THE UBIQUITOUS BROWNFIELD:

ABANDONED GAS STATIONS AND THEIR SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPLICATIONS

By

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ABSTRACT OF THE DISSERTATION

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Abandoned gas station sites are a common blight, particularly in urban areas. An EPA survey of Illinois mayors identified gas stations as the most predominant type of vacant or abandoned property (reported by nearly 71 percent of responding mayors). (Northeast Midwest 2002)

In this study I asked: 1) What is the extent of the abandoned gas station problem? 2) What are best practices for addressing former gas station sites? 3) How is New Jersey, the most urban and densely populated state, addressing the problem of abandoned gas stations? 4) What are the economic, social, and

environmental impacts of these sites? I answered these by interviewing officials engaged in the remediation and redevelopment of these sites, to catalogue the best practices nationwide and the current understanding of the extent of the problem. I next developed historical gas station inventories in three New Jersey cities, and collected information regarding their location, environmental status, reuse, ownership, taxes, and demographics. I then reviewed environmental reports for three specific gas station sites to obtain information on the extent of contamination and the cost to remediate.

Officials were divided on how well they believed the threat of former gas station sites was understood. However, the city-wide case studies make it clear that only a fraction of former gas station sites were known to environmental officials. The data indicate that most former gas stations closed prior to the 1986 reporting deadline, and that most of these lack environmental records. Economically disadvantaged communities host the majority of former gas station sites with no environmental records. Further, their current use is typically still auto-dependent or as vacant property. However, those sites that are redeveloped are able to contribute jobs, services, and tax revenue to their communities. The extent of contamination and the remediation costs to address the contamination varies widely.

This study shows that many former gas stations remain a threat. Shifting public policies and resources to better address these sites would have significant positive impacts on the distressed neighborhoods.

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CHAPTER 1

INTRODUCTION

1.1 Background

The purpose of this study is to examine the impacts of abandoned gas stations in the United States. Abandoned gas stations are present in every type of community in every corner of the country. An EPA survey of Illinois mayors identified gas stations as the most predominant type of vacant or abandoned property in their communities (reported by nearly 71 percent of responding mayors). (Northeast Midwest 2002).

The federal government began regulating underground storage tanks in 1984, with the passage of Subtitle I to the Solid Waste Disposal Act. This amendment required the registration of tanks that were in the ground on or after May 8, 1986, unless the tank was taken out of operation on or before January 1, 1974. We do not know the number of tanks that do not fall under this regulation; either those that were abandoned before 1974 or those that were orphaned tanks by the 1986 deadline and thus were not reported. Given that gas stations have been present in our communities since the early 1900s, this number could be staggering. Historic inventories conducted in Trenton, Plainfield, and Newark New Jersey indicate that only 25-40% of former gas stations are known by environmental regulatory agencies. Given the national backlog of underground storage tank cases reported in 2010 by the EPA of 93,123; that equates to an estimate of somewhere between 233,000 and 370,000 total sites, of which approximately 140,000 to 280,000 are unknown to regulators. Note that this

estimate is somewhat problematic, as it is equating tanks with sites, assumes that the distribution of known vs unknown sites is similar across the country and across different geographic types, and, in an attempt to be conservative, uses the most recent available backlog number which does not include all the closed cases over the years. However, as this “back-of-the-envelope” calculation indicates, because decades of gas station closures are not covered by the registration requirement, a significant number of sites are left out of the national accounting for this issue.

The presence of abandoned gas stations serves as a blighting influence in our communities. In many instances the former gas station site has been redeveloped, leaving little to no evidence of its past. However, often these sites are passed over for development, and remain vacant or in marginal uses, robbing the neighborhood of the redevelopment opportunities such as housing, jobs, or services and discouraging other investment. Areas where such sites tend to be passed over for development are those in areas experiencing overall disinvestment; those that tend to be economically distressed and have high percentages of minority populations.

Not only do such sites contribute to neighborhood disinvestment, they pose an environmental threat as well. The most typical contaminant found at abandoned gas station sites, not surprisingly, is petroleum. This petroleum may be mixed with additives such as MTBE or lead, which multiply the impacts of the contamination. Underground storage tanks (USTs) manufactured in the early 1980s or earlier were made of bare steel, without the protective construction or

leak detection equipment required today. These tanks are at the end of their life expectancy, and any product remaining in the tank is likely to have leaked into the environment. Petroleum can create vapors in the soil which can collect in structures and create health problems, and in extreme conditions, a flammable situation in structures. Soil contamination can migrate to the water table, creating a health risk if contaminated groundwater is used for drinking purposes.

Congress appropriates approximately $100 million per year of the federally established LUST Trust Fund, essentially equivalent to the interest earned annually by the fund, of which EPA distributed approximately 85% to the states and tribes. Thirty-six states have UST cleanup funds separate from the LUST Trust Fund; collectively states raise and spend more than $1 billion annually, (Office of Solid Waste and Emergency Response May 2007) making this an important policy issue from an economic standpoint. The economic impacts do not stop with the actual cleanup costs, but extend out into the community by contributing to blight around undeveloped vacant sites.

LUST is the federal acronym for “leaking underground storage tanks.” While any type of tank can leak, the predominant contents of USTs are petroleum related. The federal LUST program is specific to petroleum tanks, and is funded through taxes on petroleum products. Not all sites with federally regulated LUSTs are gas stations, but gas stations make up a large percentage of all LUST sites.

1.2 Key Research Questions

It is not known definitively how many closures predate regulatory requirements. This research examines the extent of the problem posed by abandoned gas stations that we know exist. Specifically, the following questions will be explored:

1) ***Extent of problem:*** *What types of locations nationally are impacted (urban, suburban, rural, highway strip) and how do these compare? Is it known what the breakdown is among active stations, properly closed stations, and stations with environmental issues?*

Abandoned gas stations are a national problem. They are located in every community – urban, suburban, and rural. They are located along highway strips, waterways, and commercial corridors. The EPA Office of Underground Storage Tanks has excellent records of how many registered tanks are in existence. Of these, they have a fair idea of how many are out of compliance and how many are leaking. However, there is no estimate of the total universe of tanks that includes unregistered tanks. This research looks at what is known by officials at each level of government, to determine if estimates are available on the numbers of tanks, sizes of tanks, and condition of tanks. This will help to establish a baseline of information on the data which exists.

2) ***Best practices:*** *What are the best practices nationally for identifying and addressing these sites? Are communities working systematically to*

address potential environmental threats from these sources? What is their motivation?

Cities, counties, and states across the nation have begun to look at the extent of petroleum brownfields in their communities. The approach these communities have taken differs widely, as does the comprehensiveness of the approach and the method of implementation. This research examines the breadth of responses to this problem, and presents a collection of best practices nationally, providing information to support future policy recommendations.

3) ***New Jersey experience:*** *How is New Jersey addressing the problem of abandoned gas stations? How does this State's approach compare to the national experience with respect to problem incidence and best practices for amelioration of the problem? Are the numbers of New Jersey gas stations comparable to those nationally? Is New Jersey a leader in identifying and addressing these sites?*

New Jersey has been a leader in the establishment of brownfield programs and environmental legislation and incentives. Comparing the New Jersey experience with those in other states provides a picture of how well this state is addressing their abandoned gas station sites, and determines if the extent of the problem in New Jersey is comparable to that in other States.

4) ***Costs and benefits:*** *For three New Jersey cities (Trenton, Plainfield and Newark), how many abandoned gas stations exist? How are these municipalities addressing the problem? What is the breakdown among*

active stations, properly closed stations, and stations with environmental issues? What are the economic, social, and environmental impacts of these sites?

Comprehensive, city-wide research focusing on abandoned gas stations has not been conducted with a view toward determining the numbers of unregistered, unaddressed underground storage tanks, or to determining the appropriate success metrics for small site UST removal operations. Focused, in-depth case studies of Trenton, Plainfield, and Newark provide a valuable picture of the universe of costs and benefits of abandoned gas stations, including reuses, taxes and jobs generated, impact to the environment, and other information. Comprehensive inventories on the historic locations of former gas stations in the three cities were conducted to develop a complete picture of the locations of these abandoned stations.

1.3 Organization of Study

The intent of this research is to examine the extent of the problem posed by abandoned gas stations. A review of the literature reveals little to no information on the extent of the problem of unregistered tanks. Thus, there exists the potential for a serious public and environmental health threat in every community, the magnitude of which is completely unknown. Through this research, this dissertation will explore the numbers of abandoned gas stations, both reported and unreported; how these are being addressed by various types of communities; and the impacts of abandoned gas stations on three New

Jersey cities. Finally, a station in each of the selected cities will be examined in depth, to further explore the differences and commonalities in addressing and redeveloping former gas station sites.

Chapter 2 of the dissertation is an exploration of the current literature on the topic, covering the numbers and distribution of abandoned gas stations, the governmental

response to abandoned gas stations, and the ethical obligations to address abandoned gas stations. The review of writings on the ethical obligations includes the environmental impacts of gas station sites, writings on distributive justice and environmental justice, and theories on economic impacts.

The data and methods are discussed in Chapter 3, including a methodological overview and a discussion of data sources and documents. Chapter 4 addresses the first two research questions:

> 1) *Extent of problem: What types of locations nationally are impacted (urban, suburban, rural, highway strip) and how do these compare? Is it known what the breakdown is among active stations, properly closed stations, and stations with environmental issues?*
>
> 2) *Best practices: What are the best practices nationally for identifying and addressing these sites? Are communities working systematically to address potential environmental threats from these sources? What is their motivation?*

This chapter presents the results of a series of interviews conducted with federal, state, and local officials, designed to elicit information on their programs, the extent of their knowledge of the locations of former gas stations, as well as what they perceived as successful in their programs.

Chapter 5 addresses the third research question:

3) *New Jersey experience: How is New Jersey addressing the problem of abandoned gas stations? How does this State's approach compare to the national experience with respect to problem incidence and best practices for amelioration of the problem? Are the numbers of New Jersey gas stations comparable to those nationally? Is New Jersey a leader in identifying and addressing these sites?*

This analysis looks at the oil companies that historically operated in New Jersey, and traces the sales and mergers that results in the currently liability chain for former gas stations. The current regulatory structure in New Jersey is discussed, examining how former gas stations would move through the regulatory process to move toward redevelopment. This discussion includes the transition to the new Licensed Site Professional program and how numbers of former gas station sites in New Jersey.

Chapters 6 and 7 address the fourth question that drove this research:

4) Costs and benefits: For three New Jersey cities (Trenton, Plainfield and Newark), how many abandoned gas stations exist? How are these municipalities addressing the problem? What is the breakdown among active stations, properly closed stations, and stations with environmental issues? What are the economic, social, and environmental impacts of these sites?

Chapter 6 presents the results of comprehensive analysis of three New Jersey cities, Trenton, Plainfield, and Newark, where comprehensive historic gas station inventories have been conducted. These include analysis of the

numbers of sites with environmental records, the current land use, and ownership patterns. Chapter 7 examines closely three specific gas station sites; one in each city, to chronicle the neighborhood changes and paths to redevelopment.

Finally, Chapter 8 provides thoughts on the limitations of the study, as well as a summary of findings, conclusions, recommendations, and discussions areas for further research.

1.4 Regulations

Six decades of gas station development and closures went on prior to any attempt at federal regulation. Among the federal laws relevant to abandoned gas stations are the 1980 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) known as the Superfund Act; the 1984 amendments to the Solid Waste Disposal Act; the 1986 Amendment to Subtitle I of RCRA which created the Leaking Underground Storage Tank (LUST) Trust Fund providing a source of funding for tank remediation; the Small Business Liability Relief and Brownfields Revitalization Act (the Brownfields Law) which was signed in 2002 and which also allowed for funds to be used to address petroleum contamination; the Underground Storage Tank (UST) Compliance Act of 2005 which required financial guarantees for active tanks to prevent future problems; and the American Recovery And Reinvestment Act of 2009 that provided an additional $200 million from the LUST Trust Fund to clean up leaks from federally regulated USTs.

States were given primary responsibility for implementing the federal tank regulations. It was the states and local officials who were charged with developing registrations for all operating tanks: owners and operators of tanks that were in the ground on or after May 8, 1986 were required to notify state or local officials of the tank's existence within 30 days of operation, unless the tank was taken out of operation on or before January 1, 1974. (Northeast Midwest 2002)

1.5 Contribution of the Research

It is my hope that this research will add to the understanding of the impacts of abandoned gas stations to society, and result in additional efforts to address this blight in our communities. Because comprehensive programs exist to address registered tanks, regulators and the general population tend to minimize the problem they pose. This research shows that there is a vast universe of unknown, unregistered tanks, and redevelopment on these sites tends to be difficult, particularly in impoverished neighborhoods. Policy changes are needed to assist these communities in addressing these sites, the ubiquitous brownfield, to effect real change on a neighborhood level.

CHAPTER 2

THEORETICAL BASIS OF RESEARCH

This literature review will look at theories relevant to how the problem of abandoned gas stations arose, including the distribution and closures of stations; the governmental response to the issue; and the ethical obligation to address these sites.

2.1 Abandoned gas stations – numbers and distribution

Numerous factors contributed to the development and subsequent abandonment of gas stations, and thus several bodies of theory must be applied to understand the current situation. An understanding of the rise of demand for gas stations, the reasons for closures including neighborhood development and decline, and theories of environmental justice are critical to understanding the magnitude of the issue and the distribution both geographically and demographically.

How many former gas stations are there, where are they located, and who is impacted? These straightforward questions do not have straightforward answers. Clearly the development of the gas station was directly related to the popularity of the automobile, so a rudimentary understanding of the growth of that industry is useful. Until the early 1900s, autos were a plaything for the wealthy, not a reliable mode of transportation. In 1908, Henry Ford's Model T grabbed the bottom of the market, whose low price and broad appeal made car ownership accessible to a large population. In 1908 a Model T cost $850; by

1921 this had dropped to $260. Sales grew exponentially, with approximately 6,000 sold in 1908 to nearly 400,000 in 1916. (McShane 1994) In 1903 there were fewer than 10,000 automobiles in the US. This number grew to 10 million by 1922, and by 1929 there were more than 23 million cars in this country; one for every five Americans (Cumbler 2005, Melosi 2001). By 1914, traffic jams and parked cars had become commonplace in urban areas, and by the 1920s horses had almost completely disappeared as a mode of urban transportation. (McShane 1994) Between 1909 and 1915, gasoline consumption increased faster than car registrations, indicating that drivers were putting more miles on their cars and driving them year round, a pattern consistent with the rise of commuting. (McShane 1994)

Early estimates of the numbers of gas stations also show a huge growth spurt; from an estimated 15,000 stations in 1920 to 123,979 in 1930. (Margolies 1993; Jackle and Sculle, 1994) These numbers continued to increase until about the 1950s. A total of 193,948 stations were reported in 1958 (Jackle and Sculle 1994), followed by a bumpy decline/growth cycle. (Margolies 1993, and Vieyra 1979) The National Petroleum News conducts an annual station count during the first quarter of each year, broken out by state. A fairly steady decline in overall gas stations is evident through these figures from the 1970s. (National Petroleum News 2004; Jackle and Sculle 1994) By 1970 the number of stations nationally had risen to 216,059, and then declined to 158,540 by 1980 and further declined to 111,657 by 1990; fewer than the number of stations present in 1930. (Jackle and Sculle 1994)

In 1994, the total station count was 202,878. (National Petroleum News 2004) This number decreased steadily until 2004, when it reached 167,346. (National Petroleum News 2004) The average total decline in sites from 1995 to 2004 was 3,123 per year. (National Petroleum News 2004) In 2005 this trend reversed, and an increase of 1,641 stations was recorded nationwide, likely a result of rising gas prices that increased profits and available credit for opening new stations. (National Petroleum News 2007) This was short lived, however, as in 2006 the numbers again declined, with 167,476 gas stations recorded, a drop of 1,511 from the previous year, and a trend that continued through 2008 where 161,768 stations were reported. (Reid, 2008) In the decade and a half between 1994 and 2008, there was a total reduction of 41,110 gas stations.

Clearly then, there are many sites that at one time housed a gas station. Why are these stations closing? As Daniel I. Vieyra writes in his introduction to *"Fill'er Up" An Architectural History of America's Gas Stations,* "The gas station … is undoubtedly the most widespread type of commercial building in America, and yet it is also the most ignored. Its very ubiquity allows the motorist to screen out its image." (Vieyra 1979, p. xiii) Abandoned gas stations impact nearly every community. An EPA survey of Illinois mayors identified gas stations as the most predominant type of vacant or abandoned property in their communities (reported by nearly 71 percent of responding mayors). (Northeast Midwest 2002)

Various factors contribute to gas station closures, such as regulations, technology, economics, and development patterns. Environmental regulations

in the 1980s required station owners to assume responsibility by carrying expensive liability insurance, upgrading the storage tanks, and installing new underground piping to accommodate the new vapor recovery nozzles.(Margolies 1993) The additional costs and reporting requirements led many station owners to walk away from their businesses. (National Petroleum News 2004)

The petroleum industry itself contributed to the gas station closures. With a product of fairly uniform quality, major petroleum distributers engaged place-product-packaging to distinguish their retailers and gather market share. This competition for territory resulted in overbuilding in areas, and in making it difficult for independent operators to compete. By the late 1970s, only 15% of gasoline in the US was sold by independent operators. The Petroleum Marketing Practices Act of 1978 resulted in the withdrawal of major companies such as Mobile, Shell, Gulf, and Standard Oil of California from entire blocks of states. (Jackle and Sculle 1994)

Technology has also played a role, as the newer models and makes of cars required much less maintenance, and specialized repair businesses like Midas Muffler and Jiffy Lube were able to undercut the price of repairs and service at gas stations. (Margolies 1993) In addition, improvements in pump technology have allowed individual stations to pump higher fuel volumes than in the past, thus leading to a need for fewer stations. (National Petroleum News 2004)

In nearly every case, however, the final reason for a station closure is the economics of the station itself. Regulations may contribute to increased

operation costs, technology may result in reduced demand, or other factors may make operating a gas station less viable. A declining market for convenience stores resulted in the closure of many locations which included gas as a service. In the 1970s, nearly half of the 8,000 7-Eleven stores were selling gas, a total of 2 billion gallons per year. By 1982, nearly 50% of the 50,000 convenience stores in the country offered gasoline. This contributed to the closure of many gas stations that were not able to offer the added attraction of a convenience store (Jackle and Sculle 1994) In the early 1980s, convenience stores began to develop financial problems, and many shut their doors along with their gas pumps. (Margolies 1993) Shrinking gas margins (National Petroleum News 2004) are also an important consideration, as retail distributers received a smaller profit per gallon and as more customers pay by credit cards, increasing the transaction costs for the retailer.

Another economic factor that contributed to the closure of gas stations is periodic gas shocks, such as the gas shortages of 1973 and 1979, caused by the Arab oil embargo and the Iranian revolution. Gas prices skyrocketed and gas consumption dropped slowly during several years in the 1970s. In the 5 years following the 1973-74 Arab oil embargo, as many as ten thousand stations closed each year. (Vieyra 1979) National Petroleum News reports a slight increase of gas station closures coinciding with the more recent price shock in 2008, but expects these numbers to grow once the 2009 numbers are available. (Reid, 2008) Unfortunately, 2008 was the last year that National Petroleum News provided these closure numbers to the public.

Development patterns have also played a role in the closure of gas stations. Development in the United States began with rural agricultural areas and densely developed urban areas. Lack of affordable individual transportation required the intermingling of residential and industrial areas. Significant environmental and social problems resulted from the overcrowded cities. (see especially Cumbler 2005; Jackle and Wilson 1992; Keating and Krumholz 1999; Low and Gleason 1998; Melosi 2001; and Tarr 2003) The development of the automobile was seen as the answer to the overcrowded cities. By providing the means for commuting, populations could become less dense, and problems such as the disposal of waste, runoff, and overcrowding were lessened. As urbanites moved to the suburbs with their new automobiles, gas stations were constructed to meet the demand. These stations were in the urban areas, in the suburbs, and along the highways that connected them.

Early gas stations were often in retrofitted spaces in central business districts that catered to the horse and carriage or bicycle populations, as the buildings tended to be suited for wheeled vehicles. Between 1919 and 1959 gas stations were the prime colonizers that saw residential neighborhoods gradually convert to commercial areas. (Jackle and Sculle 1994) There tended to be quite a bit of flux in these transitioning neighborhoods, with gas stations, along with other businesses, changing ownership and use frequently.

After World War I, the federal government-sponsored programs promoting growth focused growth away from central cities. The period following WWII brought a housing boom and increased road construction. Between 1946

and 1955 more than twice as many new houses were constructed as in the previous fifteen years; in 1950 more than one million single-family dwellings were begun, followed by shopping areas, office buildings, and restaurants. This move to the suburbs was at the expense of the central cities, which saw retail areas decline and populations decrease, resulting in a reduction of the demand for gas stations in these areas. This trend was exacerbated by the decline in the manufacturing sector, which reduced the job opportunities once available in traditional industrial cities. Suburban life required cars, as the lower densities meant that conveniences were no longer within walking distance. Two cars become the norm for middle-class families. (Melosi 2001, Cumbler 2005)

The most predominant theory on the decline of central cities is the social-technology theory. This postulates that innovation in transportation and technology provided the means to satisfy a social need. This need was the pent up demand for the suburban lifestyle, simultaneously resulting in a declining urban center and sprawling development. (Jackle 1992) Suburbanization was seen by some as a solution to overcrowded cities. The need for individual means of transportation opened the way for the development of auto technology, as Americans began thinking of streets not as open public spaces, but instead as trafficways. The auto was also more than just a form of travel; it was perceived as a status symbol and a means of escape from the city. (McShane 1994)

Another theory developed to explain development patterns, economic path dependency, is also relevant to the construction and closure patterns of

gas stations. This theory states that as investments are made, it restricts future choices, thus future decisions are dependent on prior economic decisions. Choices are constrained in time by the serviceable life of technologies. (Melosi 2001) This is very relevant to the rise of auto dependence in the US. The reliance on the car required an infrastructure of highways, gas stations, and service stations. In 1916 the first Federal Aid Road Act moved funds to the states to finance highway construction. This was followed by the Highway Aid Act of 1956 which created the National Systems Interstate and Defense Highway, to be financed 90 percent by federal revenues (in some cases 95 percent). The 41,000 mile system was planned to connect nearly all large (population 50,000 or more) American cities. The act also created the Highway Trust Fund, financed by federal taxes on lubricating oils and gasoline as well as excise taxes on buses and trucks. (Melosi 2001) The resulting building boom bypassed secondary roads and small commercial strips, resulting in the decline of many towns and businesses.

Another theory, which is relevant both to abandoned gas station sites as well as more broadly on development patterns, is the life cycle theory. This holds that urban development expands unevenly as a result of natural cycles of urban investment and decline. During those periods when cities are unprofitable, the suburbs attract this excess capital. (Jackle 1992) The neighborhood life-cycle, or stage, theory postulated that neighborhoods had a life cycle, including a decline stage. This theory, which emerged in the late1950s, became a means to redline certain neighborhoods, by declaring them

in a stage of decline and thus a poor investment; thus ensuring their decline. Neighborhoods attempting to avoid this decline would prevent minorities from purchasing in an area, in the belief that property values would begin to drop as minority populations increased. Thus, racism is blamed as a primary cause of the mass exodus to the suburbs in the 1950s. (Jackle 1992) Minorities were forced into declining neighborhoods, often in cities, where little investment occurred, thus concentrating poverty and further reducing the viability of local businesses, including gas stations. During periods of decline, retail establishments become unprofitable and closed, leading to vacant storefronts, a further reduction in traffic, and a downward spiral of decline. (Bowman and Pagano, 2004)

Several bodies of literature explore the issues of location of businesses, to include Urban Growth Machine Theory, Central Place Theory, Urban Regime Theory, and Bid Rent Theory. These approaches focus on the internal structure of cities and land use patterns. German economic geographer Walter Christaller developed the “central place theory” in the 1930s which had a strong influence on European and American scholars. He explored how cities served as “central places” for tributary regions, and focused on the change in intensity of land use with distance from the urban core. (Melosi 2001) While gas stations exist in various types of areas, urban, rural, as well as geographic strips; they are at maximum density at the periphery of core areas in densely developed places and at the intersections of major roads. The center of core areas attracts

high rent establishments that benefit from increased foot traffic (Berry 1967); clearly not the most economical location for a gas station.

If location theory is correct in predicting a greater preponderance of gas stations in urban areas, are abandoned gas stations an environmental justice issue? The EPA defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Race has been shown to be the primary factor in predicting where waste facilities would be located; more powerful than poverty, land values, and home ownership. (Bullard 2005) However, research by Vicki Been questions whether this is due to discriminatory siting or the work of market dynamics impacting the neighborhood demographics post siting. Does this hold true for brownfield sites in general, and abandoned gas station sites in particular? If abandoned gas stations are found with greater frequency in areas having a high proportion of people of color, is it because gas stations shut down as the demographics of an area changed, or because neighborhoods with abandoned gas stations tended to be more affordable and thus attracted more people of color? (Harvey 1996)

While none would argue that abandoned gas stations were "sited" intentionally in areas with a concentration of low income and minorities, the discussion is relevant to the abandoned gas station topic, as once property values in an area begin to decline, the neighborhood shifts to lower income, the gas stations along with other retail establishments close for economic reasons,

and the market is not sufficient to support the cleanup and redevelopment of the site. Therefore, the presence of a concentration of unaddressed abandoned gas stations in areas of high poverty is not necessarily a question of process inequity - these stations were not located in pockets of poverty intentionally, but rather of outcome inequity. Sites in areas with declining incomes are more likely to close, and less likely to be addressed and redeveloped for new uses, resulting in a concentration of such sites. Thus, to the extent that this dynamic occurs in areas where other environmentally negative facilities exist, (whether the income of the area declined because of these facilities is irrelevant), the neighborhood suffers disproportionately from the cumulative impact of abandoned and polluting sites.
We can predict that this is likely to occur in area with lower incomes, as higher income neighborhoods have stronger market forces, making private development of abandoned gas stations more likely.

This theory is supported by David Harvey, who argues that the market mechanism “naturally” works to concentrate poverty with environmental harms. Property values are lower near noxious facilities, resulting in an influx of poor and disadvantaged attracted to lower housing prices. (Harvey 1996) Working-class whites were able to move out of the older residential urban areas that were located near factories and other unwanted land uses as union wages and postwar prosperity made them more affluent. Because of residential discrimination and the overt discrimination of the Federal Housing Authority’s lending policy, people of color moved into the older neighborhoods. (Cumbler

2005) The lower land values of these neighborhoods made it more difficult for gas stations, along with other retail establishments, to survive, and once closed, more difficult to redevelop.

Once the lower property values are established, the addition of another unwanted land use causes less disturbance to property values than such an addition in another neighborhood. Thus, an “optimal” lowest cost location strategy for any noxious facility would site it in an area of concentrated poverty; which also often tend to be areas with high minority populations. (Harvey 1996) These neighborhoods also often lack effective political influence, and as a result, existing sources of waste remain and additional unwanted land uses are sited. (Cumbler, 2005) This uneven burden of environmental harms is an aspect of uneven development. Harvey, Smith, and others have argued that this is fundamental to the dynamics of capitalist development (Low and Gleeson 1998)

2.2 Governmental response to abandoned gas stations

Early governmental responses to pollution were rare, resulting mainly from citizens groups protesting visible air pollution in the form of smoke (Tarr 2003). In 1924, in response to public concerns about water pollution from the transport and disposal of petroleum, Congress passed the Oil Pollution Control Act. This represented the only federal environmental legislation of the time period. While the legislation was intended to protect coastal fisheries, rivers and streams were excluded, and the act was seldom enforced. (Cumbler 2005).

This is indicative of the prevailing sentiment of the time, that pollution was a necessary by-product of industry and progress, and that growth and economic development took precedence over other social goods.

The shift in thinking from an economic-centered view to a broader social approach to regulation didn't occur until much later, beginning generally in the 1960s, when a new class of educated urban professionals intent on improving the quality of life began to fill roles in the governmental bureaucracy previously held by officials focused on economic growth. (Hoberg 1992) During the decades leading up to this shift, little attention was paid to the issue of underground storage tanks, and no requirements were put in place for registration, environmental controls, or closure of such tanks. During this same period, from 1965 to 1975, administrative law changed focus from one of protecting industry from government interference, to one of ensuring that due process was provided to a range of interests. The young idealist professionals leading this change applied new advances in science to policy making, further transforming the governmental attitudes toward social regulation and elevating the importance of risk analysis in setting policy. (Hoberg 1992)

The result of this transformation was a series of laws which took a command and control approach to environmental regulation. Several of these are relevant to the issue of abandoned gas stations; see the table below.

Table 2.1: Applicable Federal Legislation

Date	Name	Purpose	Result

Date	Name	Purpose	Result
1980	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) known as Superfund	Established joint and several liability; established National Priorities List[i] (NPL) but excluded petroleum sites. Because of the uncertainty of liability and cleanup costs, sites not on the NPL were typically ignored by development.	Excluded gas stations from public funding source and created fear of environmental liability which stymied development on all contaminated sites.
1984	Amendments to the Solid Waste Disposal Act, Subtitle I of the Resource Conservation and Recovery Act (RCRA)	Required EPA to develop a regulatory program requiring owners and operators of new tanks to prevent, detect, and clean up releases. Prohibited installation of unprotected steel tanks and piping beginning in 1985, required tanks to be registered by 1986, USTs installed after December 22, 1988 must meet standards for leak detection, and spill, overfill, and corrosion protection. By December 22, 1998, all underground storage tanks installed before December 22, 1988 were required to have spill, overfill, and corrosion protection in place.	Required registration and upgrades on tanks to prevent leaks. Enabled the development of a strong UST program, but resulted in the closure of many stations. In addition, it hid the problem of tanks at sites which closed prior to the registration deadline.
1986	Amendment to Subtitle I of RCRA	Created the Leaking Underground Storage Tank (LUST) Trust Fund, used to oversee cleanups by responsible parties and to pay for cleanups at sites where the owner or operator is unknown, unwilling, or unable to respond, or which require emergency action. (Office of Underground Storage Tanks, 2007) The LUST Trust Fund is financed by a 0.1 cent Federal tax on each gallon of motor fuel sold in the country. As of September 2007, the balance in the fund was approximately $2.6 billion. Required owners and operators of petroleum USTs to demonstrate financial responsibility.	Provided a federal funding source to address tank leaks. Administered by the States, and often used for non-regulated (home heating oil tanks) instead of regulated tanks such as those at gas stations. Excludes tanks which did not register by the 1986 deadline.
2005	UST Compliance Act of 2005	This required states who received LUST trust funds to require either secondary containment and under-dispenser containment for new and replaced USTs or evidence of financial responsibility and installer certification and required the prevention of delivery to tanks which are out of compliance.	Created an incentive for states to develop programs to prevent and address leaking tanks.
2002	Small Business Liability Relief and Brownfields	Codified brownfields and created a 25% set aside for petroleum sites, launching EPA's petroleum brownfield	Provided a public funding source to address sites with petroleum

[i] National Priorities List (NPL) which was a list of properties eligible for funding through Superfund.

Date	Name	Purpose	Result
	Revitalization Act	initiative. Sites are eligible for petroleum brownfields funding if they can demonstrate the site is of "low-risk" and there is" no viable responsible party."	contamination.

States were given primary responsibility for implementing the federal tank regulations. It was the states and local officials who were charged with developing registrations for all operating tanks: owners and operators of tanks that were in the ground on or after May 8, 1986 were required to notify state or local officials of the tank's existence within 30 days of operation, unless the tank was taken out of operation on or before January 1, 1974. (Northeast Midwest 2002)

Congress appropriates approximately $100 million annually of the LUST Trust Fund. Approximately 85% ($61.2 million) are distributed via a formula to the states to run tank programs and conduct cleanups. The remaining funds are used to directly clean tanks on Indian Nation land, and to run the federal program. The funds distributed to the states are supplemented by State-run UST cleanup funds in approximately 40 states. Collectively states raise and spend more than $1 billion annually to address contamination from active and abandoned tanks. (Office of Solid Waste and Emergency Response May 2007)

In the early 1990s, EPA began to focus on contaminated sites that were not severe enough to be captured under the Superfund legislation[ii], but were

[ii] Superfund legislation, more formally known as Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA) was passed in 1980 and created a tax on the chemical and petroleum industries. It provided Federal authority to respond to the most dangerous abandoned or uncontrolled contaminated sites. Ironically, though the petroleum

contributing to contamination and blight. These sites were dubbed brownfields[iii], and grant programs were established to help states and communities address these sites. Estimates of the number of such brownfield sites vary, but EPA reports that 450,000 exist across the country. (www.epa.gov/brownfields/about.htm) Abandoned gas stations, however, are a special subset of brownfields. Because their primary contaminant is likely to be petroleum, they were not eligible for any of this early funding, which specifically excluded petroleum. As a result, these sites were often left out of the initial brownfield inventories, many of which were funded through EPA grants.

Statutory constraints prohibiting the use of Comprehensive Environmental Recovery, Compensation, and Liability Act (CERCLA) funds on petroleum sites have resulted in the exclusion of gas stations from many funding sources. The LUST Trust Fund can be used to fund response activities at these sites, but once this fund is used at a site, it can, depending upon the status of the case, limit the ability to use other EPA funds on that site.

With the passage of Public Law 107-118 (H.R. 2869) - "Small Business Liability Relief and Brownfields Revitalization Act" signed into law January 11, 2002, brownfields became codified in federal legislation, and a 25% set aside was established for petroleum sites. Use of the petroleum funds to assess or

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industry was taxed to fund the program, petroleum contamination was specifically excluded from the contaminants which could be addressed by the fund.

[iii] Brownfields are defined by federal legislation as real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. (Public Law 107-118 (H.R. 2869) - "Small Business Liability Relief and Brownfields Revitalization Act") States may define these sites differently. New Jersey defines brownfields as any former or current commercial or industrial site that is currently vacant or underutilized and on which there has been, or there is suspected to have been, a discharge of a contaminant. (N.J.S.A. 58:10B-23.d)

remediate sites with petroleum contamination requires a demonstration of “low-risk” and “no viable responsible party.” (Public Law 107-118) Some grantees have found these difficult hurdles, and have found it difficult to use the petroleum funds. (NALGEP 2007) In many cases, particularly at “mom-and-pop” owned sites, the responsible party may be difficult to find and more difficult to bring into the process. Title searches and lengthy efforts to find responsible owners have hindered many communities in their attempts to use these grant funds. Uncertainty about the federal cost recovery requirement at the state and local level has chilled efforts to direct Leaking Underground Storage Tank (LUST) funding toward sites where cost recovery efforts may be futile or too time consuming to meet the realities of the redevelopment process and local goals for reuse. (Northeast Midwest 2002)

Current funding is not meeting the demand, and competitive programs are structured in such a way as to disadvantage abandoned gas stations. The current paradigm has its proponents. Large bureaucracies have grown up around the smokestack approach to pollution; with dedicated staffs of people at the federal and state levels focused on addressing single components of environmental issues. Indeed, a $200 billion cleanup industry has grown up in the private sector based on current regulations. This serves a powerful pressure group for continued and increased environmental regulation. (Harvey 1996)

Is there a better approach to regulating and addressing these sites? One suggested approach, “ecological modernization,” is a way of thinking about

social and ecological change in which economic activity is believed to, by its nature, cause environmental harm. Proponents of this idea believe that the current fragmented and bureaucratic approach to regulations should be replaced by a more systematic set of practices that focuses on preventing environmental harms. (Harvey 1996)

This idea is widely shared. Previous attempts to address environmental hazards, including USTs, has focused on single-media, single-species, single-substance and single-life-cycle-stage approaches. Numerous authors have argued for a more holistic and longer term approach that captures the multi-media and diffuse characteristics of pollution. (see especially, Chertow and Esty 1997)

An approach based on ecological modernization would focus on developing a framework whereby individual choices of what to buy, where to live, how much to drive, and other daily decisions were made within the context of the environmental costs of each decision. This is primarily an economically based model for preventing future environmental harms. As Stavins and Whitehead write in *Thinking Ecologically*, the first option should be to get price signals to reflect environmental harms. (Chertow and Esty 1997)

Currently, producers, distributers, and retailers of gasoline are required to install pollution prevention and detection measures, the costs of which are incorporated into the price consumers pay for gasoline. To the extent that known former gas stations appear as an environmental liability on the books of current producers, distributers, and retailers, this cost is also factored into the

price. The tax on gasoline that contributes to the LUST fund is also part of the price, but it falls far short of adequately addressing the social, economic, and environmental costs of the universe of abandoned gas stations. For gas station sites that have already been abandoned, decreasing the costs of the property to reflect the cleanup required is a first and obvious price signal. Furthermore, price signals are problematic because there may be other costs involved that are not immediately obvious. .

The ecological modernization approach that looks toward prevention, is more appropriate in preventing future brownfield sites, and in the case of UST sites, is being employed as a complement to the regulatory structure. As Emil Frankel states in "Coexisting with the Car," "The key will be making car and truck travel pay for itself. When the full costs of pollution, congestion, and habitat destruction are factored into driving, incentives for change – in personal behavior, corporate transport decisions, and technologies – will be created. This can be done through: 1) fuel technology and automobile design 2) "intelligent" transportation 3) mass transportation 4) return of the railroad 5) taxes and incentives." (Chertow and Esty 1997 p. 191)

At what level of government is it appropriate to address the issue of abandoned gas stations? According to Jackle, control should be given to the lowest level at which an impact can be made (community groups – local – state – Federal). (Jackle, 1992) However, as he admits, success at addressing what may be seen in this case to be a local issue, is dependent upon linking these localities to higher levels of governance and regulation, along with resources.

Local input into the existence of abandoned gas stations, the appropriate environmental response, and the appropriate redevelopment is believed by many to be critical to the success of any program (see especially Jackle and Wilson 1992; Greenberg 1999; Measuring success in Brownfield Redevelopment Programs 2002; National Governors Association 2000; Singer, ICMA; US Conference of Mayors 2006)

Because gas station redevelopment is often complicated by upside down economics – the cost to redevelop the site is greater than the expected profit – communities may need to take an active role in promoting the site development. Greenberg found that physical decay, such as that created by an abandoned gas station, was one of people's priorities in reclaiming degraded neighborhoods. (Greenberg 1999) Mallach argues that some areas are so distressed that the market has ceased to function; requiring public intervention to stimulate demand in abandoned properties, particularly when there are environmental issues associated with them. (Mallach 2010)

In Peterman's *Neighborhood Planning and Community-Based Development,* he articulates four criteria for successful neighborhood development: 1) adequate people and money 2) demand driven by grassroots, 3) community leaders partnering with public officials, experts, and other community organizations, and 4) the "friendly tension" between community and government. (Peterman 2000) Young asserts that the ability of the public to participate in the decision making process is bracketed by the structural inequalities and in the communication devices used by those in power to

engage the communities. (Young 2000) Mallach argues for the development of a comprehensive plan, that is sensitive to market realities but also takes into account the idea that each redevelopment project is part of a cumulative process of change by which our neighborhoods are shaped and future land use decisions are guided. (Mallach 2010) What then, would an effective model be for driving the cleanup and redevelopment of gas station sites? Grassroots groups may bring the site to the attention of local officials, but can be predicted to have varying success depending upon the willingness of the local government to engage in the project.

While abandoned gas station sites cause a neighborhood impact, they may be too small a scale to attract the attention of local government officials or be competitive in a search for State or Federal grant funds. Further, studies on the impact leaking underground storage tank sites have on residential property values suggests that any negative impact is limited to the most publicized cases. (Zabel and Guignet, 2010). Given this, do abandoned gas stations cause an impact? Is there an obligation to address these sites regardless of whether or not they are creating an economic impact on the surrounding neighborhood? To examine this question, we must turn to the body of literature surrounding environmental ethics.

2.3 Ethical obligations to address abandoned gas stations

What is our obligation as society to address abandoned gas stations? To discuss this, we must understand the environmental, social, and economic

impacts that such sites have on the surrounding neighborhoods; the distribution of these sites across neighborhoods, and our obligations to mitigate such impacts.

There is no consensus on the ethical obligations of society to address environmental issues. One argument looks toward preserving the environment because of the intrinsic value of a clean environment, versus preserving the environment for human use; the preservationist vs. conservationist dichotomy. Preservationist Aldo Leopold sees value in nature when the integrity, stability, and beauty of the biotic community is preserved, regardless of the utility to humans. (Leopold 1949; Harvey 1996).

