERCLA had unintended consequences caused by their liability provisions. Cohen, et al (1994) discovered that when liability issues arose on a property under consideration for redevelopment, the redevelopment plan usually came to a standstill. Developers were searching cities for potentially profitable sites and they discovered that there were a large number of properties undeveloped because of perceived contamination. Property owners refused to sell underutilized properties because of the possibility that there may be contamination on their property that others would find. The original property owners did not want to be liable for cleanup costs (Diamond, 1996). Lenders would not lend money to projects that attempted to develop land which might have been contaminated.

Thus, Brownfield development was blocked based on two fears that resulted from liability concerns. Landowners were afraid to sell property for fear that new owners would discover contamination and attempt to sue them for the recovery costs. Landowners would not sell or develop their properties because it was better for the owners not to know what was wrong with their properties from a financial point of view. On the other hand, land buyers (developers) were afraid of buying into the strict liability standard for the "potentially responsible party" (PRP). No one, especially lenders, wanted to assume potentially substantial cleanup costs or become liable for cleanup costs

for contamination they did not contribute to. The problems were the unknown costs for remediation coupled with strict, joint, and several liability. Investors faced both financial liabilities for cleanup costs and reduced or lost returns associated with a possible contamination stigma attached to the site by potential purchasers and occupants (Yount and Meyer, 1994).

1.3.4 Other Influences on Brownfields Programs

Other influences on Brownfields programs in New Jersey and other States include Greenfield protection, farmland protection, and environmental justice issues.

1.3.4.1 Greenfield Protection: Developers were turning major tracts of land in rural areas into developments, industrial parks, shopping centers, and other profitable ventures. As the environmental movement gained popularity, people were beginning to see that once a forest was gone, as Kahn (1995) says, "...there is a significant probability that [it] will never become reestablished." Citizens wanted to do something to rein in development on virgin properties and they saw the redevelopment of Brownfields as an alternative to using Greenfields.

1.3.4.2 Farmland Protection: Farmland advocates saw a major shift of farmland to development and wanted to halt the decline. They also saw the redevelopment of Brownfields as an alternative to the development of farmland.

1.3.4.3 Environmental Justice: Environmental Justice advocates saw Brownfields Redevelopment as a way to establish viable industries, businesses, and new housing in depressed neighborhoods. Many sites are located in economically depressed urban areas and the remediation and reuse of such sites has become a priority for municipal leaders. The EPA Brownfields Pilot Program addressed the issue by requiring community participation in site selection, remediation criteria and method selection, and site reuse.

1.3.5 The Beginning of Brownfields

Abandoned and underutilized sites existed well before there was a Brownfields designation. The EPA, under Carol Browner, initiated a program called the “EPA Brownfields Initiative” to help economically burdened urban areas redevelop sites abandoned by industry. She did so to address a growing public sentiment that many pieces of environmental legislation have impeded economic development (Cohen, et al, 1994). The EPA began calling such sites Brownfields and awarded the first Brownfields \$200,000 Pilot Project Grant to the City of Cleveland, Ohio, in 1993. In 1995, the EPA established the EPA Action Agenda. The Agenda consisted of four parts: Brownfields Pilots; Clarification of Cleanup Issues; Partnership and Outreach; and Job Development and Training. The EPA selected fifty sites in 1995 and currently there are over 120 Pilots. The thrust of the Pilots is to gather useful information and develop new strategies for promoting environmental cleanup and redevelopment. The EPA used CERCLA pre-remediation funding as a source for the pilot projects. At this time there is no specific Brownfields law at the Federal level.

CHAPTER 2

FINDINGS OF PREVIOUS INVESTIGATIONS

2.1 CERCLA Liability

Although the CERCLA statute does not expressly impose a standard of strict, joint and several liability for responsible parties, federal courts nonetheless have construed it as doing so (Michael, 1995). Strict liability is the imposition of liability without regard to fault or negligence (Rosenberg, et. al, 1983). CERCLA does impose a standard of joint and several apportionment of liability in litigating a Superfund claim. Joint and several liability allows the government to sue to recover damages from all litigants (potentially responsible parties) or any one or more of the litigants (Lusk, et. al, 1982). This provides an advantage to the government to recover all costs from a single defendant, especially if there is a single defendant with "deep pockets" and the remaining are unable to satisfy a judgment (Michael, 1995). The issue of liability is used to explain why developers will not develop Brownfields sites. Most literature is case studies that state that developers are afraid of "buying into" liability when they buy contaminated property. This fear of buying into liability also applies to lenders.

2.2 Factors in the Site Selection Process

Michael Pacione (vol. 5, no. 4) listed 16 factors that are considered in the redevelopment of Brownfields into residential property in England. Physical environmental quality was the 13th most important factor identified (Pacione, vol. 5 no. 4) as ranked by developers. The factors are listed in Table 2.1.

Table 2.1 Pacione's Factors in the Site Selection Process

1. Market Factors	2. Planning Permission
3. Basic Services	4. Neighborhood Social Class
5, 6, 7. Site Availability, Access to Schools and Condition of the Sub-Soil	8,9. Topographic Conditions and Asking Price of the Land
10, 11, 12. Size of the Site, Access to the City Center, Proximity to Local Shops	13. Physical Environmental Quality
14. Access to Employment	15. Clearance Grant
16. Existing Ground Cover	

According to Pacione (vol. 5, no. 4), local authorities seeking to attract private housing investment must address the two related issues of land availability and land suitability. Specifically, planners must improve the flow of information between local authorities and potential investors on what land is available for private residential development. In addition, urban authorities must directly respond to the principle factors of importance in the developer's assessment of site attractiveness. England does not have a law equivalent to CERCLA, so liability for past contamination was not a factor. However, Pacione (vol. 5, no. 4) stated that all things being equal, developers would rather use a Greenfield, a property that has not had previous industrial use. Although costs may be higher because of a lack of infrastructure, there is no liability issue for past contamination. Developer's chief concerns are that projects generate acceptable profit with as little risk as possible and that projects follow a smooth completion schedule.

Kovtal, et al. (1993) states that industrial developers are looking for four major items when conducting the site selection process. They are:

- The site contains a minimum of at least 100 acres.
- The availability of water and sewer connections at the site.
- A 15-minute commute to the nearest major roadway exists.
- Access to an airport within 30 minutes.

2.3 Factors Affecting Brownfields Development

2.3.1 Contamination and Liability

In the United States, Page and Rabinowitz (1994) discovered three factors that act as barriers to Brownfields development:

- Liability is a barrier to investment and development.
- Potential liability (becoming a PRP) created by CERCLA may affect property values more than actual contamination.
- Property developers may be waiting for a relaxation of remedial criteria; such criteria are continuously being debated at the federal and state levels.

2.3.2 Private Industry

There are other issues currently affecting Brownfields development. Mike Sheridan (1996) lists four:

- The Brownfields market is attracting major players. For example, Koll - one of the US's largest real estate firms, is teaming with ENSR (a US firm wholly owned by REW, a German firm), a large environmental remediation company, to create Koll ENSR Environmental Realty Advisors (KEERA).

- Regional environmental firms are teaming up with commercial real estate brokers to identify potential projects and propose potential solutions.
- Risk coverage, offered by companies such as Environmental Warranty Inc., protect new owners of contaminated property from future liability.
- Finally, "environmental merchant banks" are being formed to undertake \$5 million to \$100 million deals involving the redevelopment of Brownfields sites (Sheridan, 1996).

Cole, et al. (1996) states that streamlining is an important factor in the site selection process. Recommendations include appointing case managers, consolidating the permit process, waiving or reducing fees, reducing changes to previously approved plans, stopping the imposition of conflicting requirements from different departments, and holding a single, consolidated public hearing. Municipalities can also assist by providing an expert to assist with the application process, locate private sources of funding for the developer, share in studies and marketing information, increase services such as policing, and set up business improvement districts (Cole, et al, 1996). The most valuable service cities can provide is to enhance the level of public services in neighborhoods, which improves both the actual appearance and public image of the areas targeted for development (Cole, et al, 1996).

2.3.3 Federal Policies and Programs

Governments at all levels are assisting with Brownfields redevelopment. At the Federal level, one change was the Federal Accounting Standards Board Rule 125 (as of Dec15, 1995). This rule forced owners to not only carry real estate assets on their books at true

market value but also to show a contingent liability on the balance sheet for anticipated remediation costs (Sheridan, 1996). This caused companies to publicly admit contamination problems. But more importantly, companies could now improve their financial statements by conducting a site remediation and therefore remove a financial liability from the company's books.

Congress created a "security interest exemption" in 1980. The exemption provides that "a person who without participating in the management of a vessel or facility, holds indicia of ownership primarily to protect his security interest in the facility [shall be excluded from the definition of owner operator]" (42 U.S.C. Sec. 9601(20)(A) (1988)). Congress explained the terms of the exemption and allowed its use with the passage of the Asset Conservation, Lender Liability, and Deposit Insurance Protection Act in 1996.

The EPA established a pilot program to award grants to local and state governments to obtain additional data with respect to potential liabilities associated with Brownfields restoration (Stewart, 1996). Each project was awarded up to \$200,000 to assist in enumerating, assessing and evaluating the potential for redevelopment of contaminated properties. The EPA removed over 25,000 sites from the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) listing because the projects were complete or the risk to public health did not warrant inclusion the list, removing the stigma of CERCLA enforcement actions on those sites. The EPA also provided the following guidance:

- *Prospective Purchaser Guidance* to assist property buyers with the cleanup process by outlining situations under which the EPA may enter into an agreement not to

file a lawsuit against a purchaser of property that was contaminated prior to the purchase (EPA-1, 1998);

- *Soil Screening Guidance* (EPA, 1996) to define what levels of certain chemicals are “clean enough.” This guidance serves as a tool to expedite the evaluation of contaminated soils at sites addressed under CERCLA. The guidance is intended to screen out areas of sites, exposure pathways, or chemicals of concern from further consideration assuming certain conditions are present, or to determine that further study is warranted at a site. The use of such screening may significantly reduce the time it takes to complete soil investigation and remediation actions;

- *Lender Liability at UST Sites Guidance* (EPA, 1996) to allow lenders a level of comfort if they follow the guidance in the manual when loaning money on sites that have one or more UST(s). The guidance clarifies when a lender may be exempt from UST liability;

- *Corrective Actions at RCRA Sites Guidance* (EPA, 1996) to inform the owners of Hazardous Waste Sites covered under RCRA what their responsibilities are during and after a release; and

- *Risk-Based Corrective Actions at UST Sites Guidance* (OSWER Directive 9610.17) to provide guidance to the owners of UST(s) on what to do if there is a leak in their systems (Stewart, 1996).

All these documents were published to inform the public of the requirements of the EPA to remove the factor of the unknown and provide a level of comfort to those attempting to deal with Brownfields.

2.3.4 State Policies and Programs

States are "leading the charge" in Brownfields development (Sweeney, 1996). Most States have allowed remediation with minimal regulatory oversight, exempted remediation "volunteers" from environmental enforcement actions through written assurances from the state, and held volunteers harmless for unanticipated remediation work in the future (Sweeney, 1996). Volunteers in this context are any party or parties not responsible for the original contamination at a site. Most states also provide liability protection to lenders (Sweeney, 1996). These programs may also provide remediation assistance and relaxed environmental standards (Poindexter, 1995). Unfortunately, most State voluntary programs are not open to parties responsible for a site's contamination (Sweeney, 1996).