Another argument centers around obligations to address environmental issues for existing populations versus a responsibility to provide an environment in which future generations of humans can survive and prosper. (see particularly Low and Gleeson, 1998; Partridge 1981). Peter Wenz argues that humans are morally obligated to protect the rights of others, correlated to the "closeness" of an individual's association with another. Therefore, a weaker obligation exists to protect the environment for future generations and individuals located spatially distant. (Low and Gleeson 1998) John Rawls suggests that our aim should be to hand on to the next generation a better situation than what we inherited, but not so much so that excessive costs are imposed on the current generation. (Partridge 1981)

If the good of future generations is considered greater than that of current generations because of a utilitarian notion of providing the greatest good for the

greatest number, then we have an obligation to redress environmental harms for future generations. However, this argument can be twisted to justify addressing sites in sparsely populated areas over those sites in densely populated areas which suffer a disproportionate measure of environmental harms, as the ability to reclaim an area to pristine could arguably be of greater benefit to future generations than an incremental improvement in an area with heavy environmental damage. Therefore, while we have an obligation to the future, this may not be as compelling as what we owe to the present, which is real and tangible. This approach suggests the elimination of the immediate threats, and management of longer-term consequences. (Partridge 1981)

The argument against providing a poor environment to some for the benefit of many is manifested in the 1969 National Environmental Policy Act that seeks to ensure that every individual enjoys safe and healthy surroundings; not merely the Bayesian/ utilitarian idea that average safety is ensured. (Shrader-Frechette 1991) However, the utilitarian viewpoint is inherent in the manner in which most environmental policy is made. In an effort to develop a measurement by which to understand the costs and values of environmental actions, policymakers often employ economics to such issues. This “market value” approach of assigning values and costs leads to a policy whereby the future is discounted; as in economics the value of future costs and benefits is proportional to how far in the future they will be realized. (Partridge 1981) While money is a readily understood measure, it forces a viewpoint whereby

ecosystems are viewed as an externality that is valued in relation to its utility to humans. (Harvey 1996)

David Harvey argues that we cannot reasonably argue for high environmental quality while living a lifestyle that requires others to bear a greater environmental burden. (Harvey 1996) The current situation where a car-dependent society pays low gas prices that do not adequately provide for the environmental restoration of abandoned gas stations is an illustration of this.

Some argue that an unequal distribution of environmental harms is ethical if those that suffer from an environmental harm have the capacity to choose to suffer that harm through free and informed consent, and they receive compensation for it. (Shrader-Frechette 1991) If this is true, however, we would also have to ensure that the burden of suffering is distributed to people over time in proportion to their contribution to ecological imbalance. (Low and Gleeson 1998) Indeed, some studies on risk have shown that equity is the most important factor in determining the acceptability of risk. (Shrader-Frechette 1991) Closely associated with this view is that of pluralistic liberalism and decentralized communitarianism, where, because of difficulties in defining environmental policy, a broad participatory dialogue is necessary to discuss the issues and come to consensus on the approach. (Harvey 1996) This is the stance taken by the environmental justice movement, which is concerned with egalitarian principles in the distribution of environmental advantages and burdens. (Harvey 1996)

While ideas on the type and extent of the obligation or responsibility to address environmental wrongs vary widely, and the methods of determining the impact are also diverse, there is consensus that such responsibilities do exist. It is necessary to have an understanding of the impacts of abandoned gas stations to be able to debate the extent of society's responsibility for addressing these sites. Such negative impacts can be environmental, social, and economic. These are necessarily intertwined, but an attempt will be made to discuss each separately.

2.3.1 Environmental Impacts

The largest environmental concern from abandoned gas station sites is the underground storage tanks (USTs) that may still be left in place. Such tanks frequently leak, causing contamination that impacts the soil, groundwater, and can vaporize into the air. As Robert Bullard notes, addressing the contamination at such sites will benefit the water quality of the region. "The safety of American drinking water is declining, its use is increasing, and waiting for improvement could have irreparable consequences, especially for vulnerable populations like children." (Bullard 2005, p.218)

When USTs leak into the environment, there can be significant environmental and health impacts. USTs can leak due to corrosion, punctures, faulty installation, or inadequate operating and maintenance procedures, contaminating soils and groundwater. Contaminated groundwater is a serious threat, as groundwater is the source of drinking water for nearly half of the nation's residents.(Northeast Midwest 2002) Exposure to petroleum

contamination may also occur through vapors. This is particularly prevalent on sites which have been redeveloped and contain buildings with basements. Petroleum contamination can vaporize in the soil and, similar to radon contamination, can seep into the buildings and build up into unsafe levels. In severe cases, it can increase the risks for fires or explosions. (Ryan 2007)

Catastrophic events are rare, but do occur. Workers using power saws to cut open tanks can ignite fumes within those tanks if they have not been properly ventilated, causing an explosion that can result in injury or death, as occurred in New York City recently. (CBS New York, 2012) Petroleum can percolate down to the groundwater and create a wide plume that vaporizes and impacts residential areas, as in Hartford, Illinois, where a group of petroleum companies signed an agreement to address vapor issues impacting much of residential northeast Hartford. (Illinois EPA 2004)

Exposure to petroleum can cause a range of health effects, including cancer and non-cancer impacts associated with benzene, and neurological and other non-cancer impacts associated with other petroleum constituents such as toluene. Exposures can occur through groundwater ingestion and vapor inhalation. Toxicological testing of common petroleum components indicates that long term exposure can result in cancer; neurological effects, such as central nervous system depression; hematological effects; renal and hepatic effects; and developmental effects. Acute exposures, caused by fire or explosions are rare, but have the potential to cause extensive ecological damages, injuries, and death. (Industrial Economics 2011)

In addition to risks that may be posed to human populations, an abandoned gas station site poses ecological risks. This generally occurs when contaminants reach a surface water body through overland flow or transport via groundwater. This can impact fish populations, decrease species diversity, and harm habitat, with negative implications for wildlife and plant species. When native species are damaged, the area becomes more vulnerable to invasive species, which puts further pressure on the remaining native species. Typically, abandoned gas station sites are located in areas that are already impacted by human development, so it is difficult to establish a causal relationship between a single site and the degree of ecological degradation.

Risk, whether it be from contamination in drinking water, soil, air, or other source, is often presented as science-based fact. However, there is much debate around the science of risk assessment, both in how it is measured and in how an acceptable level of risk is determined. Some believe that, when it comes to pollution, a societal imposed risk, no level should be considered acceptable. Others contend that there are risks inherent in everything and that our standard of living demands some level of impact to the environment. However, risk analysis has both a scientific and an ethical component, and both need to be taken into account. (Shrader-Frechette 1991)

Risk assessments are commonly conducted based on the probability of fatalities although this has been expanded to estimate injuries, illness, and ecological impacts. EPA, the National Academy of Sciences, and the Nuclear Regulatory Committee all use a one-in-a-million increase in the average annual

probability of fatality as the standard acceptable risk level. Anything above that level is considered unacceptable. (Shrader-Frechette 1991) However, an argument can be made that risk abatement should be targeted toward those risks which are involuntarily imposed or are distributed inequitably, as these tend to be the type of risks that people are most unwilling to bear. (Shrader-Frechette 1991) A more recent study on public perceptions related to undesirable land uses indicates that people are more accepting of risks they are familiar with, such as the construction of new pollution generating facilities adjacent to existing facilities, than unfamiliar risks. (Greenberg et al, 2012) "Scientific proceduralism" is an alternative risk evaluation method that is guided by the democratic process. It is predicated upon the idea that risk can be the subject of rational debate, it should be defined by social and ethical values, and that the people have as much right to determine the level of acceptable risk as the risk evaluation experts. (Shrader-Frechette 1991)

The most commonly used system for evaluating whether a risk is acceptable to society is the risk cost benefit analysis (RCBA). Risk analysts convert risks, costs, and benefits to monetary terms; typically involving monetizing non-market impacts. This is generally done through revealed preferences which assumes that the level of risk present in the past is acceptable, expressed preferences which uses psychometric surveys to determine the acceptability of certain risks, and natural standards which look at natural levels of risk throughout the evolution of the human species. The methodology selected to assign such monetary values involves judgments that

can significantly impact the results. (Shrader-Frechette 1991) The underlying logic to RCBA is that benefits should exceed costs. Critics point out that this focus on efficiency ignores the issue of equity, justice, and the distribution of costs and benefits. (Atkinson and Mourato, 2008) As a result, it has now become standard to employ equity weighting in cost benefit analysis. However, determining the appropriate weights also involves judgments and assumptions.

Thus, understanding the risks that an abandoned gas station site poses to society is anything but straightforward. Not only does it depend upon site specific factors such as the existence of tanks, the condition of the tanks, and the existence of product at the site; locational factors such as the geology of the site and the ecological receptors present; it also depends upon the definition of acceptable risk, and the methodology for determining that risk.

2.3.2 Social Impacts

The social impacts of individual abandoned gas stations are the impacts they have on the surrounding neighborhoods and community social capital. When these sites are undeveloped, they result in a host of societal impacts, some of which can be directly monetized, as with the reduction of property values and the loss of tax rateables. Other impacts are more difficult to measure, such as the feeling of hopelessness of a community with abandoned sites, the incremental increase in neighborhood crime, the attraction of illegal dumping and squatters, and other results of an underutilized property. Abandoned buildings signify neglect and discourage investment. They are

symbolic of the flight from the inner-city neighborhoods and the erosion of the social fabric. These sites appear as the result of a deterioration of the entire neighborhood. (Jackle and Wilson 1992, Bowman and Pagano 2004, Greenberg et al 2012)

These sites may be classified as TOADS, or Temporarily Obsolete, Abandoned, Derelict Sites. While former gas station sites are typically small sites with neighborhood level impacts, as opposed to more traditional TOADS that demonstrate quantifiable impacts on property values within a quarter of a mile from the site, these are clearly derelict sites with a blighting influence within their neighborhood. Even one such site will dampen investment in an area, leading to a spiral of decay that can produce impacts well beyond the reach of the original site. (Hollander 2009; Greenberg et al 1990).

When one area bears a disproportionate share of such sites, the societal impacts are magnified both directly and in proportion to other areas. This inequitable distribution of environmental harms can be evaluated procedurally, the extent to which regulations and enforcement are applied uniformly; geographically, how unwanted land uses are grouped spatially; and socially, how race, ethnicity, class, culture, and political power impact decision making on how environmental harms are sited and addressed. (Bullard 2005)

It has been broadly agreed that high-density urban living is the only way to achieve a more ecologically sensitive lifestyle. (see for example, Harvey 1996) The idea that cities are so impacted by development that environmental protection applies less to these areas than to more pristine areas is in direct

contradiction to society's need to make urban living more attractive. The contention that localized land use patterns are a result of local economic development decisions and not a result of discriminatory land use decisions (Bullard, 2005; Harvey 1996; Low and Gleeson 1998) is irrelevant to the need to mitigate these areas to make them more attractive places to live. Therefore, an approach that values the cleanup of sites in pristine areas over those in densely developed areas may not be adequately valuing the need to ensure that urban environments are attractive places to live in order to protect those environmentally pristine locations.

Society has as much of an obligation to address those sites located in urban areas as in pristine areas. Clearly, the first priority should be to reduce real health risks, such as contaminated drinking water, However, the next priority should be to address those sites that are causing an impact to the greatest number of current residents, which are likely to be those sites located in urban areas. This is consistent with the ideas presented by Peter Wenz (Low and Gleeson 1998) , and the philosophy underlying the National Environmental Policy Act.

2.3.3 Economic Impacts

Auto usage has a huge impact on the United States in various ways. Freeways, streets and parking lots consume 40% of the average American city; this is without taking into account the space for gas stations, auto sales, auto scrap, and auto repair facilities; and in 1983 one out of every six jobs is related to the automobile. (Watchel 1983) By 2003 that percentage had declined to

9.8% of all US jobs directly or indirectly related to the auto industry, still a significant economic driver at 3.3% of the gross domestic product. (Davis, 2012) The American obsession with cars has been increasing faster than the population. Between 1950 and 1980 the population in the U.S. increased by 50%, but the number of cars grew by 200%. (Jackson 1985)

The automobile, then, is entrenched in the economic life of this country. The resultant impact on our landscape in terms of sprawl development, air pollution, and acres of asphalt is well documented. (Melosi 2001, Cumbler 2005) Less well documented are the impacts of the thousands of abandoned gas stations that dot the landscape. However, the economic benefits to developing brownfield sites have been well studied, and gas stations are but a subset of these sites.

Redevelopment of brownfield sites generate positive benefits including jobs created, increases to the local tax base, utilization of existing infrastructure, public health benefits, community revitalization of inner city neighborhoods, reduction of areas of illegal dumping and illegal drug activity, reduction in the loss of greenspace from development, attraction of private sector investment, reduction of the public costs of building and maintaining infrastructure in outlying areas to support greenfield growth, and reduction in air pollution from redevelopment of inner cities as opposed to greenspace. (Meyer and VanLandingham 2000; Wernstedt 2004; Wernstedt, Heberle, Alberini and Meyer November 2004) Many of these benefits apply to any type of redevelopment. However, the fact that by definition, brownfield sites have been previously

developed makes it more likely that they are in areas where infrastructure and population already are present, and because they are vacant or abandoned (often with buildings) as opposed to undeveloped, they are more likely to attract crime and undesirable activities.

These benefit claims are supported by the self reporting required of EPA's grant recipients and annual surveys conducted by the U.S. Conference of Mayors. (http://www.epa.gov/brownfields/about.htm) Large benefits were projected based on such surveys. In the 2006 report from the US Conference of Mayors, of the 201 cities which responded to the survey, over 52% of respondents said that between $958 million and $2.2 billion in annual additional tax revenues could be generated if their brownfields were redeveloped, and over $233 million in annual tax revenues from brownfields redevelopment were reported generated by the 62 cities that provided this information. Seventy-one cities claimed that 83,171 jobs were created by the redevelopment of former brownfield sites, with 91 cities reporting a total potential for job creation of 149,515 jobs. (US Conference of Mayors 2006) While these are unverifiable, self-reported figures, it provides a yardstick of the perceived benefits such redevelopment provides.

EPA claims that since the inception of their brownfield grant program, an average of $18.68 is leveraged for every EPA dollar expended; 7.75 jobs are created for each $100,000, and surrounding residential property values increased by two to three percent when a neighboring brownfield was cleaned or assessed. (www.epa.gov/brownfields/overview/ brownfields_benefits

_postcard .pdf, accessed Feburary 19, 2010) In 2004, the White House Council on Environmental Quality claimed that for each acre of redeveloped brownfields, 4.5 acres of greenspace were preserved. (Wernstedt, Heberle, Alberini and Meyer 2004) The National Governor's Association claims brownfield redevelopment has "successfully rejuvenated impoverished urban centers, created hundreds of thousands of new jobs, generated millions of dollars in tax revenue, and preserved millions of acres of greenfields." (National Governors Association 2000 p.16) They also report that for every public dollar spent on brownfields, states recoup as little as 10 to as much as 100 times that amount in economic benefits. (National Governors Association 2000) However, the Association does concede that the data to accurately track the results of the brownfields programs is not being properly collected, nor is performance measurement straightforward when direct and indirect economic benefits are not easily estimated, such as in the creation of green space. Much of the data that is collected deals directly with the impacts of redevelopment of the brownfield property itself. There is now a recognized need to look at "positive externalities," or impacts beyond the brownfield property itself, of redeveloped brownfields. (Simons and Iannone 1997)

Studies on the benefits of brownfield reuse have generally used census data, (Greenstone and Gallagher 2006; Greenberg and Hollander 2006; Greenberg, Lowrie, Solitare, and Duncan 2000) interviews with local officials, (Greenberg 2005; Greenberg, Lowrie, Solitare, and Duncan 2000) surveys, (Greenberg, Lowrie, Solitare, and Duncan 2000; Wernstedt, Heberle, Alberini

and Meyer 2004; US Conference of Mayors 2006) hedonic models, (Longo and Alberini 2004; Ihlanfeldt and Taylor 2004; Greenstone and Gallagher 2006) and conventional regression models. (Greenberg and Hughes 1992) The quantitative analyses is necessarily limited to measurable economic impacts, and tends to miss the "positive externalities," especially those of a more qualitative nature. The surveys, interviews, and data obtained through self-reporting by EPA's grant recipients varies in its quality and completeness.

While many claim that Brownfields redevelopment can take advantage of existing infrastructure, often these sites are located in older neighborhoods with deteriorating infrastructure, narrow roads, and insufficient wastewater capacity. (Meyer and VanLandingham 2000) On the flip side, neighborhoods with redeveloped brownfield sites may show positive economic impacts in the surrounding neighborhood, not from the redevelopment itself, but from other variables such as good access, from which the redeveloped site is also benefiting. (Longo and Alberini 2006) Thus, it is difficult to show causality in claiming benefits derived from brownfields redevelopment; the redevelopment of the brownfield site is likely to be a contributing factor, both benefiting from and contributing to, the revitalization of an area.

Potential negative aspects of brownfields redevelopment also exist. These include the threat of gentrification, (Greenberg and Issa 2005) the creation of jobs which are not available to local residents, increased traffic in the neighborhood, inappropriate uses in the neighborhood, seeking an immediate (or interim) reuse instead of the highest and best reuse, inadequate remediation,

potential for exposure through inadequate institutional and engineering controls, (Greenberg and Issa 2005) and the sustainability of the redevelopment.

There are significant negative impacts of gas station sites that lie abandoned and undeveloped. Literature relating to the valuation of real estate clearly indicates that the known presence of an underground storage tank on a site negatively impacts the property value. Research conducted by Simons, Bowen, and Sementelli in Cuyahoga County, Ohio, indicates that sites with reported leaks, as well as sites with non leaking tanks, had a significantly lower percentage of sales receiving mortgages than uncontaminated properties. (Roddewig 2002) In addition, loan-to-value ratios for sites with non-leaking tanks was lower than that for uncontaminated properties. Also, sites with tanks or with ongoing remediation sell less than half as frequently. (Roddewig 2002) These figures point toward the existence of a “stigma effect” which makes it more difficult to get access to capital.

A large body of literature has focused on the stigma impacts of hazardous waste sites on property values. (Greenberg and Hollander 2006) These studies have shown mixed results. (Jackson 2001; Greenberg and Hollander 2006) The primary focus has been on the impacts of contaminated properties on the value of the land, the value of the surrounding property, and the impacts of a site clean up on its value and surrounding property values. Studies in Baltimore, MD found that listing a site on a registry of contaminated sites decreased the site value, but removal from the list does not bring the value back. (Longo and Alberini 2004) Greenberg and Hollander looked at lingering

stigma twenty years after six New Jersey sites were added to the Superfund National Priorities List, and found some but not substantial evidence of lingering stigma, as measured by relatively lower increases in housing values, rents, and household income. The study did indicate an increase in the proportion of rental units near the Superfund sites while decreasing in surrounding areas, perhaps as a result of a lingering stigma. (Greenberg and Hollander 2006) However, evidence of a stigma was fairly weak in all these studies, and may be able to be explained through other neighborhood factors.

A weakness in research on stigma effects is the difficulty of separating out the environmental impacts on development from other negative factors such as weak demand for such sites due to deteriorating infrastructure, degraded neighborhoods, changes in preferences for the type of facilities (i.e. a shift toward single story manufacturing facilities on large campus-like settings), higher reliance on highway transportation as opposed to water or rail, and reduction in labor forces in the inner cities. (Meyer and VanLandingham 2000) Many studies acknowledge that brownfield sites are often located in areas with other issues such as crime, high unemployment, physical decay, and lack of municipal services and inadequate infrastructure, (Greenberg, Lowrie, Solitare, and Duncan 2000) and it is difficult to separate the impacts of a brownfield site from these other factors. The existence of a brownfield may be a contributing factor to this blight, or the blight may be depressing the market, making it more difficult to redevelop the brownfield.

Simons, Bowen, and Sementelli, in their study of tank sites in Cuyahoga County, Ohio, found that residential property values in the same city block or within 300 feet of a registered leaking tank were reduced by 14-15% attributable to LUST contamination, without accounting for any other types of impact on value. (Roddewig 2002) However, research conducted by Zabel and Guignet in three counties in Maryland did not indicate a drop in residential value in properties surrounding leaking underground storage tanks. The exception was for sites that were highly publicized. (Zabel and Guignet 2010) These divergent conclusions could be due to differences in the micro-spatial scale of the housing market in the two states studied across geographies or time, other contributing factors such as existing blight in the Ohio neighborhoods, or a greater tolerance for or awareness of environmental risks in one state or time compared with the other.

Research on the impacts of hazardous waste sites generally on the housing market has been more extensive than the impact of petroleum sites in particular. (Greenberg and Hughes 1992; Greenstone and Gallagher 2005) For example, Greenberg and Hughes compared the percentage increase in median values of housing sales in Superfund and non Superfund communities in 5 year increments with a one-tailed z-test of proportions, and compared the absolute increases in housing sales prices in Superfund and non- Superfund communities for the same periods. They did not find a correlation between the risks associated with hazardous waste sites with changes in sales prices. This supports the idea that redevelopment of such sites is more a function of the

redevelopment itself or the nature of the community, and not a stigma associated with the extent of the contamination.

Contamination has a greater impact on value of commercial properties than residential properties. Commercial property transactions for properties contaminated by LUSTs occur at a rate of 2.7% a year, compared to 4.0% per year for uncontaminated properties; a reduction of 33% in sales activity. (Roddewig 2002) For those commercial properties which do sell, there is a 30%-40% reduction in sales price and more than twice the incidence of seller financing. (Roddewig 2002) The type of financing available for clean commercial sales is different than for those with known tanks or those sites with active remediation. Quit claim deeds, with minimal liability protection, are more common in properties without an environmental stigma. Financial liquidity is reduced for owners of properties with leaks; about one third as liquid than for clean commercial sites, and for sites with tanks remaining on site, only about 13% as liquid as for clean sites. (Roddewig 2002)

The hedonic price model is the standard model used to establish the magnitude of loss in real estate. However, as these models require a sale, they may understate the actual loss. (Roddewig 2002) Diminished property values can result even when there is no sale of the property through unrealized capital due to a lessened income stream and loss of full use of the property.

Reduction in property value can result in reduced net income streams. For example, if there is a period of time where no tenants can occupy the property during mitigation, if a portion of the property is not available because of

monitoring, mitigation, or environmental controls, or if tenants either pay reduced rent or avoid the property because of the environmental stigma. In addition, loss in the owner's ability to access equity in the property, higher discount rates to adjust for perceived risk, or reductions to property value due to stigma also can result from a reduction in property values. (Roddewig 2002)

Diminished future net income results from lost income, lower than expected rents, lower occupancy rates, and higher environmental monitoring costs. Loss of property value may occur through delayed transactions, as contaminated properties are more difficult to sell. Sales may be delayed or reduced, or it may be more difficult to settle on a sale price, as the perceptions of the seller and buyer as to the cost to clean the environmental issue may differ.

Finally, the existence of a tank on a property can result in a loss of liquidity as lenders are less willing to provide mortgage loans on contaminated property, which could result in the inability of an owner to use the property as collateral thus reducing their liquidity and causing cash flow issues for a business. (Roddewig 2002)

The actual costs of the investigation and remediation of such sites is also significant. This cost varies greatly depending on the state and on site conditions, and is particularly impacted by the presence of groundwater contamination. Costs per site are reported at an average of $132,908 in the 2011 annual survey conducted by the Association of State and Territorial Solid Waste Management Officials (ASTSWMO). However, this captures sites that

cost $15,000 to remediation as well as sites that cost $2 million. Vapor intrusion is another form of exposure that adds to the cost of addressing a site. This generally occurs when petroleum contacts building sumps or foundations, elevator shafts, and preferential pathways (e.g. improperly sealed utility lines). EPA estimates that vapor intrusion is an issue in 1-10% of all releases. Additional costs to address this range from $27,000 to $52,000 beyond the baseline cost of remediation. (Industrial Economics 2011)

Thus, economic impacts from abandoned gas stations result from loss of tax revenues, lost opportunity for jobs or services, blighting on the neighborhood and reduction in the value of the site and surrounding properties, in addition to the costs of any health impacts and the actual cost of investigation and remediation at the site.

Due to these factors, improvements to the data on benefits of brownfield redevelopment overall is warranted. Current research tends to focus on larger, hazardous waste sites, and overlooks the significant issues of abandoned gas stations. EPA collects success metrics on brownfield redevelopment, but their acre-based metric undervalues the redevelopment of small petroleum sites. In addition, because the stations tend to be compact in size, the benefit of redeveloping gas stations may be under-measured with typical metrics. These sites are often very integrated into communities, and thus provide a blighting influence on immediately neighboring properties. While the blighting influence may not be measurable at the individual site level, cumulatively the impact is potentially very significant. Limitations of the current research include a lack of

quantitative research based on original data on the benefits of gas station redevelopment, as well as on the numbers of former gas stations in existence and the likelihood of the environmental issues having been addressed.

Thus, there are large numbers of abandoned gas stations, many of which are likely to be located in minority, urban areas. Government response to the issue has ignored stations that closed prior to 1986, and resources to address the problem have been inadequate. Society has an obligation to address these sites, which cause negative impacts environmentally, socially, and economically.

CHAPTER 3

DATA AND METHODS

3.1 Methodological Overview

This study uses a combination of qualitative and quantitative methods to collect data, in a two-tiered research approach: 1) interviews of Federal, State, County, and local officials across the country, including within New Jersey, and 2) an in-depth analysis of former gas stations in three New Jersey cities, Trenton, Plainfield, and Newark. This will significantly add to the literature on the topic, as there do not currently exist any studies which directly evaluate the impacts of abandoned gas stations, using historical documents to identify former gas stations that are not included in regulatory databases.

3.1.1 Elite Interviews: Extent of Problem and Best Practices

Elite interviews have been conducted for three categories of officials. The majority of interviews were conducted via phone. The interviews were scheduled through email and phone correspondence, and all questions were provided in advance to participants. Each interviewee was provided with a copy of the notes from the interview and given the opportunity to make corrections and additions. Quotes were highlighted to obtain the interviewee's consent to attribute quotes directly. In many cases, interviewees provided supplemental materials describing their programs. Each interviewee was then provided with a draft of the resultant chapter and invited to provide corrections. Interviews were

conducted in compliance with the Institutional Review Board's (IRB) Human Subjects Review process. Each interviewee signed a consent form indicating that they understood that their participation in the study was not anonymous or confidential (See Appendix A for a copy of the IRB form).

The first group of interviewees consisted of federal officials from U.S. EPA's Office of Underground Storage Tanks, Office of Brownfield and Land Reuse, Office of Sustainable Communities, and the Office of Solid Waste and Emergency Response immediate office, as well as the non profit group Smart Growth America. The intent of these interviews was to establish a baseline of knowledge of the issue at the national level. Each interviewee was contacted via email with a request to participate in the interview. Once agreement had been reached on a date, the IRB form was provided via email, along with the list of questions to be addressed. Nine federal officials were interviewed. An interview was conducted at the offices of EPA's Office of Underground Storage Tanks, where two officials participated in person and one via conference call. A second in-person interview was conducted with the Office of Solid Waste and Emergency Response. A third interview was conducted at the offices of the Office of Brownfield and Land Reuse, with one official in the room and another participating via conference line. These three interviews were audio-recorded. Two additional phone interviews were conducted with EPA's Office of Sustainable Communities and Smart Growth America. These interviews were not recorded. Attempts to schedule an interview an official from the Environmental Law Institute were unsuccessful. At the close of each interview,

the question was posed, “Are there any State and local leaders in this area that you recommend I contact? Are there any industry leaders I can talk with?”

The second set of interviews was conducted with State officials from Colorado, Florida, New Hampshire, New Jersey, Ohio, South Carolina, Tennessee, Virginia, and Wisconsin. These officials were identified by federal officials as having active petroleum brownfield programs, or were identified via case study documents. These interviews provide a snapshot of various state programs, and highlighted the differences across states in funding availability, governmental structure, and remediation standards. Questions were developed to provide an understanding of the approach taken by communities to address the problem, including the motivation to address the issue, the costs and benefits, and the extent of the problem. A total of seventeen state-level officials were interviewed, all via phone, with the exception of the Tennessee and New Jersey officials. The Tennessee representative preferred to address the questions in writing, and communication was by email only. The interviews with New Jersey officials were conducted in the office of the Department of Environmental Protection Site Remediation Office. Two officials were present during the interview. No audio recording was conducted during any of the state interviews.

The third set of interviews were conducted with local and county officials from Lakewood, CO; Rocky Ford, CO; Sarasota-Manatee Metropolitan Planning organization, FL; Cuyahoga County, OH; Cincinnati, OH; Columbus, OH; Tacoma-Pierce County Health Department, WA; Milwaukee, WI; King County,

WA; Plainfield, NJ; and Trenton, NJ. Fourteen people from 11 local jurisdictions spanning 6 states were interviewed. Interviewees were selected based upon recommendations from Federal and State officials, as well as participation in case study documents. Each official responded positively to being interviewed. Interviews were conducted with all but two individuals contacted; one because workload and a vacation schedule precluded her participation during the timeframe, and another because a natural disaster in his community required his full attention. Questions were designed to determine the extent to which abandoned gas station sites were seen as an issue, how they ranked in priority to other brownfield sites, and the methods taken to redevelop them. Each interview was conducted by phone, with the exception of the New Jersey jurisdictions, which were conducted in person. The map below indicates the states and localities represented by these interviews (Figure 3.1).

Figure 3.1: Distribution of interviews

The information generated by these interviews was written into summaries which were then sent back to the interviewees for confirmation and corrections. Potential quotes were provided to obtain consent to directly attribute comments to individuals. These summaries were then finalized and coded by topic to identify patterns, recognize differences in approaches, and distinguish best practices that could be replicated by other jurisdictions. Interview information was supplemented with relevant documents, as available, to provide additional detail and to confirm information collected through the interview process. These documents include copies of inventories, fact sheets, legislation, and case studies.

Officials at two major oil companies were contacted with requests for interviews. Repeated email and phone messages elicited no response.

3.1.2 The New Jersey Experience and Costs and Benefits

To address the third and fourth research questions, the New Jersey Experience and Costs and Benefits, I first provide a background chapter on the liability and regulatory framework within the state. This was developed through a high level examination of the corporate history of early oil companies operating in the state, and through review of documents provided by the NJDEP on the new Licensed Site Remediation Professional (LSRP) program.

The city wide case studies hinge upon historic inventories conducted in each of the three target cities of Trenton, Plainfield, and Newark. These inventories were developed through a search of available Fitzgerald Historic City Directories[iv], and for more recent years, phone books. Criss cross directories[v] and Sanborn Fire Insurance Maps[vi] were also used to verify or supplement this information. For Trenton and Plainfield, all available directories were researched. For Newark, due to the number of sites, Directories were only evaluated in five year increments.

[iv] City Directories were published for certain areas from the mid-1800s until present, sometimes at irregular intervals. They typically include names and addresses of businesses and residents in each city. In later years, businesses were grouped by category, with “Gasoline and Oil Service Stations” and “Gasoline Stations” representing the categories for gas stations.

[v] Criss cross directories, also called reverse telephone directories, are phone books organized by street instead of business or resident name, enabling the tracking of the use of a particular site over time, even if the business name changes.

[vi] Sanborn Fire Insurance Maps were created to assess fire insurance liability and were produced from 1867 to 1970 for approximately 12,000 towns and cities in the United States. These detailed maps typically give the uses of a site, as well of locations of potential fire hazards such as tanks. These were used in this study to supplement information in the City Directories to verify the precise location of identified gas station sites where uncertainty existed.

The automobile-related entries in the 1927 Trenton Fitzgerald City Directory indicates how thoroughly integrated into the economy the automobile had become. Such categories included: Automobile Bodies, Automobile Dealers; Automobile Financing (see mortgages and industrial loans); Automobile Laundries (see also garages); Automobile Manufacturers; Automobile Radiators; Automobile Repairing and Services Stations (see Garages); Automobile Supplies; Automobile tires (see rubber tires); Automobile tops; Auto Wrecking Services; Automobile and Carriage Painting; Automobiles for Hire; Car Rentals, Garages, Services stations and Auto Repairs; Petroleum Products. The categories reviewed for purposes of generating the gas station inventory were: Garages, Services Stations and Auto Repairs; Oil Dealers; Petroleum Products; Garages; Gasoline and Oil Services Stations; Automobile Repairing; Gasoline Stations; Automobile Garages; and Oils and Lubricants – Dealers.

For Trenton, the following City Directories were available: 1925, 1926, 1927, 1928, 1929, 1931, 1933, 1936, 1946, 1948, 1950, 1952, 1954, 1955-56, 1957-58, 1963, 1965, 1970, 1971, 1972, and 1980. Phone books from 1985, 1990, and 2002 were reviewed. For Plainfield, the following City Directories were available: 1899, 1903, 1904, 1905, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1921, 1922, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1947, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, and 1982. Phone

books were reviewed for 1988, 1989, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, and 2009. For Newark, the years reviewed via City Directories were 1913, 1918, 1923, 1935, 1939, 1947, 1951, 1955, and 1966. Phone books reviewed were 1973, 1978, 1983, 1988, 1994, 1999, 2004, and 2009. It should be noted that the directories for 1939 and 1955 were blurred and therefore difficult to read. Likewise, the 1951 and 1964-1966 directories did not include complete listings. For all cities, current gas stations were determined via on line mapping, tax databases, and windshield surveys.

For the early years, the categories of Garages, Service Stations and Auto Repairs, along with Oil Dealers, were searched. All entries relating to “petroleum” or “service” were catalogued, to separate gas stations out from garages and other facilities that did not distribute gasoline. By 1948, “Gasoline and Oil Service Stations” had been separated from “Automobile Repairing” and “Garages” and only “Gasoline and Oil Service Stations were catalogued.

Information including the category under which the gas station was listed, the year it was listed, and the name of the station were entered into spreadsheets. For each subsequent listing at the same address, the data was entered into the same entry on the spreadsheet. It should be noted that frequently sites would be listed under different addresses from one year to the next. When it appeared that two separate entries might be for the same gas station (ie for adjacent street numbers or for addresses on the same corner using both street addresses), the gas station names were compared, the

location identified on the tax maps, and Sanborn maps were consulted to determine whether one or two separate sites were being referenced. Some gas stations are listed sporadically in historic records, and it is unclear if a given location had a vacant gas station for a period of time which was then reopened, or if the gas station was operational during the entire period. For purposes of this study, to determine the number of active gas stations across time, it was assumed that a gas station had been operational at the property from the time it first appeared in a publication until the last available listing for that site.

Once the historic inventory was developed, the addresses were cross checked with the tax assessor and tax maps for the cities. This enabled the identification of tax block and lots, and also provided information on properties which have become part of road or park systems. The block and lot information was used to obtain tax information from city tax databases, to include ownership information as well as property tax information, and in some cases reuse and size information. Windshield surveys, discussions with the city brownfield coordinators, and online mapping services were all used to identify the current use of the historic gas station. In addition, a records search of all available state and local environmental databases was conducted to determine what sites had environmental records associated with them. These databases included the New Jersey Known Contaminated Sites List, New Jersey Dataminer, the UST Summary Report, as well as city records. The NJDEP Dataminer reports that were cross-referenced with inventory sites include the Known Contaminated

Sites List (KCSL), deed notice and Classification Exception Area (CEA) reports, and Site Remediation Program property files.

This extensive inventory effort did not reveal information regarding the costs of cleanup at the sites. To determine this, it was necessary to review the environmental documents associated with each individual site. One site in each of the three target cities was selected to develop a case study indicating the extent of contamination and the costs of cleanup. Sites were selected that had been through the remediation process, and had either received regulatory confirmation that the contamination had been addressed or was close to receiving such confirmation. In all three instances, the sites had some level of public involvement; however the sites were selected to illustrate a range of different ownership scenarios and redevelopment goals. For each site, environmental documents were reviewed to include the Preliminary Assessment / Phase 1 report, the Site Investigation Report, Underground Storage Tank Closure Report, Remedial Investigation Report, and Remedial Action Report. In addition, all available correspondence relating to the cleanup and redevelopment of the sites were reviewed, and the reuse of each site was discussed with local officials. Local collections in the libraries of each city were searched for early site pictures or site plans, as available. Because all three sites were located in commercial areas, interviews with long term neighbors who might remember when the gas station was operational were not feasible.

CHAPTER 4

BEST PRACTICES

4.1 Federal Perspective

To determine the extent of knowledge and participation at the federal level regarding the identification, cleanup, and redevelopment of abandoned gas stations, I began my interviews at the federal level. I conducted interviews with nine different officials, representing four different offices within the U.S. Environmental Protection Agency (Office of Underground Storage Tanks, Assistant Administrator's office within the Office of Solid Waste and Emergency Response, and the Office of Brownfields and Land Revitalization, and the Office of Sustainable Communities), as well as with an individual at Smart Growth America, a national non-profit organization that is working with EPA under a cooperative agreement to study the reuse of abandoned gas station sites. Four of these interviews were conducted in person, and five were phone interviews. In addition, I attempted to reach a representative from the Environmental Law Institute, but they did not respond to emails or phone inquiries.

Interviewees were asked:

- What do you see as the best practices for identifying and addressing abandoned gas stations?
- Do you have a measure of the unreported / unregulated tanks from former gas stations?
- What is the average cost to clean former gas station sites?

- Do you have a measure of the typical amount of contamination present at these sites?
- What are the barriers to addressing these sites?
- Are there any State and local leaders in this area that you recommend I contact? Are there any industry leaders I can talk with?

The issue of addressing abandoned gas stations at the Federal level falls primarily with the Office of Underground Storage Tanks. They operate under the Leaking Underground Storage Tank (LUST) trust fund established by Congress and their activities are constrained by statutory restrictions on the use of the funds. Additionally, the Office of Brownfields and Land Revitalization plays a role. They operate under the Small Business Liability Relief and Brownfields Revitalization Law of 2001, which sets aside 25% of allocated funds for petroleum sites, and defines such sites in a different manner than the LUST requirements set out. Both of these Offices are housed under the larger umbrella Office of Solid Waste and Emergency Response. The Office of Sustainable Communities has become active more recently, as they look to create an environment conducive to redevelopment, in particular examining the impact zoning has on the ability of communities to redevelop infill sites such as former gas stations.

At the Federal level, data on unreported or unregulated tanks is not collected. The EPA offices rely on individual reports and studies conducted by states or localities, but do not have a mechanism to develop a national inventory of all petroleum brownfields or former gas station sites. The Office of

Underground Storage Tanks does track and report on the number of registered, federally regulated tanks, but they do not track these by geography. States provide reports on cumulative numbers of sites; the only geographic data collected at the national level is for those sites that received funding through the 2009 American Recovery and Reinvestment Act.

EPA recently released their most comprehensive study to date regarding the characteristics of releases on the national backlog, where fourteen state programs were analyzed to develop a detailed understanding of the type of releases and status of efforts to address them (EPA September 2011). While this report provides important information on the backlog of LUST releases, it does not provide a geographic level analysis below the state level, nor does it provide information on a site basis, as multiple releases may have been reported for a single site. Most importantly, it does not provide information on the potential universe of sites not currently captured in the state and federal reporting system; i.e. those sites that closed prior to the 1986 reporting deadline where no release has been reported. Interestingly enough, this study found that 34% of open LUST cases had releases that were reported 15-19.9 years ago, and 14% had releases reported over twenty years ago. This is significant because while the older reported cases were not reaching closure, the numbers of cases in the category that included pre-1986 closures were small. As the total number of sites in this category is expected to be large, given the number of closures that occurred prior to the 1986 reporting deadline, it may be an indication that a large number of sites in this category have unreported releases.

Since the inception of the petroleum grants under the brownfields law, first awarded in 2003 to the time of this interview, over 500 Petroleum only grants have been awarded (approximately 400 assessments; over 100 cleanups; and 12 revolving loan fund petroleum only grants which do not include hazardous waste). This only indicates the number of sites that successfully applied for petroleum funding, including sites that were contaminated by petroleum from uses other than former gas stations.

The federal understanding of the costs to clean a former gas station site is obtained from an annual survey produced by the Association of State and Territorial Solid Waste Management Officials (ASTSWMO). They conduct an annual survey of their members asking the average cost to clean a site that is funded by their state financial assurance funds. The average cost reported through ASTSWMO for 2011 was $132,908 per site (ASTSWMO, 2011). There are 56 state/territorial programs; 36 of which have established state trust funds. While there is agreement around the average cost, actual costs vary greatly by site and by area. Of the 302,613 sites addressed by the states participating in the ASTSWMO survey, 1,648 had site remediation costs that exceeded $1 million. The variability of supply and demand of cleanup consultants, area geology, and difference in cleanup standards were cited by federal officials as the reasons for some of the variability in cost.

There is no current measure at the national level of the amount of contamination present at abandoned gas station sites. While the Office of Enforcement and Compliance Assurance does report on contaminant prevention

through the Government Performance and Results Act, this number is misleading as they assume a catastrophic release of the entire volume of the tank is prevented by every enforcement measure. Some EPA regions also collect information on contaminant levels, but this is not standardized in any way, and its primary use is as anecdotal case studies.

There was agreement among federal officials that abandoned gas station sites have low levels of contamination relative to other brownfield sites, the contamination is predictable and easy to address, and has a relatively low clean up cost. However, because they are small sites they can still be a challenge to market and redevelop. In addition, they tend to be located in neighborhoods as opposed to commercial or industrial districts, and their abandonment causes blight within these residential areas.