As stated, most state voluntary remediation programs provide flexible cleanup standards. Such flexible cleanup standards protect human health and natural resources, but are tailored to specific existing or proposed land use. For example, in Indiana, a party can choose from three tiers of cleanup standards. Tier One represents a cleanup to background chemical levels, a Tier Two assessment moves to default values based on health risk (with higher standards for residential property), and Tier Three deals with site-specific risk assessments. Purchasers select their own level of risk. The more extensive the cleanup, the more extensive the protection from future liability; a more limited cleanup results in more limited protection (Poindexter, 1995).

Legislatures at the federal and state level are also establishing "Greenfield" programs. Greenfield programs re-craft environmental laws to remove the environmental liability impediment, thereby promoting the reuse and re-industrialization of abandoned

urban manufacturing sites (Poindexter, 1995). These programs have a two-fold policy direction: to preserve undeveloped green spaces, and to alleviate inner city employment problems.

2.3.5 New Jersey Policies and Programs

New Jersey attempted to improve ECRA with the passage of the Industrial Sites Recovery Act (ISRA) in 1993. ISRA increased the flexibility of the State's environmental cleanup program. ISRA allowed for differential risk-based standards for residential and industrial (including commercial) properties depending on the type of reuse, encouraged self-monitored remedial investigations, and provided grants and loans for remediation. ISRA offered, "... differential risk-based standards for residential and nonresidential property depending on type of reuse"; the intent of the provisions was to streamline the remediation process without sacrificing important environmental safeguards (Morgan, et. al., 1994). ISRA also provided some liability relief. But, ISRA did not completely remove liability and did not guarantee that the NJDEP would not take future action.

New Jersey established a voluntary cleanup program under ISRA (Morgan, et. al., 1994) and has been using Memorandum of Agreements (MOAs) since 1992. Under this program, a party conducting the remediation enters into a non-binding MOA with the Department of Environmental Protection (DEP) to establish the scope and schedule of remedial activities. The program provides flexibility for private parties to conduct remediation activities at their own schedule (NJDEP, 1996).

New Jersey has a program where municipalities may apply for grants and loans, up to \$2 million per year, for investigations and cleanup activities from the Hazardous Site Discharge Fund (NJ DEP, 1996). The New Jersey Economic Development Authority (EDA) works with the DEP to cover additional eligible costs and provide loan servicing. Finally, private parties required to perform remedial activities, and individuals who want to conduct such actions voluntarily, may qualify for loans of up to \$1 million a year if they are unable to obtain private funding (NJ DEP, 1996).

Under ISRA, local government entities that acquire property through foreclosure, condemnation, or similar actions are not liable under New Jersey law for past contamination. The Lender Liability Act (1993, N.J.S.A. Ch. 112) frees lending institutions of liability for contamination when providing financial support to industrial projects as long as the lender does not participate in active management of facilities (Morgan, et al., 1994). Developers of property in qualified municipalities are offered protection from liability for third party costs if they did not cause the past contamination and they have cleaned the site in accordance with DEP regulations (NJDEP, 1996).

New Jersey adopted a State Development and Redevelopment Plan in 1992. This plan favors concentrating new development in existing developed areas including urban centers rather than encouraging suburban and rural "Greenfield" development (Morgan, et al., 1994).

In 1998, New Jersey passed the Brownfields and Site Remediation Act (1988, N.J.S.A. Ch. 278). This Act improved on ISRA because, according to McDonough (1998), the Brownfields and Site Remediation Act provided for:

- Innocent purchaser protection. The Act provides purchasers who investigate and complete remediation of a property with a liability exemption.
- A covenant not-to-sue. The Act requires that the NJDEP agree in writing not to sue the purchaser once the property is remediated.
- The development of presumptive remedies by the NJDEP. The Act requires that the NJDEP will develop protective remedies that can be implemented without prior NJDEP approval to help expedite the remediation process.
- Tax incentives. The Act provides for up to seventy-five percent reimbursement of the cost of remediation from newly generated revenues.
- Incentives for the use of innovative technologies. The Act eliminates the requirement that developers post financial assurances and dedicates five percent of Hazardous Discharge Site Remediation Fund rants for those utilizing innovative technologies.
- Improved Graphical Information System (GIS) information. The Act requires that the NJDEP study the contamination of state aquifers, investigate and map large areas of fill, and make the information available through the GIS program.
- A lender liability exemption for underground storage tanks (USTs). The Act provides for a lender liability exemption for USTs when the money is used to empty and close the tanks.
- An Environmental Opportunity Zone (EOZ). The Act amended the EOZ Act by allowing the construction of residential units in EOZ areas.

2.4 Site Remediation

Cleanup procedures follow a proscribed format. For sites listed on the NPL, the EPA must follow the National Contingency Plan (NCP) (Hird, 1994). The NCP lists nine criteria:

- the protection of human health and the environment;
- compliance with applicable or relevant and appropriate regulations;
- long term effectiveness;
- reduction of toxicity, mobility, or volume through treatment;
- short-term effectiveness;
- ability to implement;
- cost;
- state acceptance; and
- community acceptance.

The NCP criteria are now included in Brownfields site assessments. As assessments occur and the extent and type of contamination and remediation is identified, the buyer and seller could modify the purchase price of the site to account for the required remediation (Page and Rabinowitz, 1994). A Phase 1 or Preliminary Assessment (PA) detects potential problems. The assessment typically includes a site visit, a review of commercial documents, and historical research - all of which deal with questions of past uses, practices, and materials handled at the site (Page and Rabinowitz, 1994). This may cost as little as \$2,500 (Page and Rabinowitz, 1994). Preliminary Assessments may be enough to establish a legal defense against liability based on "due diligence." This defense must prove that the firm:

- was an innocent land owner,
- was not involved in the original contamination,
- has diligently avoided creating new contamination, and
- has a record such that contamination was not identified at the time it

purchased the site despite an appropriate assessment (Page and Rabinowitz, 1994).

The due diligence defense, however, still may not be sufficient to avoid liability for a contamination cleanup under CERCLA.

If the developer detects potential problems, or wants greater confidence in the environmental condition of the site, a Phase 2 Assessment or Site Investigation (SI) is conducted. This phase includes soil, subsurface, ground water, and/or material sampling and testing. A field investigation is necessary to determine the extent of contamination and establish remediation costs. This assessment may cost from \$10,000 to \$1 million (Page and Rabinowitz, 1994).

A Phase 3 Remediation or Remedial Action (RA) refers to the cleanup of the site itself. Remediation costs can vary widely based on the extent and type of contamination and the experience of the contractors (Page and Rabinowitz, 1994).

2.5 Major Contributing Sources

This thesis drew information from many sources. Two were most important. The initial document was “Potential Redevelopment on Contaminated Brownfield Sites” by William G. Page and Harvey Z. Rabinowitz (1994). This document listed the factors that produced the large number of contaminated sites and the environmental legislation enacted to control pollution and remediate existing contamination. This document

additionally provided case studies as examples to illustrate problems, costs, and outcomes of redevelopment projects as well as a model that uses return on investment and risk on contamination for discriminating among redevelopment projects.

The second document was the Environmental Protection Agency Region II Brownfields Grant Project Report (Cohen, et. al, 1994). This project looked at four general factors that prevent redevelopment of Brownfields sites, including the availability of bank financing, the potential for environmental liability, crime and safety, and zoning restrictions.

This thesis combines factors from both investigations and adds other factors from additional sources uncovered in the literary search.

CHAPTER 3

METHODOLOGY

The methodology for this thesis was developed according to the guidance provided in The Practice of Social Research, by Earl Babbie (1995). The thesis process began with the development of hypotheses. This was followed by the identification of the sample, in this case, the developers who conduct business in the State of New Jersey. Then there was the identification of variables, followed by the development of a survey to collect data. The thesis procedure continued with data analysis and discussion found in Chapter 4, and concluded with policy recommendations found in Chapter 5.

3.1 Statement of Hypotheses

The hypotheses tested are:

- **Liability for possible contamination on a property is a critical concern for developers:** If liability for possible contamination is the critical concern for developers, then liability should be the most critical concern on the developer critical concern list.
- **Liability for past contamination not caused by the developer protection is a critical concern for developers:** If liability for possible contamination from past owners is the critical concern for developers, then liability protection should be the most critical concern on the developer critical concern list.
- **Profit from a project is a critical concern for developers:** If profit is the most critical concern for developers, then profit should be the most critical concern on the developer critical concern list.

- **Location is a critical concern for developers:** If location is the most critical factor for developers, then location should be the critical concern on the developer critical concern list.

- **Government programs specifically designed to assist the development of Brownfields are a critical concern for developers:** If government programs to assist with the development of Brownfields are effective and important to developers, then government programs should approach the top of the developer critical concern list.

- **Quality of life is a critical concern for developers:** If quality of life is a critical concern for developers, then quality of life should approach the top of the developer critical concern list.

- **Firm size and experience are a critical concern for developers:** If firm size and experience factors are critical factors for developers, then firm size and experience should approach the top of the developer critical concern list.

3.2 Variable Identification and Measurement

There are fifty seven variables examined in this thesis that are organized into the following six categories:

- **Contamination Variables.** Those variables having to do with site investigation and remediation. There are fifteen variables in this category.

- **Profit Variables.** Those variables having to do with profit and cost. There are nine variables in this category.

- **Conditions of the Site Variables.** Those variables having to do with the condition of the site and the availability of various infrastructure. There are nine variables in this category

- **Community Variables.** Those variables having to do with the surrounding community. There are five variables in this category.

- **Government Variables.** Those variables having to do with government programs and taxes. There are ten variables in this category.

- **Developer Variables.** Those variables having to do with the capabilities of the developer. There are nine variables in this category.

The chart in Appendix A includes the variables with reference, if applicable, to the definition, and the type of question asked. The variables are numbered as they appeared as questions in the survey. There are Likert scale questions, yes/no questions and open questions to gather data on factors not identified in the variable selection process (see section **3.4 Survey Development**).

3.3 Survey Objects

The population surveyed included all developers listed under code 6525 (Land Subdividers and Developers) in the New Jersey Data Base found at the New Jersey State Department of Labor web site (NJDOL, 1996). New Jersey was chosen because the State is considered progressive on Brownfields issues. The list contained 163 developers who conducted business in New Jersey as of 1996. This list expected to be updated sometime in 1998. Of the 164 on the list, 142 were located in New Jersey. The rest are located in New York (8), Pennsylvania (4), Texas (3), Ohio (2), and one each in Massachusetts,

Connecticut, Georgia, North Carolina, and California. The sample included those developers located outside New Jersey because they must comply with New Jersey law while conducting business within New Jersey.

An initial contact was attempted with the entire data population. Each developer on the database was sent a letter describing the project. They were requested to indicate their willingness to participate by returning a pre-addressed, stamped postcard. Five developers returned the postcard indicating an interest in participating; these five became the test pool for the survey.

An attempt was made to contact the developers by phone; sixty-seven out of the remaining 158 had valid phone numbers. After discussions with the developers it was discovered that some firms were not in the development business, some firms did not acquire their own property, and some firms did not desire to participate. Another twenty-five firms agreed to participate in the survey.