In discussing the potential environmental justice impact of abandoned gas stations, federal officials were handicapped in their ability to assess this by the lack of a geographically-based national inventory of such stations. However, it was noted that abandoned gas stations were found in every community: urban, suburban, and rural, but they may get addressed more quickly in more affluent communities. In areas with a disproportionate siting of locally unwanted land uses, land values are depressed, and it is likely to be more difficult to address former gas station sites. Because of the size and location of these sites, it is hard to get developer interest. In addition, federal officials suspect that these communities may lack the resources to effectively apply for and secure competitively awarded petroleum brownfields grants to

address these sites through publicly-funded sources, thus compounding or essentially creating a disproportionate impact. One interviewee stated that because transportation costs represent a large portion of people's budgets, abandonment of gas stations may be a lagging indicator of disinvestment in a community.

Because the siting, the abandonment, and the redevelopment of gas station sites is market driven, it is likely that gas stations that opened in densely populated urban areas closed at a higher rate than in other locations as a result of urban disinvestment, and remain abandoned at a higher rate in communities where disinvestment has perpetuated.

A recent approach that EPA is taking is to work across inter-agency boundaries with a cooperative project between the Office of Underground Storage Tanks and the Office of Sustainable Communities to examine zoning and tax incentives. A joint project with EPA, the US Department of Housing and Urban Development, and the US Department of Transportation, known as Partnership for Sustainable Communities, delivered technical assistance to five brownfield pilot communities that included smart growth and tanks funding. The goals of these projects were to clean up and redevelop potentially contaminated sites in coordination with communities' efforts to develop public transportation and affordable housing.

The Office of Sustainable Communities brings a slightly different perspective to the issue, as Matthew Dalby, Acting Director of the Federal and State Division of that office, indicated: "Inventories are an important tool; but the

best way to think about where these properties are may be to look at the common geography. Petroleum brownfield sites are most often found along arterials and main streets in metropolitan areas across the US. It is useful to get communities to recognize the interesting geography associated with these sites. Petroleum brownfield sites impact even areas that do not have an industrial legacy."

Both OUST and OSC offices emphasized that that these sites are often located in potentially desirable locations such as commercial corridors and gateway areas. In rural areas, they are most often at the gateway to the main street. State highways often were, or are, the main streets of towns and are a common location of former gas station sites that correspond to marketable locations that meet smart growth objectives. The Office of Sustainable Communities is looking to identify ways to leverage multiple funding sources to promote smart growth development. Since many of the tanks programs are delegated to the states, they are interested in exploring how to impact how state tank dollars are spent to prioritize smart growth development and integrate the tank programs with planning programs.

All the EPA offices cited the importance of corridor work, such as that being done along Route 66. Smart Growth America, a not for profit organization, developed a report under an EPA cooperative agreement to help states develop redevelopment strategies, focused on area-wide and corridor strategies. The report looks at the efficiencies of scale and effectiveness of these strategies, and the impact of a more structural redevelopment of an entire

area as opposed to piecemeal redevelopment of scattered sites. Their research indicates that corridor or area-wide approaches are best practices for addressing gas station sites. Within these approaches, there are best practices for developing inventories, or "property information systems"; for practicing authentic community engagement; conducting a market analysis and developing a marketing strategy (Smart Growth America, March 2012).

Leaking Underground Storage Tank (LUST) Fund

There is a Federal LUST fund funded by a .1 cent per gallon gas tax, and 36 States have developed their own, state-wide LUST funds in addition to the federal fund. These are all separate programs; the federal program has certified all existing state programs as satisfying a federal requirement for financial assurances, but that is the only intersection with the federal program. There is currently about $3.5 billion in the federal trust. The bulk of this is set aside to offset the federal debt, with about $113 million appropriated to the EPA for LUST activities each year, roughly equivalent to the amount of interest earned by the fund. In 2009 this number was increased by an additional $200 million of stimulus funds, dollars that were allocated directly to site cleanups. Using the ASTSWMO average cost per site of $132,908 per site (ASTSWMO, 2011), and the known backlog of approximately 88,000 sites (US EPA, September, 2011), it would take approximately $11.7 billion to fully clean all known tank issues. Of course, this does not take into account the pre-program tanks that are not on the EPA database. Even fully expending the existing Trust Fund would not

completely address the issue, and the $113 million typical allocation falls very short of the mark.

In addition, because EPA has an overall fund ceiling, unless this cap was increased commensurately, raising the amount of funds the agency received from the LUST Trust Fund would reduce the funding available to other programs in the agency. Of the $113 million annual allocation, $63 million goes to grants for State LUST cleanup programs in 56 states and territories. This is distributed via an allocation formula and is used to run State cleanup programs. An additional $34 million goes to LUST prevention funds in the form of grants to the States for prevention programs, also distributed via a formula. The remaining $16 million goes to the EPA office expenses including supporting offices such as administration, finance, research and development, and enforcement. Of the $63 million that goes to the State programs, roughly 2/3 goes to State staff salaries - general oversight not tagged to an individual site, and 1/3 goes to clean up sites. To use federal money on a particular site, the site has to meet federal eligibility requirements. As a result, many states choose to use federal funds on non-site specific activities. Thus, of the $3.5 billion available in the federal LUST Trust Fund, only about $21 million annually goes directly to site cleanup.

Federal LUST eligibility requirements differ from the federal petroleum brownfields eligibility requirements, which may differ from the state LUST fund requirements. The state definition of what constitutes an eligible site varies; they often cover a different subset of sites than the federal programs cover.

4.2 State Perspective

A total of nine states were contacted for interviews about their programs. These were selected based on recommendations from federal and municipal officials as to who the state leaders were in this field, and which states had exemplary programs. In several instances, multiple people were interviewed per state, as there tend to be overlaps in the jurisdiction of brownfield and tank programs, and abandoned gas stations may fall under both categories, depending upon how each state defines their programs. The states included in this study are: Colorado, Florida, New Hampshire, New Jersey, Ohio, South Carolina, Tennessee, Virginia, and Wisconsin.

Interviewees were asked:

- Please describe any programs your state has to address abandoned gas stations.
- How does the Tanks program and the brownfield program work together? What is the division of responsibility?
- Do you see abandoned gas stations as a big problem in your state?
- Do you know the breakdown among active stations, properly closed stations, and stations with environmental issues?
- Do you have an estimate of the average cost to clean a gas station, and/or the typical amount of contamination encountered? Can you estimate the percentage of sites with soil contamination, groundwater contamination, or both?

- How would you rank this problem compared to other types of brownfield sites, in terms of ability to redevelop, pervasiveness, cost to remediate, health impacts, social impacts?
- At what level (State, county, municipal, private, other) are abandoned gas stations being addressed in your state? Is this a systematic program or site by site? Are priorities set based on health concerns, social impacts, or development potential or other motivation?
- Are there any county or municipal leaders in your state that are leaders in this field that I should contact?

In all states interviewed, the tank program and the brownfield program are run out of separate governmental entities. This stems from the federal distinction between petroleum and other contaminants, including different federal funding sources, different legislation, and different processes for delegating authority. The degree to which the state tank and brownfield programs cooperate, however, varies greatly.

In Wisconsin, the programs work closely together, with the programs operating under the same regulations. In South Carolina and Virginia, the programs rarely intersect. However in Florida, site owners with petroleum contamination can choose whether to enter the petroleum program or the brownfield program. Entering one does not impact a site's eligibility for another, so a site could begin in one program and then move to the other program. Here, state funds are available under the petroleum program, whereas the brownfields program is an incentive-based program. However, sites are placed

on a waiting list for petroleum funds based on its risk ranking, so funds may not be readily available, depending upon where the site falls on this list.

In Ohio, the tank program and the brownfield program likewise operate separately. Ohio has the largest fund in the nation to address brownfield sites, Clean Ohio, but the enacting legislation was modeled after their Voluntary Action Program (VAP), and both the VAP and the Clean Ohio programs specifically exclude UST petroleum sites. At the time of the interview, legislation was pending that would allow the Bureau of Underground Storage Tank Regulation to transfer sites to the state VCP. This legislative fix was approved June 30, 2011, and now provides that sites contaminated with UST petroleum, when there is no viable responsible party, can be handled through the State Voluntary Action Program. This in turn allows these sites to be eligible for Clean Ohio funds. However, it is unlikely that abandoned gas station sites will be competitive unless they are part of a larger development, given the competitive criteria in place for the funding program. Prior to the passage of this legislation, if an UST petroleum release was situated on a brownfield, the tank program had regulatory oversight and the remediating party had to achieve cleanup through both the tank and brownfield regulatory standards. OH works on a risk based system, whereby they calculate a total cumulative risk for all contamination on a site. Under the prior system, a party would work with the tank program to get a no further action determination while they address additional areas of concern under the VAP; the tank information is then factored

in to the overall risk calculation. This may now be conducted as a single process.

South Carolina was in a similar situation, with the state brownfield statute specifically excluding petroleum. In June 2008, the state amended the brownfield statute to include petroleum. While petroleum is still specifically excluded from the definition of “contaminant,” sites impacted by petroleum are eligible to participate in the voluntary cleanup program. However, the programs still operate separately for the most part. Property owners are sometimes able to choose which program to enroll in, but generally they will enroll in the tank program as the State Underground Petroleum Environmental Response Bank (SUPERB) Account covers administrative costs in addition to investigation and removal.

Colorado followed a path opposite from other states; their tank program used to reside in the same Department as the brownfields program, but years ago was taken out and placed in the Department of Labor to handle what was seen as more of an occupational health and safety issue. The various departments cooperate on site cleanups, but issue separate no further action letters for a single site when both hazardous and petroleum contamination are present, and property owners have to comply with both sets of requirements.

At the time of the interview, New Jersey was in a period of transition. The Site Remediation Reform Act was passed on May 7, 2009 and due to be fully implemented by May 7, 2012. The main result of the legislation is to privatize the oversight of environmental cleanup in the state. The law set up a licensed

site remediation professional (LSRP) system that empowers licensed professionals to make determinations as to the required investigation and cleanup at both hazardous substance and petroleum brownfield sites. Upon completion of the cleanup, the LSRP is able to issue a remedial Action Outcome (RAO) letter. This transition is made less complicated by the fact that, while New Jersey historically had separate Bureaus within the Department of Environmental Protection to address Underground Storage Tanks and Brownfields, the same technical requirements governed both programs. Both programs were fully authorized and equipped to handle a site as a whole, as opposed to requiring the oversight of two separate governmental divisions on a single site. Which Bureau provided this oversight depended mainly upon how a site entered the program, and underground storage tanks were routinely dealt with through the Site Remediation / Brownfield program.

As the transition to the LSRP system is completed, the current Bureau of Underground Storage Tanks, which handled the site remediation portion of the tanks program, will cease to exist as a separate entity. However, the bulk of the tanks work will continue; housed in other areas of the agency. These activities include field inspections, enforcement, and registration. The site assessment role once performed by

(Abandoned gas station sites) are common, probably one of the most pervasive types of sites, but petroleum is well behaved. It floats so you can find it, it degrades relatively quickly compared to other contaminants. MTBE is the most common drinking water well contaminant in the state, and there are more treatment systems on water system due to gasoline than any other contaminant.

Gary Lynn, Petroleum Remediation Program Manager, New Hampshire

the Bureau will be conducted by the LSRP, or in the case of orphaned sites, will be handled through the publicly funded program. Typically such orphaned sites are brought to the State's attention by municipalities and counties; there is no effort to actively identify such sites at the state level. If such sites are identified as a priority, they are addressed through the DEP publicly-funded program. In many cases, State officials report, municipalities have stepped up to address these sites. Historically there had been funding available to characterize contamination via the State UST fund, which was established ten years ago by constitutional amendment, funded through the Corporate Business Tax (CBT). As of July 1, 2010 this fund was no longer accepting applications for commercial tanks because of the decline in CBT revenues.

4.2.1 Environmental Impact

None of the states interviewed saw the issue of abandoned gas stations as a high risk to human health and the environment. Relative to other types of sites, the contamination from these sites is relatively well understood and easily dealt with. In addition, as petroleum contamination ages, it degrades naturally. The amount of time it takes for degradation to occur varies greatly based on environmental conditions. However, in terms of numbers, there are

> *From a development and social standpoint: these sites are at key corners throughout cities and the blight they cause can be the focal point for a whole neighborhood, they can be devastating for a community. Socially it can bring down a whole area. Oftentimes the large sites are on the periphery of a community and while a greater scale, do not have the same blighting influence.*
>
> ***William Murdock, Chief Community Development Division Ohio Department of Development***

many more former gas stations than other types of brownfield sites, such as drycleaners or former factories. While contamination from abandoned gas stations can cause impacts to soil, groundwater, and vapor intrusion issues in buildings, the greatest threat, as seen by most state regulators interviewed, is when the contamination impacts groundwater. This also causes the greatest costs, and is dealt with differently depending upon the state. Colorado, however, uses a risk based system and sees the biggest threat as stemming from soil vapors. While most Colorado sites have some groundwater contamination, their risk based system allows them to address only those that impact drinking water sources and leave the remaining contamination in place.

Virginia also uses a risk based program that allows for a lessened response to groundwater contamination when there are no identified risks to human health and the environment. The majority of homes in northern Virginia around Washington, DC are on municipal water, so these are lower risk sites. However, many homes are on private or municipal wells systems outside this area. In many instances, a more cost effective solution than full remediation of groundwater is to move impacted residents to municipal water. The same metric is applied to soil contamination. If contamination levels are low and there is no exposure pathway, the soil contamination may not trigger a removal. In 60 of Virginia's 95 counties, the majority of households rely on private water supply systems, and in 52 counties, the number of households using private wells is increasing faster than the number of households connecting to public water supply systems. The heaviest reliance on these private water supply systems is

outside urban centers in rural, non-agricultural areas, where new growth occurs beyond the extent of public water or sewer lines. When petroleum contamination at any level is reported in well supplied drinking water, Virginia sends out state contractors to install carbon filtration units on the well at no cost to the homeowner.

In contrast, Florida has some of the most stringent cleanup standards in the country, and the petroleum program does not rely on risk based cleanup standards. Here, 92% of all drinking water is from groundwater, all from the same aquifer. The threat to this aquifer from petroleum sites was seen as so critical, that this was the driver for establishing the tanks program. Not surprisingly, proximity to drinking water sources is a major criteria for ranking sites for cleanup funds. It is very unusual for a case to close in the petroleum program with contamination left in place. The brownfield program, however, will close a site with institutional controls in place.

Wisconsin takes a middle ground. They do not use a risk based approach to groundwater, but they do allow institutional controls. Often source removal is required, but if contamination remains, the site owner must demonstrate that there is no risk, and conduct monitoring to demonstrate that the contaminant levels are decreasing. More active remediation may be required if concentrations are high, if there are wells or surface water in area, or if there is free product. Private wells are common in Wisconsin, and there are a fair amount of sites with groundwater contaminated from gas stations. The end use also comes into the equation: for direct contact soil standards there are

industrial and non-industrial levels. Wisconsin, like Colorado, is now looking more at vapor issues. The criteria for investigating and addressing vapor issues is currently evolving. Vapor intrusion studies are now required in Wisconsin, but as more sites undergo these studies, officials are finding that the contamination at abandoned gas stations is often so old that the petroleum has degraded to the point where vapors are not a concern.

New Jersey also sees vapor intrusion and drinking water impacts as the most pressing public health threats from former gas station sites. Abandoned sites are addressed through the publicly funded program based on risk. Often when sites are not risky enough to be addressed by DEP, municipalities are willing to take on the cleanup. Sites may be addressed in a phased manner, with DEP addressing Immediate Environmental Concerns (IEC) right away, and then addressing the remainder of the site later, or turning it over to the municipality to address the remainder of the site.

New Jersey officials see abandoned gas stations as having the same potential for risk as other types of brownfield sites, and often less as the remediation on gas station sites tends to be more prescriptive. Traditional brownfield sites are generally larger, and have a greater variability of chemicals. The gas station sites are smaller sites, with the same materials found at each site. However, New Jersey sees more abandoned gas stations sites located in congested areas, so they recognize the potential for other issues such as vapor and contaminated drinking water that may be less of an issue in more remotely located brownfield sites. In addition, petroleum contamination is not as

persistent as some other contaminants, such as PCE, and in some areas breakdown of the contaminant has been seen within two to three years. However, depending on the volume of material and the environmental conditions, persistence can occur.

4.2.2 Social Impact

There appears to be significant disagreement as to the social impacts of abandoned gas stations, mainly due to differences in real estate markets. There was wide agreement that gas stations are generally easier to clean up than traditional brownfield sites, both because the contaminant is well understood and predictable, the costs tend to be lower because of the size of the sites, and funding sources in the form of state tank programs often exist to cover the costs. However, whether or not the incentive to proceed to cleanup exists is dependent upon the marketability of the sites. In some areas, because of the small size of the sites, redevelopment often occurs as part of a larger redevelopment. Sites that are well placed at busy intersections tend to be redeveloped early, while sites in less desirable locations remain vacant or underutilized. In areas of disinvestment, the market forces to spur redevelopment are absent, and the sites remain undeveloped.

Former gas stations in small commercial strips in distressed minority neighborhoods are an issue in Florida. These commercial strips developed to support minority communities during segregation, and once that practice was abolished many of these areas were unable to sustain a commercial center. In

cases where commercial reuse is not economically viable, these sites represent an opportunity to create open space for underserved communities. However, officials do not view these sites as the source of the blight. Typically by the time a brownfield project is undertaken the former gas station has been redeveloped multiple times, with a gas station just one of the prior uses.

Ohio also recognizes a preponderance of former gas stations in distressed areas. Because of their size and location, they are less likely than traditional brownfield sites to have a reuse, there is little to no demand for the properties, the return on investment is lower than on other properties, and they have a smaller footprint. These factors, combined with the fact that the State's largest brownfield funding source, Clean Ohio, until recently specifically excluded UST petroleum contamination from eligibility, make these sites particularly difficult to address.

In Virginia, many of these former gas stations appear to be well placed for redevelopment. They are often located on intersections that are valuable locations for redevelopment. Lenders are more comfortable with petroleum sites than other sites, such as dry cleaners, and there is greater flexibility for disposing of petroleum contaminated soils than soils contaminated with other contaminants such as solvents. In addition, the UST fund helps with the cost of remediation. Because of these factors, former gas station sites are typically easier to develop than other brownfield sites. However, this can vary from site to site; there are certainly sites that an individual municipality may want to redevelop, but because of land values or location it is challenging.

Wisconsin also sees redevelopment occurring on well-placed sites by companies such as Walgreens. Those sites that continue to sit idle are located in areas where there are multiple vacant lots and abandoned buildings. Smaller communities often see these sites become parking lots, or auto repair and used car places with the tanks still in place. With plentiful greenfields, there is less incentive for developers in small towns to take on a site requiring remediation. Colorado finds that small towns with former gas stations are unable to market the sites to developers as long as the tanks remain on site. A model that is working there is towns taking on the environmental work to create a shovel-ready site, which is then marketable. In this model, public funding is key to turning around the sites.

It may be more difficult to generate public support for spending tax dollars on a small gas station site, when it is competing for resources with large brownfield sites that impact a larger area and are more recognizable as a problem. Small gas station sites tend to be viewed as a source of blight in the area immediately surrounding the site; as opposed to creating an impact for a larger area with a redevelopment that has a large job creation potential. As a result, local governments are often not focused on addressing these small sites.

In addition, the economic downturn has impacted the ability to attract developer interest to these sites, and municipal participation in readying projects for development has slowed as well. Currently, localities lack the funding, staff, and initiative to take on these liabilities.

4.2.3 Economic Impact

The costs to address a gas station site vary widely across states, and vary widely within states dependent upon the site conditions, extent of contamination, and end use. The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) Tanks Subcommittee conducts a survey of the tank funds in each state. In 2011, the average cost per site to remediate an underground storage tank site was reported at $132,908 per site (ASTSWMO, 2011). This average is slightly lower than that reported by the subset of states interviewed for this study: the average reported cost per site was $189,400. However, this is the result of hugely varying costs, with Florida reporting an average of $400,000 per site for investigation and cleanup to Virginia's $35,000 cleanup cost. The discrepancy in costs can be somewhat attributed to the different cleanup standards employed by these two states, with Florida rarely allowing any contamination to be left on site, including full groundwater remediation regardless of exposure pathway, and Virginia taking the opposite approach by allowing for the removal of an exposure pathway (ie moving private wells to municipal water) if it is a less expensive way to eliminate risk.

Even within states, there is widely varying costs to address sites. Colorado estimates an overall average for cleanups at approximately $213,000; but if only sites with active remediation were considered (eliminating sites with monitored natural attenuation) the average cost is $316,000. New Hampshire estimates that active sites (those with ongoing groundwater monitoring) typically

cost about $183,000 to remediate; 98% of these contain groundwater contamination. However, a high percentage of the closed sites are soil-only sites with an average price tag of only $48,000. Because New Hampshire requires that all cleanups meet drinking water standards, regardless of the proximity of potable wells, sites with groundwater contamination are significantly more expensive. In addition, New Hampshire has an inexpensive in-state disposal option for petroleum contaminated soils. Ohio also reports that while their average cleanup is $135,000, this average includes million dollar cleanups and cleanups that cost $30,000.

> *One of my biggest concerns is what we call the pre '74 sites. South Carolina regulations pretty much mirror the federal regulations. Those tanks that came out of production pre '74 don't need to be registered. If we associate a release with one of them, we treat it as we always do. We are a rural state, we have country stores on every corner and the tanks are still there. There is not a demand for redevelopment - these are ticking time bombs. In your rural areas, the portion of your population that depends upon private water supply are greater, much more vulnerable to releases from these old gas stations. The pre 74s are lingering out there. No one knows how many are.*
>
> **Mark Berenbrok, Petroleum Brownfields Coordinator South Carolina Department of Health and Environmental Control**

In most instances, the states maintained their own tank programs, funded through various types of taxes or fees on gasoline. The eligibility requirements of these programs varies considerably, with some funding all costs associated with the removal and remediation of abandoned tanks, others excluding them completely, and some a hybrid of these two extremes. According to the 2011 State Fund survey conducted by the ASTSWMO, funds available for addressing tanks via state programs are $1.71 billion annually, with four states not participating in the survey. Collectively, 829,379 claims were received in

2011 for over one million tanks. In ten of the states that participated in the survey, outstanding claims exceeded the balance of the fund. While the average reported cost to clean up a site was $132,908; there were 1,648 sites in 2011 where the costs exceeded $1 million (ASTSWMO, 2011).

Federal regulations require that tanks that were still in the ground in 1986 register, and any new USTs must register. EPA and the states have a good handle on the number of registered tanks that exist. There are 590,104 active USTs (at approximately 212,000 sites) which are regulated by EPA's UST program. Of the 501,723 releases reported since the beginning of the UST program, 413,740 (or 82.5 percent) have been cleaned up, leaving a backlog of 87,983 remaining to be cleaned up. (USEPA, September 30, 2011)

There is general agreement that the universe of known tanks is well understood and well managed. However, State officials vary widely on their perceptions of whether the numbers of pre-program tanks (those tanks that were never registered) are significant, and whether they present a potential problem. New Hampshire and Colorado believe that the numbers of unregistered tanks is potentially huge. In New Hampshire, a study was conducted by the Department of Environmental Services through a review of historic Sanborn Fire Insurance maps for the City of Nashua. A list of former gas station sites was generated, and compared to the list of registered tanks. Only about half of the gas stations identified in this study were listed in the state database. Those sites that were not registered, presumably because operations

were shut down prior to 1986, are not in the system, and the environmental condition of those properties is unknown.

> *We don't know what we don't know. There could be a lot of sites out there that probably have tanks on them, we just don't know about it.*
>
> **Randy Chapman Remediation Program, Virginia Department of Environmental**

Colorado estimates that there are an average of five unknown petroleum brownfields sites in each of Colorado's 269 municipalities; resulting in 1300 such properties statewide. Given the large potential number of sites with unknown environmental impacts, they are concerned about the potential for a receptor impact on these sites. Because natural attenuation would have taken place, the human health and environmental impact is reduced, but Colorado views it as an issue that should be addressed. As such, they set aside 20% of their state fund to address sites with non-responsible parties, which includes properties that are abandoned tank sites.

When an unregistered tank is discovered in Ohio, as in other states, it is registered and addressed. Of the registered tanks in Ohio, less than 1% are abandoned tanks that had not been in the registry prior to discovery. Virginia's inventory categorizes tanks by registered, active, and closed, and they recognize that there is some number of tanks that are not captured in the database. However, they believe this to be a small number, particularly in the well developed northern part of the state. However, officials acknowledge that tanks are often found under roadways, routinely enough that the State DOT has access to the state tank fund to address these abandoned tanks as they arise during maintenance and expansion projects. State agents do come across sites

that aren't registered, and they do encounter previously unknown tanks during development.

Responses received from both Tennessee and Florida indicate that the universe of tank sites is believed to be well catalogued and understood in those states. New Jersey also expressed confidence that the vast majority of tanks were registered and were in the process of being addressed either by a responsible party, a municipality, or the state's publicly funded cleanup program.

4.3 Local Perspective

Based on recommendations of Federal and State officials, a number of people working at the local level were contacted for interviews. Fourteen people from 11 local jurisdictions spanning 6 states were interviewed. This was made up of 7 municipalities, both urban and rural; 3 counties; one metropolitan planning organization; and one developer. The variety of organizations recommended is indicative of the variety of approaches taken to this issue across the country. In most cases, the interviews were conducted via phone.

Interviewees were asked:

- Do you see abandoned gas stations as a big problem in your state?
- Do you know the breakdown among active stations, properly closed stations, and stations with environmental issues?
- How would you rank this problem compared to other types of brownfield sites, in terms of ability to redevelop, pervasiveness, cost to remediate, health impacts, social impacts?

- Does your community have a brownfields inventory? Do you distinguish between gas station sites and other brownfields? How did you develop your inventory? What was the motivation for developing the inventory? How many former gas stations were identified in the inventory? Do you know how many already had environmental records?
- How are you going about addressing the sites? How many sites have been addressed? What was the remediation cost? What was the extent of the cleanup (how many tanks, how much product, groundwater contamination?)
- What would you like to see changed to make it easier to address these types of sites?
- How many sites have been redeveloped? What reuses have occurred on these sites?
- Do you see this work as a systematic approach to a problem, or more of a site by site approach?
- Do you have any reports, inventories, case studies, etc you could share with me?

4.3.1 Environmental Impact

To evaluate the environmental impact, it is important to first know whether local officials understand the extent of the abandoned gas station issue in their jurisdiction. In most instances, local officials report that they do not have

a full accounting of their abandoned gas stations. All states have records of the registered tanks, which are accessible to the local governmental divisions. Many officials conceded that tanks that were not required to register because they were no longer in use by the 1986 regulatory deadline are more difficult to capture. Cuyahoga County, OH (of which Cleveland is the major metropolitan area), has records of the pre-1986 sites in Cleveland in maps and permits filed with the Cleveland Fire Prevention Bureau, however records for older tanks in the suburbs are not as reliable. If records exist, they generally document a tank abandonment. While the public generally assumes that this equates to a clean site, this is not necessarily the case. Tanks may be abandoned with soil contamination left in place, leaving less informed local officials or members of the public with a false sense that the site is clean.

The extent to which local governments tend to view abandoned gas stations as an environmental problem appears to vary by the percentage of residents using well water. When well water is a primary source of drinking water in an area, local officials are more likely to be concerned about the issue of groundwater contamination from former gas stations. In areas such as Lakewood, CO, where most residents are on municipal water and wells are used for irrigation purposes only, concern about groundwater contamination from old USTs exists, but it is not considered a priority problem. In Trenton, NJ, where there are no potable wells, groundwater contamination was seen as an issue to the extent that it increases remediation costs, but not from a public health concern.

Vapor intrusion is also recognized as an emerging problem in some areas, but Cuyahoga County, Ohio, for example, has only found vapor intrusion issues associated with active facilities.

Trenton, NJ sees abandoned gas station sites as having the potential to be as great a human health risk as any other site; the contaminant is explosive and carries a threat of vapor intrusion. As J.R. Capasso, Brownfield Coordinator for Trenton explained, “People are doing work on these properties with potential for health and safety violations; they are essentially working on a site with petroleum-contaminated soil that has a bomb buried underground. Occasionally we see fuel seeping into the sumps in the basement of neighboring properties, which also carries a potential risk of explosion.” He further states that abandoned gas stations are likely to be located in neighborhoods that are more densely developed than areas surrounding other types of brownfield sites, thus making them potentially more of a health risk. However, he does concede that the risk of vapor intrusion from petroleum is low in comparison to the risk from chlorinated VOCs.

In contrast to the views expressed by some State officials, described in the preceding section, Trenton disagrees that the degraded contamination makes it less of a concern. While petroleum does degrade, even degraded petroleum vapors are potentially flammable, and although they are less mobile, they are still toxic. The difference is that in the typical suite of analytical analysis, laboratories do not test directly for these degraded compounds. They show up as TICs – tentatively identified compounds. When you look into the

makeup of the TICs from gas station sites, they tend to be comprised of the degraded petroleum compounds that still may pose a health risk.

Tacoma/ Pierce County, Washington has a broader definition of the human health impacts of these sites. This is one of the few places in the country where the local tank program is housed in the Health Department. While most localities see the potential for health and environmental impacts in terms of a direct impact to groundwater or vapor intrusion, here it is viewed more broadly. They see the issue in terms of lost opportunities for needed services that have a direct health impact on underserved communities. The neighborhoods where abandoned gas stations sit idle often are the same neighborhoods that do not have grocery stores, thus residents do not have access to healthy food. The same neighborhoods often have a lack of parks, limiting recreational options. The presence of these blighted sites that are difficult to develop are lost opportunities for such services, and bring down a neighborhood making walking or other activity unappealing or dangerous.

Role of Planning – Plainfield NJ

Plainfield frequently comes across sites where former gas stations were closed, and a complementary use, such as a used car lot, continues. The gas station was never properly closed out, and the change in Certificate of Occupancy was never issued. A change in use that conforms with current zoning would be heard by the planning board. A non-conforming change in use is heard by the zoning board. In these instances, the local Building Department provides the site history, and if a former gas station is identified there, environmental compliance is required prior to approval. A change of tenancy application would not trigger the records review.

There was widespread agreement among all local officials interviewed that the existence of former gas stations is closely correlated with

underprivileged neighborhoods, in large part because the development incentives are weaker. Tacoma officials feel that the health link becomes obvious when the link between such brownfield sites and disadvantaged communities is made clear. Through a population based approach to public health issues, there is a growing recognition of public health issues around discrimination, poverty, and place. While the chance of tanks leaking enough to cause a direct public health issue may be low, the feeling of being less valued through having underutilized sites throughout the neighborhood impacts feeling of place and reduces the overall quality of life.

4.3.2 Social Impact

Local governments are faced with a myriad of concerns ranging from maintaining infrastructure, dealing with crime and poverty, and sensitivity to high taxes. Concern about the impacts of abandoned gas stations generally ranks much lower than these other social problems. For Plainfield, NJ, abandoned gas stations and the auto-related uses they have often evolved into, are seen as an impediment to the ability to develop priority areas. However, in a city that faces high crime, high taxes, high poverty and unemployment, and other pressing social problems; abandoned gas stations are not seen as an issue that warrants the allocation of significant resources.

In Tacoma/ Pierce County, Washington, where as previously discussed houses the tanks program within the county Health Department, views this as a significant issue for communities across the country. They have conducted a

comprehensive historic inventory and know that in Pierce County, with a population of 800,000, there are 379 old gas station sites where there is no documentation of what happened in these tanks; one old mystery station for every 2,110 people. In many cases no one remembers the stations used to be there, so there is no motivation to address these environmental concerns. Often, the sites are located at intersections of two arterials, so they are key pieces of properties for redevelopment. While it may not rank high in the economic development plans of the city overall, it can be a big problem for the impacted neighborhood.

Redevelopment of old gas stations often are infill projects, as they tend to be located in established neighborhoods, surrounded by existing uses. These smaller infill projects are typically more difficult than larger scale redevelopment projects because of the number of sites needing redevelopment and the fact that they are small. Milwaukee has found that the low hanging fruit of brownfield redevelopment is the larger site with the correspondingly larger return on investment, and most of these have now been addressed. What now remains are the small, more difficult to develop sites, to include 1/4-acre gas stations. In more affluent neighborhoods, market forces make these infill projects worthwhile. In Seattle, for example, market forces have for the most part addressed former gas station sites without the need for public funding. However, in the areas where the standard of living is not as high, these sites remain vacant.

In economically depressed areas, market forces are not sufficient to offset the risks the private sector must take to redevelop these sites. If there is no economic reason to redevelop a site, there is no incentive to remediate the site. Any development has an associated cost; even a community garden requires an investment to ensure that the soil is safe to grow and walk on, any pre-existing structures must be demolished, and fencing, gravel, raised beds, topsoil, etc must be brought onto the site. In more impoverished neighborhoods, such redevelopment occurs one site at a time, and is a slow process. In a recession, when public funds are scarce and development projects are slowed, it is even more difficult to get sites moving forward. This economic environment also makes people much more risk adverse. When the economy was such that development projects were occurring frequently, it was much easier for a local government to work with property owners to assess sites and help ready them for development. In a depressed economy property owners are less willing to take risks and are unwilling to let anyone investigate property that could potentially turn up an environmental liability they have no means to address.

Even when funding is available, it is sometimes difficult to use. Lakewood, CO applied for an EPA petroleum assessment

Case Study: Tacoma, WA

Gas station sites represent opportunities to capture the pent up energy of the community to do something positive. Tacoma Washington used a former gas station site to turn a tragedy into a positive experience for a distressed community. When a little girl was abducted and killed near her school, the community worked together to turn a nearby vacant former gas station site into a neighborhood park to commemorate the child and improve the neighborhood. Using EPA funds for the assessment and cleanup, the 5th grade class received a demonstration of what a UST was, they visited the gas station during the remediation, and they worked with students in the University of Washington's Architecture Department to develop plans for the park. 1500 people attended the ribbon cutting.

grant because they were concerned about the impacts abandoned gas stations have on the environment, community development, economic development, and blight. However, responsible parties could be identified at all of the sites of concern. Even though the responsible parties were not addressing the problem, the sites were not eligible for the federal funds. As a result, Lakewood focused these funds on planning studies along corridors negatively impacted by former gas stations. The intent is to enable environmental contamination to be addressed in a larger project focused on improvement of the design corridors for traffic and economic development. The study will also assist in identifying potential brownfield sites, and provide necessary planning research to support a light rail line in Lakewood.

Florida's US Route 41 is another example of a corridor approach to redevelopment of former gas stations. Here it is the metropolitan planning organization, or MPO, that has taken the lead in assessing brownfield sites. US 41 was Florida's transportation spine until the interstate was finished in the mid 1980s. This drew energy away from the traditional core, resulting in the closure of many businesses including gas stations.

The Sarasota/Manatee MPO (MPO) covers Manatee and Sarasota Counties. They inherited a petroleum brownfield inventory conducted several years ago under EPA grants received by the counties, and took over the program due to a shortage of staff at the county level. The MPO has now received a coalition assessment grant, and is working with the local communities to identify priorities for use of the funds. They are taking a site by

site approach within the larger corridor context, looking to improve the entire US Route 41 corridor by systematically addressing each site.

In little Rocky Ford, CO, the numbers of gas station sites are manageable, with nine former stations identified. Of these nine, two have been developed for other auto-related uses (a used car dealership and a welding / car detail business), some have been incorporated into neighboring residential properties, and the rest remain vacant. The population of Rocky Ford is approximately 3900, so resources to address such sites are limited.

Case Study: Parma Heights, Cuyahoga County, OH
A gas station was vacant for many years. The current owner had owned it since 1984. Because a responsible party existed for the site, it was not eligible for EPA or State funds. The owner wanted to donate the site to the town to develop it into a pocket park, so EPA approved the use of assessment funds on the site, but it was not eligible for cleanup funds. The county spent $55,000 of an EPA assessment grant and the owner spent $40,000 on cleanup. The site is less than 1/4 acre, and it is now a pocket park.

Tacoma/ Pierce County, WA sees a distinctive pattern of social impact with old gas station sites clustered in poorer neighborhoods. The more affluent areas often have market forces that will drive the old gas station site through cleanup and redevelopment on their own. The old sites that are legacies of former transportation routes and historic industrial patterns are left to decay, taking properties around them down, and are often magnets for crime. The Tacoma gas station database found that 68% of the population lives in census tracts that had 0-4 sites, while 32% live in census tracts that had five or more sites. The tracts that contain five or more sites account for 88% of the former gas stations, and have higher concentrations of minorities. According to the Census 2000, the most current

data source at the time of the Tacoma/Pierce study, the census tracts containing 0-4 former gas stations had 18.7% minority residents, with 8.0% poverty rate and 7.6% unemployment. Those census tracts with 5 or more former gas stations had 27.8% of residents as minorities, with 14.8% living in poverty at 11.5% unemployment, indicating a pattern of former gas station sites located in poor, minority neighborhoods. (Tacoma / Pierce County Health Department, 2008)

Cuyahoga County, Ohio echoes others' experiences with former gas stations serving as a blighting influence in the urban areas and inner ring suburbs but not in the exurbs where redevelopment values are higher. Communities in these underinvested areas often want to turn these sites into pocket parks, but as there is little in the way of public funds to address petroleum contamination in Ohio, reuses that do not provide a revenue stream are particularly challenging. This is in contrast to areas such as Virginia where public funds are available to address petroleum contamination, and as a result these sites may actually be preferred as a redevelopment site.

> *Gas station sites are probably the hardest type of brownfield sites to redevelop. Similar to dry cleaners (which are also difficult), there are more such sites, they are expensive, and they are sandwiched in among residential development.*
>
> **J.R. Capasso, Brownfields Coordinator, City of Trenton, NJ**

Trenton, NJ reports a similar experience. They see the issue of abandoned gas stations as a clear environmental justice issue, as gas stations tended to be located along highways and in populated areas. As such, cities would be expected to have a greater number of stations. Officials in

Pierce County WA agree. Their inventory map show former gas stations following historic transportation routes, which coincide with neighborhood business districts, and line up with drinking water wells. Transportation follows water, and gas stations follow transportation. Further, because of competition among oil companies, it was not unusual to see gas stations on each of the four corners in a busy intersection, often dating back to the 20s and 30s. Interest in redeveloping gas stations is very low, even when the site is in a good location, because of concerns regarding contamination. The cost per acre of cleanup for a gas station site is higher than for other brownfields, and petroleum contamination tends to impact adjacent properties. Those sites that are located in areas with high redevelopment potential have already been redeveloped. The remaining sites are those that are located in disadvantaged neighborhoods with little redevelopment interest.

In contrast, in Cleveland, gas stations are a lesser concern. Typically, redevelopment of gas stations is part of a larger development, and if a tank is found it is more of a nuisance than a problem. In the suburbs, it is more likely that the gas station will be the entire site, and as there are not a lot of funds available to address it directly, it is a greater problem. These sites are a problem for the small communities, as there are 2-3 in each community, and there is a lack of resources or expertise to address them. The community often will assume a site is clean and they don't have the expertise to guide a brownfield project through to completion.

The redevelopment efforts of Cincinnati, OH are focused on identifying and assisting projects that have high redevelopment potential and a likelihood of generating significant new jobs. As a result, smaller gas station sites do not typically benefit from the resources of the Strategic Program for Urban Redevelopment (SPUR), the redevelopment arm of the city. However, a recent EPA Coalition grant provided $250,000 in petroleum assessment grant funds. The coalition partners, the Development Authority, Hamilton County, and Cincinnati, are accepting applications from municipalities, private owners, or environmental consultants to use the grant funds to assess sites. Selection is based on the EPA eligibility requirements with a focus on cleaning up properties for redevelopment, with job creation the primary goal.

In Columbus, OH, officials also find that abandoned gas stations tend to affect areas that are disenfranchised; developers are not interested in targeting these areas as potential locations for investment without public incentives. While officials here are able to use Clean Ohio, a state grant program, to fund remediation on large brownfield redevelopment projects, until very recently, UST petroleum was excluded from eligibility. Clean Ohio has provided approximately $42 million in cleanup grants for more than two dozen projects in Columbus, leveraging over $300 million dollars. These projects have been primarily industrial or former retail; no abandoned gas stations have been included. As Ohio does not offer a grant program directed toward the cleanup of underground storage tanks, Columbus has several hundred abandoned gas station sites without any funding source directly addressing it. While EPA Revolving Loan

Fund dollars are available to provide loan funds for the cleanup of abandoned sites, this funding opportunity is not attractive to developers.

Columbus is reviewing the potential for a local Clean Ohio-type fund that would focus on smaller projects such as abandoned gas stations. Abandoned gas stations tend to be located on postage size lots, but if incentives are identified for smaller sites, housing, retail, or public buildings are possible. According to Gary R. Guglielmi, Economic Development Manager for the City of Columbus, "Working with developers is all about their risk. Our job as public officials is to lower that risk and make it profitable for them. These sites tend to be located in areas that are not as attractive to developers." A $1 million fund was established in 2009-2010 using city capital funds to implement a local grant program. Eligibility is connected to the City's green program and sites are required to receive LEED certification. As of the date of the interview, one gas station site was under consideration for funding. The redevelopment would be a family dollar store at the intersection of a major freeway, in a disadvantaged area of the City. As a condition of accepting the funds, developers are required to commit to redevelop the site in a manner acceptable to the neighborhood and City.