The New York Times (Kannapell, 1998) published an article about waterfront development in New Jersey and listed the names of ten additional developers. Seven had names that were variations of those firms already identified but the correct names allowed for telephonic contact. Three firms were not previously identified and an attempt was made to contact them.

3.4 Survey Development

There were three types of questions used in the survey to solicit data from the developers:

- **Open Questions.** For example those used to discover the size and experience of the organization, size of desired properties (in dollars), and cost data. The range was those developers who have considered/conducted one or more development projects on land they selected. The variation was not defined.

- **Likert Scale Questions.** The survey employed ordinal measures to measure the response to a majority of the questions. The range for each question was those developers who have considered/conducted one or more development projects on land they selected. The variation for the Likert Scale questions was from “one” (1), the variable had little importance, to “five” (5), the variable was extremely important. The developer could also select “unknown” if the variable was unfamiliar, or “no importance” if the item was not important. Likert Scale analysis was used to develop rankings to discover the relative importance of various factors to developers.

- **Yes/No Questions.** These questions were used to solicit information such as whether the developers had their own environmental staffs. The range was those developers who have considered/conducted one or more development projects on land they selected. The variation was yes or no.

The survey underwent a specific development process. The process began with an initial survey development followed by a review of the survey by knowledgeable persons. Next came the test of the survey; the survey was sent to the five respondents from the initial contact. After an analysis of the results of the test survey was obtained, the original survey was slightly modified. The modified survey was sent to the remaining 35 potential participants by mail or fax. The modified survey is located in Appendix B.

3.5 Survey Response

The total number of developers contacted was seventy-nine. The total number of developers that agreed to look at the survey and were sent a survey was forty. The total number of developers who returned the survey was thirteen. Therefore there was a sixteen- percent response rate.

There was difficulty in getting the developers to agree to participate in the survey. When discussing the survey with developers the first impediment was one of time; the developers did not believe they had the time to participate in the survey. They had to be convinced the survey would not take valuable time away from other issues more important to them. Many developers did not believe they have the time to work on the survey and those who did respond had to be convinced that it was important, and reminded on numerous occasions to actually mail it back even with the postage paid envelopes provided.

A second issue was one of qualification for the thesis population. Few developers actually develop their own property - most develop the property of others after the property has been bought. This reduced the number of participants available for the survey.

An additional issue was one of Brownfields redevelopment. Most developers did not consider the development they were/are conducting as “Brownfields redevelopment”, and therefore they felt they were wrongly included in the survey example. The developer had to be convinced of the need for input from all types of developers. It was noticed that some developers were conducting Brownfields redevelopment but did not recognize it as such.

Two recommendations are offered to increase respondent participation. Students who have been through the process of survey development recommend that money be attached to the survey to influence the possibility of a response. In addition, a reduction in the size of the survey might lead to additional responses.

CHAPTER 4

DATA ANALYSIS AND DISCUSSION

The survey respondents were separated into categories by the type of development they conduct as indicated by their response. Of the 163 developers found in the New Jersey Database (NJDEP, 1996), thirteen responded. These developed into the following end product categories:

Residential Developers: Those developers that identified themselves as only conducting residential development. Residential developers must deal with the strictest remediation levels, and they have the highest liability concerns. There are three developers in this category.

Commercial Developer: Those developers that identified themselves as only conducting commercial development. Commercial developers must deal with the strictest remediation levels, but they do not have the same level of liability concerns as residential developers. There are three developers in this category.

Residential/Commercial Developer: Those developers that identified themselves as conducting residential and commercial development. They must deal with strict levels of remediation when conducting residential and/or commercial development, but liability concerns depend on the type of actual development. There are five developers in this category.

Industrial Developers: Those developers who identified themselves as conducting residential and industrial; or residential, commercial, and industrial development. They must deal with the strictest levels of remediation criteria for commercial and residential development, and a lower criteria level for industrial development. They have different

levels of liability concerns for different projects. There are two developers in this category.

Two methods were used to analyze the data to establish the critical factors. The mean, median and mode were established for each variable that was measured using a Likert Scale. The variable with the highest mean was selected as the most critical factor for developers. The second method used the number of “extremely important” (5) responses to identify the most critical concern for developers. Those factors having the greatest percent of “5” responses were the most important variables using this approach. The Yes/No questions were analyzed using percentages of yes and no answers to draw conclusions. Answers to open questions were analyzed by forming common categories.

The statistical program *Stata* was used to conduct univariate and bivariate analysis on the variables. Due to the small number of surveys returned, especially for each category used in the analysis, neither regression analysis nor small statistics regression could be used. The first section analyzes the data for all the respondents. The following sections analyze the data according to the types of development conducted by the developers as reported by the developers. The categories are Residential (three surveys); Commercial (three surveys); Residential/Commercial (five surveys); and Industrial containing residential/industrial (one survey) and residential/commercial/industrial (one survey). The last two were respondents were combined into the industrial category because of the common industrial selection to allow for limited analysis.

4.1 Data Limitations

The major limitations of this thesis are the relatively small sample size and the self-participation sampling approach. Because a small number of developers responded there was no possibility to conduct sensitivity analysis. Small sample size, however, was used to draw the conclusions in “The Site Selection Process of Speculative Residential Developers in an Urban Area” (Pacione vol.5, no. 4). This thesis had almost fifty percent more responses than used to support the analysis in the Pacione article. Also, in areas such as medical and educational research small sample size is used to provide a basis for future research, such as in the article “Preliminary Evaluation of a Sensory and Psychomotor Functional Test Battery for Carpal Tunnel Syndrome: Part II – Industrial Subjects” (Jeng, 1997). The research presented in this thesis reveals trends among developers as a group and in categories. Therefore, analysis of the research allows for the generation of recommendations that can be used by Brownfields Coordinators, Community Developers, Community Leaders, and others to help prioritize redevelopment efforts.

4.2 Developer Analysis

This section analyzes the data for all the respondents as one developer category. Each developer has bought and developed property in the State of New Jersey but may or may not have dealt with Brownfields issues.

4.2.1 Likert Question Analysis

This section discusses the means that were calculated for all Likert Scale variables.

Table 4.1 (Partial) lists the factors in order of their mean value. The complete table is located in Appendix D. The higher the mean, the more critical the factor for the developers sampled. Those factors that received all “4”s (somewhat important) or “5”s (extremely important) are indicated with an asterisk, showing that there is more agreement about the importance of that factor among the respondents.

Table 4.1 Overall Rankings by Mean (Partial)

Variable	Mean
Existence of an end user	4.92*
Availability of electricity	4.84
Ability of the firm to absorb delay	4.76*
Expected Profit	4.76
Possibility of contamination	4.53
Asking price of the property	4.46
Availability of a water system	4.46
Possibility of liability for past contamination	4.46*
Low property crime statistics	4.46
Availability of a sewer system	4.46

(* Indicates all responses of either 4 or 5)

This data indicates that the existence of an “end user” as the highest, and therefore most critical, factor. Additional critical factors include the availability of electricity, the ability of the firm to absorb delay, the expected profit, and the possibility of contamination. All these factors affect the amount of profit a firm can expect at the completion of a project as well as whether or not the project will actually occur. One developer stated, “The lower the risk for developers, the lower the required return.” With an end user in place developers have more certainty about profit and therefore can accept more risk in other areas, including having to deal with possible contamination. The ability of a firm to absorb delay affects the amount of risk a firm can take on because

delay means added costs, including interest on loans and a lack of resources for other projects. The possibility of contamination places uncertainty on the project. There are costs associated with identifying contaminants as well as possible remediation. Firms may not be able to accept the risks of unknown contaminants at a project site without certain guarantees from government or end users. The availability of electricity can save developers money for installation of power lines, grids and systems. The availability of water and sewer systems, however, did not rate as high as the availability of electricity. However, the difference is small and would likely be statistically insignificant.

An analysis of contamination variables shows that the possibility of contamination is fifth on the list and the possibility of liability for past contamination was sixth. Neither of these factors is the most critical factor because it is believed that firms are learning to deal with contamination in urban areas. This is especially true for commercial developers. If there is electricity at the site, then developers have readily available power to install and maintain remediation systems assuming they do not “dig and haul.” Expected profit influences the amount of risk accepted by the developer, including the risks presented by possible contamination.

4.2.2 Analysis of the Open and Yes/No Questions

The Yes/No and individual questions were used to support the analysis of the Likert Scale questions and collect data on factors not covered in the survey. This section discusses the results of the individual questions. The analysis of each question may be found in Appendix C.

4.2.2.1 Contamination Issues: Seventy-five percent of developers would not immediately drop a property from consideration if the property were perceived to be contaminated. These results suggest that a majority of developers are willing to conduct the Site Assessment and the Site Investigation necessary to decide whether a site is contaminated, what it is contaminated with, and the extent of the contamination. However, developers are experiencing problems with development of contaminated properties. Sixty percent of the developers rejected a property due the actual presence of contamination, contamination they could not remediate. Forty-one percent rejected a property due to liability concerns based on the contamination found. This suggests that once contaminants are known, there are types and/or quantities of contaminants that developers are not willing to deal with. It is believed the reasons are cost related, that developers cannot reach NJDEP standards without spending more money than is acceptable for the size of the project.

Ninety-two percent of the developers would accept a NJDEP No Further Action (NFA) Letter and stay with their selected property if the letter removed future liability for contamination not caused by the developer. To receive the letter the developer must use a NJDEP approved method to conduct the remediation. One developer stated that, “Anything can be overcome by engineers with enough time and money”, an indication of this developers willingness to accept remediation methods. Seventy-five percent of the developers would trade higher up-front costs for a guarantee against future liability for contamination not caused by the developer. This suggests that developers are willing to work with government agencies to develop properties using approved methods in exchange for protection from liability law suites. Liability protection for past

contamination after an approved remediation is performed is a key component of Brownfields redevelopment and voluntary cleanup programs. Developers are willing to participate in such programs so state governments must actively communicate the existence of, and requirements for, voluntary cleanup programs.

4.2.2.2 Property Rejection Factors and Suggestions to Government: The developers were asked to suggest why properties are rejected and recommend ways government could help.

- **Market and Community Issues:** If the developer perceives that there is no market, then the developer will avoid the area. Lack of a market includes a lack of buyers, a lack of economic vitality, and a lack of new development. Crime, neighborhood deterioration, security, and traffic influence market. The government can work out ways to create market demand by searching for end users, training citizens for specific jobs, creating and maintaining infrastructure, improving services such as crime prevention, and encouraging neighborhood cleanup.

- **Use Issues:** Intended use can restrict the type of development in an area due to the fact that the location may not be suitable for the intended use. Zoning restrictions and wetland protection also can cause developers to disregard sites that may be available for redevelopment. One developer suggested that the government allow for a greater building concentration per acre, a higher density. Communities should create long range development plans so they know what types of development they want and intelligently apply zoning laws to reach their goals.

- **Community Support:** The media and political support can play crucial roles in the development process. Both have the potential for turning the community against a project or causing the community to embrace a project. Communities play a major role in the redevelopment process. Once a community has a plan that the citizens, politicians, and businesses were involved in creating then the entire community is likely to claim ownership of the plan or project regardless of the press or individual politician's support. This is especially if the community was involved in the planning of a specific project. The support of the community can ensure project success.

- **Contamination Issues:** Potential liability, the threat of contamination, and cost of remediation are critical issues for developers. The respondents suggested that government address these issues by providing liability relief for past contamination not caused by the developer when the developer conducts remediation activities with the approval and verification of the NJDEP. The respondents recommended that government provide low interest loans, subsidize the process, provide funding, pay for the remediation, and provide tax breaks. The government can actually conduct the remediation. The government can provide a location for waste/contaminated material. Finally, the government should ease cleanup criteria and cooperate in site remediation at all levels as long as protection of citizens remains paramount. Following these recommendations could ease the redevelopment process for developers by reducing time and monetary requirements.

- **Government Programs:** While there are federal and state programs available to provide money to assist with redevelopment in urban areas, only twenty-three of the developers have actually received government money for a development project. This

indicates that the programs are not as successful as advertised and the government should become more involved in searching for or developing projects. The government can remove paperwork delays and speed the process of development plan and remediation plan approvals. One developer commented that, "The approval process is slow" and another commented that, "There is a lack of communication across government levels in the approval process." Only fifteen percent have ever received government assistance (not including money) during a development project. Government at all levels should become involved in the redevelopment of urban areas, especially in areas where a small amount of money can leverage large redevelopment projects. Government involvement in the process can provide comfort to lenders, reduce development process delays, and ensure the success of a redevelopment project.

4.2.2.3 Firm Variables: The ability of a firm to absorb delay is a critical issue. The firms had an asset value ranging from \$100,000 to \$7 billion. Sixty percent provide their own internal financing. The more assets a firm has the greater the amount of delay a firm can absorb. Only one developer (seven percent) had an environmental expert or staff while forty-six percent reported that they have Brownfields redevelopment experience. Most developers must therefore rely on consultants to maneuver through the remediation process. This allows an opportunity for the formation of environmental consulting firms to service developers and offers an opportunity for government to partner with developers or provide expert assistance to developers for specific projects.

4.2.2.4 Cost Factors: The data shows that average value for a desirable project was \$23 million, adjusted for one developer that desired projects that were greater than a factor of ten above the other twelve developers. The average value for a completed project was \$18.4 million, again adjusted for the one developer that had an average project size that was greater than a factor of ten above the other twelve developers. Developers may desire larger projects, but are conducting smaller projects because that is the market.

Local, State and Federal governments can use their resources to conduct any portion of the remediation process to influence developers in site selection. The maximum reported cost of a Preliminary Assessment (PA) was \$10,000 and the average cost of a Site Investigation (SI) was \$32,250. Using the maximum reported cost of a PA and SI, and an average value of a completed project, the government can conceivably leverage \$42,250 into a \$18.4 million redevelopment project (1:435). Removing the stigma of contamination may cause developers to consider properties that they may otherwise avoid. Using the maximum reported Remedial Action (RA) costs, a \$1.54 million investment (PA+SI+RA costs) can still leverage a \$18.4 million redevelopment project (1:12). The money the government spends can be recovered in the long run through property, sales, and other taxes. For example, in Chicago, Illinois, the city spent \$370,000 to clean and grade a site. Scott Peterson Meats then invested \$5.2 million in a new smokehouse and hired 100 new employees (Pepper, 1997). These ratios are an excellent reason for government to become involved in the redevelopment process.

4.2.3 Developer Analysis, “Extremely Important” Likert Variable Selections

The second method used to identify the most critical concern for developers was to examine the “extremely important” “5” responses for each question that used a Likert Scale. A percentage was established for each response based on the number of respondents who chose “extremely important” “5”. Table 4.2 (Partial) lists the variables in order of precedence. The complete table is located in Appendix D.

Table 4.2 Variables Rated “Extremely Important” (5) (Partial)

Variable	Percent
Profit at completion of the project	92%
Existence of an end user	92%
Availability of electricity	92%
Possibility of contamination	84%
Possibility of liability for past contamination not caused by the firm	84%
Ability of the firm to absorb delay due to contamination	76%
Asking Price of the Property	69%
Availability of a Water System	69%
Monetary assets available internal to the firm	69%

The existence of an end user, again, was the most critical factor. This factor was also tied with profit at completion of the project and the availability of electricity. The possibility of contamination, possibility of liability for past contamination not caused by the developer, and the ability of the firm to absorb delay due to contamination are four, five and six on the critical concern list.

4.3 Results by Categories

4.3.1 Residential Developer Concerns

A partial list of the mean rankings for respondents who identified themselves as residential developers is located in Table 4.3 (Partial). The complete table is located in

Appendix D. Seven factors were equally the most critical concerns with “extremely important” (5) selected by all the residential developers.

Table 4.3 Residential Developer Rankings by Mean (Partial)

Variable	Mean
The asking price of the property	5.00
The expected profit at the end of the project	5.00
The existence of an end user	5.00
The possibility of liability for past contamination	5.00
State and local government attempts to preserve farmland and open areas	5.00
Availability of local tax incentives	5.00
Availability of State tax incentives.	5.00
Low Crime Statistics, Personnel Crimes	4.66
Low Crime Statistics, Property Crimes	4.66
Local Government Attitude Towards Developers	4.66
Monetary Assets Available in the Firm	4.66
Ability to Absorb Delay due to Contamination	4.66

Residential developers have the least amount of experience dealing with contamination issues because they normally develop Greenfields. The fact that residential developers prefer Greenfields was corroborated by the importance of state and local attempts to preserve farmland and open areas. Government protection programs and residential developers are competing for the same Greenfields. The importance of state and local attempts to preserve farmland and open areas variable does not appear as a most critical factor for any other category. Because residential developers have less experience, liability for past contamination is one of the most critical concerns because residential developers have not gone through the process of getting No Further Action (NFA) letters from the NJDEP. Liability is also one of the most critical concerns because if a remediation job is done poorly, it is most likely that children, the elderly, and the sick living within the residential units will be affected by the chemicals left behind, almost

guaranteeing a future law suit. The other factors on the list affect profit. The lower the asking price and the greater the amount of tax incentives, the greater the profit.

4.3.2 Commercial Developer Concerns

A partial list of the mean rankings for respondents who identified themselves as Commercial Developers are in Table 4.3 (Partial). The entire table is located in Appendix D. There are five factors that are equally the most critical concerns with “extremely important” (5) selected by all the commercial developers.

Table 4.4 Commercial Developer Rankings by Mean (Partial)

Variable	Mean
Profit at the conclusion of the project	5.00
Existence of an end user	5.00
Availability of electricity	5.00
Availability of a water system	5.00
Monetary assets available in the firm.	5.00
Availability of Private Lending	4.66
Availability of a Highway System	4.66
Low Personnel Crime Statistics	4.66
Low Property Crime Statistics	4.66
Ability to Absorb Potential Delays due to Contamination	4.66

Commercial developers have the most experience dealing with contamination issues in urban areas and therefore liability is not the most critical concern. Liability for past contamination is tied for twenty-ninth on the critical concern list. Families do not live in commercial areas, therefore there is less exposure of people to chemicals that may be left behind. Based on discussion, sufficient funds to initiate projects are important to a project because most firms do not apply for external financing until after the property is selected. The other factors deal with profit, including the existence of an end user, the availability of electricity, and the availability of a water system. If an end user has signed a contract

to guarantee a lease at the completion of a project, then there is much less risk to the developer. If electricity and water are in place, then there is less a developer will have to spend to install such systems. Electricity and water are also important to remediation efforts.

4.3.3 Residential/Commercial Developer Concerns

A partial list of the mean rankings for respondents who identified themselves as Residential/Commercial Developers are in Table 4.4 (Partial). The complete table is listed in Appendix D. There are six factors that are equally the most critical concerns with “extremely important” (5) selected by all the residential/commercial developers.

Table 4.5 Residential/Commercial Developer Rankings by Mean (Partial)

Variable	Mean
Profit at the completion of the project	5.00
Existence of an end user	5.00
Possibility of contamination	5.00
Availability of electricity	5.00
Availability of a water system	5.00
Ability of the firm to absorb potential delays due to dealing with contamination	5.00
Asking Price of the Property	4.6
Availability of Trained Workforce or Qualified Home buyers	4.6
Possibility of Liability for Past Contamination	4.6

The possibility of contamination was on the critical concern list. Liability for past contamination was tied for seventh on the critical concern list. The possibility of contamination affects profit, along with existence of an end user, and the availability of electricity and water systems. Liability, while not one of the most critical concerns, is still high on the list because of the residential component of development for these

developers. If a remediation job is done poorly and people living within the residential units are affected by the chemicals left behind then there will be future lawsuits.

4.3.4 Industrial (Residential/Industrial and Residential/Commercial/Industrial) Concerns

A partial list of the mean rankings for respondents who identified themselves as Residential/Industrial and Residential/Commercial/Industrial Developers are in Table 4.5 (Partial). The complete table is in Appendix D. There are two factors that are equally the most critical concerns with “extremely important” (5) selected by both the respondents.

Table 4.6 Industrial (Residential/Industrial and Residential/Commercial/Industrial) Developer Rankings by Mean (Partial)

Variable	Mean
Availability of Electricity	5.00
Possibility for contamination for past contamination.	5.00
Existence of an End User	4.50
Availability of a Water System	4.50
Availability of a Highway System	4.50
Ability of the Firm to Absorb Potential Delays due to Contamination	4.50

Again, there is a residential component for this category that causes liability of past contamination to take on a major importance. If a remediation job is done poorly and people living within the residential units are affected by the chemicals left behind then there will be future lawsuits.

4.4 Discussion of Results

This section begins with an analysis of each hypothesis. This is followed by a discussion of critical concerns including the most critical factor, developer staffing, infrastructure, firm assets, NFA letter, cleanup costs, community factors, and profits.

4.4.1 Analysis of Hypothesis

• **Liability for possible contamination on a property is a critical concern for developers:** If liability for possible contamination is the critical concern for developers, then liability should be the most critical concern on the developer critical concern list. Liability for possible contamination is not the most critical concern for developers. It is one of a number of critical concerns that are more related to profit than liability.

• **Liability for past contamination not caused by the developer protection is a critical concern for developers:** If liability for possible contamination from past owners is the critical concern for developers, then liability protection should be the most critical concern on the developer critical concern list. Liability protection was not the most critical concern for developers. It is one of a number of critical concerns more related to profit than liability.

• **Government programs specifically designed to assist the development of Brownfields are a critical concern for developers:** If government programs to assist with the development of Brownfields are effective and important to developers, then government programs should be the most critical concern on the developer critical concern list. Government program variables were towards the middle of the critical concern list.

• **Profit from a project is a critical concern for developers:** If profit is the most critical concern for developers, then profit should be the most critical concern on the developer critical concern list. Profit was not the most critical concern. It is one of a number of critical concerns.

- **Quality of life is a critical concern for developers:** If quality of life is the most critical concern for developers, then quality of life should be the most critical concern on the developer critical concern list. Quality of life enhancements are not the most critical concerns; they were in the upper third on the critical concern list.