Former gas station sites represent an opportunity to help in neighborhood revitalization. A former gas station site in Plainfield, NJ's downtown area that sat vacant for 34 years recently received approval to be converted into a large outdoor dining area connected to a new proposed restaurant on the 1st floor of the neighboring property. The remainder of the neighboring building will hold 12

apartments. Lakewood, CO has seen sites redeveloped as dry cleaners, flower shops, pawn shops, and convenience stores. In Columbus, OH, approximately two dozen sites have been addressed; redeveloped into uses such as sandwich shops, drive-through business, and banks. Many of the communities interviewed admitted that, in addition to the reuses articulated above, auto related reuses of former gas stations are still the prevailing reuse, to include parking lots, used car sales, car dealerships, or car repair shops.

In Tacoma/ Pierce County, WA, gas stations are redeveloped as Walgreens, parks, retail, and mixed use. Walgreens in particular targets old gas station sites, and has a model for converting them into drive up pharmacies. AutoZone and McDonalds also are comfortable with converting old gas station sites. The county conducted a comprehensive inventory of former gas station sites in 2004. They identified 379 previously unknown sites, mainly in Tacoma where more comprehensive records were available. While several of these sites have move forward without public funding, the economic decline stopped the majority of these redevelopment projects beginning in approximately 2008. Officials are beginning to see renewed interest in these projects, and expressed that the decline represents a good opportunity for planning to be prepared for a surge forward in the economy. Milwaukee has also seen a slowing of redevelopment, attributed to the more marketable properties already having been addressed, leaving only the more difficult properties.

In some ways the big superfund sites are the low hanging fruit. These consist of large tracts of land that people recognize as contaminated sites. The projects are expensive, but not as much as 150 individual old gas stations. Large sites are easier because it fits the mental models we have – the bad guy should pay. With gas stations you have a couple of guys just doing their job; they aren't trying to rip anyone off. People would run a tab and pay for gas at end of month; it was personal, you knew these people and they knew you. Gas stations are more about who we are; we can't treat a gas station like a superfund site. People are worried about finding the perpetrator, and on gas station sites, the perpetrator is us. We have to have a different approach for these sites. **Greg Tanbara, Tacoma / Pierce County WA**

Columbus, OH sees many former gas stations in use as used car lots; often with underground storage tanks still intact, albeit abandoned. These sites are businesses in operation, while other sites are fully abandoned and growing weeds. The abandoned sites are not seen as a health threat, but as eyesores. Code standards and neighborhood cleanup programs ensure that the sites are mowed and trash is picked up. The influence of blight varies from place to place, but if it is in an area where everything is occupied and an abandoned gas station exists, it is only a matter of time before it is redeveloped. As Sam Stephens, from Cincinnati, OH states, "The blighting influence of smaller sites is a huge problem. There is a bigger problem for crime, blight, and economics than anyone wants to admit. Safety isn't a factor of the number of police on the street, it is a factor of the number of eyeballs; high vacancy rates mean less people keeping crime at bay, and create a disincentive to building owners to keep their buildings up and maintained."

4.3.3 Economic Impact

Local officials were consistent in that the small size of old gas station sites makes them more difficult to redevelop. They are often "upside down,"

meaning that the cost to remediate is greater than the value of the land, and their size limits the development options and potential return on investment. Many localities, such as Cincinnati, OH, strategically focus on the larger sites because of their greater potential for job development, and because of the level of effort required to work with the larger, more experienced developers who tend to conduct larger development projects is equal to the level of effort required to work with the smaller, neighborhood developers who are interested in infill projects; the larger projects typically have greater returns in terms of jobs created, taxes generated, and impact on a neighborhood.

Costs to address former gas station sites are generally not collected by local officials. However, they report that these costs vary tremendously by site, and depend upon a variety of factors, including the end use, geologic conditions, groundwater contamination, the presence of potable wells, the number of tanks, etc. Cuyahoga County reports that one gas station project cost approximately $300,000, but this was high because that site had 10 tanks; an unusually large number. Tacoma/ Pierce County, WA agrees, citing costs of up to about $250,000 per site. In King County, WA they see ranges of costs from about $100,000 for minimal soil cleanup to over $340,000 per year for many years to achieve cleanup of groundwater with a pump and treat system.

There has been much interest at the federal level in a corridor approach to the redevelopment of petroleum brownfields. A few places are looking at this, such as Florida, and Lakewood, CO. However, the vast majority of municipalities examined, including Tacoma / Pierce County, WA; Cuyahoga

County, OH; Milwaukee, WI; Columbus, OH; King County, WA; Trenton, NJ and Plainfield, NJ take a site by site approach. Several of these communities expressed interest in exploring a systematic approach that would result in more efficient use of funds. The corridor approach has worked best when there is a large development that requires the consolidation of several sites, such as a large shopping center development in Lakewood, CO that involved contamination issues from 1-2 old gas stations and 1-2 dry cleaners, with a cost estimate of $3-4 million in cleanup contamination. A $2 million BCRLF loan and $100k of Assessment funds were applied to address the contamination. It is now a mixed use residential and retail development with a shopping center. Lakewood is also conducting a corridor study for a light rail line that involves numerous gas station sites; they estimate that 40% of their work is site specific, with 60% corridor-focused. King County, WA sees current development patterns as a site by site approach, but envisions potential for a systematic approach involving a large end-user that would focus on the reuse of former gas stations, such as small community health centers.

Cincinnati, OH has developed a different type of systematic approach; they conducted a strategic analysis of the entire city and identified six areas in which to cluster public investment. The targeted areas are those that support a tax base adequate to maintain the public infrastructure. State remediation grants and EPA coalition assessment grants are used to help identify and prioritize sites based on neighborhood needs and other factors such as developer timelines, motivation, and ownership. Given the concentration of

former gas station sites in the more distressed areas, as well as the ineligibility of gas stations sites for the state remediation grants, it seems likely that Cincinnati's approach does not result in the redevelopment of a large number of former gas station sites. Instead, as they describe, public investment is focused more on larger projects with high job creation potential.

Inventories are often cited as a best practice for municipalities wishing to address brownfield sites (Smart Growth America, 2012; USEPA, May, 2009; USEPA, October 2009). However, local officials have very mixed views about this tool. Rocky Ford, CO is likely typical of most small communities. Julie Worley, Executive Director of the Rocky Ford Office of Economic Development reports that, "We do not have a formal brownfield inventory. Most of the information is contained in notes and my head." Cuyahoga County, OH developed an interactive map that was available on their web site, but lacked the resources to keep it current. As a result, they do not view an inventory as a useful tool. Instead of an inventory, they have a project list containing about 200 sites that is only available through a formal public records request. Columbus also maintained a map of approximately 2 dozen targeted sites that have since been addressed; they see this as a scorecard, not an inventory.

Lakewood, CO expressed concern about the potential impact an inventory could have on the real or perceived value of the sites. Cincinnati, OH sees potential liability issues for owners of properties surrounding a designated brownfield. Like Cuyahoga County, they maintain a project list instead. As Sam Stephens, Cincinnati Community Development expressed, "We believe the

desire to put together inventories for these properties is completely misguided. Contamination is unknown until an assessment is conducted, and the inventory creates a negative impact on the asset value of the property and surrounding properties; the assessment and cleanup process takes years to clear out, even if you are looking at an inventory as a means for prioritizing funds. The benefit of an inventory is less than the damage that the inventory can cause."

Milwaukee, WI is creating, not a brownfield inventory, but a real estate database that will cover acquisitions, sales, relocations, and environmental information. It is intended to spur redevelopment, and is a result of financial audits that indicated that better records need to be kept for city transactions. Currently, their brownfields inventory consists of an archaic list entitled "do not acquire" that indicates which properties have suspected contamination issues. This list was initially comprised of 350 tax delinquent properties with suspected contamination; both hazardous substance and petroleum sites. They now have 140 sites on the list; some were removed when taxes were brought up to date, some were foreclosed on after testing showed manageable contamination or when development interest was strong enough to justify public involvement.

In contrast, Tacoma/ Pierce County, WA sees the inventory as an important tool, and they developed a comprehensive inventory focused exclusively on gas station sites. The initial motivation was a Health Department concern about impacts to surface water. They sent a letter to five major oil companies inquiring as to the location of their oil tanks to begin the inventory

process. The inventory began with the lists they got from the three major oil companies that responded to the initial request. This was supplemented with sites found in Polk business directories and historic phone books. The research went back to 1925 in 5 year increments for gas stations, gas and oil, and other appropriate categories, up through the early 1990s. They developed an inventory of names and addresses; however the Polk directories were only available initially for Tacoma, then Tacoma and Tacoma Suburban areas; records for the entire county are not available. The Tacoma Fire Chief provided a box with 200-300 permit drawings that were submitted for the UST installation, dating from the mid-1920s to mid 1930s; again, these just covered the City of Tacoma. The inventory was completed in 2004 and documented 749 former gas station sites. These were then compared to state and local records on tank removals, reported releases, and current regulated gas stations. Of the original list of 749, 52 were active, 318 were under regulatory oversight or the tanks had been removed; and 379 were abandoned commercial tank sites. Undocumented sites thus represent just over half of all current and former gas station sites.

Plainfield, NJ also developed a comprehensive gas station inventory using city directories and historic phone books, supplemented by Sanborn Fire Insurance maps. The city finds this inventory, along with the hazardous substance inventory, most useful in responding to public records review requests. Most such requests come from environmental consultants performing a Phase 1 environmental assessment. The inventory was developed initially

because the city was seeking a starting point to prioritize brownfield sites. However, sites are not prioritized because they are on the inventory; they are targeted for redevelopment based on redevelopment plans, and more frequently, developer interest. The inventory is one source of background information once a site has been targeted for redevelopment.

Florida's Sarasota/ Manatee MPO also views their inventory as an important tool. It initially was developed through EPA grant funding to promote economic development. The targeted corridor that is the focus of the inventory runs through some of the more impoverished neighborhoods in the county; the inventory is an important redevelopment effort for these neighborhoods. The list was developed by searching databases to determine prior uses, historical surveys, locating the parcels and conducting a large amount of research going through databases.

Trenton, NJ initially developed their gas station inventory for a much different reason. While they were looking to help identify sites on which to apply their EPA petroleum assessment grant, the primary motivation was as a starting point to try to bring retail oil companies to the table to help clean the sites. A site at 504 Martin Luther King Boulevard seemed the perfect test case; Gulf Refining Company's logo was still embossed on the fill ports at the site. Trenton conducted a Phase 1 assessment of the site and sent the information to Chevron (a successor to Gulf), who never responded. Without the resources to pursue the large company, Trenton turned over the information to the New Jersey Department of Environmental Protection's enforcement office. The State

declined to pursue the matter. In most sites, the liability is not as clear; the ownership history is typically clouded with multiple owner / operators, and it is rare that the oil company was ever in the chain of title. The city made the determination that the effort to try to track down the responsible parties and compel action was not justified by the potential benefits. As J.R. Capasso, City of Trenton Brownfield Coordinator stated, “Once there is development pressure on the site we are not able to wait the time it would take to get a responsible party to respond; and until there is development pressure we have to focus our resources on more promising sites.”

Despite this, Trenton has found the inventory useful for redevelopment purposes and for responding to inquiries regarding contaminated sites. Quite a few former gas stations now have commercial development on them, and it may not be obvious that the site was once a gas station.

4.4 Best Practices

It was mentioned several times by officials at every level of government that abandoned gas station sites were not typically challenging from a technical standpoint; the contaminant and remedial options are well understood. However, significant barriers to the redevelopment of these sites continue to exist. Numerous strategies have been developed to address these barriers, and in many instances, these strategies can be translated into best practices that can be implemented by other jurisdictions. These barriers and complementary best practices can be classified into the following headings: inventories, liability,

funding availability, market conditions, regulatory environment, and enforcement.

4.4.1 Inventories

Federal officials identified a lack of publicly available site information and a lack of inventories of sites likely to be contaminated with petroleum as a significant barrier, and as an important mechanism to prevent unknown tanks from stopping a development. However, states and localities tended not to see this as a big issue, and as the federal officials acknowledged, no states are conducting comprehensive petroleum inventories, despite a brownfields inventory being a requirement for the receipt of federal Section 128a brownfields grant funds. While states were split on whether their registered tanks inventory captured the majority of tank sites, there was a belief that as tank sites were identified in the course of development they could be addressed; and the possible stigma from labeling a site a brownfields in a formal inventory process had the potential to do more harm than the potential benefit that might come from identifying these properties upfront. Local governments were much more likely to conduct comprehensive inventories, but even these are often for internal use only, or developed as a project management tool for ongoing or completed projects. Local jurisdictions also conduct inventories to better position the community for grant funds. Some localities opt not to develop inventories because of legal concerns that labeling a private property as a brownfield site is tantamount to a taking.

That said, there are certainly communities who do see inventories as a useful tool. For those communities that choose to develop an inventory, some localities have found it useful to be able to link this information through a geographic information system platform. This enables them to identify potable wells in the area, keep track of institutional controls, and identify potential off site sources of the contamination. In Virginia, Chesapeake and Albemarle Counties both have robust GIS mapping programs to identify known petroleum leaks. Albemarle County adopted an ordinance related to drinking water regulations for any new well that is installed within a radius of DEQ spill; requiring petroleum testing along with testing for bacteria. Lakewood, CO is developing a GIS system to plot the location of monitoring wells. This could easily be linked to an inventory, and will solve a problem they have of ensuring that wells are removed after three years, as required. Tacoma/ Pierce County, WA linked their comprehensive gas station inventory to a GIS system that allowed connectivity with the county tax assessor database, as well as to historic library photos, and information on parcels, streets, well head protection zones, the city's empowerment zone, Department of Ecology sites with reported releases (not just gas stations), census tracts and poverty rates.

4.4.2 Liability

There was agreement across levels of government that liability concerns, including fear of the unknown risk in terms of time, liability, and cost, was a barrier to the redevelopment of brownfield sites, including former gas stations. The longer timeframes and uncertainties inherent in a development project

involving an environmental issue may be a greater disincentive than the perceived and/or actual contamination. In Tacoma/ Pierce County, WA, they see the “polluter pays” principle as difficult to apply in the case of abandoned gas stations. This makes property owners reluctant to get engaged, and in some instances property owners are surprised that they are considered responsible. The responsible party definition is very confusing, as often people had operated the site according to what was standard practice at the time. In addition, the Washington Department of Ecology is not able to provide complete liability protection to a property owner; the qualifiers that are put on any liability protection language makes property owners uneasy. The current threat of potential liability for current, past, and future owners, operators and others makes knowledge of environmental issues risky. The threat of this risk is preventing people from moving forward on cleanups, especially in a depressed real estate market.

Federal officials cited a landbanking program initiated in Michigan as a best practice for providing liability protection to developers, as the state obtains property for development and works with developers to clean it while keeping the developer out of the ownership chain until the cleanup is complete. A WI statute allows a redevelopment authority to address the issues on the property and turn it over to a developer without actually acquiring it and becoming part of the chain of title. There is some risk involved in that the delinquent owner can pay taxes up to the last minute. In this approach, the developer enters into a

contract with the state regulatory agency, saying they know the issues and they will be new responsible party.

4.4.3 Funding Availability

In states that do not have a well-funded tank program in which orphaned sites are eligible for funding, the lack of easily accessible public funds for these smaller sites was seen as a critical barrier. In terms of their ability to address abandoned gas stations, certain elements emerged as best practices in State Tank funds. According to federal officials, some state tank programs offer periodic amnesty programs that will cover the costs of cleanup, including Florida, Michigan, South Carolina, and South Dakota. Those states that had a dedicated funding source of course had a greater ability to address sites with non-responsible parties. Many states allowed qualified contractors to apply directly for the funds, thus eliminating the burden of waiting for reimbursement from the property owner. Virginia specifically referenced NatLUST, a 501(c)(3) non profit created to provide low-cost financing to LUST fund claimants & consultants on a national basis. NatLUST is an outgrowth of Virginia's award winning Virginia Resources Authority ("VRA") Accelerated Claim Payment Program, a quasi-governmental financing program created in 2002. At the time, Virginia's tank program was insolvent and could not reimburse UST claims in a timely manner. This non-profit group monetizes the LUST funds commitment, thus enabling remediating parties to receive funding immediately.

The availability of grant funds can directly influence the market and determine which sites are developable. For example, a brownfield in Cincinnati that is eligible for Clean Ohio funds is actually more feasible to redevelop than other sites, because the Clean Ohio funds are available to cover a wide range of remediation activities including asbestos surveys and demolition costs. Projects are thus targeted based on what will be competitive for the Clean Ohio fund.

One of the issues raised by local officials is the investment of time and resources required to prepare a competitive EPA grant application. The Clean Ohio program has developed a scoring system to allow applicants some degree of certainty as to whether or not an application will receive a grant. Because of the predictability of the scoring process and methodology, potential applicants are able to determine whether to invest the time in application preparation. In addition, the way the Clean Ohio process is scored, it is intended to fund not just the best projects in state, but the best projects in each area of state. They do this by having each of the nineteen integrating districts review and score the applications, with large bonus points awarded for the best projects in each district. This ensures that there will be a geographical distribution of grantees.

Clean Ohio also offers a best practice for reporting. The reporting requirements for the Clean Ohio grants, which often are millions of dollars, are less burdensome than those for the much smaller EPA grants. This provides a model for a more efficient and streamlined collection of data to verify the work performed and accomplishments achieved. Standardizing reporting with other grant programs, including the reporting deadlines, would help make the EPA

reporting requirements less burdensome, particularly for those projects that combine multiple sources of grant funding.

4.4.4 Market Conditions

Poor prevailing economic conditions were cited as the largest barrier to the redevelopment of former gas station sites. The sites that are well located and where the market is strong have been addressed. This leaves undeveloped and abandoned the sites in poor, typically minority areas characterized by a pattern of disinvestment. The abandoned gas station site is likely to be one of many vacant lots and abandoned buildings. A best practice cited by both the OUST and OSC offices is to understand that these sites are located in potentially desirable locations such as commercial corridors and gateway areas. However, municipalities report that those sites that are in locations that are not particularly desirable are the more challenging sites.

Good planning is seen as a practice that can be employed to address the poor market conditions in these areas. As officials in Tacoma, WA explain, “We can't just go into a dilapidated neighborhood and clean up one gas station and turn the neighborhood around. We target sites for redevelopment that are located on the edge of impoverished neighborhoods, and work our way in.” In this model, when new investment such as a new commuter station or a large development nearby is anticipated in an area, officials will approach private owners or prospective purchasers of nearby brownfield sites and discuss the development potential and provide assessment assistance.

Plainfield asserts that public funds should be directed toward those areas where growth is desired; thus more resources would be available for the difficult-to-develop inner-city sites. Cities have the infrastructure, population, and jobs; directing public funds in these areas is good planning and good public policy. A focus on redeveloping urban areas with an eye toward smart growth would necessarily support the redevelopment of brownfields. Public investment can make the difference between a profitable project that will attract a developer and a site with no developer interest.

The physical characteristics of UST sites impact the ability to develop them; they tend to be small sites, so there is a smaller portfolio of redevelopment options. Sites are small so the return on investment is lower, and because of their size they may not be eligible for insurance or funding opportunities. As the country moves to implement the new national health care law, many of these sites may become desirable locations for small community clinics where people, newly covered by health insurance, can get their basic health care needs met. This idea was touted by several interviewees. Other types of redevelopment that are suited to the small gas station sites are small retail, small groceries, bank branches, coffee houses, and fast food places. However, many municipalities report that land assembly to include gas station sites in a more expansive redevelopment project are the more frequent way such sites are addressed. The former gas stations in Milwaukee are often redeveloped as new gas stations, as there is an unwritten policy that you can't build a gas station on land that was never a gas station.

4.4.5 Regulatory Environment

The Federal regulations that separate petroleum brownfields from other types of brownfields are often mirrored in state programs, creating silos at both the state and federal levels that force people to navigate separate regulations and programs. This translates to differences in eligibility requirements between the brownfield hazardous substance and brownfield petroleum sites, and in some states different cleanup criteria and oversight managers for different areas of concern at the same site.

Many states have problems implementing the EPA Petroleum assessment grants. Strict application of the EPA criteria makes it difficult to find qualifying sites, and the administrative burden tends to be much higher on petroleum assessment than on hazardous substance assessment. This is due to the lower cost of petroleum sites, which tend to result in a greater number of sites being addressed with the same amount of grant funds; as well as the greater amount of up front research required in some areas in order to make an eligibility determination.

> *"EPA is interested in acres cleaned up. It takes just as much work to get to closure on a 30 acre site as a half acre site, and you don't receive as much "credit" for the smaller site."*
> **Greg Tanbara, Tacoma / Pierce County, WA**

Plainfield, NJ is concerned that the complexity of the programs and environmental regulations prevents the majority of municipalities from fully understanding the program and successfully navigating the process without outside expertise. In addition, frequent regulatory changes make it difficult for municipal officials, with numerous responsibilities in addition to environmental compliance, to stay

current. They stress that it should be made more simple and the layers of government should be reduced. As these interviews were conducted during a period of major change in the New Jersey site remediation program, this may have contributed to the frustration levels expressed by Plainfield officials.

4.4.6 Enforcement

Enforcement against responsible parties to compel the cleanup of gas station sites is typically done by state authorities. Some municipalities have expressed frustration on the level of enforcement; either too much enforcement where it results in an inability to move a site forward, or not enough enforcement when it could be helpful. An open dialogue between the state enforcement agents and the municipal officials working to redevelop a site to jointly determine the level of enforcement that would be most useful to moving a site to redevelopment could help to address this.

An example of this is cooperation between the City of Cincinnati and the State of Ohio. Cincinnati noticed that many of the undeveloped sites had liens on the property from a previous owner's non compliance that made the property harder to develop. The City works with the State to structure penalties and fines to run with the responsible party and not with the land. These liens are not tied to physical location of the contamination, and thus do not impact the ability to develop the property.

Milwaukee officials agree that it would be useful to have enforcement available for when a gas station becomes abandoned that requires removal of

tanks; a program that would force the owners of a property to deal with tanks very quickly. Trenton suggests the State target former owners and operators of brownfield sites with enforcement, so that the burden is removed from the current owners. Often current owners did not contribute to the contamination. Even when the responsibility is clear, the State is not willing to conduct the enforcement necessary to get timely action from responsible parties. The existing system makes such enforcement difficult.

In the 1920-1940s, the industrial practices that caused brownfield sites were the state of the industry. Pinpointing the responsible party is not always possible. In addition, some property owners are small operators that cannot afford the cleanup costs. If the states take an aggressive stand on enforcement, it can embroil the site in legal issues and result in a delay of development. Enforcement should be carried out in a sensitive, site specific way to maximize the redevelopment of sites.

CHAPTER 5

ADDRESSING GAS STATION SITES IN NEW JERSEY

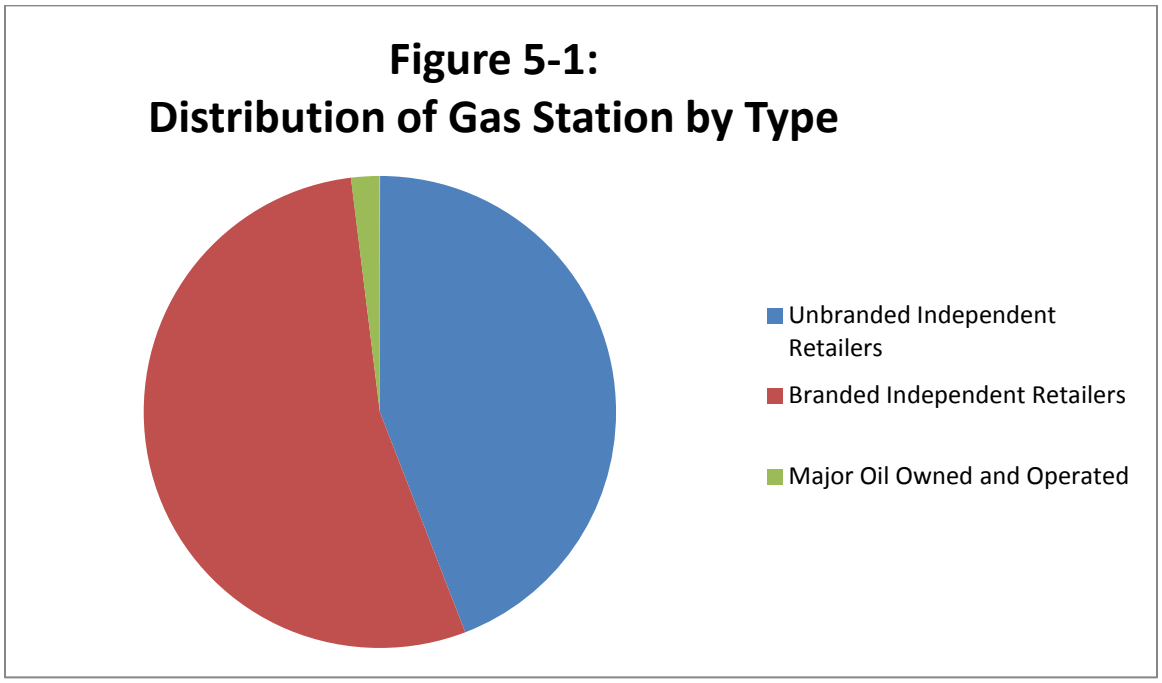
5.1 Liability and Big Oil

In order to further understand the issue of abandoned gas stations and the responsibilities and challenges associated with addressing them, it is useful to have a general understanding of the ownership structures of retail stations and the history of gasoline providers.

The 2009 Gas Price Kit published by the National Association of Convenience Stores classifies motor fuel retailers into three broad categories, depending on the manner in which they obtain their wholesale product: major oil owned and operated, branded independent retailers, and unbranded independent retailers. (National Association of Convenience Stores, 2009) Fewer than two percent of facilities are retail operations directly owned by large oil producers. These stations receive wholesale product directly from the oil company's refinery, and their profit is part of the oil company's profit. At these facilities, the parent corporation manages all aspects of the customer experience and establishes a consistent brand identity.

The vast majority of retailers are known as "jobbers," or franchises. Jobbers are responsible for siting and building new facilities, which further removes refiners from operating activities. Branded jobbers, or branded independent retailers comprise approximately 55% of facilities. These are independently owned but contract the right to sell a particular brand. These franchises benefit from marketing done by the refinery, and are assured a

constant supply of fuel. Unbranded independent retailers comprise approximately 45 percent of facilities. These retailers purchase gasoline on the open market, without committing to a particular supplier. (See figure 5-1 for a breakdown of the retail gasoline market types.)



Liability for pollution at gas station sites is anything but clear. In the past, gas stations frequently were named for their owners or for an attribute, such as "Al's Service Station," or "Guy's Friendly Service Station." While gas stations often advertised the type of gasoline offered, such as "The Two Sons Esso Service Station," this was not always the case. In addition, frequently the same site was home to several different stations, offering gasoline from several different providers. Thus, even the gasoline provider behind any contamination is often cloudy. This is complicated by the various ownership scenarios described above, which have ramifications on liability. Even in rare cases where

an oil company has direct liability, municipalities or developers frequently find, in a cost benefit analysis, that it is more expedient to address the environmental issues directly than to try to pursue a responsible party through legal means. As the City of Trenton indicated, the municipality lacks the resources to pursue such parties, and refers such cases to the State for enforcement. New Jersey, faced with limited enforcement resources, only chooses to pursue those cases with very clear liability and that are a high priority from a human health and environmental standpoint. Former gas stations rarely make the cut.

Another complicating factor in determining liability for contamination is the pattern of mergers and acquisitions throughout the years as major oil companies appeared and disappeared from the scene. In New Jersey, numerous oil companies have had retail distributers, with 38 different recognizable gasoline brands sold in the three cities included in this study, Trenton, Plainfield, and Newark. Such brands include: American Oil, Jersey Standard, Flying A, Tydol-Veedol, Richfield, and Sinclair to name a few. Many of the various brands have a common history in the giant conglomerate of Standard Oil Company, dissolved by a federal court order in 1911 that resulted in no fewer than 34 different descendent companies; one of which was Standard Oil Company of New Jersey, or Jersey Standard; today's Exxon.

There are a handful of major oil companies today, which encompass the earlier brand names found on former gas station sites. There is no straight line relationship, as some acquisitions took place over a period of time, and some only included portions of the assets. With that disclaimer, it is possible to trace

the ancestors of today's major oil companies. The listing below attempts to capture the primary ancestors that were present in the east coast market, of today's oil companies.

- Today's ExxonMobil is the successor company to, of course, Exxon and Mobil, but it is also the descendent of Jersey Standard, Esso, Humble, and Socony. (Droz, 2008)
- Sunoco is descended from Atlantic Refinery, Philadelphia Chevron Refinery, Sun, Atlantic Petroleum Corporation, ARCO, Atlantic Oil, Richfield Oil, Standard Oil, Atlantic Petroleum Storage Company, and the west coast holdings of Sinclair Oil and Standolind. (McElwee, 2012; BP, 2012; Droz, 2008)
- Shell encompasses acquisitions of Pennzoil, Pennsylvania Refining, and American Oil Works. (McElwee, 2012)
- Today's BP is a result of mergers and name changes including BPAmoco, Amoco, Standard Indiana, American Oil Co, Anglo-Persian Oil, Anglo-Iranian Oil, and the East coast operations of Sinclair Oil and Standolind. (BP, 2012; Droz, 2012)
- Hess began in New Jersey, and over time acquired Cletrac, Amarada Petroleum, Triton Energy, and the Merit stations. (Hess, 2012)
- ConocoPhillips is the result of the merger between Continental Oil which became Conoco, and Phillips Petroleum. (Droz, 2008)

- Chevron acquired Texaco, which had previously acquired portions of Getty, and their long string of ancestors includes Associated Oil, Pacific Oil, Socal, Mission Corporation, Tidewater, Tidewater-Associated Oil, Associated Flying A, Tydol Flying A, and Flying A. (McElwee, 2012; Droz, 2008; Royal Petroleum, 2012)
- Lukoil purchased the rights to the Getty name, and some Getty stations were converted to Lukoil. The Russian company also bought many Mobil stations that had been owned by ConocoPhillips. These were acquired by ConocoPhillips after an antitrust decision prompted by the merger between Exxon and Mobil forced ExxonMobil to divest some stations; ConocoPhillips now owns a share of Lukoil.

The complexity of the string of owners of the Lukoil stations in particular demonstrates the difficulty in placing liability on major oil companies for contamination found on historic gas station sites. While large corporate mergers provide a good starting point for research on a particular site, individual stations may have been part of separate, smaller acquisitions whereby a few stations were spun off and sold, or contracts with independent operators were transferred to different companies.

The preceding discussion on the difficulties in tracing liability ignores the larger question of whether major oil companies should have liability for contamination caused by their gasoline. In the vast majority of situations, it is an independent operator that is responsible for the maintenance and operation of

the site. The retail stations are an integral part of the marketing and distribution of gasoline. What responsibility do oil companies have to ensure that stations selling their product are well managed to minimize spills? The federal government, through the EPA's Office of Underground Storage Tanks, passes regulations governing the operations of the retail operators. For the most part, the responsibility for enforcing these regulations is delegated to the states. Distribution of oil by oil refineries in tankers, trucks, and pipelines is regulated separately. However, individual contracts that the oil companies have with independent gas station operators can vary widely in their terms, and may provide some shared liability for accidental releases. The owner / operator of the tanks is jointly and severally liable for any contamination resulting from the tank operation. In the instance of a non-operational tank, liability rests with the entity who owned the tank immediately prior to the discontinuation of use. In some instances, the oil companies retain ownership of the tanks, even when independent operators own the property. This compels the franchises to continue to sell a particular brand of gasoline, but results in retained liability on the part of the oil companies. Therefore, under the UST program, the owner of the tank is not necessarily the same as the owner of the real property. However, under other New Jersey laws, such as the Spill Act and Industrial Site Recovery Act (ISRA), the owner of the real property may be the "responsible party" for the tank, and would be held responsible under these laws.

Where liability is clear, however, is when a site is owned by the oil company. Every major oil company does have a real estate portfolio that

contains former gas stations. In New Jersey, for instance, when the state instituted its new Licensed Site Professional (LSRP) program, the first sites to opt in under the new regulations were those belonging to several major oil companies.

5.2 New Jersey Programs

The New Jersey site remediation program is currently undergoing a major shift, which impacts the way that sites enter the program and are addressed. As previously described in *Chapter 4: Best Practices*, New Jersey is moving from a program that is overseen by the State Department of Environmental Protection (DEP) to one that is delegated to licensed professionals, as per the Site Remediation and Reform Act of 2009; N.J.S.A. 58:10C-1 et seq. (SRRA). This change was instituted because of severe backlogs in DEP response to reports, which resulted in delays in real estate development projects and which had overwhelmed the Department's ability to address. The State manages the licensing process and retains the right to audit closure documents, known as "Remedial Action Outcomes" (RAO).

In New Jersey's Voluntary Cleanup Program, pre-SRRA, the tank program and the brownfield program were closely integrated. This allowed the transition to the LSRP program under SRRA to occur more smoothly, as only one set of cleanup standards had been applied to tanks, regardless of whether they were handled by the brownfield or by the tanks program. Administratively, the Bureau of Underground Storage Tanks (BUST) had handled remediation on

active facilities, while the Site Remediation program (Brownfields) typically handled tank sites as part of a larger redevelopment project, or when state brownfield grant funds were being used. While BUST has ceased to exist now that SRRA has been fully implemented, the core functions of the tanks program remain unchanged. Inspections and registrations of active tanks will still occur. However, cleanup of closed sites will now be done through the LSRP program. DEP believes that under the new program, LSRPs will be actively seeking out and moving sites forward, resulting in more sites being addressed in a shorter amount of time.

An LSRP is obligated to report any known discharge. However, information that the site is a former gas station is not enough to require a call to the spill hotline. Once a spill is confirmed, however, the responsible party will be held liable for the cleanup and will be subject to mandatory timeframes for submission of deliverables. Missed deadlines put a responsible party into direct oversight, with a requirement for a financial assurance. Anyone can place a call to the spill hotline, after which notifications get sent to the owner of record and other entities. If the owner is not a responsible party, they have the opportunity to notify the DEP, and the site is then not subject to the mandatory timeframes.

As described in *Chapter 6: City-wide Case Studies*, many of the former gas station sites are sites that were closed and abandoned years ago, with no current responsible party. The properties are often owned by the municipality as a result of foreclosures for non-payment of taxes. In these instances, the sites are not subject to the mandatory timeframes, and they will only be addressed if

there is developer interest, if the municipality takes the initiative to address the site, or if the site is associated with a sensitive receptor and ranks high enough to be addressed by the State publicly funded cleanup program. The publicly funded program in New Jersey is funded in part by the Federal LUST funds. These funds typically go toward the salary costs to run the program, and are not used directly for cleanups. Under SRRA, DEP no longer has the authority to issue closure letters (previously known as “no further action” or NFA letters), and will be relying on contracts with licensed professionals to implement publicly funded cleanups.

CHAPTER 6

CITY-WIDE CASE STUDIES

To examine the impacts of former gas station sites more closely, this study undertakes an in-depth examination of three New Jersey cities: Trenton, Plainfield, and Newark. New Jersey is an appropriate focus for this research as it is densely developed, at the forefront of environmental practices having one of the earliest state voluntary cleanup programs, historically industrialized with a commensurate large decrease in manufacturing sector jobs more recently, and is located on the transportation corridor between the DC/Philly and New York/Boston corridor. In addition, New Jersey is a leader in passing legislation to deal with abandoned properties. (Mallach 2010) These factors make it likely that New Jersey municipalities will have a significant number of abandoned gas stations and are potentially advanced in policies to identify and address these issues.

Two of the selected cities, the City of Trenton and the City of Plainfield, are both mid-sized, economically depressed cities. Newark is much larger in terms of geographic size and population, albeit having similar economic challenges. Trenton covers 7.65 square miles, Plainfield 6.02, and Newark three times that size at 24.19 square miles. Table 6-1 provides some useful demographic comparisons. Because all three target cities are economically depressed, former gas stations are less likely to have been addressed through the private real estate market; as these areas typically have a lower rate of return on investment, making redevelopment less attractive. Trenton and

Newark show very similar economic characteristics, with Plainfield slightly better off. All three cities have high unemployment and high percentage of non-white population, as well as high density. In addition, all three cities have active petroleum brownfields programs, although the philosophies and programs in each city differs considerably.

Table 6-1: Comparative Demographics

	US	New Jersey	Union County	Plainfield	Mercer County	Trenton	Essex County	Newark
Total Population	308,745,538	8,791,894	536,499	49,808	366,513	85,403	783,969	277,140
Minority Population[1]	27.6%	31.4%	30.6%	76.5%	33.1%	73.4%	49.9%	73.7%
Unemployment Rate[2]	8.3%[3]	9.6%	10.2%	11.6%	8.9%	13.8%	11.6%	16.0%
Per Capita Income	$27,334	$34,853	$34,096	$23,767	$36,016	$17,400	$31,535	$17,367
Median Household Income	$51,914	$69,811	$66,791	$52,056	$71,217	$36,601	$55,125	$35,659
Persons Below Poverty	13.8%	9.1%	9.1%	16.8%	10.1%	24.5%	14.6%	25.0%
Persons per square mile	87.4	1,195.5	5,216.1	8,269.6	1,632.2	11,102.6	6,211.5	11,458.2

Source: US Census 2010
[1] Defined as the percent of total population not self-identified as white
[2] New Jersey Department of Labor and Workforce Development, July 2012
[3] US Bureau of Labor Statistics, July 2012

Trenton was developed as a central manufacturing city, but has evolved into a commuter city; as the State capitol, a large number of State employees commute into Trenton. Plainfield, in contrast, grew up as primarily a bedroom community, and is now an older suburb whose residents continue to work primarily outside the city. Like Trenton, Newark developed from a strong manufacturing base. While Newark's manufacturing segment has declined, the

city still retains a manufacturing and industrial presence, in large part due to the Port of Newark and the Newark Liberty International Airport.

The historic gas station inventories in each city were conducted primarily through means of available Historic City Directories, and for more recent years, phone books. Criss cross directories and Sanborn Fire Insurance Maps were also used to verify or supplement this information. Once the historic inventory was developed, the addresses were cross checked with the tax assessor and tax maps for the cities. This enabled the identification of tax block and lots, and also provided information on properties which have become part of road or park systems. The block and lot information was used to obtain tax information from city tax databases, to include ownership information as well as property tax information, and in some cases reuse and size information. Windshield surveys, discussions with the city brownfield coordinators, and online mapping services were all used to identify the current use of the historic gas station. In addition, a records search of all available state and local environmental databases was conducted to determine which sites had environmental records associated with them. The database search was conducted through use of the DEP's Dataminer search program, which pulls data from the New Jersey Environmental Management System (NJEMS) database, and the DEP Master Database. It includes sites from the New Jersey Known Contaminated Sites List, public right to know, the UST Summary Report, and others.

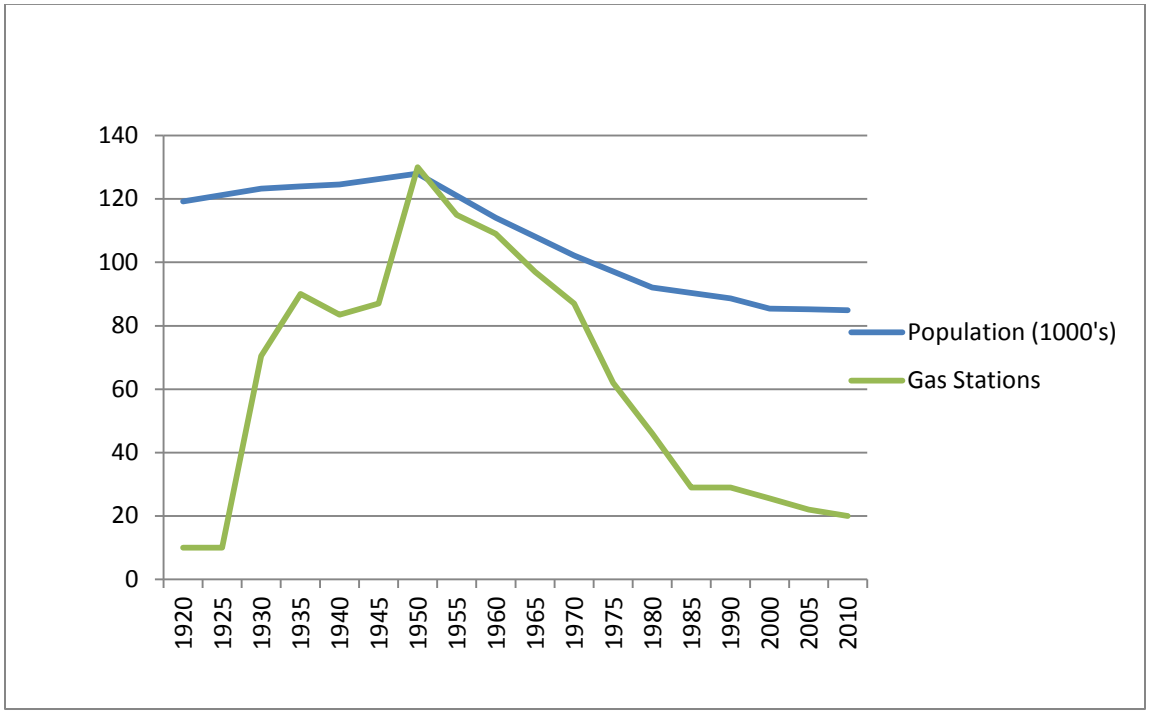
These searches were designed to identify locations where retail gas stations were located. This would include fueling stations on industrial properties designed to service a particular fleet of vehicles, or public works sites available only for use by public employees. In some instances, fueling stations that were intended for private use were listed in these directories. In these cases, such stations were captured in the numbers identified in the city inventories. However, it is anticipated that the majority of such sites were not publicly listed in the directories or phone books, and were not included. Because such private fueling stations are not commonly listed as such in historic documents, it is even more likely that a developer working on such a site will be unaware of the potential for underground storage tanks at the redevelopment location. In addition, fueling stations that were listed under the heading of convenience stores, as Jakle and Sculle indicate were common in the early 1980s, may also be excluded from these inventories. (Jakle and Sculle 1994) Thus, the inventories are likely to understate the extend of unknown former gas station sites.