- **Location is a critical concern for developers:** If location is the most critical factor for developers, then location factors should be the most critical concern on the developer critical concern list. While electricity was a critical factor, other location factors were on the upper one-third on the critical concern list.

- **Firm size and experience are a critical concern for developers:**

If firm size and experience factors are the most critical factors for developers, then firm size and experience should be the most critical concern on the developer critical concern list. The ability of the firm to absorb delay is one of the most critical concerns. Staff and experience variables are near the bottom of the critical concern list.

4.4.2 Critical Concerns

An analysis of the data for the total group shows that the most critical factor for developers is the presence of an “end user”. Liability for past contamination is one of the most critical factors on all residential development categories. Liability for past contamination is not the most critical concern by itself because developers must, and therefore are, learning to deal with contamination

4.4.3 Developer Staffing

Developers do not provide their own environmental staffs. The importance of having an environmental staff in the firm ended up near the bottom of the concerns; of almost least importance was the presence of an environmental expert in the firm and the firms' experience in dealing with Brownfields issues. The firms' relationship with an environmental consultant was somewhat important as shown by it being in the middle of the items of concern. This means that developers will usually hire environmental experts to deal with Brownfields issues. It is possible that developers could rely on the government to pave the way for development projects by providing experts or conducting the site remediation. This is an avenue for local, state, or federal development agencies to coordinate with developers.

4.4.4 Infrastructure

Local and state governments can have a major influence on the status of infrastructure in communities. The most important infrastructure factor was the availability of electricity. Close to the top of the critical concerns list were the availability of water and sewer systems, and the availability of a highway system. This is true for residential developers, commercial, residential/commercial developers, and residential/industrial and residential/commercial/industrial developers. The availability of a rail system and an airport fell at the bottom of the list for categories surveyed except than commercial developers. These factors are important because the more infrastructure available, the less cost there is to the developer and the faster a project can be completed.

4.4.5 Firm Assets

The ability of the firm to absorb delays was the near the top of critical concerns list.

Sixty-six percent of the firms conduct their own internal financing and therefore probably have the assets available to absorb delay. The ability to absorb delay or the availability of internal liquid assets was another most critical concerns for all categories. The more assets available in the firm the greater the amount of risk a firm can take on. This allows developers to deal with contamination related issues.

4.4.6 NFA Letter

Ninety-two percent of the developers would accept a NJDEP No Further Action (NFA) letter to protect them from liability for past contamination after a NJDEP approved remediation. Seventy-five percent would trade higher up-front costs for the letter and they have the internal assets to pay the higher up-front costs. This is extremely important for the NJDEP Voluntary Cleanup Program because it shows that developers are willing to use the program to remediate contaminated sites. Developers are willing to use NJDEP approved methods to conduct cleanups and spend more money up front using those methods to get a guarantee against future liability for past contamination. Government should respond by approving cleanup methods as quickly as possible.

4.4.7 Cleanup Costs

Preliminary Assessment (PA) costs are important to local and state governments because by paying the costs to conduct the assessments, the government could leverage a few thousand dollars in tax dollars for millions in developer dollars. The maximum cost that

was reported for this phase was \$10,000, with an average cost of \$5,000. The government could remove the stigma of contamination from a property by certifying the property clean if there is any question about contamination on the property. There are great leverage possibilities.

The government could agree to conduct the Site Investigation (SI) to leverage additional development dollars. The maximum cost reported was \$100,000 with an average cost of \$32,250.

The government could additionally agree to conduct the Remedial Actions (RA). The maximum cost reported was \$1.5 million, with an average cost of \$413,000. The government may absorb the cost if the future income from the property development justifies the expense.

4.4.8 Community Factors

Personnel and property crime statistics as well as quality of life enhancements are among the important, but not critical, concerns for developers. Presence of community support was somewhat important as shown by it being towards the middle of the critical concerns list. Government, through police power and community organization, can influence crime in a community. Government can also build and maintain quality of life enhancements. It will take more effort by government, however, to get developers to raise the importance of community concerns in development projects.

4.4.9 Profits

Expected profit was among the more important critical concern lists, and was among the most critical concerns for residential developers, commercial developers, and residential/commercial developers, but not the combined industrial (residential/industrial and residential/commercial/industrial) developers. There were not enough responses in the industrial related category to explain the lower significance of profit in that category. Influences on profit include the asking price of the property and the possibility of contamination, both of which ended up near the top of the critical concern list. However, local, state and federal tax incentives are near the middle of the list suggesting that they are not that important for developers. Only twenty three percent have received money from government, and only fifteen percent have received government assistance, reinforcing the level of concern expressed. Either government is not communicating the existence of available programs to assist development in urban areas, or there are not enough programs for redevelopment in urban areas. It may be that assistance programs are too hard for developers to use.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Following analysis a number of conclusions were developed. These conclusions are offered to provide guidance to Brownfields Coordinators and urban planners in general. There is discussion on the importance of a community development plan and the development of government programs to influence developer profit, reduce delay, and prepare infrastructure. All levels of government can also conduct one or all phases of the remediation and improve quality of life. The state and federal governments can assist developers deal with contamination by providing voluntary cleanup programs and develop a Brownfields law to provide guidance for such programs. There are suggestions for future research and conclusions from the conduct of the survey.

5.1 Conclusions from the Thesis Analysis

Liability for contamination is not the most important factor facing developers in the State of New Jersey. While long term liability remains an important issue, other short term profit factors are just as or more important including the presence of an end user, the availability of electricity, the ability of the developer to absorb delay, the expected profit, and the possibility of having to *deal* with contamination and site cleanup. This is so because developers have learned to deal with some types and quantities of contamination. Liability concerns become more important when developers cannot remove contaminants from sites programmed for residential use.

Liability for past contamination is one of the most important policy factors that government can control. Governments at the state and federal level can offer liability

protection in exchange for the use of government approved remediation methods and standards.

Liability remains an important factor for residential developers along with a number of other issues. The reason for this is that residential developers do not normally develop in urban areas and therefore do not deal with brownfield issues. They normally buy and develop large tracts of Greenfields. These developers must also clean land to very high levels/standards and they are concerned about exposure of people.

Residential/Commercial Developers and Commercial Developers have dealt with contamination in urban areas and therefore liability for contamination did not appear as the most critical concern, but it is of greater concern for the Residential/Commercial Developer than the Commercial Developer. Industrial (Residential/Industrial and Commercial/Residential/Industrial) Developers have liability as one of the most critical concerns on their list, again because of the residential component of their business. But the concern for liability is not alone on the critical concerns list because these developers have also learned to deal with certain types and quantities of contaminants.

5.2 Recommendations and Policy Changes

The fact that developers are less concerned about liability for past contamination means communities should concentrate on other issues. In order of priority, the following suggestions are offered.

5.2.1 Develop a Plan for the Area and Attract End Users

The most important factor for the developer is the presence of end users. Cities need a plan for development so that they can target those industries they want to locate in certain areas. Getting a commitment from a firm to move into an area is the most important factor from the developer's point of view. Therefore, it should also be the most important factor for the urban planner. The urban planner must include community input in the plan as well as issues of other businesses, so all involved will accept ownership of the plan and support those firms that desire to move into the area.

Local governments should develop an office with the primary function of finding end users for projects in their community as well as assisting developers through the development process. The office should market the community, and provide liaison to county, state, and federal agencies and programs to assist developers in qualifying for dollars.

5.2.2 Influence Developer Profit

Governments can influence developer profits through the creative use of tax incentives, tax rebates, grants and loans. However, while profit is important to developers, only twenty-three percent have received government money and only fifteen percent have received government assistance. There are programs available in New Jersey.

Communication of such programs to developers is an important issue. Money available from government can allow firms with fewer resources to compete for development projects. Such funds can then be recovered as properties return to the tax rolls.

Government/private partnerships and the use of government funds to leverage private

funds are important parts of the re-development process. Local government can help guide developers with approved projects in their communities to available government assistance whether that is expertise or money for a specific project.

5.2.3 Reduce Delay

The greater the possibility of delay, the smaller the number of firms able to consider a development project. Governments should streamline the development approval process. Governments can maintain databases on properties including possible contamination information and past investigation results to save developers time. Local and state governments can establish “one stop” approval centers so developers can go to one central place for plan guidance and approvals.

5.2.4 Conduct Government Remedial Actions

Local and state governments should perform Preliminary Assessments (PA) to begin the development process in their communities. At an average cost of \$5,000, the government can leverage millions of dollars of investment in the community. Conducting the PA will also save developers time in their decision making process. Government should also consider conducting Site Investigations and Site remediation if, by doing so, the government can attract development projects that use private dollars. Sometimes, the start of one government/private development project can be the catalyst for other private projects that can lead to a revitalization of depressed areas.

5.2.5 Promote Voluntary Cleanup

Developers are dealing with contamination. The good news is that ninety-two percent would accept a No Further Action Letter from the NJPED and seventy-five percent would trade higher up-front costs to get that letter. The NJPEP should promote its Voluntary Cleanup Program more aggressively because developers are willing to use it. The state should offer and accept the use of innovative technologies to reduce costs for the developer while protecting the public, and continue to match cleanup standards to end use to lower costs for the developer while protecting the public.

5.2.6 Prepare Infrastructure

Communities should prepare and maintain infrastructure. The less infrastructure urban developers must install at their own cost, the greater the Brownfields' value.

Infrastructure includes electric, water, and sewer systems as well as local roads and highways.

5.2.7 Improve Community Quality of Life

Local communities can influence many factors by concentrating on the reason local governments exist – the prevention of personal crime, property crime, and the improvement of the quality of life for the residents of the area. The more desirable the area the greater the developer profit and the greater the cost for remediation that can be assumed by the developer. Just starting one project in an area combined with improved policing and the improvement of other community services can be enough to leverage other projects in the same area.

5.2.8 Federal Brownfields Law Proposal, CERCLA Liability, and Cleanup Technology

Congress should pass a law to apply the successes of the USEPA Brownfields Pilot Program across the nation. The program should allow the use of comparatively small amounts of federal dollars to leverage large amounts of private dollars to continue the process of rebuilding our urban areas. Brownfields Programs can capitalize on the desire of developers to reuse urban lands and provide assistance to ensure project success. Developers are waiting for approved remediation methods and are willing to use them to get No Further Action (NFA) Letters for protection from liability for past contamination. The USEPA and NJDEP must develop cleanup technologies as quickly as possible while protecting the communities surrounding the Brownfield sites.

5.3 Future Research

The following are offered as areas for future research in the subject area.

Urban Planner priorities. What are the priorities in development from the urban planner's point of view? It is important to know if the priorities of urban planners are the same as property developers, if not why not, and how can the two work together to support community development plans. The urban planner is key to the development process and, with Brownfields tools, they can greatly improve the condition of communities.

How can/do cities create market demand? Do communities create market demand on their own? How? If communities can create demand for housing, office space, or industrial areas then developers will be more likely to find end users for their projects. Once a development plan is in place, how do communities find and develop projects.

What technologies should no longer be considered “innovative” and should now be used as primary remediation methods? Innovative technologies can allow firms to save money during the remediation process. Which technologies should no longer be considered innovative? The cheaper the options developers have to conduct remediation, the more properties that will be available for development.

What can government do to remove delay in the re-development process? To a developer, time is money. What can the government do to remove time barriers? The less costs for a developer the more developers that will be able to compete for development projects.