6.1 Social Impacts of Former Gas Stations

Trenton has a total of 205 historic gas station sites, with 18 of these still operating as gas stations. Gas stations began appearing in Trenton City Directories as early as 1925, listed under “Petroleum Products,” and “Oil Dealers.” A jump in the numbers of gas stations occurred in the late 1920s, as car ownership became more prevalent. The numbers took a dip during the

Great Depression, rebounding and reaching a peak in the 1950s. At that point, the rise of suburbia and commensurate white flight from the city centers resulted in a decline of the population and a steep decline in the numbers of gas stations, as indicated in Figure 6-1. This decline in the 1950s also coincides with the construction of US Route 1 through the city. The sharp decline continued until the mid-1980s, when modern environmental requirements went into effect, at which point numbers of gas stations leveled off somewhat.

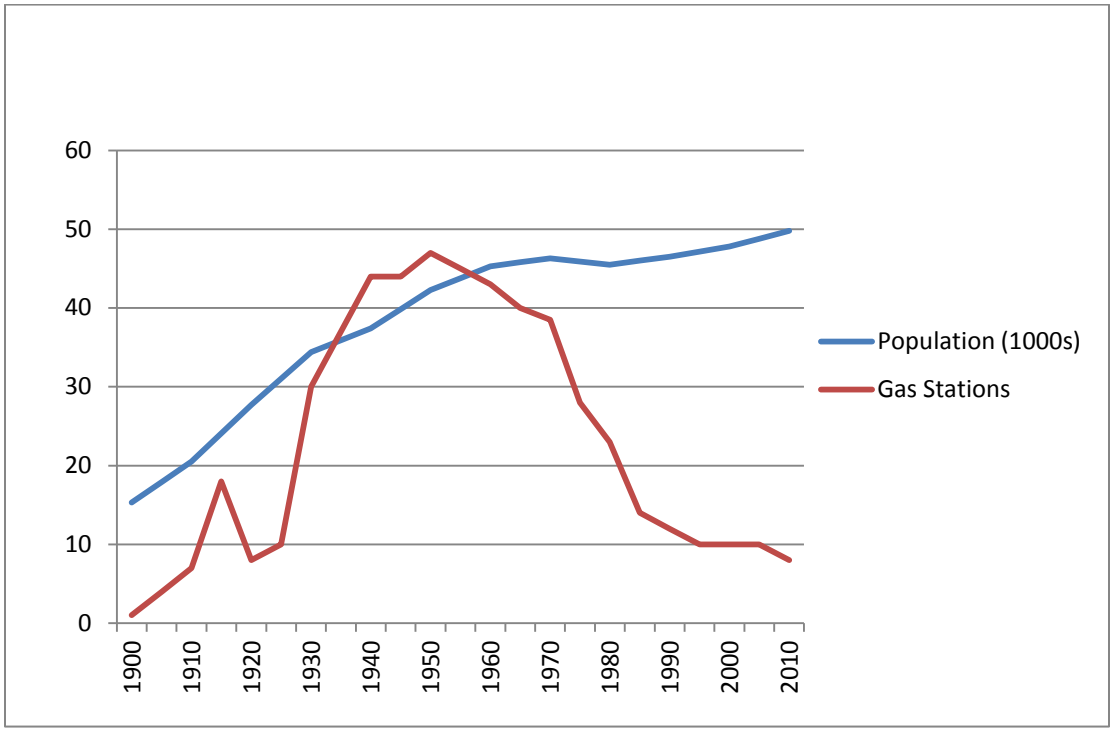
Figure 6.1: Pattern of operating gas stations in comparison to population levels in Trenton, NJ



Plainfield has 104 historic gas station sites, with only eight currently operating as gas stations. The numbers of gas stations in Plainfield follows a similar pattern to that of Trenton, peaking in the 1950s and then declining

steeply until the mid 1980s. As Plainfield never experienced the significant population decline of Trenton, the reasons for the gas station closures appear to be unrelated to overall population, as demonstrated in Figure 6.2.

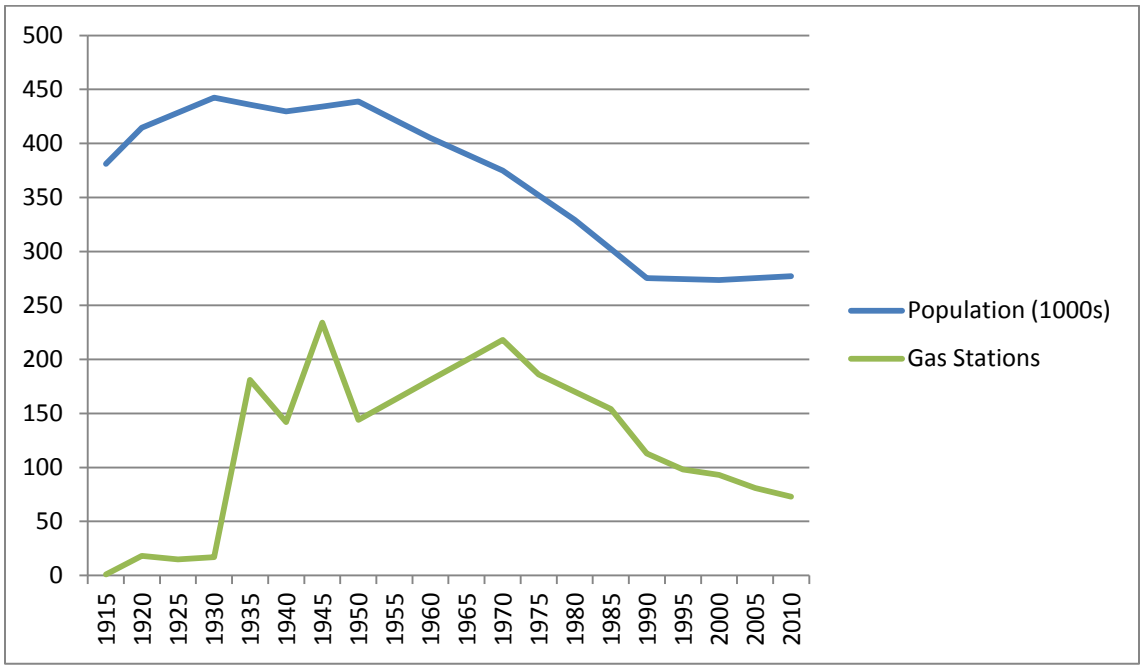
Figure 6.2: Pattern of operating gas stations in comparison to population levels in Plainfield, NJ



Newark has 416 historic gas station sites, with 63 currently operating as gas stations. The city saw a sharp incline in the numbers of gas stations from the mid 1920s to mid 1930s as Newark's population was increasing, followed by a sharp decline of numbers of active sites during the Great Depression. This was followed by an increase in the numbers of active gas stations to a peak of 234 sites in 1947, followed soon after by the sharpest drop in numbers of active

stations, coinciding with the construction of several interstates through the city. Despite a gradual decrease in the overall population levels of Newark that began in 1950, the numbers of gas stations rebounded gradually until 1973, when the numbers began to decline again, consistent with the oil shocks of the early 1970s that sent gas prices soaring. The pattern of numbers of active gas stations is compared to the population changes in Figure 6.3.

Figure 6.3: Pattern of operating gas stations in comparison to population levels in Newark, NJ



To examine the issue regarding the distribution of former gas stations and environmental justice indicators, the identified gas stations were grouped into census tracts, to enable a comparison of demographic indicators in areas with the greatest number of former gas stations. Appendix A3 contains maps of the identified gas stations, with the presence or absence of environmental

records noted, as well as selected demographic information by census tract for each of the three target cities.

Because of large breaks in the data, ordinal correlation and Pearson correlation were not feasible. A chi-square test was run to examine the correlation between minority levels and the number of gas station sites, and the Phi correlation coefficient was calculated. The correlations need to be interpreted with caution because all the census tracts in all three cities examined have minority levels greater than the national average. The percent minority selected as the dividing line between high and low was generated to place a roughly equal number of census tracts in each category. Thus, high minority rates were defined as greater than 75% for Newark and Trenton and greater than 84% for Plainfield. Obviously, there are still significant minority populations in census tracts labeled, for the purposes of this correlation, as “low minority.”

Trenton contains 27 census tracts, of which all but two have at least one current or former gas stations. The range of indicators for the five census tracts containing the largest number of former gas stations with no environmental records show individual poverty rates between 32.6 and 42.9%, minority rates ranging from 70.2% -95.6%, and unemployment from 6.7% to 14.2% (see table 6.2). Population levels within Trenton Census Tracts range from 1203 to 6152, with minority percentages from 21.7% (one of the two census tracts with no gas stations, census tract 25) to 96.1% (having only two former gas stations, one of which has environmental records while the other does not). Unemployment ranges from 0% to 21.9%. Census tract 24, with 0% unemployment, is the other

census tract within which no current or former gas station is located. Poverty in individuals ranges from 8.8% to 51.1%, while family poverty ranges from 4.5% to 44.7%.

There is a positive correlation between the presence of former gas stations and poverty rates within Trenton. It is interesting to note that Census Tract 25, which contains no current or former gas stations, has the highest population level, the lowest minority rates, and the lowest family and individual poverty rates.

A Chi-Square test was run to determine whether current and former gas stations were more likely to be present in areas with high minority populations. Minority populations were defined as high if they were above 75%, and low if they were 75% or lower, as described above. Total numbers of gas stations were defined as low if fewer than 10 sites were located in a census tract, and high if 10 or more stations were located within the tract. A 0.26 Phi correlation between low minority census tracts and high numbers of gas station sites was found, with a 18% probability that the correlation could have occurred by chance.

Table 6.2 shows the five census tracts with the least number of gas stations lacking environmental records (with the two census tracts having no gas station sites removed), and the five census tracts having the greatest number of sites lacking environmental records, along with associated demographic information for each tract. The two census tracts with no stations lacking environmental records have relatively lower minority levels. The five tracts with

the least number of sites lacking environmental records have much lower poverty rates than the five tracts with high numbers of sites lacking environmental records.

Table 6.2: Trenton: Demographic Information on the Census Tracts with the least and greatest number of Gas Stations Lacking Environmental Records

Census Tract	Population	% Minority	Unemployment rate	% Families Below Poverty	% Individuals Below Poverty	Gas Stations with Environmental Records	Gas Stations without environmental records	Active Gas Stations	Total Current and Former Gas Stations
7	3016	30.2	10.3	19.6	28.4	1	0	0	1
2	4116	48.7	7.5	18.3	20.9	0	0	1	1
12	3766	80.0	8	16.5	18.8	3	1	1	5
11.02	3806	92.4	17.1	27	27.3	2	1	1	4
11.01	2490	96.1	17	27.9	27	1	1	0	2
14.01	3644	91.0%	14.2%	33.0%	34.7%	8	7	1	15
15	2770	90.8%	6.7%	22.0%	32.6%	8	8	2	18
17	3955	95.6%	13.4%	34.8%	32.4%	8	9	1	18
10	2865	70.9%	8.7%	35.4%	42.9%	4	14	1	19
9	3409	70.2%	10.8%	28.3%	36.2%	10	18	0	28

Source: 2007-2011 American Community Survey 5-year estimates

Plainfield is divided into 10 census tracts, two of which contain no current or former gas stations at all. The gas stations in Plainfield are clustered along the commercial/industrial corridor of the city, as defined by the rail line and South Street. The range of indicators for the five census tracts containing the largest number of former gas stations with no environmental records show poverty rates between 11.5% and 37.7%, 81.5% to 87.5% minority, and 11.3% to 13.7% unemployment (see table 6.3). Population levels within Plainfield Census Tracts range from 3428 to 7085, with minority percentages from 57.8% to 88.5%. Unemployment is shown at a low of 4.9% to a high of 13.7%. Family

poverty ranges from 3.0% to 33.3%, and individuals below poverty range from 5.4% to 37.7%. The two census tracts with the lowest total population and lowest unemployment are the two with no gas stations present. The two census tracts showing the lowest percent minority population have zero and one former gas station, with that one gas station having an environmental record associated with it. The tract with the largest poverty rates have the largest number of current and former gas stations, and the tract with the smallest poverty rates has no current and former gas stations.

A Chi-Square test was run to determine whether current and former gas stations were more likely to be present in areas with high minority populations. Minority populations were defined as high if they were above 84%, and low if they were 84% or lower, as described above. Total numbers of gas stations were defined as low if fewer than 8 sites were located in a census tract, and high if 8 or more stations were located within the tract. A .60 Phi correlation between low minority census tracts and high numbers of gas station sites was found, with a 6% probability that the correlation could have occurred by chance.

Table 6.3 shows the eight census tracts in Plainfield with at least one current or former gas station site, along with associated demographic information for each tract. The three census tracts with the least number of sites lacking environmental records show the lowest unemployment levels. The two census tracts that have by far the least number of overall numbers of sites, as well as the lowest number of sites lacking environmental records, also demonstrate somewhat lower percentages of minorities.

Table 6.3: Plainfield: Demographic Information on the Census Tracts with the least and greatest number of Gas Stations Lacking Environmental Records

Census Tract	Population	% Minority	Unemployment rate	% Families Below Poverty	% Individuals Below Poverty	Gas Stations with Environmental Records	Gas Stations without environmental records	Active Gas Stations	Total Current and Former Gas Stations
392	4848	77.8	9.9	17	17.9	1	0	0	1
397	5634	80.5	7	5.6	7.5	1	1	0	2
395	7085	88.5	9.6	15.6	19.2	5	2	1	8
389	5258	82.7	12.0	19.8	21.4	1	3	0	4
394	4705	81.5	11.8	11.5	19.8	2	8	2	12
388	4400	87.5	13.7	7.4	11.5	3	4	1	8
390	3974	86.2	13.1	16.0	22.0	4	16	3	23
393	6153	84.7	11.3	33.3	37.7	10	35	1	46

Source: 2007-2011 American Community Survey 5-year estimates

For the city of Newark, the largest and most densely populated in our study, of the 87 census tracts located within the city, 10 tracts contained no current or former gas stations at allThese tracts tend to be those in residential areas, with the gas stations located in tracts containing primarily industrial, commercial, or more mixed use neighborhoods. The range of indicators for the five census tracts containing the largest number of former gas stations with no environmental records show poverty rates between 24.8% and 42.6%, 74.5% to 94.0% minority, and 3.0% to 14.4% unemployment. The range of indicators for the five census tracts containing the least numbers of former gas stations with no environmental records (with census tracts containing no former gas station sites removed), show poverty rates between 9.6% and 19.5%, 90.3% to 98.4% minority, and 12.5% to 15.2% unemployment. (see table 6.4). There is a

correlation within Newark between poverty rates and the likelihood of there being a former gas station. Population levels within Newark Census Tracts range from 849 to 6,982, with minority percentages from 20.1% to 100%. Unemployment is shown at a low of 0% in the industrial tracts, to a high of 20.5%. Likewise, the range of poverty in individuals (7.7% to 85.7%) and families (5.4% to 100%) is significant. It is interesting to note that Census Tract 9802, located in the port area, contains nine current and former gas stations, six of which have no environmental records and has the lowest overall population (849), the highest individual poverty (85.7%), and the highest family poverty rate (100%).

A Chi-Square test was run to determine whether current and former gas stations were more likely to be present in areas with high minority populations. Minority populations were defined as high if they were above 75%, and low if they were 75% or lower, as described above. Total numbers of gas stations were defined as low if fewer than 4 sites were located in a census tract, and high if 4 or more stations were located within the tract. A .18 Phi correlation between low minority census tracts and high numbers of gas station sites was found. This is the weakest of the three associations between gas stations and white-nonwhite proportions.

Table 6.4 shows the five census tracts with the least number of gas stations lacking environmental records (with the ten census tracts having no gas station sites removed), and the five census tracts having the greatest number of sites lacking environmental records, along with associated demographic

information for each tract. It should be noted that Newark has high minority and poverty rates overall, and a comparison between Newark and a city with a different demographic makeup may provide a more descriptive picture of former gas station site distribution by demographic criteria.

Table 6.4: NEWARK: Demographic Information on the Census Tracts with the least and greatest number of Gas Stations Lacking Environmental Records

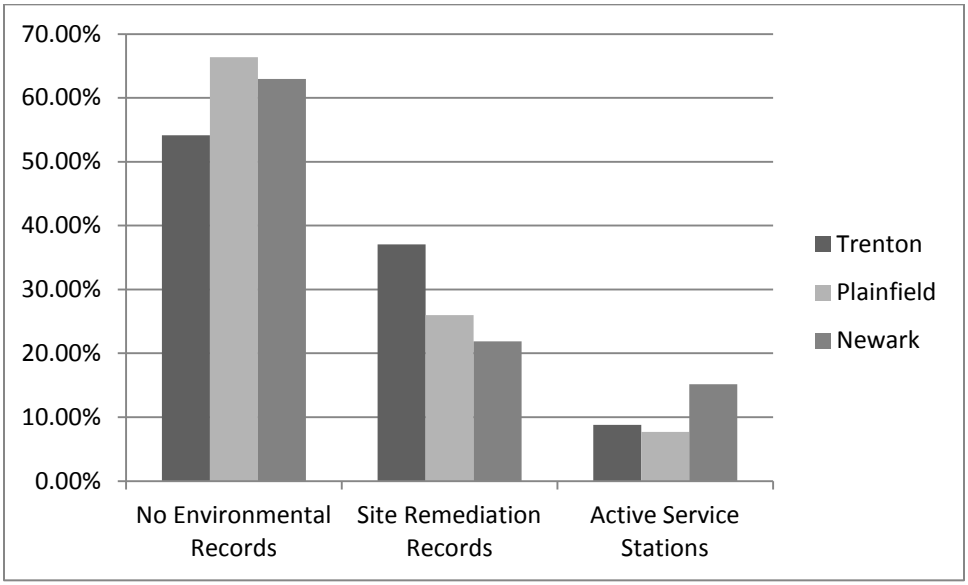
Census Tract	Population	% Minority	Unemployment rate	% Families Below Poverty	% Individuals Below Poverty	Gas Stations with Environmental Records	Gas Stations without environmental records	Active Gas Stations	Total Current and Former Gas Stations
20	4290	96.8%	15.2	12.2	18.9	1	0	1	2
25	3316	98.4%	12.4	10.3	15.7	2	0	0	2
22.02	3515	93.3%	14.4	7.4	9.6	1	0	3	4
41	2864	96.0%	13.7	23.7	23	1	0	0	1
16	1822	90.3%	12.5	16.7	19.5	1	0	2	3
231	2320	91.8%	14.3	41.2	40.9	1	11	1	13
81	3278	91.4%	10.7	8.4	24.8	3	11	1	15
10	4021	74.5%	3	22.1	35.7	1	12	1	14
50	2933	94.0%	12.3	44.8	42.6	3	12	0	14
57	3124	68.5%	14.4	40	40.8	4	13	3	20

Source: 2007-2011 American Community Survey 5-year estimates

6.2 Environmental Impacts of Former Gas Stations

A review of the available environmental databases indicates that a large majority of these sites have no record of any environmental work having been conducted at the site. Of former gas stations in Trenton, 59.3%, or 111 sites, have no environmental records; 71.8%, or 69 sites, have no environmental records in Plainfield; and 74.5%, or 263 sites, have no environmental records in Newark (see Figure 6.4).

Figure 6.4: Comparison of percentages of former gas stations with environmental records – Trenton, Plainfield, and Newark



The results are even more striking when considered around the 1986 reporting deadline. In Trenton, 94.1% of all former gas stations closed prior to 1986, and of these only 37.5% have any type of site remediation record. In Plainfield, 92.7% of former gas stations closed prior to the 1986 reporting deadline, with only 25.8% having any type of site remediation record. In Newark, 82.9% of former gas stations closed prior to 1986, and just under 17%

of these have a site remediation record. The percentage of gas stations with environmental records is significantly better when those which closed after the 1986 reporting deadline are examined. In Trenton, 90.9% of gas stations that shuttered post-1986 have environmental records on file with New Jersey's Office of Site Remediation; in Plainfield the number is approximately 57%; and in Newark 68%.

6.3 Economic Impacts of Former Gas Stations

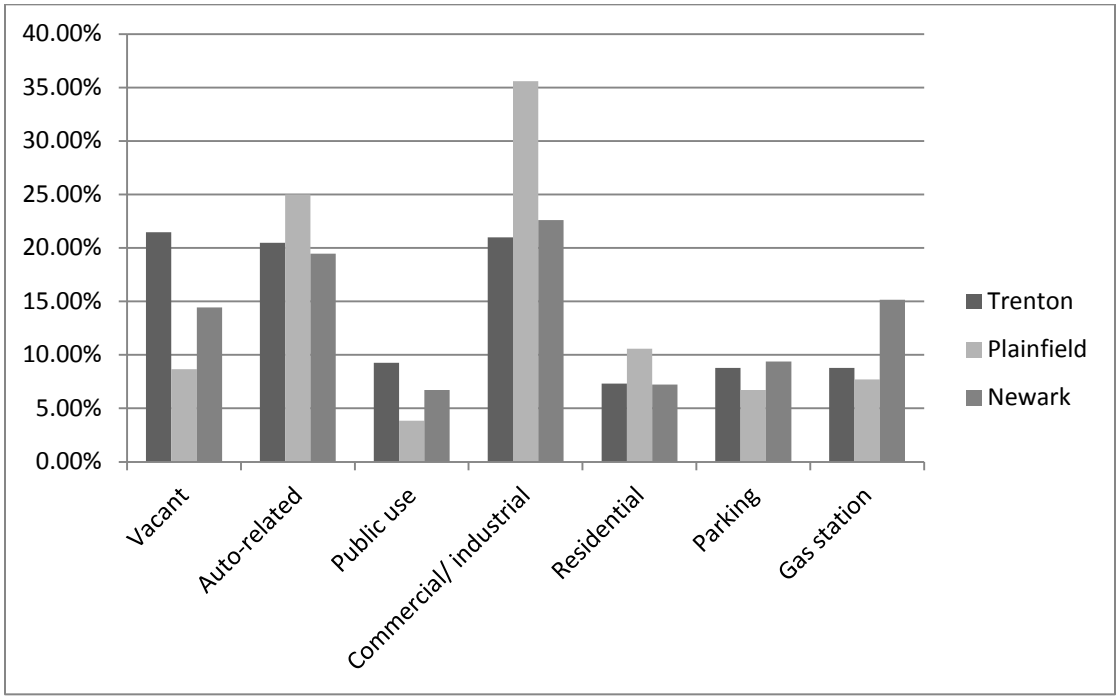
The economic impact of former gas stations consists both of the cost to clean the site to enable reuse, as well as the impact the former use has on the ability to generate the highest and best use development at the site. As indicated in Chapter IV, Best Practices, the costs to remediate sites varies considerably depending upon the region, the standards in place, the extent of contamination, and the contemplated reuse. Removing the regional variability does not do much to aid in predicting the cost. While all three case study cities are located in New Jersey, as Chapter VII demonstrates, great variability still exists. In examining the actual cost to remediate a single site in each of the three subject cities, the cost varied from a low of $41,550 in Plainfield, to a high of $274,665 in Newark.

Clearly, gas stations are able to be redeveloped into any type of reuse. It is somewhat telling, therefore, that they typically are not. In Trenton, the most common reuse of a former gas station is a vacant property. This is somewhat less prevalent in Plainfield and Newark, but it remains a significant category

across all three cities. If auto-related uses, consisting primarily of used auto sales and auto repair, but with highways, towing companies, rental companies, and motor pool maintenance also falling into this category; parking; and current gas stations are accumulated, the gas station sites are overwhelmingly still being used for auto-dependant activities. In Trenton, 38% of all sites currently house one of these auto-dependant uses, in Plainfield 39.4%, and in Newark, 43.9%. Other identified reuses include public uses such as open space, firehouses, police stations, schools health centers, churches, a salvation army, and public offices; commercial / industrial uses to include restaurants, convenience stores, storage facilities, hotels, and junk yards; and both single and multi-family residential dwellings.

A surprising result of this analysis was that far fewer stations are consolidated into larger properties for the purpose of redevelopment than one would predict based on the best practices discussed during interviews. In large part, gas station redevelopment retains the footprint of the original site, and in a surprising number of instances, the original gas station building is still present. This finding, however, is not in conflict with the discussions regarding best practices. Indeed, those instances where the former gas station was consolidated typically resulted in larger developments providing greater tax generating potential or job creation. Rather, it shows that significant obstacles exist to achieving this ideal, and as a result, a preponderance of marginal reuses is found on these sites. Figure 6.5 shows a comparison of the reuses in each city equalized by percent of total numbers of gas stations in each city.

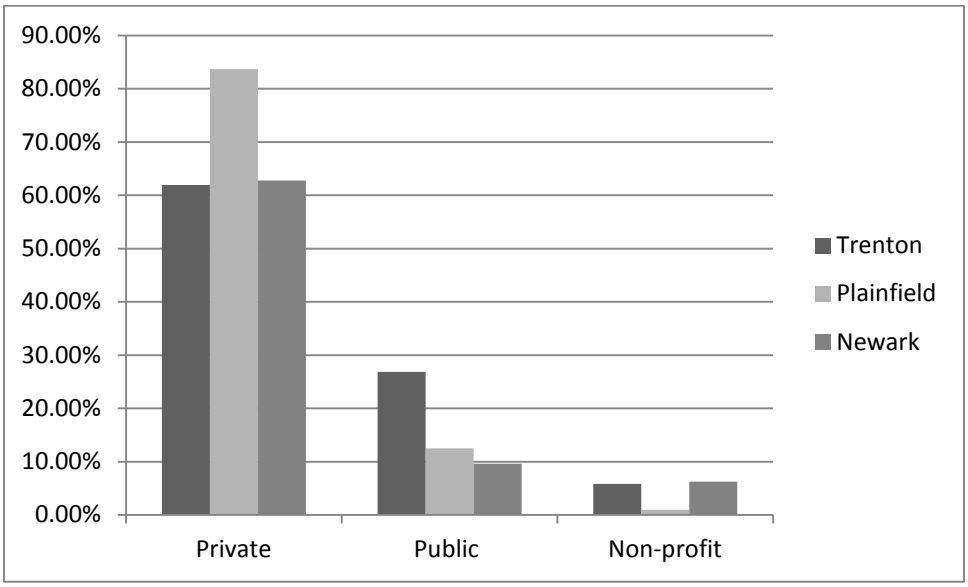
Figure 6.5: Comparison of Reuses of Gas Station Sites in Trenton, Plainfield, and Newark, NJ



An examination of ownership of current and former gas stations in the three cities shows similar patterns, as indicated in Figure 6.6. While Trenton has a higher percentage of sites in public ownership than Plainfield and Newark, privately held sites make up the strong majority in all three cities, at 61.9% for

Trenton, 83.6% for Plainfield, and 62.7% for Newark. Public ownership is the next largest category, with 26.8% of Trenton sites, 12.5% of Plainfield sites, and 9.6% of sites in Newark owned by public entities. For a small number of sites in each city the ownership was not able to be definitively ascertained due to uncertainties in the address of the site as a result of changes in street numbering systems, lot consolidations, and road construction. In each of the cities, a small number of sites are owned by non-profit organizations.

Figure 6.6: Categories of site ownership



Redeveloped gas stations have potential to contribute significantly to the tax base. Estimates of taxes generated on former gas station sites varies considerably based on the reuse, but also on the size of the parcel. In some cases, sites were consolidated into larger development parcels, and the taxes reported are based on the consolidated property; in some cases tax information was unavailable. The numbers that follow provide information on the overall

taxes generated on current and former gas station sites, inclusive of sites that consist of parcels larger than the original gas station.

In Trenton, tax information was available for 108 former gas station sites, excluding those that are owned by public or non-profit entities and that do not contribute to the tax base. Taxes range from a low of $332.52 on a small vacant lot to a high of $456,516 on a large commercial building, with an average contribution of $12,793.40 annually. In total, these 108 sites contribute $1,381,689 to Trenton's tax base.

Table 6.5 provides information on the average tax revenue generated by former gas station sites by census tracts, including demographic information, the presence or absence of environmental records, and reuse information. Information is provided for the five census tracts with the lowest average tax generation (excluding those census tracts with no sites or sites with no available tax information) and the five census tracts with the highest average tax generation. Census tract 9, with the highest average tax generation, represents Trenton's downtown area, while census tract 16, with lowest average tax generation, is situated just north of the downtown and consists primarily of distressed residential neighborhood with high vacancy rates, and is an area of active city redevelopment involvement.

Table 6.5: Trenton: Average taxes by census tract

Census Tract	% Minority	Unemployment rate	% Individuals Below Poverty	Environmental records	No environmental records	Active Gas Station	Auto related reuse	Residential reuse	Commercial reuse	Parking	Public reuse	unknown	vacant	Total Sites	average taxes
16	90.9	3.5	20.5	3	3	0			1		2		3	6	$1,552
10	70.9	8.7	42.9	4	14	1	3		1	7	1	3	3	19	$2,280
14.02	92.1	8	20.7	1	2	0						1	2	3	$3,015
3	49.0	8.9	12.2	3	4	1	5		1				1	8	$3,791
17	95.6	13.4	32.4	8	9	1	9	3	3	1			1	18	$4,304
13	80.2	9.1	11.1	0	1	0			1					1	$11,407
21	84.5	8.4	32.1	1	5	3	1	1	1				3	9	$11,672
6	45.7	9	12.3	2	4	0	2		3				1	6	$13,413
20	80.3	21.9	49.9	4	3	0		1	5				1	7	$25,222
9	70.2	10.8	36.2	10	18	0	3	2	5	6	7	1	4	28	$71,100

Plainfield has 88 sites generating tax revenue. Taxes range from a low of $1,211.52 on a small car wash, to a high of $167,412 on a parking lot that is part of a larger commercial development, with an average contribution of $16,891.84 annually. In total, these 88 sites generate $1,486,482.06 to Plainfield.

Table 6.6 provides information on the average tax revenue generated by former gas station sites by census tracts, including demographic information, the presence or absence of environmental records, and reuse information. Information is provided for all eight Plainfield census tracts (excluding those census tracts with no sites). The area with the highest average tax contribution is based on a single site redevelopment. This is a large, multi-story mixed use building on a consolidated lot that includes a former gas station. Retail and professional offices occupy this downtown building. The census tract showing the lowest average taxes per site is at the edge of the city, in a primarily

residential neighborhood, with all tax generating parcels reused as auto-related establishments.

Table 6.6 Plainfield: Average taxes by census tract

Census Tract	% Minority	Unemployment rate	% Individuals Below Poverty	Environmental records	No environmental records	Active Gas Station	Auto related reuse	Residential reuse	Commercial reuse	Parking	Public reuse	unknown	vacant	Total Sites	average taxes
389	82.7	12	21.4	1	3	0	3				1			4	$6,736
397	80.5	7	7.5	1	1	0		1					1	2	$10,749
394	81.5	11.8	19.8	2	8	2	5		1		2	1	1	12	$11,756
390	86.2	13.1	22	4	16	3	9	1	7	1	1	1		23	$14,011
393	84.7	11.3	37.7	10	35	1	5	6	21	6			6	46	$16,893
388	87.5	13.7	11.5	3	4	1	1	2	4		0			8	$19,316
395	88.5	9.6	19.2	5	2	1	2	1	3				1	8	$29,870
392	77.8	9.9	17.9	1	0	0			1					1	$40,267

Tax information was available for 260 current and former gas station sites in Newark, excluding those that are owned by public or non-profit entities and that do generate taxes. Taxes range from a low of $945.15 on a small residential property to a high of $316,046.84 on a parking garage, with an

average contribution of $16,629.80 per site annually. In total, these 260 sites contribute $4,323,748.81 annually in property taxes.

Table 6.7 provides information on the average tax revenue generated by former gas station sites by census tracts, including demographic information, the presence or absence of environmental records, and reuse information. Information is provided for the five census tracts with the lowest average tax generation (excluding those census tracts with no sites or sites with no available tax information) and the five census tracts with the highest average tax generation. The tract with the highest average tax generation is based on the taxes of a single parcel (the other three sites located in census tract 74 did not have available tax information.) This is a consolidation of a former gas station site and other lots, and is a large industrial tank farm owned by Sunoco, in the port section of the city, directly on the Passaic River. The tract with the lowest average tax generation per site is a high minority residential area, and the two former gas station sites are currently privately owned, vacant land.

Table 6.7 Newark: Average taxes by census tract

Census Tract	% Minority	Unemployment rate	% Individuals Below Poverty	Environmental records	No environmental records	Active Gas Station	Auto related reuse	Residential reuse	Commercial reuse	Parking	Public reuse	unknown	vacant	Total Sites	average taxes
54	93.6	12.6	32.2	0	2	0							2	2	$1,254
26	90.1	12.4	46.1	0	0	1								1	$2,855
18	92.7	10.6	23.3	0	6	0	1		1	1		1	2	6	$3,001
13	88.5	9.8	38.9	0	2	0			1				1	2	$3,823
69	33.9	10.7	14.8	0	1	0	1							1	$4,399
92	76.0	11.1	33.1	2	1	1		1		1				4	$26,265
57	68.5	14.4	40.8	4	13	3	5		8	3		1		20	$27,610

9802	81.9	0	85.7	2	6	1	2		3		1		2	9	$27,885
80	58.2	8.4	25.3	1	9	6			5	3		1	1	16	$54,069
74	57.4	5.1	16.7	0	3	1	1		1				1	4	$278,264

6.4 Conclusions

The growth and decline of the numbers of active gas stations follows a similar pattern across all three cities examined. By 1986, when tanks were required to register with the state, the vast majority of sites had already closed. Closure prior to this deadline is a strong indicator that no environmental records will be available for these sites, leaving uncertainty as to whether tanks may still be present below the surface. It is more likely that an abandoned gas station will be located in areas with high poverty, and these sites are likely to have no environmental records associated with them. There is also a correlation between the percentage of minorities and the presence of former gas stations, although these were not strong. Gas stations are typically reused for auto dependent uses, though uses of every type are demonstrated within the selected cities. Significant tax generation is possible on these sites, particularly when they are consolidated with neighboring parcels to allow for larger developments.

CHAPTER 7

A TALE OF THREE GAS STATIONS

As indicated through discussions with officials throughout the country, while a comprehensive program to address petroleum brownfield sites may be a goal in some areas, redevelopment is more typically addressed through a site by site approach. This chapter takes a closer look at three specific sites, one from each of the New Jersey cities presented in Chapter 6. Each of these sites were vacant for an extended period, and required public funding to move the site to a redevelopment ready state. In Trenton, the site at Front and Warren was publicly owned and remediated primarily through the use of city funds, then sold to a private developer for the construction of a mixed use building. In Plainfield, the station at East Second and Gavett Place was privately owned, but was able to make use of grant funds awarded to the city to investigate and address contamination at the site. The site has an interim use as parking and has been approved as an outdoor seating area for a neighboring restaurant. The site at Market and South 13th Streets in Newark is a publicly owned site that utilized public funds for investigation and cleanup. It is poised to be redeveloped for a public use, as an animal shelter owned and operated by a non-profit corporation. The cost to address the contamination at the three sites also varied greatly, with Trenton spending $87,000, Plainfield just $41,550, and Newark $274,665.

7.1 Front and Warren, Trenton

In one of the oldest sections of Trenton, near where the first Battle of Trenton was fought in the Revolutionary War, is a half-acre corner piece of property at the intersection of South Warren and Front Street. The area was developed early on with a mix of housing and commercial uses. By 1890, the site at 102 South Warren contained a series of three stores fronting South Warren Street, consistent with the rest of the neighborhood. Between 1890 and 1908, the property was occupied by a Chinese Laundry and Saloon, in addition to stores; across the street on the South Warren side is an early 19th Century tavern that a century later became a historic landmark. Nearby, a sheet metal manufacturing facility was in place. By 1927 the site still contained single story commercial buildings. Tires and batteries were sold next door, with commercial uses and a garage across the street on South Warren, and a garage across the street on East Front. The four buildings present in 1927 had been demolished by 1930, and in 1931 Servusoil Co service station was listed in the City Directory as occupying the site. Sanborn Maps from that time indicate a lunch wagon shared the property. By 1933 the lunch wagon was established as a diner, with the gas station still operational at the site, and by 1938 used cars were also sold there, along with the gas station operations.

From 1950 – 1980 the property continued to serve as a gas station and parking, now known as Frankie and Johnnie's Amoco, with a tire center and used car sales next door, commercial restaurant further down the block, and a

parking lot and post office across South Warren Street (the post office was gone by the late 1970s). By 1963 the site was known as C&S American service station. On the other side of East Front Street an Auto Wrecking facility was located. The commercial facility next door was a cleaners from at least 1977, and remained as such until the tenants were forced to vacate in 2006 as the city readied the property for redevelopment.

The gas station ceased operations in the early 1980s, and the owners stopped paying property taxes. In December, 1982, the City of Trenton foreclosed on the property. However, no further action was taken, and in August, 1985 the lien was redeemed by the owner.

The Trenton Landmarks Commission for Historic Preservation designated the area around South Warren Street a historic district, and later found the former “Golden Swan” tavern directly across the street from the site worthy of protection and preservation as an historic landmark. The former gas station site itself, however, sat abandoned for two decades, with the empty lot in front of the former service station building used for parking for neighboring commercial uses.

Figure 7.1: Front and Warren Gas Station, Trenton, 2003

Photo courtesy of Thomas McGough, 2003

In the early years of the 21st century, a major redevelopment project led by the city of Trenton was occurring just down the street from the abandoned gas station site. The development of a Marriott Hotel just one block away gave urgency to the revitalization of the entire neighborhood, and development of vacant lot at this very visible corner became a priority for the city. As a result, the city was actively seeking to acquire the property as early as 2001, and offered the owners (Fred Rotowsky and C Hoover) $35,000 as the fair market value, based on an appraisal by Tighue Appraisal group in February 14, 2001. The owners expressed interest in developing it themselves, and submitted an application to the planning board for a McDonalds. The application was denied.

When the private owners had made no additional progress by 2004, the city began to discuss acquiring the property via condemnation. The city asked Tighue Appraisal to update the appraisal report, and they came back with an appraised value as of June 24, 2005 of $105,000. On June 28, 2005, the city passed a resolution designating Woodrose Properties LLC as the developer of the former gas station site, and another ordinance on July 20, 2005 authorizing

the acquisition by negotiation or eminent domain from the owners, Fred Rotowsky, Charles Hoover, and Joseph Kondisko for redevelopment purposes. The authorized amount was $105,000, to be funded with Capital dollars. In 2006, the sellers responded by maintaining that they had contracts from willing buyers for this and the neighboring property (102-114 South Warren Street) totaling $475,000. The city began due diligence, conducting a site investigation through Langan Engineering, dated May 25, 2006. Upon the passing of Fred Ratowsky, the city was able to successfully negotiate a purchase of the property from his heirs, Paul Ratowsky and Craig Ratowsky; and Charles Hoover and Joseph Kondisko.

On October 19, 2006, the City entered into an “Environmental Testing Agreement” with the then owners of the property. As a follow up to the site investigation work conducted by Langan, Trenton planned a test pit investigation at the former service station. As part of the Environmental Testing Agreement, $50,000 of the agreed upon price was held in escrow and would be used in part to cover the costs of this test pit investigation. If contamination was discovered during the test pit investigation, the city would have to provide the reports, along with a remedial cost estimate, and the Sellers would have an opportunity to obtain a lower estimate for the remediation, or use the City’s company and deduct from the acquisition price for the property the amount of the lower estimate or $50,000 whichever was less. The agreement thus capped the environmental costs to the Seller at $50,000, held in escrow by the city. Once

DEP approved the remediation, the remainder (if any) of the escrowed amount would be returned to the seller.

Langan Engineering and Environmental Services conducted a Sanborn Map review and GPR survey, soil investigation activities (nine soil borings and lab analysis), and site investigation in 2006. This was followed by additional soil and groundwater investigation, for a total investigation cost of $26,560. The soil investigation yielded evidence of a release at the site including oil staining, sheen, elevated PID readings and petroleum odors at and below the water table. While no underground storage tanks were found during the geophysical survey, a tank was later discovered during the building demolition. Soil samples were found to have concentrations of volatile organic compounds and total petroleum hydrocarbons below the New Jersey Department of Environmental Protection's soil cleanup criteria. The City of Trenton entered into a Memorandum of Agreement with the NJ DEP to enter the site into the state voluntary cleanup program, effective April 5, 2007. Testing of soil in the sump pump indicated it was hazardous for Tetrachlorethelyne. In June 2007, the city disposed of 2 cubic yards of soil from the sump.

The city and Woodrose Properties, LLC entered into a disposition agreement on August 21, 2007. The project was described as the "the construction of a building at least 9,000 square feet. The building can be used for multiple purposes, retail, office, commercial, food establishment, professional and residential occupancy. The improvements will add to the overall development of the Center City South Redevelopment Area, the Hotel District

and the South Warren Street Historic District." Stipulations included in the disposition agreement indicated that the main building entrance would be on South Warren Street, or at the corner, and the building would be a minimum of 2.5 stories. While mixed use was permissible, residences would not be permitted on the first floor. The façade was to be masonry and complement the surrounding neighborhood.

As part of the disposition agreement, the city committed to demolishing the building (necessary to complete the remediation) and to conduct all appropriate remediation to obtain a No Further Action letter from NJDEP. A clause was included, "If the results of continuing investigations and remedial actions indicate that remediation costs are excessive as to render the project not feasible, the City or Redeveloper may terminate this agreement, and the property ownership shall revert to the City.

USA Environmental Services, Inc was hired in 2008 to remove a 550 gallon waste oil UST at the site, discovered during the demolition of the service station building. Excavation began on January 15, 2008, and involved the pumping and disposal of 325 gallons of liquids from the tank. The UST was a single steel layer 42 inches in diameter by 7 ft and 8 inches long. The tank appeared to be intact, and field screening of soils in the excavation showed no evidence of contamination; in addition, no groundwater was encountered in the excavation. AWT Environmental services Inc was retained to complete the soil remediation, consisting of excavation and removal of 50 yds of contaminated soil and backfill, in June, 2008. On August 7, 2008, the sale of the property to

Woodrose was finalized, for $105,000, with Trenton still retaining responsibility for completing the environmental work remaining on site.

DEP required a groundwater investigation in the vicinity of the former sump. In March 2009 a temporary well point was installed, and one sample taken which showed tetrachloroethene at 4.35 µg/l above its respective GWQS of 1.0 µg/l. In total, 110 tons of soils impacted with chlorinated volatile organic compounds and arsenic in exceedance of NJDEP SCC were excavated and disposed. The remediation consisted of contaminated soil removal and cost $60,300, for a total environmental cost of just under $87,000, funded entirely through capital dollars. Two separate no further action letters were issued by the DEP: one in January 6, 2009 for unrestricted use for 550 Gallon Underground Waste Oil Tank, and the other in April 2, 2012 for unrestricted use for the Sump Pit Area of Concern.

The new mixed use commercial building was opened in 2010. It is a three story cast stone and brick building with about 13,000 square feet of space. The ground floor has retail space, an entry lobby and several on-site parking spaces. The upper two floors serve as office space for the Communication Workers of America.

Figure 7.2 Reuse of Front and Warren Gas Station, Trenton

Photo: Leah Yasenchak, June, 2012

7.3 Gavett Place Lot 5, Plainfield

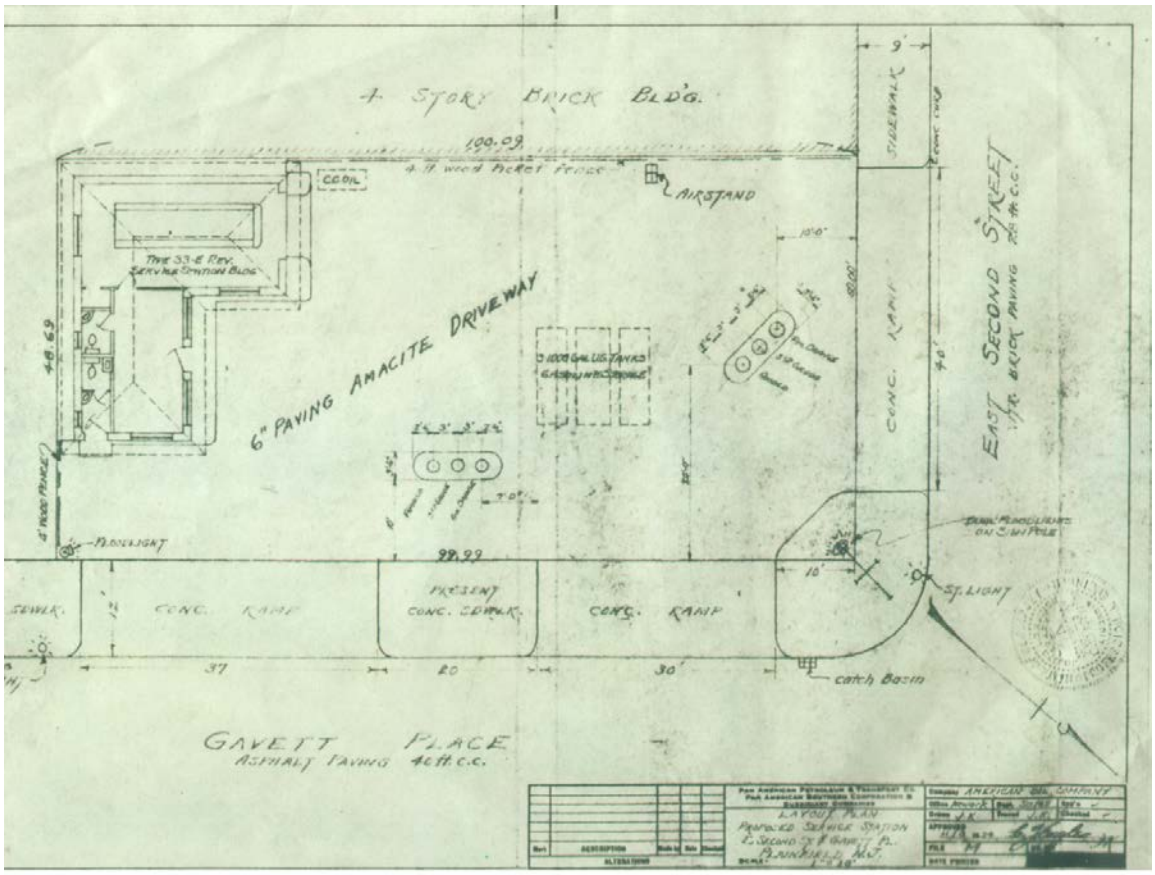
On the corner of East Second Street and Gavett Place, in the heart of downtown Plainfield's Central Business District, sits a vacant parcel known as "Lot 5." The site was residential until at least 1886, when the earliest available Sanborn map shows a two family residential dwelling occupying the property, prior to the construction of the Gavett Place roadway. By 1892, however, a large building occupied the site, labeled AD Thompson livery. By 1904 services at the site had expanded to include trucking and storage, and in 1910 the building was labeled "Boarding and Sale." The neighborhood was gradually changing from a residential / commercial area to become more and more predominantly commercial.

The next available mapping of the site appears in a 1931 aerial, which provides the earliest documentation of the existence of Gavett Place. A 1934 proposed site plan (see below) shows the filling station as it appears today. However, City Directories document a filling station at this location as early as 1916, and it is probable that the 1934 proposed site layout was intended to expand a filling station that was already present at the site; it is believed that the structure currently present at the site was constructed in the 1920s. The site was vacated in the 1970s. The site has been known as American Oil Company, Amoco JM Service station, Socony Service Station, Steve's Friendly Service, Joe's Friendly Service, Drew's Friendly Service, Bud's Friendly Service, and Pete's Friendly Service Station. The last listing of the site as an active service station was in the 1972 City Directory. At the time of decommissioning, the tanks were removed. This was verified by recent environmental investigations; no documentation of the original tank removal was found. The current owners acquired the property in 1977 and confirm that it has been vacant at least since that time.

While the site is privately owned, the City of Plainfield identified this as a priority site for redevelopment via the North Avenue Redevelopment Plan, and included it in the Brownfields Development Area application to the NJ DEP. To promote redevelopment, the city dedicated a portion of their 2005 EPA Petroleum Brownfield Assessment grant funds to conduct a Phase 1 study of the site to assist the current property owner in obtaining a no further action (NFA) letter for the property. The Site encompasses approximately 0.115 acres

of land; of which, 480 square feet (sf) is occupied by a one-story masonry structure that was historically used as an automotive repair facility and filling station, located along the southern boundary of the Site. The remainder of the property is paved.

Figure 7.3 Proposed Site Plan, Gavett Place, Plainfield, 1934



Submitted November 8, 1934, courtesy of the Plainfield Public Library, Local History collection.

Since acquired by the current owner in 1977, the site has been used only for storage, and more recently as parking under a formal arrangement with an adjacent school. A Preliminary Assessment / Phase 1 Report conducted by Hatch Mott MacDonald (HMM) for the City of Plainfield was conducted in early 2009. This report identified five areas of concern, including a heating oil tank, underground storage tanks and piping, above and below ground pumping stations, and sumps and pits. The Site Investigation Report, dated December, 2009, presents a summary of environmental activities, including the performance of a geophysical survey, installation and sampling of soil borings and test pits, laboratory analysis of soil samples, and the removal of one heating

oil tank. HHM was contracted to remove a 550 gallon heating oil tank that had been out of use since at least 1977. The tank was removed in November, 2009, and was found to be intact, with no discharge. The Phase 1 cost $3,000, the Phase 2 was $25,050, and the tank removal and additional investigative work was $13,500, for a total environmental cost of $41,550. All costs were eligible under the City of Plainfield's EPA Brownfield Petroleum Assessment grant, and because no contaminated soils were encountered, the site was able to receive a no further action letter from the state at the completion of the Phase 2 investigation and tank removal.

The owners, (Gavett Place Properties, LLC) then brought the site to Plainfield Planning Board to receive approval to renovate the neighboring vacant four-story building. The first floor will contain 2,482 square feet of retail space, and the upper floors will have a total of twelve residential apartments; four on each floor consisting of six single bedroom units and six two bedroom units. Final site plan approval, with conditions, was granted on October 6, 2011. The abandoned gas station site will be used as an outdoor retail area, likely outdoor seating to support a neighboring restaurant.

On December 17, 2012, over a year from the date of initial site plan approval, the developer submitted plans to the City to comply with the conditions of the initial approval and to ask for variances on the required number of parking spaces. This application shows the gas station building remaining as a kiosk, and a flat green roof placed over the open plaza area that will host either open

air retail or outdoor seating. To date, no development on either the gas station site or the adjacent building has commenced.

Figure 7.4: Gavett Place Lot 5, with adjacent building targeted for redevelopment

Photo courtesy of Kevin McAllister, December, 2008.

7.4 Mahdi Getty, Newark

On the western edge of Newark, the Roseville neighborhood was fully developed by 1892. South 13th Street, Market Street, and Orange Street come together here, in a primarily residential enclave. The property situated on the corner of Market and South 13th housed two homes with a horse stable behind the southern-most home and an auto garage behind the northern home. These homes remained through 1950, while the house facing them on the opposite corner of Market and South 13th made way for a restaurant. The homes remained until about 1954, when the lots were sold to a holding company. A gas station was constructed on the .4 acre site by about 1966,including a 1,350

square foot one story masonry building with a flat roof, coinciding with the start of construction on Interstate 280 behind the site. By the 1980s the entire Interstate had been completed, and much of the properties surrounding the gas station site were abandoned. On May 8, 1986, as required, the property owner, James E. Godwin, filed a NJDEP Underground Storage Tank Registration Questionnaire, listing five tanks. The Getty site remained a gasoline station until the mid 1990s, at which time Godwin converted the property to an automobile repair shop.

Figure 7.5: 1961 view of Mahdi Getty neighborhood

View of the Mahdi Getty neighborhood circa 1961. The "Orange Towers" restaurant (Hamburgers – 15 cents) is shown in the right hand side of the photo, with the Mahdi Getty site off the to the left. The photo is taken standing on Orange Street looking down S 13th Street. (courtesy of the Berg Collection, Newark Public Library, Roll #45, photo 68)

Figure 7.6: Mahdi Getty site in 2009

Photo courtesy of Birdsall Services Group, 2009.

Godwin, owner and operator of Mahdi's Service Center received a hardship grant from the state to remove the tanks present at the site. He hired AquaSol, an environmental contracting company to remove five tanks in November, 1999. The closed USTs included one 550 gallon vehicular waste oil UST, two 3,000 gallon gasoline tanks, and two 4,000 gallon gasoline tanks. According to the UST closure report, the tanks were in poor condition. Numerous holes and evidence of severe corrosion were identified on all sides and along the bottoms of all five tanks. Petroleum had contaminated the soil around and beneath the former tanks and near the former fuel dispensers. AquaSol reported stockpiling 800 tons of contaminated soil for later removal.

The UST Closure Remedial Investigation Report dated November 4, 1999 was submitted to DEP. Just a few weeks later, NJ DEP Bureau of Underground Storage Tanks responded with a list of deficiencies and requirements for the contamination case including delineation and remediation of the contaminated soils, completion of a groundwater investigation, receptor evaluation and ecological evaluation.

Godwin received another hardship grant to hire AquaSol to conduct the remedial investigation required by the DEP. May 10, 2000 547.57 tons of petroleum contaminated soil was disposed of to Soil Safe Incorporation (SSI) to Salem, NJ. On July 24 and Oct 5, 2000, three shallow monitoring wells were installed around the former UST areas at the site. A petroleum odor and sheen was observed in MW 1 and 3. GW was encountered at approximately 21.6 ft, bg to 24.13 ft bg. The resultant Remedial Investigation Report was dated January 26, 2001. Costs to do supplemental remedial activities was $99,851.46 (above the initial costs of tank removal). On October 1, 2001 the city foreclosed on the property for non-payment of taxes, but Godwin stayed on as site operator. The DEP response to the RIR was dated October 31, 2001, and required that a Remedial Action Workplan (RAW) be submitted to address outstanding issues including delineation and remediation of the contaminated soils, completion of a groundwater investigation, institution of a groundwater CEA, and a receptor evaluation. DEP followed up with a letter to the Mahdi Service Center on June 24, 2002, indicating that the required RAW and Receptor Evaluation were overdue and that enforcement action will be taken.

Correspondence between AquaSol (now renamed AquaTek) and DEP continued until 2006, with AquaTek seeking grants on behalf of Godwin, now a tenant on the site, to complete the additional work. No additional work occurred as a result of these negotiations, and in 2006 Godwin vacated the site.

Figure 7.7: Interior of Mahdi Getty building, 2009, illustrating poor housekeeping practices

Photo courtesy of Birdsall Services Group, 2009.

No further environmental work took place at the site until the city obtained an EPA Petroleum Assessment Brownfields Grant in 2009, and expended $4,500 to have Birdsall Services group perform a preliminary assessment at the site, dated March 11, 2009. Areas of concern identified during this investigation included potential residual soil contamination at the area of previous tank removals, a 275 gallon waste oil above ground storage tank inside the building,

an additional 1,000 gallon fuel oil UST, an in-ground car lift with hydraulic fluid tank, the gasoline dispenser / pump island areas, at interior of structure, a potential on-site waste water collection system of oil/solid/water separator, drums and buckets containing potentially hazardous wastes within the building, and stained soils throughout the site. Contaminants of concern included gasoline, heating fuel oil, air compressor lubricants, parts cleaning fluids, motor oil, transmission fluid, gear oil, lubricants, automotive antifreeze, waste solvents and automotive fluids, oxygen (compressed gas), acetylene, argon, solvents, paint thinners, waste solvents, paints and automotive fluids.

Figure 7.8: Mahdi Getty, Newark

Photo courtesy of Birdsall Services Group, 2009.

Feb 20, 2009, the two former hydraulic lift pistons were excavated. About 46 gallons of an oil / water mix was removed and disposed. The 1000 gallon

heating oil tank that had not been removed in the earlier tank removal activities was identified and removed in Feb 2009. The Remedial Investigation / Remedial Action Report documenting these activities was dated May 4, 2009.

The city obtained an EPA Petroleum Assessment Brownfields Grant in 2009, and expended $158,565 of the $200,000 grant conducting the investigation at Mahdi. A HDSRF application was submitted to the state in the amount of $135,901.25 to cover some additional groundwater investigation as well as 25% of the costs of soil removal at the site. The site was eligible for 25% of the costs of remediation because the site was being cleaned to unrestricted use. As of this writing, the grant application had been pending for over three years, and the city moved forward with the work in expectation of eventually receiving the grant funds. All site structures were demolished in February, 2011, and 693 tons of benzene contaminated soil was excavated and disposed of off site. The scope of work changed somewhat based on the results of the groundwater investigation, so the eventual amount spent does not exactly equal the amount requested in grants. As a result of the building demolition and additional excavation, Birdsall intends to issue a soils only Remedial Action Outcome (RAO). They were named LSRP by the City of Newark at the end of 2012. However, based on contamination encountered at the bedrock / groundwater interface, they have recommended an additional groundwater investigation to include a bedrock well. In total, the amount that the city will have spent to fully remediate the site will be $274,665, with the bulk of that covered by federal or state brownfield grants.

In March, 2011, a pit bull was found severely neglected, stuffed in a garbage bag, and thrown in a garbage chute in Newark. Patrick, as he was christened, has made a full recovery and became a rallying cry around the need for a better animal shelter to serve Newark and the surrounding area. The city-owned Mahdi Getty site was eyed as a potential site for this shelter. ARQ Architects developed a plan for building the animal shelter here in 2011 that envisioned a three-story building of 23,000 square feet. In 2012 a non-profit was formed to raise funds, build, and operate the shelter. Currently the project is in the fund-raising stage, with the Mahdi Getty site vacant and awaiting its new purpose.

Figure 7.9: Mahdi Getty, 2012

View of the Mahdi Getty site from South 13th Street, October 2012. (photo Leah Yasenchak)

CHAPTER 8

CONCLUSIONS

This study provided insights as to the location and current uses of former gas station sites, as well as the extent of knowledge of these sites. There are, however, unavoidable limitations of the data that was used in this study, which are presented here. Following this, a description of each research question and the findings that result are presented. Policy implications and opportunities for further research are presented at the end of the chapter.

8.1 Limitations of Data

Interviews were conducted with public officials throughout the country. However, their perspective is necessarily limited to those gas stations that move through the public funding and regulatory programs. Having the opportunity to talk to responsible parties, oil company representatives, gas station developers, and gas station owners would add an additional dimension to this discussion, and may result in additional examples of best practices.

There is some error involved in developing historic gas station inventories. Addresses change, sites are identified by more than one address, street names changes and streets are reconfigured, and early gas station listings were not always clear on the differentiation between auto repair and gas supply. As a result, the location of some sites could not be definitively identified. In Urban Renewal Areas, the entire street grid was reconstructed – for these sites, only general areas where the site had been could be identified. Others

were identified via clues from the name, block configuration, and historic Sanborn maps. Particularly where block and lot configurations have changed over time, there is likely to be some error in the identification of these parcels. Identification of ownership, taxes, and reuse are necessarily snapshots in time, and are constantly changing. In addition, formulaic payments in lieu of taxes (PILOTS) are not generally provided in the tax assessor's database, and thus these sites are not able to be included in the analysis of tax revenues generated on former gas station sites.

Determinations on the presence or absence of environmental records was obtained using available file searches, and may not fully capture all environmental work done at a site. For example, at the Gavett Place site in Plainfield, the tanks had been removed in the 1970s, but no records of that removal were available. In addition, because of the great variability of remedial costs, it is impossible to generate a reasonable estimate of the total costs to clean these sites on any type of large scale. The data collected by ASTSWMO only reflects those sites that moved through the publicly funded UST program, which are not necessarily representative of the costs of sites addressed on the private market. Finally, these sites are generally located in areas that have been heavily impacted by development; in many cases it would be impossible to isolate any type of environmental impact of the site from neighboring sites.

8.2 Summary of Findings

While this study focused on three New Jersey cities and regional variability is to be expected, somewhat similar results in disadvantaged cities across the country is indicated by the fact that the reporting deadlines are national requirements, and the factors leading to gas station closures were national in scope. The results from the Trenton, Plainfield and Newark research indicate that the universe of unreported and unaddressed sites may be more than double what EPA is currently tracking and regulating. Left unaddressed, these tanks pose potential threats to human health and the environment, as well as representing a significant unaddressed cost both socially and economically.

8.2.1 Research Question #1: What is the extent of problem?

Former gas stations exist in every community. States differ in their approaches to identifying and addressing these sites, with a commensurate difference in understanding of the extent of the problem. Those localities that have developed historic inventories, to include Tacoma - Pierce County, Washington; Rocky Ford, Colorado; and the subjects of this study: Trenton, Plainfield and Newark in New Jersey, all have come to the same conclusion: the standard environmental databases miss a large portion of the actual former gas stations. For some of these, such as the former gas station on Lot 5 on Gavett Place in Plainfield, NJ, the tanks actually had been removed when the gas station went out of commission. However, that experience tends to be the

exception, and officials report finding tanks frequently during redevelopment activities.

In looking at the three historic inventories generated through this study, 59.3%, or 111 sites in Trenton have no environmental records; 71.8%, or 69 sites in Plainfield have no environmental records; and 74.5%, or 263 sites in Newark have no environmental records. Extrapolating these percentages nationally, with a federal backlog of underground storage tank cases of 93,123 reported in 2010 by the EPA, we could expect to find approximately 140,000 to 280,000 sites currently unknown to regulators.

This great unknown should be of great concern to regulators, who have created a false sense of security both within government agencies and the public overall, that the issue of underground storage tanks is well understood and under control. The truth is that there are more potential tanks out there then known tanks, and those that are not registered are likely to be older tanks put in place prior to safety requirements that are now standard. Merely by making more of a public attempt at identifying these sites and adding them to the reported backlog of cases, greater awareness of the scope of the problem would be generated. A greater appreciation of the magnitude of the problem could result in increased resources being applied to identifying and remediating these sites. A greater understanding of the locations of these sites can protect developers from unexpected costs and delays associated with environmental cleanup.

8.2.2 Research Question #2: What are best practices for addressing former gas station sites?

Officials interviewed were very candid about their programs along with shortcomings and where they felt their programs were particularly successful. Based on these interviews, identified best practices fell generally into the following categories: inventories, liability, funding availability, market conditions, regulatory environment, and enforcement.

Inventories: Historic brownfield inventories have the potential to uncover many unknown sites which may have tanks still present underground. The most useful inventories are those that are linked to geographic information system (GIS) information to allow for tracking of potable wells in the area, institutional controls, and potential off-site sources of contamination. A robust tracking system allows sites to be addressed based upon multiple priorities, including potential impacts to human health and the environment, redevelopment potential, and those located in economically or environmentally distressed neighborhoods.

Liability: Various practices were identified to assist with liability concerns, including a Michigan landbanking program that protects developers from liability by keeping them out of the ownership chain until the environmental issues have been addressed, and a Wisconsin statute that allows a redevelopment authority to address environmental issues on a property and turn it over to a developer without becoming part of the chain of title.

Funding Availability: Some state tank programs offer periodic amnesty programs that will cover the costs of cleanup; these are very dependent upon the availability of funding. Many states developed their own funding sources for underground storage tanks, with varying eligibility requirements and varying success levels. Those states that had a dedicated funding source of course had a greater ability to address sites with non-responsible parties. Many states allowed qualified contractors to apply directly for the funds, thus shifting the burden of waiting for reimbursement from the property owner to the contractor.

The Clean Ohio program was cited as a best practice for grant programs for the predictability of their scoring system, which allows applicants to know going into the process, how likely they are to receive funds. In addition, the Clean Ohio process includes having each of the nineteen integrating districts review and score the applications, with large bonus points awarded for the best projects in each district. This ensures that there will be a geographical distribution of grantees. This program is also held up as an example of streamlined reporting to verify the work performed and accomplishments achieved.

Market Conditions: Targeting sites located on the edge of impoverished neighborhoods builds upon the stronger market conditions outside these neighborhoods and starts to move redevelopment into the core target area. Piggybacking redevelopment of gas station sites onto large ongoing developments is another way to engage property owners and encourage spinoff development that could encompass former gas station sites. Land assembly to

include gas station sites in a more expansive redevelopment project is another mechanism that has been successful in moving former gas stations to development.

Regulatory Environment: Many brownfield sites, including former gas station sites, have a multitude of areas of concern encompassing both hazardous substance contamination and petroleum contamination. The current legislative distinction between the types of contaminants is mirrored in federal programs and often in state programs as well. Some states, however, developed an integrated approach to these sites, and enabled remediating parties to work under a single regulatory framework with a single oversight contact to receive a single closure document.

Enforcement: A cooperative approach to enforcement between the state enforcement agents and the municipal officials working to redevelop a site was cited as helpful to facilitating redevelopment. An example of this best practice occurs between the City of Cincinnati and the State of Ohio. The City works with the State to structure penalties and fines resulting from a prior owner's non compliance to run with the responsible party and not with the land, thus freeing the land for redevelopment.

As evidenced by the wide variety of suggestions that resulted from interviewing officials who are grappling with this issue on a regular basis, there are many mechanisms that could be employed to better assist local governments and developers. The fragmented approach to UST regulatory implementation makes widespread adoption of these practices challenging.

This was initiated by the different legislation that addressed hazardous vs. petroleum contamination. As the programs were delegated to the states for implementation, this fragmented approach was preserved. New Jersey is a rare exception, with an integrated program that uses the same technical requirements for UST and hazardous sites. The federal government could assist by removing the fragmented legislative approach to brownfield development that currently exists, which spawned the fragmented approach adopted by many states. Funding is clearly an issue, and one which has been successfully addressed by many states with robust state LUST programs that allow for orphan site eligibility. Encouraging this approach nationwide would allow for a resource for local governments and developers when faced with a UST that is impacting development.

8.2.3 Research Question #3: How is New Jersey addressing the problem of abandoned gas stations?

New Jersey has an integrated approach to brownfield sites, with both petroleum and hazardous substance contamination remediated under the same technical requirements, and offering a single closure document to indicate regulatory compliance with the standard. The state has recently transitioned from a state voluntary cleanup program, with state officials providing oversight and regulatory closure, to a licensed site remediation professional (LSRP) program. This change was instituted because of severe backlogs in DEP response to reports, which resulted in delays in real estate development

projects. The State manages the licensing process and retains the right to audit closure documents, known as “Remedial Action Outcomes” (RAO). DEP believes that this program will result in more sites being addressed in a shorter amount of time, as LSRPs will be actively seeking out sites.

Knowing that a site is a former gas station is not enough to require a spill report, actual evidence of a discharge is required. Once a spill is confirmed, however, the responsible party will be held liable for the cleanup and will be subject to mandatory timeframes for submission of deliverables. Missed deadlines put a responsible party into direct oversight, with a requirement for a financial assurance. Many of the former gas station sites were closed and abandoned years ago, with no current responsible party. These properties often have come under municipal ownership through non-payment of taxes. In these instances, the sites are not subject to the mandatory timeframes, and they will only be addressed if there is developer interest, if the municipality takes the initiative to address the site, or if the site is associated with a sensitive receptor and ranks high enough to be addressed by the State publicly funded cleanup program.

While New Jersey has taken great strides to mandate cleanup of contaminated sites and to hold responsible parties accountable to strict timeframes for compliance, the bulk of orphaned gas station sites are exempt from these requirements. This is appropriate, as local governments do not have to resources to take on all of these sites at once, however an alternate is needed that will ensure orphaned gas station sites are addressed at some level.

New Jersey's LUST trust fund is bankrupt and is no longer accepting applications. However, passing legislation to develop a guaranteed funding source and providing publicly funded cleanups to orphaned gas station sites using this source would enable the State to systematically address former gas station sites without placing an undue burden on local governments. This cleanup should be done in cooperation with localities who are setting redevelopment priorities. This would require that the public recognize this as a significant problem impacting many communities, and a decision at the political level that it warrants putting appropriate resources toward addressing this issue.

8.2.4 Research Question #4 What are the economic, social, and environmental impacts of these sites?

To answer the question of the costs and benefits of addressing former gas station sites, I relied primarily on the three city-wide inventories and the three individual site case studies.

8.2.4.1 Environmental Impacts

The data collected from Trenton, Plainfield, and Newark demonstrates the potential magnitude of the unaddressed abandoned gas station issue. The numbers of gas stations which closed prior to the 1986 federal reporting requirement dwarfs those that are subject to this requirement, and a majority of these have no associated environmental records. This indicates the potential presence of numerous USTs that are at the end of their life expectancy. This

hidden threat is likely to be contributing to soil and groundwater contamination, and potentially indoor air pollution as well.

Actual environmental impacts vary greatly from site to site, and depend upon the age of the tanks, the age of the contaminants, the extent of the contamination, whether groundwater has been impacted, the presence of potable wells, and the presence of nearby sensitive receptors such as surface water bodies. The development of an order of magnitude analysis of these impacts requires exceedingly complex risk assessments beyond the scope of this work. (National Research Council, 1994; Ellerbusch 2006) However, I believe that the greatest risk comes from impacts to groundwater, particularly when groundwater is used as a drinking water source.

8.2.4.2 Social Impacts

Poor market conditions are the primary reason that gas station sites remain undeveloped. This is more likely to be the case in economically disadvantaged communities. As all three cities examined in this study are characterized by high unemployment, high poverty, and high minority populations, the ability to compare the presence of former gas station sites across different socio-economic characteristics was limited. However, the presence of unreported gas stations is more prevalent in the most distressed census tracts within the three cities studied. This should be a concern from an equity standpoint, as well as a health and economic development standpoint. The abandoned gas station site is likely to be one of many vacant lots and

abandoned buildings in a neighborhood characterized by disinvestment. This results in lower returns on investment for a potential developer, and makes it much more difficult to attract a developer and fund a remediation and development.

In addition, the physical characteristics of former gas station sites impact the ability to develop them; they tend to be small sites, so there is a smaller portfolio of redevelopment options, and the return on investment is likewise smaller. Gas station sites are sometimes folded into larger projects for development, but this tends to happen in areas with higher land values. Former gas stations are often developed into new gas stations; in many communities it is difficult to site a new gas station unless the property has historically had a gas station there.

In examining the reuses of former gas stations, it is clear that these sites often do not stray far from their gas station roots. Auto body shops, used car lots, parking lots, and scrap yards are common reuses. These less desirable uses, many of which evolve on the site without addressing the environmental conditions left over from the prior gas station uses, are what neighborhoods with weak markets have come to expect. Strong public involvement is necessary if communities are to ensure that the environmental issues are addressed and that higher and better uses are championed.

As communities look to prioritize sites for redevelopment, these sites with active, although less than ideal, reuses, typically would be a lower priority. The exception would be a larger revitalization project involving changing land uses

on a wider scale, or if contamination were to impact the water supply or neighboring residents.

8.2.4.3 Economic Impacts

The cost of addressing contamination on gas station sites can range widely, and either represent the very low end of remediation costs or be astronomical in comparison to the size and reuse potential of the site. Because of this, it is difficult to make generalizations on the economic impact of investigating and remediating these sites. However, it is clear that even the rare site that has no contamination present will, by virtue of its former use, require several thousand dollars of investigation costs to verify that no contamination exists. Any owner or developer will approach this investigation with caution, not knowing whether their particular site will be on the low or high end of the remediation spectrum. Liability concerns, including fear of the unknown risk in terms of time, liability, and cost, are barriers to the redevelopment of former gas stations. In many instances, if no public funds are available, development will not occur.

The costs of not addressing the issues, however, are greater to society overall. Unaddressed gas station sites tend to be vacant or to have marginal reuses such as scrap yards, used auto sales, parking lots, or repair shops. These continue to contribute to contamination at the site, and continue to blight the neighborhoods in which they are located. The lost opportunity for jobs, services, and ratables is enormous, given the large number of former gas

station sites serving no use (vacant properties) or marginal uses. The tax data for the redeveloped sites in each city indicates the potential these sites have for becoming an important source of tax revenue. Bringing more of these sites back into productive use will provide jobs and services to these underserved communities, as well as remove blight from the neighborhood, thus contributing to improved quality of life and higher property values.

While some areas do not have adequate markets to support redevelopment of vacant former gas station sites as tax generating or job producing engines, relatively little funds would be required to transform these sites into gathering places for the community as opposed to a source of blight and magnets for crime. Interim uses appropriate for these locations include parking, temporary locations for farmer's markets, or community gardens in raised beds.

Clearly, there are significant impacts, environmentally, socially, and economically. The environmental impacts vary from site to site, and can be well understood and characterized. However, due to the great variability in site conditions, an estimate of the overall environmental impact of former gas station sites is impossible. The social impacts are more troubling. In some cities studied, there is a clear correlation between abandoned gas stations with no environmental records and poverty. This should come as no surprise: market conditions are poor in areas of high poverty, which depresses development potential, which is often the trigger for environmental investigation. However,

these sites then contribute to a larger social issue of abandonment and decay. The economic impacts of this blighting influence are widespread, in addition to the direct cost of environmental investigation and cleanup.

8.3 Policy Implications and Recommendations

There are important policy implications to this study. Currently EPA is not addressing a large category of underground storage tanks. Understanding the extent of the problem and where these sites are located indicates a need for policy changes in the distribution of brownfield money and the criteria by which funds are distributed through states to address underground storage tanks. Liability relief measures at the federal and state levels could also be explored to encourage municipalities or private owners to address these hidden threats. In addition, municipalities may wish to conduct historic gas station surveys as part of their brownfields inventory efforts to ensure these sites are fully captured in brownfield programs.

This study clearly shows that many former gas stations remain unaddressed environmentally and undeveloped or underdeveloped. Shifting public policies and resources to better address these sites would have significant positive impacts on the distressed neighborhoods that host these properties. Many strategies can be employed, including making public funding more available and easy to obtain and use, a more thoughtful enforcement strategy that is focused on promoting redevelopment, a clearer more predictable roadmap toward cleanup that developers and officials can readily understand

and follow, employing good planning practices in prioritizing and redeveloping sites, and aligning public assistance to generate the greatest potential return in difficult to develop areas.

Existing public funding for petroleum cleanups is difficult to obtain and difficult to use. Petroleum and hazardous substance funding should be integrated to the extent that the administrative work involved in developing an artificial separation ceases to be a barrier to the use of funds. This would involve aligning eligibility requirements for the two funding sources on the brownfield side, as well as aligning these with the LUST Trust fund eligibility requirements. A level of certainty and predictability should be brought to the federal funding applications, so that applicants can conduct a cost benefit analysis on the time required to develop an application against the likelihood of receiving funds. Reporting should also be streamlined to avoid placing an undue administrative burden on those receiving public funding. Administrative requirements that remain should be fully fundable by the grant, without impacting the competitiveness of the application.

Sites are often subjected to an array of different, sometimes contradictory requirements from hazardous substance vs. petroleum regulations at the state and federal level. These should be aligned so that there is a single oversight entity for a given site, and the closure requirements pertain to the overall site, not just a portion of the contamination. The uncertainty in terms of time and scope that results when a single site has to move through two separate

regulatory processes is often enough to convince a developer to move on to another site.

Cooperative relationships between the State enforcement agencies and the municipalities and developers moving projects forward would facilitate remediation and development. Development is often complicated by property liens placed by the State for remediation work and assistance in working through these would be beneficial to moving development forward. When appropriate, enforcement should be targeted toward the entity that contributed to the pollution, not toward the current owner who often acquired the property after the gas station closed and is working to redevelop it. It should also be remembered that identifying the responsible party is not always clear, and sometimes the costs to enforce is greater than the cost to remediate. Public funding should be made more readily accessible to address these sites in the cases where no true viable responsible party is available.

The goal of enforcement should be to maximize the redevelopment of sites, which requires that it be carried out in a sensitive, site specific way, in partnership with a municipal government working toward a reuse for the site. At the State level, the limited resources available are a constraint, but could be prioritized by examining sites for those that have viable responsible parties and addressing these in cooperation with the municipality, so that a reuse can be developed while the enforcement process is underway. In this model, the State would be proactive, as opposed to reactive. The current practice is for States to look at sites that have been referred by municipalities, at which point there is

usually development pressures that can not tolerate the delays caused by the enforcement system.

The complexity of environmental regulations forces the majority of municipalities to hire outside expertise in order to navigate these programs. Frequent regulatory changes make it difficult for municipal officials, with numerous responsibilities in addition to environmental compliance, to stay current. Layers of government should be reduced, programs should remain constant for a given period of time to inject some certainty into the process, and the process should be simplified so that local officials and developers can understand each subsequent step. While outside expertise would be expected for the actual investigation and cleanup, developing clear, unbiased, understandable processes for addressing these sites would help municipal officials to better manage the process, and reduce the level of uncertainty facing developers.

Public funds should be directed in areas where the private market is unable to move redevelopment forward without assistance, and in areas where additional growth is desired in order to promote more sustainable communities. Thus, more resources would be made available for urban sites that have resisted development. Directing public funds to areas where infrastructure, population, and jobs already exist is good planning and good public policy.

Former gas station sites can be a catalyst for revitalization of a neighborhood, if the site is selected properly. Sites located in the transition area between a distressed area and a more affluent area are good choices for initial

investment. Targeting an entire area for redevelopment is more effective than a shotgun approach to redevelopment, and provides greater potential for neighborhood wide revitalization that is sustainable once the publicly funded incentives are gone. This indicates an alignment of federal and state funding sources and incentives beyond environmental, to include planning, transportation, acquisition, demolition, infrastructure, and redevelopment.

8.3.1 Setting Priorities

The overall picture is bleak. Numerous former gas stations dot the landscape, most of which are not included on any inventory or tank registration, and nothing is known about the environmental conditions at the site. There is currently not enough funding to address all the sites, so if this issue is to be tackled, priorities must be established to enable communities to target resources and maximize the impacts of efforts. Sites could be prioritized based on any number of factors, to include public health impacts, environmental impacts, redevelopment potential, need for public funding, cumulative environmental and blighting impacts, and potential for removing blight. The “correct” prioritization for any municipality will be determined by the goals and particular situation of the municipality. However, some guidelines for selecting among priorities are possible.

If, as the literature suggests, we have an obligation to address these sites for the good of both current and future generations, removing threats to human health and the environment should be the first priority. Human health threats from abandoned gas station sites stem primarily from contaminated ground

water, where groundwater is a source of drinking water. These sites should receive first priority; in areas where petroleum contamination has been found in the drinking water supply, these sites should be aggressively sought out and remediated. While some states, such as Virginia, allow for carbon filters to be placed on wells to eliminate exposure, these need to be maintained and the water must be monitored long term. By removing the contaminant source, this problem can be resolved permanently, with the added benefit of the creation of one or more developable sites.

A similar argument can be made for the prioritization of sites that directly impact a natural resource such as a stream or wetland. Removing the source of the contamination will provide benefits into the future from an ecological standpoint. This is a benefit to both humans and wildlife, and can be seen as an important obligation one generation has to the next.

The types of urban areas that are the focus of this study are unlikely to have many gas stations falling into these categories. None of these cities relies on groundwater for drinking water, and all residents are connected to the municipal water supply. While it is possible that there may be some ecological impacts from these stations, given the highly developed state of these cities, such impacts are likely to be limited to a small number of stations. However, in these highly developed areas, it becomes more likely that vapor intrusion from soil contamination could be entering surrounding buildings and creating an indoor air health risk. These sites should also receive priority for remediation.

Despite the apparent reduced health and ecological risks, I argue that society nonetheless has an obligation to address these sites, as opposed to allowing them to languish and spread through impoverished neighborhoods like a cancer, lowering investment interest and perpetuating decay. The obligation is more to current residents than to future generations, as it is today's communities that suffer from the economic blight inherent in these sites. While the overall impact of redeveloping these sites in depressed markets may be slight, to the immediate neighbors the impact is enormous. In addition, while the environmental impacts of an abandoned site may be small, in depressed urban areas this site is likely to be only one of many hazards that is contributing to a cumulative environmental risk. Finally, there is a benefit to both present and future generations as improvements in areas of high density areas reduce the development pressures in more pristine locations, thus preserving them into the future. By making our urban centers more appealing, we are encouraging a more sustainable, smart growth development pattern.

Once the immediate health hazards have been addressed, prioritization of the remaining sites should be done based on the most good that can be accomplished with the funds. Where there is active developer interest, the private market can be expected to handle the environmental and redevelopment issues. However, in many instances the additional costs of the environmental work make the redevelopment economically infeasible without the addition of public funds. For those projects where the redevelopment is socially beneficial, (i.e., creating jobs, reducing blight, creating housing opportunities, etc), these

projects should be ranked highly in determining how to allocate limited resources.

For communities looking to systematically reduce blighted properties, interim uses can be employed that maximize the return on public dollars. Depending on the individual requirements of the State, frequently sites that are covered with concrete can be repurposed for community gardens using raised beds and imported soil, or covered with asphalt and used for basketball courts or other hardscape-dependent recreational uses, without addressing the underlying environmental contamination. Once a more permanent reuse is identified, the tanks can be removed and environmental issues can be addressed. This strategy only is feasible where all potential exposure pathways have been eliminated.