What would be the effect of a “Greenfields Tax”? It is possible for the state or federal government to establish taxes to favor Brownfields redevelopment over Greenfields development. What would be the projected outcome of such a change? What would be the unintended consequences? There are many issues that should be studied and discussed before enacting such a sweeping change.

What are the concerns of the end users? The presence of an end user reduces risk for developers. Most developers build with end users already in mind. What are the factors influencing the end user selection of a Brownfield site? What influences the site selection process for major corporations?

5.4 Conclusions from the Conduct of the Thesis

Profit is the overriding factor for developers in New Jersey. Decisions on site selection are based on profit. The presence of contamination is a short-term cost that can be fitted into profit models individual developers use to estimate profit potential. The Federal and

state governments can issue health and risk based remediation standards and approved remediation methods which developers are willing to use. Developers will reject Brownfields based on remediation costs along with other critical concerns.

Liability remains a long- term issue. Liability can be addressed with liability protection through the use of voluntary cleanup programs and the issuance of no further action letters. Developers are willing to use government approved remediation standards and methods to receive liability protection.

There are many research recommendations from this thesis. Due to the small sample size, statistical inferences were not able to be determined, especially among the developer categories. An expanded analysis is required to determine statistical inferences. An expanded analysis could determine the link between liability and profit for developers as a group and in development classification areas such as residential, commercial, industrial, or in any combination of developer expertise.

APPENDIX A
VARIABLE IDENTIFICATION

<u>Contamination Variables</u>	<u>Definitions</u>	<u>Measurement</u>
<i>Previously Developed a Brownfield</i> Variable 1	The firm has/has not ever developed a property actually or perceived to be contaminated.	Question, Yes/No
<i>Immediately drop a property perceived to be contaminated</i> Variable 42	The firm does/does not immediately drop from consideration property perceived to be contaminated.	Question, Yes/No
<i>Removed a property from consideration due to liability concerns</i> Variable 43	The firm has/has not removed a property from consideration due to future liability concerns.	Question, Yes/No
<i>Rejected a property proven to be contaminated</i> Variable 44	The firm in the past has/has not rejected a property that was proven to be contaminated	Question, Yes/No
<i>Accept a NJDEP No Further Action(NFA) Letter Liability Protection Guarantee</i> Variable 45	The firm would/would not accept a NJDEP NFA Letter with liability protection for past pollution not caused by the developer.	Question, Yes/No
<i>Trade Higher Up-front Costs</i> Variable 46	The firm would/would not be willing to pay higher up-front costs for the NFA Letter with liability protection.	Question, Yes/No
<i>Experience with Brownfields</i> Variable 49	The firm does/does not have experience developing Brownfields.	Question, Yes/No
<i>Presence of an Environmental Expert</i> Variable 50	The firm does/does not have an environmental expert in the firm.	Question, Yes/No
<i>Most Desirable Size of a Project</i> Variable 51	The firm has a most desirable size of a project, in dollars.	Question, Open
<i>Average Size of a Project</i> Variable 52	The firm has an average size of a project, in dollars.	Question, Open
<i>Received Government Money</i> Variable 54	The firm has/has not received federal, state, or local money for a project.	Question, Yes/No
<i>Received Government Assistance</i> Variable 54	The firm has/has not ever received federal, state, or local government assistance on a project.	Question, Yes/No
<i>Remediation Costs</i> Variable 55 Variable 56 Variable 57	The firm has the maximum costs for the following: Phase I, Preliminary Assessment Phase II / Site Investigation Phase III / Site Remediation	Question, Open Question, Open Question, Open

<u>Profit Variables</u>	<u>Definitions</u>	<u>Measurement</u>
<i>Asking Price of Land</i> (Pacione, vol. 5 no 4) Variable 2	The cost of the property a developer wants to develop was/was not within the developers acceptable range. May or may not include a reduction in the selling price to recover remediation costs. (Cohen, et al, 1994)	Likert Scale
<i>Total Costs, Short Term</i> Variable 3	Short-term costs allowed/did not allow for development.	Likert Scale
<i>Total Costs, Long Term</i> Variable 4	Long-term costs allowed/ did not allow for development.	Likert Scale
<i>Taxes</i> (Greenberg, et al, 1992) Variable 5	Tax breaks and incentives were/were not important to project selection.	Likert Scale
<i>Fees</i> Variable 6	Fees were/were not important to project selection	Likert Scale
<i>Profits</i> (Pacione vol. 5 no 4) Variable 7	Profit was/was not an important consideration for project development	Likert Scale
<i>Private Lending</i> (Pacione, vol. 5 no 4) (Cohen, et al, 1994) Variable 8	The availability of funds from private sources (bankers and other lending institutions) was/was not an important consideration	Likert Scale
<i>Insurance Coverage</i> (Cohen, et al, 1994) Variable 9	The cost and availability of insurance was/was not an important consideration	Likert Scale
<i>Existence of an end user</i> Variable 10	The existence of an end user was/was not an important consideration	Likert Scale

<u>Condition of Site Variables</u>	<u>Definitions</u>	<u>Measurement</u>
<i>Size of Site</i> (Pacione, vol. 5 no 4) Variable 12	Site was/was not large enough to develop successfully	Likert Scale
<i>Brownfield</i> (Page and Rabinowitz, 1994)(Cohen, et al, 1994) Variable 13	Property was/was not perceived to be contaminated	Likert Scale
<i>Infrastructure</i> (Morgan, et al, 1994)(Cohen, et al, 1994) Variable 14 Variable 15 Variable 16 Variable 17 Variable 18 Variable 19	Infrastructure in place (transportation, sewer, utilities) was/was not an important consideration. Sewer system Electrical system Water system Highway system Rail system Airport	Likert Scale Likert Scale Likert Scale Likert Scale Likert Scale Likert Scale
<i>Land Availability</i> (Pacione, vol. 5 no 4) Variable 20	Land availability and physical development was/was not an important consideration.	Likert Scale

<u>Community Variables</u>	<u>Definitions</u>	<u>Measurement</u>
<i>Workforce/Qualified Homebuyers</i> (Morgan, et al, 1994)(Cohen, et al, 1994) Variable 21	The availability of a trained, local workforce or qualified homebuyers was/was not an important consideration.	Likert Scale
<i>Crime and Safety</i> (Iannone, 1996)(Cole, et al, 1996) Variable 22 Variable 23	Crime and safety in the area selected was/was not an important consideration. Personnel Crime Property Crime	Likert Scale Likert Scale
<i>Community Support</i> (Cohen, et al, 1994) Variable 24	Community reaction to projects was/was not an important consideration	Likert Scale
<i>Quality of Life Enhancements</i> Variable 25	Quality of life enhancements was/was not an important consideration	Likert Scale

<u>Government Variables</u>	<u>Definitions</u>	<u>Measurement</u>
<i>Liability</i> (Page and Rabinowitz, 1994)(Cohen, et al. 1994) Variable 26	Liability for past pollution was/was not an important consideration.	Likert Scale
<i>Greenfield Loss</i> (Morgan, et al, 1994) Variable 27	Pressure from the state of New Jersey to redevelop urban areas over rural land was/was not important.	Likert Scale
<i>Government Attitude and Assistance</i> (Cole, et al, 1996) Variable 28 Variable 29	The attitude of Government Officials was/was not an important consideration. Local government State government	Likert Scale
<i>Government Efficiency</i> (Morgan, 1994)(Cole, et al, 1996)(Cohen, et al, 1994) Variable 30	Government streamlining of the redevelopment process was/was not an important consideration	Likert Scale
<i>Public Money</i> (Greenberg, et al, 1992) Variable 31 Variable 32	The availability of government grants and loans was/was not an important consideration. Public loans Public grants	Likert Scale Likert Scale
<i>Tax Incentives</i> Variable 33 Variable 34 Variable 35	The availability of tax incentives from various levels of government was/was not an important consideration. Local tax incentives State tax incentives Federal tax incentives	Likert Scale Likert Scale Likert Scale

<u>Developer Variables</u>	<u>Definitions</u>	<u>Measurement</u>
<i>Developer</i> (New Jersey Data Base)	A company listed under code 6552 in the New Jersey Land Sub-dividers and Developers Listing.	N/A
<i>Type of Developer</i> Variable 11	Type of developer (Residential, Commercial, Industrial, or any combination)	Question, List
<i>Monetary Assets</i> Variable 36	Monetary internal and available to the firm was/was not an important factor.	Likert Scale

<i>Potential Delay</i> (Pacione, vol. 5 no 4) Variable 37	The potential for delays due to possible contamination was/was not an important consideration.	Likert Scale
<i>Experience Level</i> Variable 38 Variable 39 Variable 40 Variable 41	Firm experience was/was not an important consideration Environmental Expert Environmental Staff Experience Dealing with Brownfields Relationship with a Brownfields Consultant	Likert Scale Likert Scale Likert Scale Likert Scale
<i>Total Value of Firm</i> Variable 47	The firm has a total value, in dollars.	Question, Open
<i>Internal Financing</i> Variable 48	The firm does/does not conduct internal financing.	Question, Yes/No

APPENDIX B
FINAL SURVEY

Northeast Hazardous Substance Research Center

January 12, 1998

«Title» «FirstName» «LastName»
«JobTitle»
«Company»
«Address1»
«Address2»
«City», «State» «PostalCode»

Dear «Title» «LastName»;

My name is Dan Chachakis, and I am a graduate research student at the Northeast Hazardous Substance Research Center at the New Jersey Institute of Technology. I am in the Environmental Policy Program, and am conducting my research in the area of Brownfield redevelopment. I am asking for your assistance because you are an expert in the development process and you have knowledge of your firm's experience in dealing with governmental entities in New Jersey. I am sending you this survey after discussing the possibility of your participation telephonically in December, 1997.

I am asking you to respond to the attached survey whether or not you or your firm has ever developed a Brownfield property. I hope to gather information to confirm or question the effectiveness of development programs in New Jersey and I will recommend policy changes for the future. The results will be used in my graduate thesis to demonstrate which factors are important to developers in New Jersey. The results will also be presented to the New Jersey Department of Environmental Protection.

I will not identify the source of any specific information so you can be open and frank, and be assured that I will maintain your anonymity. If you have any comments or need more space to answer any question, please add them to the last page of the survey. If you would like a copy of the thesis when published, please indicate so on the last page of the survey.

Thank you in advance for your time. Please return the survey in the pre-stamped envelope I provided by February 13, 1998. If you miss the deadline, send it anyway.

Sincerely,

Daniel F. Chachakis
Graduate Research Student
Northeast Hazardous Substance Research Center
(973) 642-7088 (W) (973) 759-3138 (H)
dxc6720@megahertz.njit.edu

ENVIRONMENTAL
PROTECTION AGENCY
RESEARCH CENTER
FOR FEDERAL
REGIONS 1 & 2

Participating Academic
Institutions:

Massachusetts
Institute of
Technology

New Jersey Institute of
Technology

Rutgers University

Rutgers — The State
University of New Jersey

Stevens Institute of
Technology

Yale University

University of
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New Jersey

BROWNFIELDS: Abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination (EPA Definition)

I. Has your firm ever developed a property that was considered a Brownfield? a. Yes b. No

PART I: I have found that there are five major areas when developing a property that a developer considers, with a number of factors in each area. After reading the statement for each area, please rate each factor from a range of **1 having little importance to 5 being extremely important**. Circle the number that you feel best represents it's importance in the development process. If the item has no importance, circle N; if the item is not known to you, circle U. Please answer based on what you and your firm do now, not what you might do in the future.