To put public funding into cleaning and redeveloping an abandoned gas station as a solely public initiative, communities could prioritize based on several factors. Abandoned gas stations may be identified in areas where they serve as the single blighting factor in an otherwise robust community. For these sites, often a minimum of public funds is required to assess and market the site. Once the risk of uncertainty has been eliminated, developers are much more likely to address sites in otherwise strong neighborhoods.

The remainder of sites, and the bulk of sites in economically distressed urban areas, are likely to be clustered in poor neighborhoods where such site is one of many blighting properties. These sites should be prioritized from the outside in. In other words, the sites at the periphery of the distressed

neighborhood should receive attention first, as the community seeks to revitalize derelict areas by squeezing the blighted area; rehabilitating the areas that border stable neighborhoods first. These properties are the most likely to support a successful redevelopment, and provide the greatest potential for improving the neighborhood. Care must be taken to ensure that a redevelopment designed to benefit one neighborhood does not cause negative impacts to the adjacent neighborhood.

8.4 Recommendations for Further Research

In Chapter 2: Theoretical Basis of Research, I discussed various literature and theories relating to the numbers and distribution of abandoned gas stations, the governmental response, and the ethical obligations we as a society have to address such sites, including a discussion of the environmental impacts, social impacts, and economic impacts. However, these rich areas of study provide an incomplete lens with which to view the overall issue of abandoned gas stations. More work is needed, as clearly demonstrated by the sheer numbers of gas station sites requiring remediation and redevelopment. We have a good understanding of the market forces that caused stations to be located where they are, and of the economic decisions that led to their closures. However, the most appropriate reuse of each station lies in the decisions of the community within which it is located, and should be developed within the larger context of the neighborhood and the market.

Various areas which deserve further exploration are the environmental justice implications of abandoned gas stations and regional differences in how the issue is approached; and the benefits of gas station redevelopment.

This study indicates that unreported former gas station sites are slightly more prevalent in minority and economically distressed neighborhoods in cities with many minorities. Additional analysis in the form of a multivariate regression would be useful to determine the extent of the correlation and identify additional variables contributing to the likelihood of an unreported former gas station site in a particular neighborhood. Conducting inventories in wealthy communities, or in communities with greater racial and income diversity than the three selected in this study, would be important to be able to establish this relationship.

Developing inventories of other types of environmentally compromised sites, such as dry cleaners, traditional brownfield sites, landfills, waste to energy facilities, scrap yards, etc, would provide a more complete picture of the cumulative environmental impacts placed upon economically disadvantaged areas. Layering this with health data also has the potential to highlight social inequities, though there are likely to be a myriad of causes for increased health impacts to include environmental contamination, but also involving lack of access to healthcare, nutritious foods, and recreational outlets.

This study only examined three cities in depth, and these are likely to be subject to the same regional variability. As the brownfields redevelopment programs, state requirements, land use values and development pressures will vary from state to state and locality to locality, these differences could be

significant. To enable a more complete understanding of the patterns of untracked former gas stations; additional research to include areas outside New Jersey, rural areas, and highway or geographic strip areas would be required. However, while City Directories are available for many larger urbanized areas, duplication this effort in other types of geographic areas that do not have access to these historic documents would be more challenging.

Much work has been done to identify the types of reuses appropriate for former gas stations, but this study shows that, at least in the poor, urban areas targeted here, the most common reuse is for marginal auto-dependant activities. A greater understanding of the potential of these small sites to provide jobs, services, and tax revenue, and to reduce blight and encourage increased investment in communities would provide a means for concerned community groups to market these sites to public officials, and encourage public participation in the redevelopment. As the literature on environmental ethics indicates, we have an obligation to both current and future generations to continue to pursue this issue.

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APPENDIX 1

IRB CONSENT FORM

INFORMED CONSENT FORM
The Ubiquitous Brownfield: Abandoned Gas Stations and their Social, Economic, and Environmental Implications

You are invited to participate in a research study that is being conducted by Leah Yasenchak, who is a student in the Bloustein School of Planning and Public Policy at Rutgers University. The purpose of this research is to establish a baseline of best practices for addressing issues associated with abandoned gas stations.

Approximately forty-two environmental professionals will participate in the study, and each individual's participation will last approximately 30 to 60 minutes.

The study procedures consist of emails to determine an appropriate time for the interview and communicate in advance the interview questions, the interview itself, and follow up summaries of the discussions.

Your participation in this study is not anonymous or confidential. A summary of your responses will be provided to you for any clarifications or corrections via email, and any statements attributed to you will be verified prior to publication. Alternatively, at your request, statements made by you during the interview will not be directly attributed to you by name in the final report.

The research team and the Institutional Review Board at Rutgers University are the only parties (please modify if others will have access to the data) that will be allowed to see the data, except as may be required by law. If a report of this study is published, or the results are presented at a professional conference, only group results will be stated. All study data will be kept for a minimum of three years.

There are no foreseeable risks to participation in this study. It will yield information that will be used to examine the problem of abandoned gas stations nationwide. However, you may receive no direct benefit from taking part in this study.

Participation in this study is voluntary. You may choose not to participate, and you may withdraw at any time during the study procedures without any penalty to you. In addition, you may choose not to answer any questions with which you are not comfortable.

If you have any questions about the study or study procedures, you may contact me at 10 Acopan Place, Manasquan, NJ 08736; 732-859-0831; or leah@njbrownfield.com, or you can contact my advisor, Michael Greenberg at the Bloustein School of Planning and Public Policy, 33 Livingston Avenue, New Brunswick, NJ 08901-1958; 732-932-0387 (x673); mrg@rci.rutgers.edu.

If you have any questions about your rights as a research subject, you may contact the IRB Administrator at Rutgers University at:
Rutgers University, the State University of New Jersey
Institutional Review Board for the Protection of Human Subjects
Office of Research and Sponsored Programs
3 Rutgers Plaza
New Brunswick, NJ 08901-8559
Tel: 732-932-0150 ext. 2104
Email: humansubjects@orsp.rutgers.edu

EXPIRES
JAN 26 2012
Approved by the Rutgers IRB

You will be given a copy of this consent form for your records.

Sign below if you agree to participate in this research study:

Subject (Print) _____

APPROVED
Date: 1/27/11

APPENDIX 2

HISTORIC GAS STATION INVENTORIES:

TRENTON

PLAINFIELD

NEWARK

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
4	Anderson 1101; S Clinton 1229	1950, 1952, 1954, 1957/58, 1963, 1965, 1970	n	auto related	private	4925.86
15	Bellevue 200	1936, 1938, 1948, 1950, 1952, 1954, 1955/56, 1957/58	n	auto related	private	2260.04
15	Bellevue 210 (Bellevue near Calhoun)	1929, 1931, 1933, 1936, 1938, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1980	y	vacant	non profit	4024.1
10	Bridge 109	1948, 1950, 1952, 1954, 1955/56, 1963	n	vacant	public	0
10	Bridge 230 /Union 117	1950	n	parking	private	546.69
10	Bridge 419, 421-427	1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972	y	vacant	public	0
10	Bridge 424-426; 432	1928, 1929, 1931, 1933, 1936, 1938, 1946, 1948, 1950, 1952, 1955/56, 1957/58, 1963, 1965, 1972	y	auto related	private	2417.84
10	Bridge 431	1948, 1950, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972	n	auto related	private	3381.6
10	Bridge 700, 702-4	1928, 1929, 1931, 1933, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970	n	commercial	private	1352.64
16	Brunswick 191, 199-201, 205	1931, 1936, 1948, 1950,1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970,	y	vacant	public	0
16	Brunswick 222, 224	1933, 1936, 1948, 1950	n	commercial	private	2254.4
17	Brunswick 406	1948, 1952, 1954, 1957/58, 1963, 1965, 1970, 1972, 1980, 1990, 1999	s/s	s/s	private	4954.04
17	Brunswick 412-418	1929, 1931, 1933, 1936, 1946, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980	y	auto related	private	4198.82
17	Brunswick 520	1929, 1931, 1933, 1936, 1948, 1950, 1952	y	commercial	quasi-public	11063.47

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
17	Brunswick 552-572; Brunswick 560	1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1967, 1970, 1977	y	auto related	private	4892.05
17	Brunswick 646	1948, 1952	n	auto related	private	1888.06
18	Brunswick 842, 852	1929, 1931, 1933, 1938	n	residential	non profit	0
18	Brunswick 1020	1931, 1933, 1936, 1938, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965	n	auto related	private	3900.11
15	W. Hanover @ Calhoun, W.Hanover 326-338; 401, Calhoun 102-110	1929, 1931, 1933, 1936, 1948, 1950, 1955/56, 1957/58, 1963, 1965, 1970	s/s	s/s	public	
11.02	Calhoun 33	1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972	s/s	s/s	private	5636
15	Calhoun 415, 417, 423; 451	1925, 1931, 1933, 1936, 1946, 1948, 1950, 1957/58	n	commercial	private	5252.75
15	Calhoun 620	1948, 1950, 1954, 1955/56, 1963, 1965, 1970	n	auto related	private	3567.59
15	Calhoun 700; 730	1952, 1960, 1963, 1965, 1970, 1971, 1980, 1985, 1990	y	vacant	public	0
15	Calhoun 726; Calhoun cor New Rose	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1960	y	commercial	private	9378.3
14.01	Calhoun 745	1948, 1950, 1952, 1955/56	n	auto related	public	0
15	Calhoun 746	1954, 1955/56, 1957/58, 1960, 1963, 1965, 1971	n	commercial	private	2694.01
14.01	Calhoun 843-849	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1970, 1972,	y	auto related	private	2446.02
17	Calhoun 1901	1948, 1950, 1957/58, 1963	y	auto related	private	4266.45
4	Cass 741, 751	1927, 1929, 1931, 1933, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980	y	vacant	private	1882.42
1	Centre 802-804; 802 Centre cor Lalor	1948, 1950, 1955/56, 1957/58, 1963, 1965, 1972, 1980	n	vacant	private	7129.54

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
21	Chambers 305; Greenwood Av and Chambers	1925, 1926, 1927, 1928, 1929, 1931, 1933, 1936, 1946, 1948, 1950, 1952, 1954,1955/56, 1957/58, 1963, 1965, 1970	n	commercial	private	29966.61
6	Chambers 750 / 758; Chambers and Miflin	1929, 1931, 1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1970	n	commercial	private	14856.5
6	Chambers 790	1948	n	auto related	private	5098.56
5	Chambers 859	1929, 1931, 1933, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965	y	auto related	private	5382.38
5	Chambers 875-883	1929, 1931, 1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965	n	commercial	private	15803.34
5	Chambers 1005	1933, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1980, 1990	n	auto related	private	6374.32
6	Chambers 1060	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980, 1990, 1999, 2002	y	commercial	private	12399.2
4	Division 501	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965	y	commercial	private	7107
9	E Front 168; (158); E. Front 160; E. Front/S. Montgomery; E Front 158 cor S Montgomery	1929, 1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1963, 1965, 1970	n	parking	private	0
21	E. State 601	1929, 1931, 1933, 1946, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970	n	vacant	private	2040.23
21	E.State 730; 724, State and Monmouth	1933, 1936, 1946, 1948, 1950, 1952, 1954,1955/56, 1957/58, 1963, 1965, 1970	n	vacant	private	2598.2
21	E. State 760	1928, 1929, 1931, 1933, 1936, 1938, 1946, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1965,	y	auto related	private	3770.48

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
		1972, 1980				
22	E. State 1225-1231, 1231 E state and Garfield Ave; 1235 E State	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970	n	vacant	public	0
22	E. State 1300	1957/58, 1965, 1970	n	commercial	private	693.23
9	Greenwood 364	1931, 1933, 1948, 1950	n	auto related	public	0
21	Greenwood 410, 406	1965, 1970, 1972	s/s	s/s	private	13007.89
9	Greenwood 431	1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1980	y	parking	private	6684.3
21	750 Greenwood ave and Chambers St, Greenwood 754, 756	1933, 1936, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980, 1990, 1999	s/s	s/s	private	11412.9
21	Greenwood 800-810	1929, 1931, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980, 1990, 1999, 2002	s/s	s/s	private	18908.78
22	Greenwood and Logan, Greenwood 1415; 1489	1929, 1931, 1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970	n	commercial	private	9919.36
9	Hamilton 102 (104)	1963, 1965, 1970	y	auto related	private	2947.63
8	Hamilton 231-241	1948, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970	y	auto related	private	8076.39
9	Hamilton 250-256	1929, 1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1970, 1972	y	auto related	private	3950.84
6	Hamilton 1017	1948,1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980	y	auto related	private	12066.68
8	Hudson 201	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972	n	residential	private	4198.82
1	John Fitch Way 230	1972	n	public	public	

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
1	John Fitch Way 500	1954, 1955/56, 1957/58, 1963, 1965, 1970	n	auto related	public	0
2	Lalor 602	1957/58, 1963, 1970, 1972, 1980, 1990, 1999, 2002	s/s	s/s	private	8758.34
3	Lalor 830	1948, 1950, 1952, 1954, 1963	n	commercial	private	2896.9
3	Lalor 930	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1970, 1972, 1980, 1990	y	auto related	private	2090.96
9	Lewis 1; Lewis cor Clay; 220 Clay	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965	n	public	public	0
3	Liberty 5-15 (700 Lalor)	1929, 1931, 1936, 1948,1950, 1952, 1954, 1955/56, 1963, 1965, 1970,1972	s/s	s/s	private	5675.45
6	Liberty 1500-1502	1950, 1952, 1955/56, 1957/58, 1963, 1970, 1972	n	commercial	private	22645.45
20	Lincoln 82; 80	1936, 1938, 1952, 1954. 1955/56, 1957/58	n	commercial	private	11480.53
10	Market 46-52	1948, 1950, 1954, 1955/56, 1957/58	n	parking	public	0
19	Mulberry 26	1950, 1952, 1954, 1957/58, 1963, 1965, 1970	y	public	public	0
18	Mulberry 305-331	1948	y	vacant	private	4497.53
18	Mulberry 340; Mulberry cor Enterprise	1948, 1950, 1952, 1963, 1965, 1970, 1972, 2002	s/s	s/s	private	3206.88
20	N. Clinton 202	1948, 1950, 1952, 1954, 1955/56, 1957/58	y	commercial	private	1933.15
19	N. Clinton 411	1946, 1980	n	public	non profit	0
19	N. Clinton 461; N Clinton 465	1931, 1933, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1980, 1972	n	vacant	non profit	0
19	N. Clinton 678	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1972	y	vacant	public	0
19	N. Clinton 779	1980	y	commercial	private	7769.23

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
11.02	N. Hermitage 227	1938, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965	y	vacant	public	0
11.02	N. Hermitage 228-230/Artisan	1948, 1955/56, 1957/58, 1963, 1965, 1970, 1980	n	vacant	public	0
16	N. Montgomery 310-320	1936, 1938, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972	n	vacant	private	851.04
19	N. Olden 302	1948, 1950, 1955/56, 1957/58	n	vacant	public	0
19	N. Olden 398-344, N Olden Ave 338-340	1928, 1929, 1946, 1948, 1950, 1952, 1954,1955/56, 1957/58, 1963, 1965, 1970, 1972, 1990	y	vacant	public	0
18	N. Olden 801, New York 595, New York and N Olden Aves	1929, 1931, 1933, 1936, 1972	s/s	s/s	private	23998.09
18	N. Olden 800-830; 838	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980	n	commercial	private	15634.26
18	N. Olden 915	1948, 1950	n	commercial	private	6735.02
9	N. Stockton 19; E Hannover 243	1948, 1950	n	parking	private	
16	N. Warren 304-306; 305 N Broad Street	1925, 1926, 1927, 1928, 1929, 1931, 1933, 1948, 1950, 1952, 1954, 1957/58, 1963, 1965, 1970, 1980, 1990, 2002	y	public	public	0
15	N. Warren 321	1963, 1965, 1970	n	public	public	0
9	N. Willow 28, 6	1933, 1936	n	commercial	private	39519.63
9	N. Willow 102-110	shown in 55 Sanborn	y	parking	? private	9429.03
11.01	N. Willow 123, 125-131; 135-137	1927, 1936, 1946, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963	n	parking	public	0
11.01	N. Willow 145-147	1938, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1980	y	auto related	private	9986.99
14.01	Oakland 80	1980	y	vacant	public	0

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
14.01	Parkside 912	1963, 1965, 1970, 1980	n	commercial	private	10759.12
13	Parkside 905; 251 Homan	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970	n	commercial	private	11407.26
15	Pennington 25	1929, 1931, 1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965	y	vacant	public	0
15	Pennington 91-99, Pennington Ave 95, Willow and Pennington	1929, 1931, 1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1957/58	y	vacant	public	0
15	Pennington 160	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1972	y	auto related	private	3826.84
15	Pennington 178-182	1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1999, 2002	s/s	s/s	private	4875.14
14.01	Pennington 321	1925, 1927, 1929, 1931, 1933, 1936, 1948	n	vacant	public	0
14.01	Pennington 533-539, Pennington Ave 405, Pennington Ave and Brook Pennington 441	1931, 1933, 1936, 1938, 1946,1948, 1950, 1952, 1954	y	vacant	public	0
14.01	Pennington 546; Prospect 850	1929, 1931, 1933, 1946, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1972	y	auto related	private	4029.74
14.01	Pennington 639; Mellon 18	1931, 1933, 1936, 1946, 1948, 1952, 1954	y	vacant	private	
14.01	Pennington 735, 739	1933, 1948, 1950	n	public	non-profit	0
14.01	Pennington 741	1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965	n	public	non-profit	0
14.01	Parkway 275, Pennington/Parkway, Pennington 937	1929, 1931, 1936, 1938, 1948, 1950, 1952, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970	n	commercial	private	21850.77
16	Perry 224-324, 334, 340	1931, 1933, 1936, 1938	y	public	public	0
20	Perry 506 (Perry and Carroll)	1957/58, 1963, 1965, 1970	y	commercial	private	5016.04

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
20	Perry 600-638	1929, 1933, 1936, 1948, 1950, 1948, 1948, 1952, 1954, 1955/56, 1957/58	y	commercial	private	82460.31
16	Princeton 502-504	1929, 1931, 1936, 1938, 1948	n	vacant	public	0
17	Princeton 667; 675	1929, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970	y	commercial	private	5410.56
17	Princeton 1242	1948, 1950	y	auto related	private	
18	Princeton and N Olden, Princeton 1500-1502	1929, 1931, 1933, 1936, 1946, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980, 1990, 1999	s/s	s/s	private	5759.99
15	Prospect 310	1946, 1948, 1950, 1952, 1954, 1955/56, 1957/58	y	commercial	private	21704.24
14.01	Prospect 600	1955/56, 1963, 1970, 1972, 1980, 1990	y	auto related	private	10263.16
14.01	Prospect 819	1936, 1946, 1970	n	vacant	private	2299.49
4	Rusling 2-4	1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972	y	commercial	private	4170.64
12	Sanhican 110-114, Sanhican Dr and Sullivan Way	1925, 1926, 1927, 1928, 1929, 1931, 1933, 1936, 1948, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980, 1990, 2002	s/s	s/s	private	
12	Sanhican 144	1931, 1936, 1938, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980	y	vacant	private	
12	Sanhican 200-204, 206	1933, 1936, 1938, 1946, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970	y	commercial	private	
1	2nd 596	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972	y	commercial	private	9355.76
1	2nd 723	1954, 1955/56, 1957/58	n	commercial	private	3426.69
9	S. Broad 400; Greenwood av cor S Broad	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970	n	parking	private	

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
10	S. Broad 403	1948, 1950	n	parking	public	
9	S. Broad 444 / 10 Hamilton	1972, 1999	y	vacant	public	
10	S. Broad 485	1936, 1948, 1950, 1952, 1954,1955/56, 1957/58,	n	parking	? Private	
10	S. Broad 495	1929, 1931, 1933, 1936, 1950, 1952, 1954, 1955/56, 1957/58, 1965	n	parking	? Private	
10	S. Broad 579-585	1928, 1929, 1931, 1933, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1980	s/s	s/s	private	
8	S. Broad 617, 605	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972	s/s	s/s	public	
8	S. Broad 682	1948, 1950, 1952, 1954, 1955/56, 1963, 1965	y	vacant	public	
4	S. Broad 1009-13	1927, 1928, 1929, 1931, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1965	n	parking	public	0
4	S. Broad 1065-1067	1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980, 1990	s/s	s/s	private	6842.1
3	S. Broad 1230-1246, 1269 Hamilton)	1928, 1929, 1931, 1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1980	n	auto related	private	3398.51
3	S. Broad 1255	1946, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972	y	auto related	private	
3	S. Broad 1303	1929, 1931, 1933, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980, 1999, 2002	y	vacant	private	
3	S Broad 1314	1936, 1938, 1948	n	auto related	private	4897.68
3	S. Broad 1400-1402, South Broad and Lakeside Av	1929, 1931, 1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963	n	auto related	private	
8	S. Clinton 727; 701 Hudson	1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980	y	auto related	private	

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
22	S. Olden 100-110, S Olden and Walnut (102 S Olden Ave)	1929, 1931, 1933, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972, 1980, 1990, 1999	s/s	s/s	private	6599.76
22	S. Olden 258-266, 276	1946, 1948, 1950, 1952, 1954, 1955/56, 1957/58, 1963, 1965, 1970	y	auto related	private	
9	S. Stockton 25	1970	n	vacant	public	
9	S. Warren 102-108	1931, 1954, 1955/56, 1957/58, 1963, 1965, 1970, 1972	y	commercial	private	
9	S. Warren 238; 240-258; S Warren and E Lafayette	1931, 1933, 1946, 1948, 1952,1954, 1955/56, 1957/58, 1963	n	unknown	public	
9	S Warren 300, 320-324	1925, 1926, 1928, 1929, 1931, 1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1957/58	y	commercial	private	107,084
10	S. Warren 307, 301	1927, 1928, 1929, 1931, 1933, 1936, 1948, 1950, 1952, 1954, 1955/56, 1957/58	n	unknown	public	
9	S. Warren 384-386; S Warren 350, 352, 360; 200 Market	1929, 1931, 1936, 1933, 1936, 1938, 1948, 1950, 1952, 1954, 1955/56, 1957/58	y	public	public	0
10	S. Warren 632-6; 640	1946, 1950, 1955/56, 1957/58	n	parking		
10	S. Warren 702, S Warren cor Bridge	1948, 1950	n	unknown	?	
9	Southard 112	1948, 1950, 1952, 1954, 1955/56	n	public	public	
20	Southard 220-230; 238	1936, 1948, 1950, 1955/56	y	residential	public	
20	Southard 300	1938	n	commercial	private	
17	Southard 958	1948, 1950	n	residential	public	
14.02	Stuyvesant 396 /296 (same)Stuyvesant Ave (396) cor prospect (301)	1946,1948, 1952, 1954, 1955/56, 1957/58, 1963, 1965	y	vacant	public	

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
7	Swan 100-118	1957/58, 1963, 1965, 1970, 1972, 1980, 1990, 1999, 2002	y	auto related	private	
21	Walnut 1	1948	n	residential	various (3 city, 2 homeowners, 2 landlords)	
11.02	West End Ave 100, West End & Edgewood	1929, 1931, 1933, 1936, 1946, 1948, 1950	y	public	?	
12	W. State St. 1500	1963, 1965, 1970, 1980, 1990, 1999	y	public	public	
15	Bellevue Av 2	1948	y	residential	non profit	0
15	Bellevue Ave 110	1933	n	residential	private	456.52
10	Bridge 701	1936	n	unknown	private	4035.38
17	Brunswick 442 (418)	1950	n	residential	private	2147.32
17	Brunswick and Evans,	1931	n	auto related	private	
	Brunswick and Sanford, Hamilton 270? (193 Brunswick Ave)	1929, 1931, 1933	y	vacant	public	0
18	Brunswick Av 1050	1929	n	residential	private	8160.93
17	Brunswick Av 617, 621	1929, 1931, 1933	n	residential	non profit	0
	Brunswick Av cor Southard	1948, 1950, 1952	s/s	s/s	private	4954.04
17	Calhoun 1710	1946	y	commercial	private	5314.75
17	Calhoun 1800	1963	n	auto related	private	1132.84
14.01	Pennington 363	1925, 1931, 1936	y	commercial	private	338.16
17	Calhoun 902	1948, 1950, 1952	y	parking	public	0

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
8	Cass 427, Cass and Third	1931, 1933, 1936	n	vacant	public	0
1	Centre 789	1952	n	residential	private	4041.01
9	E Front and Stockton, E Front 305; 120 S Stockton St	1929, 1931, 1933	n	commercial	private	456,516
9	E State 581	1928, 1929	n	public	non profit	0
9	Factory 112, 114, 116 (corner of S Warren 230?)	1926, 1929, 1931	n	vacant	public	0
10	Furman 224; 136 2nd St	1933	y	auto related	private	3900.11
6	Hamilton and Olden	1933, 1948, 1950	n	vacant		
9	Hamilton Av 126	1936	n	vacant	private	2254.4
21	Locust 141	1925	n	vacant	public	0
20	Monmouth 159	1927, 1928, 1929, 1931, 1933	n	vacant	public	0
9	N Broad 218	1933	y	public	public	0
9	n Warren 247	1946, 1948	n	residential	private	In lieu
	N Willow 121; N Willow 125	1929, 1931, 1933, 1948	n	parking	public	0
15	N Willow 285-289	1929, 1931, 1936	n	residential	private	8882.34
17	401-433 New York and Hillside Ave	1929, 1931, 1933, 1936	n	auto related	private	5900.89
18	1401 New York and Pear (Puritan Ave)	1925, 1926, 1927, 1928	n	parking	private	14625.42
18	New York Ave 610, New York and Olden Ave	1929, 1931, 1933, 1936	y	commercial	nonprofit	0
14.01	Oakland 143, 149	1929, 1931, 1933, 1936	y	unknown	private	5286.57

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
15	Pennington 203	1936, 1948, 1950	n	public	non profit	0
9	Perry 539 (Perry 509-523?)	1933	y	public	nonprofit	0
17	Princeton 1029	1946	n	auto related	private	484.7
4	S Broad 1062	1931, 1933	n	residential	private	3274.52
4	S Broad 1120	1926, 1927, 1928, 1929	n	commercial	private	3499.96
	S Broad 491	1929, 1931, 1933	n	commercial	private	2677.1
4	S Broad 816	1929	n	commercial	private	11598.89
4	S Broad 868	1931, 1933, 1936	n	vacant	public	0
9	S Clinton Ave 101	1926, 1928, 1929, 1931, 1933, 1936, 1946	n	parking	public	0
9	S Montgomery 19, 23	1931, 1946	n	residential	private	In lieu
22	S Olden 516	1933, 1936	n	vacant	private	13216.42
10	S Warren 522; 25 Market	1925	y	public	public	0
10	S Warren 629	1946	n	vacant	private	332.52
9	S Warren 8-10	1929, 1931, 1933, 1936	n	commercial	private	11519.98
10	S. Warren 851	1933, 1936, 1946, 1950	n	parking	public	
12	Sanhican Dr 111	1948, 1950	n	auto related	public	
17	Southard 951	1948	n	vacant		
14.02	Stuyvesant 514	1931, 1936	n	vacant		
14.02	535 Stuyvesant av and Exton, Wilburtha	1929	n	unknown		3015.26
9	W Hannover 40	1936, 1948	n	public		

TRENTON, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env. Rpts**	**Land Use Category**	**Ownership type**	**taxes**
	Willow 141, Willow and Passaic	1929, 1931, 1933, 1946, 1950	y	auto related		

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
393	304-312 Park Avenue, 310-312 Park Avenue	1903, 1904, 1905, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917	n	commercial	private	$21,674.29
393	330 Park Avenue	1916	n	commercial	private	$20,308.70
394	300 Plainfield Avenue, 300 Plainfield Avenue cor West 3rd, 300-306 Plainfield Avenue	1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1966, 1967, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982	n	auto related	private	$4,173.79
394	200 Plainfield Avenue	1930, 1931, 1933, 1935, 1938, 1940	n	vacant	non-profit	$0.00
394	701 West 3rd	1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972	n	public use	public	$0.00
395	212 Lee Place	1938, 1940	y	vacant	public	$0.00
395	1616 South 2nd	1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1978, 1982	y	auto related	private	$8,669.55
395	1701, 1711, 1715 West Front	1929, 1930, 1931, 1933, 1935,1938, 1940, 1943, 1944,1947	y	commercial	private	$45,506.17
394	1740 West Front, 1800 West Front, 4 Ransome Place, 1806 West Front	1928, 1927, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950	n	public use	public	$0.00

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
394	1810 West Front	1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982, 1988	s/s	s/s	private	$13,058.14
394	1852 West Front	1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973	n	auto related	private	$16,753.16
395	1325 West Front	1912, 1913, 1914, 1915, 1916	y	commercial	private	$113,601.00
395	1665 West Front	1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1978, 1982, 1988, 1989, 1992	y	commercial	private	$3,587.40
394	1520 West Front	1914, 1915	n	commercial	private	$5,805.61
394	1622 West Front	1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982	n	auto related	private	$8,203.19
394	1404 West Front	1938, 1940, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963	n	auto related	private	$3,946.14
395	1205 West Front	1931, 1933, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972	n	auto related	private	$9,943.08

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
395	801 West Front	1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982, 1988, 1989, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009	s/s	s/s	private	$13,879.95
394	111 Grant Avenue, 755 West Front	1925, 1926, 1927, 1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1950, 1951, 1953, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982, 1988, 1992, 1994, 1995, 1996, 1997, 1998, 2000, 2001, 2002, 2003	s/s	s/s	private	$32,400.20
394	609 West Front	2004, 2005, 2006, 2007, 2008, 2009	y	unknown	private	$14,678.29
394	601 West Front, West Front nr Rock	1927, 1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1949, 1950, 1951, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973	y	auto related	private	$6,792.91
393	551 West Front, 551 West Front cor Plainfield Avenue, West Front at Plainfield Avenue	1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1973, 1974, 1975, 1976,	s/s	s/s	private	$13,305.70

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
		1977, 1978, 1982, 1988, 1989, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009				
393	131 Plainfield Avenue, 546 West 2nd	1927, 1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1950, 1953, 1955, 1956, 1957	y	*residential*	public	$0.00
393	425 West 2nd	1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951	n	auto related	private	$5,217.24
393	462 West Front St	1982, 1988, 1989	y	auto related	private	$6,393.74
393	468 West Front, 468 West Front cor Washington Avenue	1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1944, 1947, 1948, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973	n	auto related	private	$1,211.52
393	401, 403 West Front	1914, 1915, 1916, 1917	n	residential	private	$25,322.85
393	415 West 2nd	1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972	n	auto related	private	$12,353.29
393	409 West 2nd	1930, 1931, 1943	n	vacant	private	$7,962.41
393	214 Park Avenue	1917	n	residential	private	$20,573.74
393	119 Madison Avenue, 119 and 124 Madison Avenue; 119, 213, 143 West Front	1899, 1912, 1913, 1914, 1915, 1916, 1917	n	*parking*	public	$0.00
393	327 West Front	1912	n	residential		$21,849.36
393	311-313 West Front, 313 West Front, 315 West Front, 333-335, 337-339	1907, 1908, 1909, 1910,1915, 1916, 1917, 1920, 1921, 1922, 1924, 1925,	n	commerci al	private	$12,241.24

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
		1926				
393	116-120 Madison Avenue	1917	y	*residential*	private	$35,592.99
393	318 North Avenue, 322 West Front	1916, 1917, 1921	n	residential	private	
393	12-16 Grove	1917	n	commercial	private	$13,913.13
390	427, 429 East 3rd	1929, 1930, 1931, 1933, 1935, 1938, 1940, 1947, 1949, 1950, 1951, 1953	y	*auto related*	private	
390	230 East 3rd	1955, 1956, 1957, 1969, 1971, 1972	n	auto related	private	$7,584.25
390	240 East 3rd, East 3rd cor Church, 221 East 3rd, 221-229 Church, East 3rd cor Church, East 3rd and Church, East 3rd cor Church	1943, 1944, 1947, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963	n	auto related	private	$22,759.75
390	201 Church, 234 East 2nd	1935, 1938, 1940	y	*public use*	public	$0.00
390	221 East 2nd, 221-225 East 2nd, 219 East 2nd, 150 Church St, Church, cor Church and 2nd	1938, 1940, 1943, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982, 1988, 1989, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008	s/s	s/s	private	$15,144.81
390	212-216 East 2nd	1933, 1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960	n	parking	public	$0.00
393	148 East 2nd (210 - 211 Gavett Place)	1940, 1943, 1953, 1955, 1956	y	vacant	private	$5,662.11
393	158 East 2nd	1913, 1914, 1915, 1917	n	vacant	private	$14,050.65
393	150 North Avenue	1914	n	commercial	private	$10,080.59

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
393	124- 128 East 2nd	1931, 1933, 1935, 1938	n	vacant	private	$8,968.50
393	130-132 East 2nd cor Gavett Place, 205 Gavett Place, 212 Gavett Place, 215 Gavett Place	1917, 1933, 1935, 1938, 1943, 1944,1947, 1949, 1950, 1951, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982	n	vacant	private	$10,654.58
393	138 -140 East 2nd, 138 East 2nd cor Gavett Place	1916, 1917, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972	y	vacant	private	$4,693.52
393	180 East Front	1915, 1916	n	commercial	private	$11,700.90
393	121-123 East 2nd, 121-125 East 2nd, 127-137 East 2nd (listed in dataminer as 141 -157 e 2nd street)	1922, 1924, 1925	y	parking	public	$0.00
393	189 East Front, East Front c Watchung Avenue	1912, 1917, 1921	n	commercial	private	$59,790.00
393	26, 34 Somerset	1908, 1909, 1910, 1911, 1916, 1917	n	parking	public	$0.00
393	38-40 Somerset	1912, 1929, 1930	n	commercial	private	$25,911.10
389	150 Garfield Avenue	1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973	n	auto related	private	$7,372.11
389	745 North Avenue, 745-49 North Avenue	1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976	n	auto related	private	$5,581.39

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
389	1025 South Avenue	1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974	n	public use	public	$0.00
389	1006 East 2nd cor Garfleld Avenue; 1008 East 2nd	1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978	y	*auto related*	private	$13,990.86
388	377 Hillcrest Avenue	1955	n	residential	private	$7,514.20
388	202 Terrill Road, 210 Terrill Road, Terrill Road cor East 3rd, Terrill Road cor 3rd	1930, 1940, 1943, 1944, 1947, 1949, 1950, 1953, 1955, 1956, 1957, 1960,1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978	y	auto related	private	$15,126.87
388	1471 East Front, 1475 East Front	1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982, 1988, 1989, 1992	n	commerci al	private	$12,047.69
388	1470 East Front, East Front and Terrill Road, 110 Terrill Road	1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982	n	commerci al	private	$26,050.50

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
388	302 Terrill Road	1931, 1933, 1935, 1938	n	residential	private	$7,976.42
395	1242 West 7th, 1240 West 7th St; 1300 West 7th, 629 Clinton Avenue, Clinton Avenue cor West 7th, West 7th cor Clinton Avenue	1927, 1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1940, 1943, 1944, 1947, 1951, 1977, 1978	n	residential	private	$13,907.15
390	209 East 5th	1915, 1916, 1917	n	commercial	private	$1,297.44
390	203, 205 East 5th	1912, 1913, 1917	n	commercial	private	$12,741.25
390	407 Watchung Avenue	1908, 1909, 1910, 1911	n	commercial	private	$9,103.90
390	510 South Avenue	1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1949, 1950, 1955, 1956, 1957, 1960, 1962, 1960, 1962, 1963, 1964, 1966, 1967,	n	auto related	private	$5,763.47
390	536 South Avenue	1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982	y	auto related	private	$2,773.19
390	527 East 7th, 535 East 7th	1916, 1926, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982, 1988, 1989, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 2000,	y	auto related	private	$8,074.46

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
		2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009				
390	600, 602 South Avenue	1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978	n	auto related	private	$7,157.07
390	640 South Avenue	1968	n	auto related	private	$16,036.87
390	1147 South Avenue, 1149 South Avenue, South Avenue cor Leland Avenue	1927, 1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1976, 1977, 1982, 1988	n	*commercial*	private	$66,143.34
390	742 South Avenue	1938, 1940, 1943, 1947, 1949, 1950	n	residential	private	$6,631.84
390	800 South Avenue	1925	n	commercial	private	$11,554.95
390	840, 842 South Avenue, 880 South Avenue	1927, 1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967	n	unknown	private	$6,652.85
390	920 South Avenue	1904	n	commercial	private	$15,924.82

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
390	1000 South Avenue, 507 Woodland Avenue	1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982, 1988, 1992, 1993, 1994	n	auto related	private	$9,984.93
390	1100 South Avenue, cor South and Belvidere Avenues, 1100-1110 South Avenue	1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982, 1988, 1998, 2000, 2001, 2002, 2003, 2004	s/s	s/s	private	$14,827.92
390	1150 South Avenue, cor South and Belvidere Avenues, South and Leland Avenue	1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982, 1998, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007	s/s	*s/s*	private	$19,073.01
388	1200 South Avenue, South and Leland Avenues	1927, 1928, 1929, 1930, 1931, 1933, 1935, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977	y	*commerci al*	private	$32,654.99
388	1314 South Avenue	1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982	y	commerci al	private	$37,464.41

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
388	1472 South Avenue, 504 Terrill Road	1930, 1931, 1933, 1935, 1938, 1940, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962,1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982, 1988, 1989, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007	s/s	s/s	private	$15,700.85
390	915 South Avenue	1914, 1915, 1916, 1917	n	commercial	private	$21,009.00
393	110-112 West 6th	1917	n	*parking*	private	$3,431.95
393	106 West 7th, 630 Park Avenue	1935, 1938, 1940, 1943	n	parking	public	$167,412.00
397	106 Randolph Road	1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1982	y	*vacant*	public	$0.00
397	996 Central Avenue	1916, 1917	n	residential	private	$10,749.61
393	547 West 5th, 547 West 5th cor Plainfield Avenue, 5th and Plainfield	1930, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1968, 1969	n	parking		
392	705 Park Avenue	1929, 1930, 1931, 1933	y	commercial	private	$40,267.25
393	400 Watchung Avenue	1916	y	commercial	private	$13,655.85
393	139 East 5th, 5th cor Cleveland Avenue	1935, 1938, 1940, 1943, 1944, 1947	n	commercial	private	$1,291.46
393	131 East 5th, East 5th cor Cleveland Avenue, 133 East 5th, 137 East 5th, East Front and Cleveland Avenue	1924, 1927, 1928, 1929, 1930, 1931, 1933, 1949, 1950, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966,	n	commercial	private	$6,935.64

PLAINFIELD, NJ						
Census Tract	**Address(es) in Directory**	**Directory Years**	**Env Rpts**	**Reuse category**	**Owners hip type**	**taxes**
		1968, 1969, 1971, 1972				
393	409 Cleveland Avenue, 409-411 Cleveland Avenue, Cleveland Avenue and East 4th, 409 Cleveland Avenue, 155 East 4th, 401 Cleveland Avenue	1929, 1930,1931, 1938, 1940, 1943, 1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957, 1960, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1971, 1972, 1973, 1975, 1976, 1977, 1978, 1982	y	commercial		
393	126 East 5th, 128 East 5th	1930, 1931, 1933, 1935, 1938, 1940, 1943, 1947, 1949, 1950, 1951	n	commercial	private	$1,494.75
393	410-416 Sycamore, 124 East 5th, East 5th cor Cleveland Avenue, East 5th sw cor Cleveland Avenue	1905, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1927, 1928, 1929, 1930	n	commercial	private	$7,473.75
393	115 East 5th	1927	n	*commercial*	private	$8,077.63
393	413 Park Avenue	1912, 1913, 1914, 1915, 1916	n	commercial	private	$9,103.90
393	110 East 4th	1905, 1907	n	commercial	public	$6,277.95
393	114 West 4th, 116 East 4th, 118 East 4th	1944, 1947, 1949, 1950, 1951, 1953, 1955, 1956, 1957	y	auto related	private	$9,961.01
393	124 East 4th	1914	n	commercial	private	$10,331.71
393	314 Watchung Avenue	1916	n	commercial	private	$4,972.13
393	147-149-151 East 4th, 4th and Watchung Avenue, 147-151 East 4th	1907, 1908, 1910, 1911, 1912, 1913, 1914, 1915, 1916	y	commercial	private	$9,267.45
393	331, 333 Park Avenue	1915, 1916	n	auto related	private	$5,532.37
393	307 Park Avenue	1913	n	commercial	private	$24,188.36