You are attempting to develop a property. It is located in an urban area, and has one three story structure on it which you may refurbish or tear down as you see fit. Whatever you need to have present or absent to develop this site is present or absent, making this an extremely suitable site based on individual site factors, community factors, governmental factors, and firm related factors. First, please consider cost factors. Naturally, costs are important but please answer the questions on cost relative to profit. If everything else is perfect, how important are the following cost factors?

- | | | | | | | | |
|--|-------------------|---|---|---|---------------------|---------|--|
| 1. Asking price of the property | | | | | | | |
| no importance | little importance | | ↔ | | extremely important | unknown | |
| N | 1 | 2 | 3 | 4 | 5 | U | |
| 2. Short term costs, that is, costs that accrue over the first year | | | | | | | |
| no importance | little importance | | ↔ | | extremely important | unknown | |
| N | 1 | 2 | 3 | 4 | 5 | U | |
| 3. Long term costs, that is, costs that accrue beyond the first year | | | | | | | |
| no importance | little importance | | ↔ | | extremely important | unknown | |
| N | 1 | 2 | 3 | 4 | 5 | U | |
| 4. Taxes on the completed sale of the property | | | | | | | |
| no importance | little importance | | ↔ | | extremely important | unknown | |
| N | 1 | 2 | 3 | 4 | 5 | U | |
| 5. Fees (sewer, ect.) | | | | | | | |
| no importance | little importance | | ↔ | | extremely important | unknown | |
| N | 1 | 2 | 3 | 4 | 5 | U | |
| 6. Expected Profit at completion of the project | | | | | | | |
| no importance | little importance | | ↔ | | extremely important | unknown | |
| N | 1 | 2 | 3 | 4 | 5 | U | |

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7. Availability of private lending

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

8. Cost of insurance

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

9. Existence of an end user

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

You are attempting to develop the same property. It is located in an urban area, and has one three story structure on it which you may refurbish or tear down as you see fit. Whatever you need to have present or absent to develop this site is present or absent, making this site extremely suitable for you based on cost factors, community factors, governmental factors, and firm related factors. Now, please consider individual site factors. Some sites are better than others. If everything else is perfect, how important are each of the following site factors?

10. Please circle the type(s) of development you do (circle as many that apply):

a. residential b. commercial c. industrial

11. Size of the site

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

12. Possibility of contamination from past users

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

13. Availability of a sewer system

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

14. Availability of electricity

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

15. Availability of a water system

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

16. Availability of roads and highway system

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

17. Availability of a rail system

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

18. Availability of an airport

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

19. Availability of the site

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

You are attempting to develop the same property. It is located in an urban area, and has one three story structure on it which you may refurbish or tear down as you see fit. Whatever you need to have present or absent to develop this site is present or absent, making this site extremely suitable for you based on cost factors, individual site factors, governmental factors, and firm related factors. Now, please consider community factors. There is a community presence in urban areas. If everything else is perfect, how important are each of the following community factors?

20. Availability of a trained workforce with required skills or qualified home buyers

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

21. Low crime statistics for personnel crimes

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

22. Low crime statistics for property crimes

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

23. Presence of community support

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

24. Availability of quality of life enhancements (parks, schools, shopping centers, ect.)

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

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25. The possibility of liability for past contamination of a property NOT caused by your firm

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

26. State and local governmental attempts to preserve farmland and open areas

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

27. Government attitude at the local level toward developers

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

28. Government attitude at the state level toward developers

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

29. Government assistance programs intended to streamline development in urban areas

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

30. Public loans intended for the cleanup of sites

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

31. Public grants for intended for the cleanup of sites

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

32. Availability of tax incentives at the local (city, town) level

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

33. Availability of tax incentives at the state level

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

34. Availability of tax incentives at the federal level

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

You are attempting to develop the same property. It is located in an urban area, and has one three story structure on it which you may refurbish or tear down as you see fit. Whatever you need to have present or absent to develop this site is present or absent, making this site extremely suitable for you based on cost factors, individual factors, community factors, and governmental factors. Now, please consider firm (company) related factors. Every firm has it's own assets. If everything else is perfect, how important are each of the following firm factors?

35. The monetary assets available at your firm, specifically for internal financing of projects

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

36. The ability to absorb potential delays due to suspected or actual contamination

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

37. The presence of an environmental expert in your firm

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

38. The presence of an environmental staff in your firm

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

39. Your firms experience dealing with Brownfields issues in development

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

40. Your firms relationship with a consultant who deals with Brownfields issues in development

no importance	little importance			↔		extremely important	unknown
N	1	2	3	4	5		U

At this point, if there are any comments, suggestions, or ideas you wish to comment on, please place them here before going on:

PART II: Please answer the following questions.

1. If a property was perceived to be contaminated with an unknown substance, would you and your firm immediately drop it from consideration?

Yes - Why? _____

No - Why? _____

2. What factor, in your experience, most often results in a property being rejected for development in urban areas?

3. Has the potential for future liability for past contamination for your firm ever resulted in the rejection of a property?

Yes - Why? _____

No - Why? _____

Not Applicable - We never considered future liability - Why not? _____

4. Have you ever rejected a property that was proven to be contaminated?

Yes - Why? _____

No - Why? _____

5. If a property you selected was contaminated but could be cleaned using New Jersey Department of Environmental Protection approved methods resulting in a letter removing future liability from your company, would you and your firm stay with your selected property if all other factors were suitable?

Yes - Why? _____

No - Why? _____

6. Would you trade higher upfront costs for cleaning a property for a guarantee against future liability for past contamination in an urban area?

Yes - Why? _____

No - Why? _____

7. What could the government do to get you to develop sites in urban areas that you would normally consider unsuitable for development?

8. What could the government do to get you to develop sites that might be contaminated in urban areas?

PART III: COMPANY PROFILE

1. What is the total value of your firm, in dollars? _____

2. Does your company do its own internal financing? Yes No (Circle correct response)

3. Does your company have experience dealing with brownfield issues? Yes No
(Circle correct response)

4. Does your company have an environmental expert or staff? Yes No (Circle correct response)

5. What is the most desirable size of a project, expressed in dollars? _____

6. What is the average size of a project, expressed in dollars? _____

7. Have you ever received federal, state, or local money for a project?

From who? _____

Type of funding? _____

8. Have you ever received federal, state, or local assistance for a project (not money)? Yes No
(Circle correct response)

From who? _____

Type of project? _____

Type of assistance? _____

9. What is the maximum cost of a Phase I / Preliminary Assessment, in the site remediation process, based on your experience?

Phase II / Site Investigation? _____

Phase III / Site Remediation? _____

Not Applicable (Circle if you have never developed a Brownfields property)

PART IV: General Questions:

1. Are there any factors that you and your firm considers when deciding on a property to develop that I do not have listed in this survey? Please list:

2. If you have any other comments about the site selection process, remediation process, or any other related topic, or this survey, please do so here. Add additional paper if necessary.

APPENDIX C
RESPONSES TO OPEN AND YES/NO QUESTIONS

This section presents an analysis of each individual open and yes/no questions.

The first Yes/No question asked, “If a property was perceived to be contaminated with an unknown substance would you and your firm immediately drop it from consideration?” Four respondents answered yes, eight answered no, and one did not answer. Overall, thirty-three percent would immediately drop the property from consideration. The interesting point here is that seventy percent would not immediately drop the property from consideration and would move to investigate for possible purchase.

The second question asked, “What factors most often results in a property being rejected for development in an urban area?” The developers offered the following responses:

Market Issues:

Market demand: Suggested by one developer. In the survey it is covered by the question asking the importance of the presence of qualified home buyers/trained workforce and the existence of an end user. If the developer perceives that there is not a market, then the area is dropped from consideration.

Lack of buyers: Suggested by one developer. See Market Demand.

Lack of economic vitality: Suggested by one developer. If there is no economic activity, no citizens with buying power, than developers will choose another area.

Lack of new development: Suggested by one developer. The condition of the surrounding area can cause one site to be selected over another.

Use Issues:

Intended use: Suggested by one developer. Communities do not want certain types of development, especially some types of industrial development, within their borders.

Zoning suggested by two developers. Zoning prevents the type of development developers would like to do in certain parts of the community.

Wetland protection: Suggested by one developer. Wetland protection/reclamation laws can cause developers to reject certain project sites.

Community Support:

Media: Suggested by one developer. The media has the potential of turning the community against a project causing the developer to look elsewhere.

Political pressure: Suggested by one developer. Political leaders can cause a development project to fail if they withhold their support.

Contamination Issues:

Potential liability: Suggested by one developer. Liability has the potential to cause a site to be rejected.

Threat of contamination: Suggested by one developer. The threat of contamination has the potential to cause a site to be rejected.

Cost of remediation: Suggested by one developer. The cost of remediation can drive a developer to another site.

Community Issues:

Crime: Suggested by two developers. The crime level in the area suggested for development can cause the site to be rejected

Neighborhood deterioration: Suggested by one developer. The condition of the neighborhood that is evaluated for a development project can cause the site to be rejected.

Security: Suggested by one developer. The cost of securing a facility can cause one site to be selected over another.

Traffic: Suggested by one developer. Traffic congestion can cause one site to be developed over another.

Service Costs:

Initial cost of utilities: Suggested by one developer. The cost of utilities can drive developers to another area.

Initial cost of services: Suggested by one developer. The initial cost of services can drive developers to another area.

The third question asked, “Has the potential for future liability for past contamination for your firm ever resulted in the rejection of a property?” Five developers answered yes, seven developers answered no, and one did not answer. Forty-one percent have rejected a property due to liability concerns. This shows that while a majority of developers will not immediately drop a Brownfields property from consideration, the potential liability for actual contamination has resulted in the non-selection of certain properties.

The fourth question asked, “Have you ever rejected a property that was proven to be contaminated?” Six developers answered yes, four answered no, and three did not answer. Sixty percent have rejected a property due to actual contamination. This suggests that while a majority of developers will not immediately drop a property from

consideration due to the possible presence of contamination, actual contamination of certain types will cause a property to be rejected.

The fifth question asked, "If a property you selected was contaminated but could be cleaned using a NJDEP approved method resulting in a letter removing future liability from your company, would you and your firm stay with your selected property if all other factors were suitable?" Twelve developers answered yes, one developer answered no. Ninety-two percent would accept a NJDEP NFA letter and would use a NJDEP approved remediation method to get the letter.

The sixth question asked, "Would you trade higher up-front costs for cleaning a property for a guarantee against future liability for past contamination in an urban area?" Nine answered yes, three answered no, and one did not answer. Seventy-five percent would trade higher up-front costs for liability protection.

Questions seven and eight asked what could the government do to help you develop properties considered unsuitable or contaminated in urban areas? Most developers gave the same answers to the two questions.

Cost Issues:

Provide low interest loans. The developer would like low interest loans offered to developers to facilitate urban redevelopment projects.

Subsidize the process. The developer would like government to subsidize the entire redevelopment process in urban areas.

Provide funding. The developer would like the government to provide funding to the developer to conduct urban development projects.

Pay for cleanup. The developer would like the government to pay for site cleanup in urban areas.

Provide tax breaks. The developer would like the government to provide tax breaks for urban redevelopment projects.

Fix time and paperwork delays and Speed the process. The developers would like government to fix delays in the approval process to save developers time and therefore money.

Market Issues:

Create market demand. The developer would like government to create market demand.

Allow for a greater concentration per acre, a higher density. The developer would like government to allow a higher density of buildings, apartments, and or houses on an acre of land.

Contamination Issues:

Cooperate in site remediation at all levels. The developer wants government to cooperate in the selection of remediation methods and remove barriers caused by the existence of multiple agencies and multiple levels of government.

Have the state provide a location for waste/contaminated material. The developers would like government to create and maintain a location for waste and contaminated material.

Ease cleanup criteria. The developer wants the government cleanup criteria to ease, which will result in lower costs.

Conduct the cleanup. The developer would like the government to conduct the cleanup and therefore reduce the expense for the developer.

Remove liability and Give a guarantee of indemnity. The developer would like the government to provide a mechanism to remove liability for past contamination from future owners.

APPENDIX D
CAEGORY MEAN RANKINGS

Table 4.1 Overall Rankings by Mean

Variable	Mean
Existence of an end user	4.92*
Availability of electricity	4.84
Ability of the firm to absorb delay	4.76*
Expected Profit	4.76
Possibility of contamination	4.53
Asking price of the property	4.46
Availability of a water system	4.46
Possibility of liability for past contamination	4.46*
Low property crime statistics	4.46
Availability of a sewer system	4.46
Low personal crime statistics	4.38
Company assets	4.30
Local government attitude towards developers	4.30
Availability of a highway system.	4.30
Long term costs	4.15
Availability of quality of life facilities	4.15
Availability of a trained workers or qualified buyers	3.84
Local tax incentives	3.84
State tax incentives	3.84
Presence of community support	3.76
State attitude towards developers	3.76
Size of the site	3.69
Short term costs	3.69
Federal tax incentives	3.61
Availability of private lending	3.53
Availability of public grants	3.30
Fees	3.30
Attempts to preserve open areas and farm land	3.23
Availability of the site	3.23
Taxes on the completed sale	3.07
Firms relationship with a consultant (environmental)	3.07
Public Loans	3.00
Cost of Insurance	3.00
Government assistance and process streamlining	3.00
Experience of the firm dealing with Brownfield issues	2.23
Having an environmental expert in the firm	2.23
Availability of a rail system	1.76
Availability of an airport	1.61
Having an environmental staff in the firm	1.53

(* Indicates all responses of either 4 or 5)

Table 4.2 Variables Rated “Extremely Important” (5)

Variable	Percent
Profit at completion of the project	92%
Existence of an end user	92%
Availability of electricity	92%
Possibility of contamination	84%
Possibility of liability for past contamination not caused by the firm	84%
Ability of the firm to absorb delay due to contamination	76%
Asking Price of the Property	69%
Availability of a Water System	69%
Monetary assets available internal to the firm	69%
Availability of a sewer system	61%
Long Term Costs	46%
Availability of a highway system	46%
Availability of the site	46%
Availability of a trained workforce/qualified home-buyers	46%
Low personnel crime statistics	46%
Low property crime statistics	46%
Availability of quality of life enhancers	46%
Size of the site	38%
Local government attitude towards developers	38%
Local tax incentives	38%
State tax incentives	38%
Federal tax incentives	38%
Short term costs	30%
Availability of private lending	30%
Presence of community support	30%
State government attitude towards developers	30%
Public grants for remediation	30%
The firms relationship with a Brownfields consultant	30%
Attempts to preserve farmland / open areas	23%
Presence of an environmental expert in the firm	23%
Taxes on the completed sale of the project	15%
Fees	15%
Cost of insurance	15%
Government assistance/streamlining programs	15%
Public loans for remediation	15%
Availability of a rail system	7%
Availability of an airport	7%
The firms experience with Brownfields	7%
Presence of an environmental staff	0%

Table 4.3 Residential Developer Rankings by Mean

Variable	Mean
The asking price of the property	5.00
The expected profit at the end of the project	5.00
The existence of an end user	5.00
The possibility of liability for past contamination	5.00
State and local government attempts to preserve farmland and open areas	5.00
Availability of local tax incentives	5.00
Availability of State tax incentives.	5.00
Low Crime Statistics, Personnel Crimes	4.66
Low Crime Statistics, Property Crimes	4.66
Local Government Attitude Towards Developers	4.66
Monetary Assets Available in the Firm	4.66
Ability to Absorb Delay due to Contamination	4.66
Long Term Costs	4.33
Taxes on the Completed Sale	4.33
Fees (Sewer, etc.)	4.33
Availability of Private Lending	4.33
Availability of a Sewer System	4.33
Government Assistance Programs, not money	4.33
Availability of Electricity	4.33
Availability of a Water System	4.33
Availability of Federal Tax Incentives	4.33
Firms Relationship with a Brownfields Consultant	4.33
Presence of Community Support	4.33
Availability of Quality of Life Enhancements	4.33
Cost of Insurance	4.00
Availability of Highways	4.00
Presence of Community Support	4.00
Short Term Costs	3.66
State Government Attitude Towards Developers	3.66
Public Loans for Site Cleanup	3.66
Public Grants Intended for Site Cleanup	3.66
Size of the Site	3.33
Possibility of Liability for Past Contamination	3.33
Availability of a Trained Workforce or Qualified home buyers	3.00
Firms Experience Dealing with Brownfields	3.00
Availability of the Site	2.33
Availability of a Rail System	1.33
Presence of an Environmental Expert in the Firm	1.33
Presence of an Environmental Staff in the Firm	1.33
Availability of an Airport	1.00

Table 4.4 Commercial Developer Rankings by Mean

Variable	Mean
Profit at the conclusion of the project	5.00
Existence of an end user	5.00
Availability of electricity	5.00
Availability of a water system	5.00
Monetary assets available in the firm.	5.00
Availability of Private Lending	4.66
Availability of a Highway System	4.66
Low Personnel Crime Statistics	4.66
Low Property Crime Statistics	4.66
Ability to Absorb Potential Delays due to Contamination	4.66
Short Term Costs	4.33
Long term Costs	4.33
Availability of a Sewer System	4.33
Presence of Community Support	4.33
Availability of Quality of Life Enhancements	4.33
Local Government Attitude Towards Developers	4.33
State Attitude Towards Developers	4.33
Government Assistance Programs Intended to Streamline the Development Process	4.33
Public Grants Intended for Site Cleanup	4.33
The Firms Relationship with a Brownfields Consultant	4.33
Fees (Sewer, etc.)	4.00
Asking Price of the Property	4.00
Availability of a Trained Workforce or Qualified Home buyers	4.00
Availability of Tax Incentives, Federal	4.00
Possibility of Contamination	3.66
Size of the Site	3.66
Availability of Tax Incentives, Local	3.66
Availability of Tax Incentives, State	3.66
Availability of a Rail System	3.33
Availability of an Airport	3.33
Availability of the Site	3.33
Possibility of Liability for Past Contamination	3.33
Presence of an Environmental Expert in the Firm	3.33
The Firms Experience Dealing with Brownfields	3.33
Cost of Insurance	3.00
State and Local Government Attempts to Preserve Open Areas and Farmland	3.00
Public Loans Intended for Site Cleanup	3.00
Taxes on the Completed Sale	1.33
Presence of an Environmental Staff in the Firm	1.00

Table 4.5 Residential/Commercial Developer Rankings by Mean

Variable	Mean
Profit at the completion of the project	5.00
Existence of an end user	5.00
Possibility of contamination	5.00
Availability of electricity	5.00
Availability of a water system	5.00
Ability of the firm to absorb potential delays due to dealing with contamination	5.00
Asking Price of the Property	4.6
Availability of Trained Workforce or Qualified Home buyers	4.6
Possibility of Liability for Past Contamination	4.6
Long Term Costs	4.4
Size of Site	4.4
Low Property Crime Statistics	4.4
Availability of a Water System	4.2
Availability of a Highway System	4.2
Low Personnel Crimes Statistics	4.2
Availability of Quality of Life Enhancements	4.2
Local Government Attitude Towards Developers	4.2
Monetary Assets Available in the Firm	4.0
Availability of the Site	3.8
State Government Attitude Towards Developers	3.6
Short Term Costs	3.4
Availability of Local Tax Incentives	3.4
Availability of State Tax Incentives	3.4
Availability of Federal Tax Incentives	3.4
Taxes, Completed Sale	3.2
Presence of Community Support	3.2
Fees (Sewer, etc.)	2.8
Cost Of Insurance	2.6
State and Local Government Attempts to Preserve Farmland and Open Areas	2.6
Public Loans Intended for Site Cleanup	2.6
Public Grants Intended for Site Cleanup	2.4
Availability of Private Lending	2.4
Presence of an Environmental Expert in the Firm	2.0
Government Programs Intended to Streamline the Development Process	1.8
Availability of a Rail System	1.6
Presence of an Environmental Staff in the Firm	1.6
Availability of an Airport	1.6
The Firms Relationship with a Brownfields Consultant	1.2
Firms Experience Dealing with Brownfields	0.6

Table 4.6 Industrial (Residential/Industrial and Residential/Commercial/Industrial) Developer Rankings by Mean

Variable	Mean
Availability of Electricity	5.00
Possibility for contamination for past contamination.	5.00
Existence of an End User	4.5
Availability of a Water System	4.5
Availability of a Highway System	4.5
Ability of the Firm to Absorb Potential Delays due to Contamination	4.5
Asking Price of the Property	4.0
Possibility of Contamination	4.0
Low Personnel Crime Statistics	4.0
Low Property Crime Statistics	4.0
Presence of Community Support	4.0
Availability of Quality of Life Enhancements	4.0
Local Government Attitudes Towards Developers	4.0
The Firms Relationship with a Brownfields Consultant	4.0
Short Term Costs	3.5
Taxes on the Completed Sale	3.5
Profit at Completion of the Project	3.5
Availability of Private Lending	3.5
Availability of a Sewer System	3.5
State Government Attitude Towards Developers	3.5
Public Grants Intended for Site Cleanup	3.5
Availability of Local Tax Incentives	3.5
Availability of State Tax Incentives	3.5
Monetary Assets Available in the Firm	3.5
Firms Experience Dealing with Brownfields	3.5
Long Term Costs	3.0
Availability of the Site	3.0
Availability of a Trained Workforce or Qualified Home-buyers	3.0
Public Loans Intended for Site Cleanup	3.0
Cost of Insurance	2.5
Size of the Site	2.5
State and Local Government Attempts to Preserve Farmland and Open Areas	2.5
Availability of Federal Tax Incentives	2.5
Presence of an Environmental Expert in the Firm	2.5
Presence of an Environmental Staff in the Firm	2.5
Fees (Sewer, etc.)	2.0
Government Assistance Programs Intended to Streamline the Development Process	2.0
Availability of a Rail System	0.5
Availability of an Airport	0.0

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