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
23	1001 18th Av	1973, 1978, 1983, 1988	y	auto related	private	10879.23
91	106, 108 Park Av	1947, 1973, 1978	y	auto related	private	7860.74
20	1129 S Orange Av	1973, 1978, 1983, 1988	y	auto related	private	6556.16
9802	1225 McCarter Hwy	1947, 1988, 1994, 1999, 2004, 2009	n	auto related	private	44036.1
57	1226 Broad	1978, 1983, 1988	y	auto related	private	13937.66
57	1237 Broad	1947, 1973, 1978	n	auto related	private	11225.34
57	1240 Broad	1947, 1973	n	auto related	public	0
10	134 Sussex Av	1973, 1978, 1983	n	auto related	private	6958.85
10	169 , 171-173 Central Av	1935, 1939, 1947, 1978, 1983	n	auto related	private	$ 9,671.17
10	175 Sussex Av	1935, 1939, 1947, 1973, 1978	n	auto related	private	4592.64
88	18 Park Av	1983	n	auto related	private	6782.46
72	190 Wilson Av	1973, 1978, 1983, 1988, 1994, 1999	n	auto related	private	17468.67
74	216 Wilson Av	1935, 1939, 1947, 1973, 1978	n	auto related	public	0
75.01	221 Raymond Blvd	1973	y	auto related	private	17049.34
68	225 South, 227 South St	1947, 1973, 1978, 1983, 1988, 1994, 1999	y	auto related	private	8779.26
94	241 Bloomfield Av	1947, 1973, 1978, 1983, 1988, 1994	y	auto related	private	20813.31
8	242 Park Av	1947, 1973, 1978, 1983, 1988, 1994, 1999	y	auto related	private	8922.37
68	254 South	1935, 1939, 1947, 1973, 1978, 1983, 1988, 2009	y	auto related	private	7251.71
68	262 South	1935	n	auto related	private	4160
57	280 Elizabeth Av	1935, 1939, 1947	n	auto related	private	124314.11
87	29-31 Bloomfield Av	1939, 1947, 1973, 1978, 1983, 1988, 1994	y	auto related	private	7674.37
45	292 Lyons Av	1935	n	auto	private	9634.56

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
				related		
87	296 Broad	1973, 1978, 1983	n	auto related	private	8596.22
229	315 Orange	1947, 1973, 1978, 1983, 1988, 1994, 1999	y	auto related	private	9488.13
50	317 Elizabeth Av	1935, 1947	n	auto related	private	4093.44
50	333 Elizabeth Av	1947, 1973, 1978, 1983, 1988, 1994, 1999, 2004	y	auto related	private	3427.84
69	336 South St	1973, 1978	n	auto related	private	4399.62
50	345 Badger Av	1947	n	auto related	private	2492.67
14	353 S Orange Av	1935, 1939, 1947, 1978, 1983	n	auto related	private	9152
53	360 Hawthorne Av	1935, 1939, 1951, 1973	y	auto related	private	8552.96
93	364 Broadway	1973, 1978, 1983, 1988	y	auto related	private	8266.75
75.01	429 Raymond Blvd	1935	n	auto related	private	10173.7
16	456 W Market	1935, 1973, 1978, 1983, 1988, 1994, 1999	y	auto related	private	7471.36
78	46 NY Av	1973, 1978	y	auto related	private	7488
75.01	469 Raymond Blvd	1935, 1939, 1947, 1973, 1978	n	auto related	private	7834.11
42	470 Avon Av	1935, 1973	n	auto related	private	12783
6	490 Bloomfield Av	1935, 1939, 1947	n	auto related	private	6835.71
48.02	499-501 Frelinghuysen Av	1935, 1973, 1978, 1988	s/s	s/s	private	19388.93
67	503 Washington	1939, 1947	n	auto related	private	6086.91
43	556 Hawthorne Av	1978, 1983	n	auto related	private	6266.62
9802	558 Frelinghuysen Av	1973	n	auto related	private	6472.96
231	576-582 Springfield Av	1947	n	auto related	private	9142.02
231	580 Springfield Av	1935	n	auto	private	8160.26

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
				related		
19	591, 595, 589-591 S Orange Av	1935, 1947	n	auto related	private	$4,492.80
93	610 Broadway	1930	n	auto related	private	7474.69
232	618-624 Bergen	1947, 1973	n	auto related	private	4193.28
17	619 Central Av	1973, 1978	n	auto related	private	5391.36
17	633 Central Av	1947, 1973	n	auto related	private	3830.53
48.02	643 Frelinghuysen Av	1935, 1947	n	auto related	private	7374.85
75.02	650-652 Ferry	1947, 1973	n	auto related	private	5873.92
97	690 Broadway	1935, 1973, 1978, 1983	n	auto related	private	18653.44
75.02	730 -750 Ferry	1935, 1947	n	auto related	non profit	0
96	769 Broadway	1935, 1939, 1947, 1973	y	auto related	private	7521.28
23	780 Sanford Av	1947, 1973, 1983	y	auto related	private	7145.22
23	786-790 Sanford Av	1935, 1939, 1947, 1973, 1978, 1983	s/s	s/s	private	14007.55
22.02	789, 791 Sanford Av	1935, 1947, 1973, 1978	y	auto related	private	9258.5
3	840 N 6th	1973, 1978	n	auto related	private	3777.28
96	874 Broadway	1935, 1939, 1947, 1973, 1978, 1983, 1988, 2009	y	auto related	private	8087.04
24	925 18th Av	1935, 1947, 1973, 1978, 1983, 1988	y	auto related	private	5068.54
48.02	942 Frelinghuysen Av	1947	y	auto related	private	13371.9
24	953, 963, 967 18th Av	1935, 1947, 1983, 1988	y	auto related	private	7488
23	1020 18th Av	1935, 1939, 1947, 1973, 1978	n	auto related		
9802	1111 Delancy	1978	s/s	s/s		
57	1212 Broad	1935, 1939, 1947, 1973, 1978, 1983,	n	auto related		

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
		1988, 1994, 1999, 2004, 2009				
10	13-15 Nesbitt	1935, 1939, 1947, 1973, 1978, 1983, 1994, 1999, 2004	n	auto related		
9	145 N 6th	1983	n	auto related		
87	2 Clay, 327 Broad	1947, 1973, 1978	y	auto related		
10	285 Central Av, 287 Central Av	1947, 1973, 1983	n	auto related		
11	305 Central Av	1935, 1939, 1947	n	auto related		
70	312 Chestnut	1935, 1939, 1947, 1973, 1978, 1983, 1988	y	auto related	private	$7,334.91
48.02	343 Frelinghuysen Av	1935	n	auto related		
75.02	35 Foundry	1978, 1983	n	auto related	private	$7,081.98
78	37 Pacific	1935, 1939, 1947	n	auto related		
50	387 Elizabeth Av	1935, 1939, 1947, 1973	n	auto related		
18	406 Orange (south)	1935, 1939, 1947	n	auto related	public	$0
75.02	41 Foundry	1935, 1939, 1947	n	auto related		
9	471 Orange	1978, 1983, 1988, 1994, 1999	y	auto related	private	$9,005.57
75.02	60 Raymond Blv	1935	n	auto related		
35	622, 636-638 Springfield	1935, 1947, 1973	y	auto related	private	4862.21
3	654 N 6th	1939, 1947, 1973, 1978, 1983	y	auto related		
87	76 Clay	1935, 1939, 1947	n	auto related		
75.01	786 Raymond Blvd	1935, 1947	n	auto related		
97	822 Broadway	1935, 1939, 1947	n	auto related	private	$25,625.60
87	85 Bloomfield Av	1947	n	auto related		
67	1060 Broad branches	1935	y	commercial	private	0
70	107 Pulaski	1978	n	commerci	private	35609.6

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
				al		
72	115-129 Gotthart	1918	y	commercial	private	27595.78
57	1176 1184, 1188 Broad	1935, 1939, 1947, 1978, 1973, 1983	n	commercial	private	189546.23
91	119 Park Av	1935, 1947	y	commercial	private	3078.4
57	1249 Broad	1935, 1939, 1947	n	commercial	private	2609.15
75.02	128 Doremus Av	1935, 1939, 1947, 1973, 1978, 1983, 1988, 1994, 1999	y	commercial	private	34987.26
57	140 Frelinghuysen Av	1935, 1947, 1973, 1978, 1983, 1988	y	commercial	private	37739.52
50	144 Hawthorne Av	1935, 1939, 1947	n	commercial	public	0
48.02	149 Meeker Av	1978, 1983, 1988, 1994	y	commercial	private	21971.46
7	15 Hedden Pl	1935, 1939	y	commercial	private	22493.95
9	150 North 5th	1923, 1935	n	commercial	private	4779.01
68	17 Ave A	1947	n	commercial	private	44072.7
13	171 12th Av	1935	n	commercial	private	2975.23
57	171 Frelinghuysen Av	1947	n	commercial	private	9984
68	172 Emmet	1973	y	commercial	private	11641.34
91	173 Ridge	1935	n	commercial	private	9148.67
68	180 South St	1935	n	commercial	private	29852.16
81	185 Washington	1947	y	commercial	non profit	0
11	186 Central Av	1935	n	commercial	non profit	0
80	188 Market	1918	n	commercial	private	9984
79	195 Lafayette	1918	y	commercial	private	30324.74
57	203 Frelinghuysen Av	1973, 1978	n	commercial	private	7917.31

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
57	224 Elizabeth Av	1935, 1939, 1947, 1973, 1978, 1983, 1988, 1994, 1999	n	commercial	private	10479.87
94	225 Bloomfield Av	1935, 1939, 1947, 1973	n	commercial	private	25991.68
73	23 Niagara	1973, 1978, 1983, 1988	n	commercial	private	8352.88
80	242 Mulberry	1935	n	commercial	private	20250.88
43	247 Fabyan Pl	1947	n	commercial	private	12519.94
232	259 Elizabeth Av	1935	n	commercial	private	19968
3	263 Heller Pkwy	1973, 1978, 1983, 1988, 1994	y	commercial	private	49920
9802	276-284 Frelinghuysen Av	1947	y	commercial	private	20374.02
48.02	283 Frelinghuysen Av	1947	n	commercial	private	32048.64
77	283 Lafayette	1973, 1978	n	commercial	private	12896
232	289 Elizabeth Av	1947, 1973	n	commercial	private	10449.92
68	307 Jefferson	1947, 1973, 1978, 1983	y	commercial	private	8320
81	31 William	1918	y	commercial	private	5833.98
50	320 Elizabeth Av	1935	y	commercial	private	124800
9802	330 Frelinghuysen	1935	n	commercial	private	30341.38
75.01	335 Raymond Blvd	1973, 1978	y	commercial	private	10370.05
2	345-347 Bloomfield Av	1935, 1939, 1947, 1973, 1978	n	commercial	private	5411.33
41	354 Avon Av	1973, 1978, 1983, 1988	y	commercial	private	14673.15
73	37 Wilson Av	1973	n	commercial	private	35220.22
75.01	373-379 Raymond Blvd	1947, 1973	n	commercial	private	10293.5
18	378 S Orange Av	1973, 1978, 1983, 1988	n	commercial	private	3058.43
57	384 Mulberry	1935, 1939, 1947	n	commerci	private	6489.6

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
				al		
5	390 Bloomfield Av	1947	n	commercial	private	7547.9
79	394 Market	1935	n	commercial	private	20800
5	408 Bloomfield Av	1973	n	commercial	private	16992.77
232	415 Clinton Av	1978, 1983, 1988, 1994, 1999	y	commercial	private	3917.06
37	415-421 Avon Av	1935, 1939, 1947, 1983, 1988	y	commercial	private	14976
74	416 Doremus Av	1935, 1939, 1947, 1978, 1983	n	commercial	private	278264.06
50	420-424 Elizabeth Av	1935, 1939, 1947, 1973, 1978, 1983, 1988, 2009	n	commercial	private	39936
43	421 Lyons Av	1935, 1939, 1947, 1973, 1978	y	commercial	private	5128.45
5	426 Bloomfield Av	1935, 1939, 1947, 1973, 1978, 1983, 1988, 2009	y	commercial	private	5381.38
71	431 Chestnut	1978, 1983	n	commercial	private	5234.94
57	455 McCarter Hwy	1947	n	commercial	private	6862.34
5	466 Bloomfield Av	1994, 1999, 2004, 2009	y	commercial	private	39626.5
93	468 Broadway	1951	n	commercial	private	3694.08
79	468-478 Market St	1935	n	commercial	private	18107.65
4	483 Bloomfield Av	1947	n	commercial	private	6559.49
38	501 Bergen	1947	n	commercial	public	0
5	512 Roseville Av	1923, 1935, 1947, 1973	y	commercial	private	6060.29
96	519 Broadway	1935	n	commercial	private	13631.49

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
6	522, 524 Bloomfield Av	1947, 1973, 1978, 1983	n	commercial	private	3234.82
6	526, 536 Bloomfield Av	1935, 1939, 1947, 1973, 1978, 1983, 1988, 1994, 1999, 2004	y	commercial	private	14976
231	539 15th Av	1947	n	commercial	private	9281.79
4	539 Bloomfield Av	1935, 1947, 1973	n	commercial	private	10816
231	555 18th Av	1947, 1973, 1978	n	commercial	private	6566.14
6	560 Bloomfield Av	1947	y	commercial	private	3580.93
80	561 McCarter Hwy	1973	n	commercial	private	8107.01
76	572 Market	1973, 1978, 1983	y	commercial	private	24324.35
7	618 Orange	1973	y	commercial	private	7507.97
96	635 Broadway	1947, 1973	n	commercial	private	41193.98
10	66 Sussex Av	1935, 1939, 1947	n	commercial	public	0
48.02	677-683 Frelinghuysen Av	1930; 1935; 1939; 1947	n	commercial	private	14260.48
80	721 McCarter Hwy	1947, 1978, 1983	n	commercial	private	18460.42
96	735 Broadway	1947	n	commercial	private	6789.12
19	735 S Orange Av	1994, 1999, 2004	y	commercial	public	0
25	782 S Orange Av	1947, 1973	y	commercial	private	5551.1
2	785 N 6th	1947	n	commercial	public	0
79	81-83 Elm	1935, 1939, 1947, 1973, 1978, 1983	n	commercial	private	12882.69
25	810 S Orange Av	1935, 1939, 1947, 1973, 1978, 1983, 1988, 1994, 1999	y	commercial	private	19096.06
22.02	829 Sanford Av	1935, 1939, 1947	n	commercial	private	19814.91
75.02	85 Doremus Av	1935, 1939, 1947, 1973, 1978, 1983, 1988, 2009	y	commercial	private	46592

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
48.02	889 Frelinghuysen Av	1973	y	commercial	private	18034.43
3	895 Franklin Av	1973, 1978, 1983, 1988, 1994	y	commercial	private	14976
24	918 18th Av	1935, 1939, 1947	n	commercial	private	12646.4
24	924 18th Av	1999	s/s	s/s	private	7271.68
9802	934 Frelinghuysen	1935	n	commercial	private	38205.44
49	973 Bergen	1973	n	commercial	private	4409.6
80	1159 Raymond Blvd	1947	n	commercial		
11	131-133 Newark St	1918	n	commercial		
94	171 Bloomfield Av	1973	n	commercial	private	$7,937.28
46	194 Chancellor Av	1939, 1947, 1973, 1978, 1983	y	commercial		
78	249 Walnut	1935, 1939, 1947, 1973	y	commercial		
80	1067-1075 Raymond Blvd, 1063 Raymond Blvd	1947, 1973, 1978, 1983	n	parking	private	316046.84
21	1112 S Orange Av	1935, 1947, 1973, 1978	n	parking	private	5314.82
229	116 Orange	1947, 1973	n	parking	non profit	0
92	1427 McCarter Hwy	1988	y	parking	private	73066.24
10	144 Orange	1947, 1973, 1978	n	parking	non profit	0
81	160 Washington St	1935, 1939, 1947, 1978, 1983	n	parking	non profit	0
57	17 E Runyon	1994	y	parking	private	1214.72
8	236 Park Av, corner 4th St	1923, 1973, 1978, 1983, 1988, 1994, 1999, 2004, 2009	y	parking	private	2931.97
10	236 Sussex Av	1978	n	parking	private	2642.43
81	241 Halsey	1918	n	parking	private	11178.75
8	255 Park Av	1923, 1939, 1947, 1973, 1978, 1983, 1988, 1994, 1999, 2004	n	parking	private	20863.23
81	268 Halsey	1918	n	parking	private	4246.53

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
81	282 Washington Av. Cor. Grafton Av	1923	n	parking	private	19968
44	315 Lyons Av	1947	n	parking	public	0
81	324-326 Washington	1935, 1947	n	parking	non profit	0
80	328 Market	1947	n	parking	public	0
81	342-346 Washington	1935, 1939, 1947	n	parking	public	0
57	345, 351 McCarter Hwy	1973, 1978, 1983, 1988, 1994, 1999	y	parking	private	2515.97
76	40 VanBuren	1988	n	parking	non profit	0
79	403 Market	1935, 1939, 1947	n	parking	private	12796.16
79	405 Market	1947	n	parking	private	10706.18
80	42 Cherry	1947	n	parking	private	66560
45	472 Lyons	1973	n	parking	private	6320
81	48 William	1935, 1947	n	parking	non profit	0
57	50-54 Sherman Av	1935, 1939, 1947	n	parking	private	1604.1
48.02	601 Frelinghuysen Av	1935, 1939, 1947, 1973, 1978	n	parking	private	4492.8
22.02	695 Irvington Av	1978, 1983	y	parking	non profit	0
227	71 Elizabeth Av	1935	n	parking	non profit	0
79	937 Raymond Blvd	1947	n	parking	private	21186.05
24	954 S Orange Av	1935, 1939, 1947, 1973	n	parking	private	3710.72
21	974 S Orange Av	1935, 1939, 1947	s/s	s/s	private	11980.8
15	20-22 Littleton Av	1935	n	parking	non profit	$0
46	239 Chancellor Av	1935, 1939, 1947, 1973, 1978	n	parking		
230	33 16th Av	1947	n	parking		
15	39 E Fairmount Av	1918	n	parking		
18	414 Orange (south)	1935, 1939, 1947	n	parking	private	$2,945.28
15	54-56 1st St	1935	n	parking	private	$12,709.63
7	626 W Market	1973, 1978, 1983, 1988, 1994, 1999, 2004	n	parking	non profit	$0
228	65 West St	1947	n	parking		
79	983 Raymond Blvd	1973	n	parking		
229	101, 155 Washington	1935, 1939, 1947, 1978, 1983	y	public use	non profit	$0

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
229	1123 McCarter Hwy	1983	n	public use	public	0
70	142 Clifford	1935, 1939, 1947, 1978	y	public use	non profit	0
87	146 Broadway	1935	n	public use	private	15015.94
10	155 Central Av E	1973	n	public use	public	0
11	204, 214 Central Av	1935, 1939, 1947, 1973	n	public use	non profit	0
52	210 Clinton Pl	1918; 1935, 1939, 1947, 1978, 1983	n	public use	non profit	0
46	244 Chancellor Av	1935	n	public use	non profit	0
14	264 S 12th	1935	n	public use	non profit	0
46	284 Clinton Pl	1947	n	public use	non profit	0
230	315 Bergen	1935	n	public use	public	0
229	351 Broad	1947	n	public use	private	26104.83
15	406-408 W Market	1935, 1939, 1947, 1978, 1983	n	public use	private	33809.15
3	433 Bloomfield Av	1923, 1935, 1947, 1973	n	public use	public	0
231	455 S 10th St	1935	n	public use	non profit	0
15	486 Central Av	1935	n	public use	non profit	0
9802	528 Frelinghuysen Av	1935, 1939, 1947, 1973, 1978, 1983, 1988, 1994	y	public use	public	0
11	65, 73 W Market	1930, 1935, 1939, 1947	n	public use	public	0
96	747 Broadway	1935, 1939, 1947, 1973, 1978	n	public use	public	0
43	860 Clinton Av	1918	n	public use	private	5341.44
97	913 Mt. Prospect Av	1930, 1935, 1939, 1947	y	public use	private	7458.05
24	914 S Orange Av	1935, 1973, 1978	n	public use	public	0
81	289-301 Halsey	1935	y	public use	private	$19,255.81
43	403 Lyons Av	1935, 1947	n	public use		
96	41 Herbert Pl	1999, 2004	n	public use		
227	6-12 Elizabeth Av, at Clinton Av (238-252 Clinton)	1930	n	public use	private	$47,117.82
229	69-79 New	1939, 1947	n	public use		

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
229	911 McCarter Hwy	1947	n	public use		
10	10 Norfolk	1978	y	residential	private	1813.76
17	109 S 14th St	1935	n	residential	private	11757.82
88	15 Stone	1973, 1978, 1983	n	residential	private	14400.26
39	151 -153 Avon Av	1947, 1951	n	residential	non profit	0
230	204 S Orange	1973	n	residential	non profit	0
230	21 16th Av	1947	n	residential	private	5777.41
50	276 Jelliff Av	1935	n	residential	private	13039.11
88	3 Stone	1973, 1978, 1983	n	residential	public	0
92	300 Garside	1951	n	residential	private	2496
14	360 S 11th St	1918	n	residential	private	10386.69
38	419-421 18th Av	1947	n	residential	private	7031.66
81	438-440 Washington	1935, 1947	n	residential	non profit	0
9	439 Orange St	1935, 1939, 1947, 1978, 1983	n	residential	private	2256.38
38	443-445 Bergen	1935, 1939, 1947	y	residential	private	3942.88
76	536 Market	1935, 1939, 1947, 1978	y	residential	private	7431.42
88	57 Crane	1935	n	residential	private	8493.06
93	630 Broadway	1947	n	residential	private	6090.24
45	67 Summit	1947	n	residential	private	5860.61
97	702 Broadway	1947, 1973, 1978, 1983, 1988, 1994, 1999	y	residential	private	11654.66
89	70X Mt Prospect Av	1947	n	residential	private	4339.71
97	828 Summer Av	1947	n	residential	private	6712.58
53	85 Osborne Ter		n	residential	private	6522.88
1	850 Mt Prospect Av	1935	n	residential	private	10243.58
48.02	989 Freylinghuysen Av	1935	n	residential	public	0
17	120 13th Av (south)	1935, 1947	n	residential	private	$945.15
11	134 Norfolk	1935, 1939, 1947, 1973, 1978, 1983, 1988	n	residential		
82	203-205 W Market	1935, 1939, 1947	n	residential		
11	252-4 Academy St	1930	n	residential		
228	39-41 Belmont Av	1947	n	residential		
75.01	621 Market	1935, 1939, 1947, 1978, 1983	n	residential	private	19455
89	108 Bloomfield Av	1973, 1978	s/s	s/s	private	8043.78
229	1086 McCarter Hwy	1973, 1978, 1988, 1994, 1999, 2004, 2009	s/s	s/s	private	29452.8
70	141 Delancey	1935	s/s	s/s	private	12436.74

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
92	1434 McCarter Hwy	1983, 1988, 2004, 2009	s/s	s/s	private	19066.11
92	1437 McCarter Hwy	1994, 1999, 2004, 2009	s/s	s/s	private	10433.28
57	185 Pennsylvania Av	2009	s/s	s/s	private	2782.21
230	226 S Orange Av	1973, 1978, 1983, 1988, 1994, 1999, 2004, 2009	s/s	s/s	private	16872.96
232	234 Elizabeth Av	1947, 1973	s/s	s/s	private	15601.66
57	242 Elizabeth Av	1973, 1978, 1983, 1988	s/s	s/s	private	12539.9
8	245-247 Park Av	1947, 1973	s/s	s/s	private	14792.96
8	264 Park Av	1923, 1947, 1988, 1994, 1999, 2004, 2009	s/s	s/s	private	8752.64
26	267-269 16th Av	1947, 1973, 1978, 1983	s/s	s/s	private	2855.42
3	268 Heller Pkwy	1923, 1939, 1947, 1973, 1978, 1983, 1988, 1994, 1999, 2004	s/s	s/s	private	10816
232	273 Elizabeth Av	1983, 1988, 1994, 1999, 2004, 2009	s/s	s/s	private	18167.55
75.01	303 Raymond Blvd	1973, 1978, 1983, 1988	s/s	s/s	private	21485.57
70	312 Walnut	1973, 1978, 1988, 1994, 1999, 2004, 2009	s/s	s/s	private	13724.67
2	315 Bloomfield Av	1973, 1978, 1983, 1988, 1994, 1999, 2004	s/s	s/s	private	15808
5	320 Bloomfield Av	1935, 1939, 1947, 1973, 1978, 1983, 1988, 1994, 1999	s/s	s/s	private	9591.3
2	325 Bloomfield Av	1947, 1973, 1978, 1983, 1988	s/s	s/s	private	7404.8
70	343 South St	1973, 1978, 1983, 1988, 2009	s/s	s/s	private	13821.18
75.01	349 Raymond Blvd	1973, 1978, 1983, 1988, 1999, 2004	s/s	s/s	private	29948.67
10	36 Nesbitt	1935, 1939, 1947, 1973, 1978, 1983, 1994, 1999, 2004	s/s	s/s	private	9281.79
38	387 Springfield Av	1973, 1994, 1999, 2004	s/s	s/s	private	13698.05
81	390 Washington	1973, 1978, 1983, 1988	s/s	s/s	private	78803.71

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
16	481 Central Av	1973, 1978, 1983, 1988, 1994, 1999, 2004, 2009	s/s	s/s	private	41510.14
79	487-491 Market	1935, 1939, 1947, 1973, 1973, 1978, 1983, 1988, 1994, 1999, 2004	s/s	s/s	private	20800
231	584 Springfield	1999, 2004, 2009	s/s	s/s	private	17245.7
73	63 Wilson	1973, 1978	s/s	s/s	private	22307.58
75.01	638 Raymond Blvd	1935, 1939, 1947	s/s	s/s	private	13757.95
80	645 McCarter Hwy	1983, 1988, 1994, 1999, 2004, 2009	s/s	s/s	private	19136
7	65-71 Springdale Av	1935, 1947, 1973, 1978, 1983	s/s	s/s	private	8123.65
89	66-80, 70 Bloomfield Av	1973, 1978, 1999, 2004, 2009	s/s	s/s	private	8932.35
23	810 Sanford Av	1935, 1947, 1973, 1978, 1983, 1988, 1994, 1999, 2004, 2009	s/s	s/s	private	4898.82
43	822 -824 Clinton Av	1935, 1939, 1947, 1973, 1983	s/s	s/s	private	7035.39
1	864 Mt Prospect Av	1973	s/s	s/s	private	8985.6
3	865 Franklin Av	1973, 1978, 1983, 1988, 1994, 1999, 2004, 2009	s/s	s/s	private	10885.89
1	900-902 Mt Prospect Av	1935, 1973, 1978, 1983	s/s	s/s	private	8702.72
48.01	956 Bergen	1973, 1978, 1983, 1988, 1994, 1999, 2004, 2009	s/s	s/s	public	0
80	96 Walnut	1947	s/s	s/s	private	22231.04
21	972 S Orange Av	1973, 1978, 1983, 1988, 1994, 1999, 2004	s/s	s/s	private	11980.8
227	1 Elizabeth Av	1973, 1978, 1983, 1988, 1994, 1999, 2004, 2009	s/s	s/s		
64	101 13th Av	1973, 1978, 1988, 1994, 1999, 2004	s/s	s/s		
229	1126 McCarter Hwy	1973, 1978, 1983, 1988, 1994, 1999, 2004, 2009	s/s	s/s	private	$33,280
89	122 Summer Av	1947, 1973, 1978	s/s	s/s		

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
87	1285 McCarter Hwy	1973, 1978,1983, 1988, 1994, 1999, 2004, 2009	s/s	s/s		
74	185 Wilson Av	1935, 1939, 1947, 2009	s/s	s/s		
75.02	242 Raymond Blvd	1973, 1978, 1983, 1988, 1994, 1999, 2004	s/s	s/s		
70	329 VanBuren	1947	s/s	s/s		
80	35 Cottage	1935, 1947, 1978	s/s	s/s	private	$5,850.62
57	355 McCarter Hwy	2004, 2009	s/s	s/s		
70	370 South St	1973, 1978, 1983	s/s	s/s		
72	427 Lafayette	1935, 1939, 1947, 1973, 1978, 1983, 1988, 1994, 1999, 2004, 2009	s/s	s/s		
93	432 Broadway	1973, 1988, 1994, 1999, 2004, 2009	s/s	s/s		
16	446 - 448 W Market	1935, 1947	s/s	s/s		
80	615 McCarter Hwy	1947, 1973, 1994, 1999	s/s	s/s		
80	625 McCarter Hwy	1973, 1978, 1994, 1999, 2009	s/s	s/s		
20	971 S. Orange Av E	1918; 1947	s/s	s/s		
80	99 Walnut	1935, 1939, 1947	s/s	s/s		
11	145 Bleeker	1935	n	unknown		
228	15 Belmont Av	1973	n	unknown		
75.02	150 Raymond Blvd and Wheeler Point Rd	1935, 1939, 1947, 1973, 1978	n	unknown	public	0
57	158 Wright	1935, 1939, 1947, 1973, 1978, 1983, 1988, 2009	n	unknown		
228	178 William	1935	n	unknown		
50	181 Hawthorne Av	1935, 1939, 1947, 1978, 1983	n	unknown		
80	21 Lawrence Street	1913, 1918, 1923	n	unknown		
18	267-269 14th Av	1935	n	unknown		
81	311 Halsey	1918, 1923	n	unknown		
73	356 Ferry	1973, 1978, 1983	y	unknown		
93	408 Broad	1947, 1973, 1978	n	unknown	private	$5,797.38
81	417 Washington	1935, 1939, 1947, 1978, 1983	n	unknown		
75.01	508 Raymond Blvd	1935, 1947	y	unknown		

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
11	59 Lock	1973	n	unknown		
67	597 Washington Av	1973	n	unknown		
10	6 Colden	1947	n	unknown		
19	630 S Orange	1935, 1947	n	unknown		
11	72-74 Lock	1947	n	unknown		
229	9-13 Lombardy	1918, 1935	n	unknown		
79	967 Raymond Blvd	1947	n	unknown		
229	996 McCarter Hwy	1939, 1947	n	unknown		
227	101 Elizabeth Av	1935	n	vacant	private	1381.12
43	109 Fabyan Pl	1947	n	vacant	private	4499.46
229	1234 McCarter Hwy	1973, 1978, 1983	y	vacant	private	15275.52
87	1244 McCarter Hwy	1988, 1994, 1999, 2004, 2009	n	vacant	private	15308.8
51	154-156 Custer Av	1918	y	vacant	non profit	0
74	159 Wilson Av	1973, 1978, 1983, 1988, 1994	n	vacant		n/a
231	188 16th Av	1947	n	vacant	public	0
14	194 12th Av	1947	y	vacant	private	1081.6
231	198 16th Av	1947, 1973, 1978	n	vacant	public	0
50	213 Ridgewood	1947	n	vacant	private	5061.89
10	233 Central Av	1923	n	vacant	public	0
54	237 Hawthorne Av	1935	n	vacant	public	0
46	256 Lyons Av	1935, 1939, 1947, 1978, 1983	n	vacant	public	0
46	284 Chancellor Av	1973, 1978, 1983	n	vacant	public	0
13	293-295 S. Orange Av	1918	n	vacant	private	4672.51
45	294 Chancellor Av	1935, 1947	n	vacant	private	5161.73
230	302 Springfield Av	1935, 1939, 1947	n	vacant	private	2941.95
5	340 Bloomfield Av	1935, 1939, 1947, 1983, 1988	y	vacant	private	8636.16
229	341 Orange	1923, 1935, 1947, 1973	n	vacant	public	0
38	375-379 18th Av	1947	y	vacant	public	0
231	395 S 10th	1947, 1973	y	vacant	private	998.4
50	396 Clinton Av	1947	n	vacant	private	2292.99
45	398 Chancellor Av	1935, 1939, 1947, 1951, 1973, 1978	n	vacant	public	0
14	419 13th Av	1935	n	vacant	private	1084.93
79	438 Market	1973, 1978, 1983	n	vacant	private	14426.88
18	444 S Orange Av	1947, 1973, 1978	n	vacant	public	0
18	462 S Orange Av	1973	n	vacant	public	0
67	482 Washington	1935	n	vacant	private	14253.82
80	48-50 Mulberry	1947	y	vacant	public	0
231	524 S 12th St	1973	n	vacant	private	13578.24

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
9802	538-540 Frelinghuysen av	1935, 1939, 1947	n	vacant	public	0
2	581 N 3rd	1939, 1947, 1973, 1978, 1983	n	vacant	private	5614.34
231	596 S 11th St	1918	n	vacant	public	0
37	663 Springfield Av	1935, 1939, 1947, 1973, 1978, 1983	n	vacant	public	0
54	779 Bergen	1935	n	vacant	private	1254.66
42	867 Clinton Av	1939, 1947, 1973, 1978	y	vacant	public	0
88	10 Park Av	1947, 1973	n	vacant		
49	1033 Bergen	1973	n	vacant	public	0
50	113 Hawthorne Av	1935, 1939, 1947, 1973, 1978, 1983, 1988, 1994, 1999	n	vacant		
9802	14 1st	1947	n	vacant		
50	197 Peshine Av	1935	n	vacant		
7	213 N 13th	1935	n	vacant		
11	23 1st	1935	n	vacant	private	$5,711
10	24 Norfolk (18-36)	1935, 1939, 1947	n	vacant	private	$14,540.03
43	267 Nye Av	1973, 1978, 1983, 1988	y	vacant		
88	28 Summer Av	1935, 1939, 1947, 1973, 1978, 1983, 1988	n	vacant		
81	29 W Kinney	1935, 1939, 1947	n	vacant		
82	3 Jones	1947	n	vacant		
230	309 15th Av	1947	n	vacant		
64	42-46 Jones	1947, 1973, 1978	n	vacant		
50	428 Clinton Av	1935	n	vacant		
4	453, 467-471 Bloomfield Av	1935, 1939, 1947, 1973, 1978	n	vacant	private	$1,134.85
231	558 Springfield Av	1978, 1983	n	vacant		
231	562 Springfield Av	1939, 1947	n	vacant		
22.02	765 Sanford Av	1935, 1939, 1947, 1973, 1978, 1983, 1988, 1994, 1999	y	vacant		
229	85 Nesbitt	1923, 1939, 1947, 1973, 1978, 1983, 1988, 1994, 1999, 2004	n	vacant		
68	9 Av B	1935, 1939, 1947, 1978, 1983	n	vacant		
24	968 18th Av	1947, 1973, 1978, 1983	n	vacant		

NEWARK, NJ						
Census Tract	**Address**	**Year**	**Env Rpts**	**Land use category**	**owner type**	**Taxes**
229	974 McCarter Hwy	1978, 1983	n	vacant		
23	995 18th Av	1973, 1978, 1983, 1988, 1994, 1999, 2004	y	vacant	private	$1,767.17

APPENDIX 3
GAS STATIONS AND CENSUS TRACTS

DATA

MAPPING OF GAS STATIONS BY CENSUS TRACT AND ENVIRONMENTAL STATUS

TRENTON, NJ										
Census Tract	Population	White Only Population	% Minority	Unemployment rate	% Families Below Poverty	% Individuals Below Poverty	Env Rec	No Env rec	active gas station	Total
7	3016	2104	30.2%	10.3	19.6	28.4	1	0	0	1
12	3766	753	80.0%	8	16.5	18.8	3	1	1	5
16	1430	130	90.9%	3.5	20.9	20.5	3	3	0	6
10	2865	833	70.9%	8.7	35.4	42.9	4	14	1	19
14.02	1982	157	92.1%	8	10.5	20.7	1	2	0	3
3	4486	2288	49.0%	8.9	11.8	12.2	3	4	1	8
17	3955	173	95.6%	13.4	34.8	32.4	8	9	1	18
4	5404	3346	38.1%	5.5	22.8	25.2	3	6	1	10
11.02	3806	289	92.4%	17.1	27	27.3	2	1	1	4
1	3486	1784	48.8%	7.2	26.9	24	1	5	0	6
15	2770	254	90.8%	6.7	22	32.6	8	8	2	18
8	2247	1309	41.7%	12.9	23.6	29.1	3	2	1	6
14.01	3644	329	91.0%	14.2	33	34.7	8	7	1	15
22	5860	1426	75.7%	9.7	19.7	22.3	1	4	1	6
19	1680	707	57.9%	4.6	41.9	51.1	4	3	0	7
2	4116	2113	48.7%	7.5	18.3	20.9	0	0	1	1
5	3945	2318	41.2%	13.7	13.4	17.6	1	2	0	3
18	3811	1905	50.0%	8.8	24.6	22.7	2	6	3	11
11.01	2490	98	96.1%	17	27.9	27	1	1	0	2
13	3568	707	80.2%	9.1	5.3	11.1	0	1	0	1
21	5735	889	84.5%	8.4	25.4	32.1	1	5	3	9
6	4504	2447	45.7%	9	15.6	12.3	2	4	0	6
20	1203	237	80.3%	21.9	44.7	49.9	4	3	0	7
9	3409	1015	70.2%	10.8	28.3	36.2	10	18	0	28
24	1866	488	73.8%	0	-	-	0	0	0	0
25	6152	4818	21.7%	7.4	4.5	8.8	0	0	0	0
unknown							2	2	1	5

Source: 2007-2011 American Community Survey 5-year estimates

PLAINFIELD, NJ										
Census Tract	Population	White Only Population	% Minority	Unemployment rate	% Families Below Poverty	% Individuals Below Poverty	Env Rec	No Env rec	active gas station	Total
389	5258	911	82.7%	12	19.8	21.4	1	3	0	4
397	5634	1097	80.5%	7	5.6	7.5	1	1	0	2
394	4705	870	81.5%	11.8	11.5	19.8	2	8	2	12
390	3974	550	86.2%	13.1	16	22	4	16	3	23
393	6153	940	84.7%	11.3	33.3	37.7	10	35	1	46
388	4400	550	87.5%	13.7	7.4	11.5	3	4	1	8
395	7085	813	88.5%	9.6	15.6	19.2	5	2	1	8
392	4848	1078	77.8%	9.9	17	17.9	1	0	0	1
391	3428	1446	57.8%	4.9	3	5.4	0	0	0	0
396	3880	519	86.6%	6.1	14.5	19.7	0	0	0	0

Source: 2007-2011 American Community Survey 5-year estimates

NEWARK, NJ										
Census Tract	Population	White Only Population	% Minority	Unemployment rate	% Families Below Poverty	% Individuals Below Poverty	Env Rec	No Env rec	active gas station	Total
228	1900	11	99.4%	8.2	28.4	40	0	4	0	4
39	1599	0	100.0%	12.7	40	47.6	0	1	0	1
44	1641	0	100.0%	20	23.6	23.9	0	1	0	1
46	3533	64	98.2%	12.2	29.5	29.4	1	5	0	6
48.01	2517	33	98.7%	15.5	34.8	28.5	0	0	1	1
51	2138	7	99.7%	14.4	26.9	23.5	2	0	0	1
52	1023	0	100.0%	7	5.4	10	0	1	0	1
64	1058	125	88.2%	6	28.6	22.6	0	1	1	2
82	2541	414	83.7%	7.6	37.2	51.7	0	2	0	2
54	3785	241	93.6%	12.6	29.8	32.2	0	2	0	2
26	1641	162	90.1%	12.4	45.8	46.1	0	0	1	1
18	1512	111	92.7%	10.6	19.9	23.3	0	6	0	6
13	1537	177	88.5%	9.8	36.6	38.9	0	2	0	2
69	4256	2814	33.9%	10.7	12.1	14.8	0	1	0	1
49	3560	62	98.3%	12.9	18.3	15.8	0	2	0	2
19	1962	0	100.0%	11.6	42.7	49.8	0	2	1	3
35	2230	9	99.6%	10.2	20.6	23.5	1	0	0	1
71	3406	2721	20.1%	3.3	15.5	14.6	0	1	0	1
9	3315	734	77.9%	16.6	52.2	49.1	1	3	0	4
14	2261	418	81.5%	7.2	48.2	52.9	1	4	0	5
17	2071	106	94.9%	11.3	21.7	31.9	0	4	0	4
11	3042	1144	62.4%	2.4	31.9	31.3	0	11	0	11
4	2625	1691	35.6%	4.1	19.1	19.3	0	3	0	3
93	4916	1237	74.8%	11	19.6	23.1	1	4	1	6
20	4290	137	96.8%	15.2	12.2	18.9	1	0	1	2
91	3387	1575	53.5%	10.6	31.2	34.5	2	1	0	3
45	2977	6	99.8%	16.2	7.2	7.7	0	5	0	5
43	2460	0	100.0%	20.5	16.5	21.9	2	5	1	8
10	4021	1027	74.5%	3	22.1	35.7	1	12	1	14
89	1937	732	62.2%	12.5	37.7	36.2	0	1	3	4
6	3937	2067	47.5%	11.6	16.3	19.2	2	2	0	4
24	3618	96	97.3%	16.8	26.2	29.3	2	4	1	7
78	3054	2281	25.3%	9.1	15.6	17.9	2	1	0	3
53	2572	93	96.4%	10.5	24.1	19.5	1	1	0	2
23	5211	109	97.9%	14.8	14.1	17.8	3	1	2	6
38	1827	187	89.8%	7.3	11.5	18.2	2	2	1	5
230	2874	160	94.4%	10.4	25	35.6	0	6	1	7

NEWARK, NJ										
Census Tract	Population	White Only Population	% Minority	Unemployment rate	% Families Below Poverty	% Individuals Below Poverty	Env Rec	No Env rec	active gas station	Total
2	2959	1019	65.6%	14.6	29.1	29.8	0	3	2	5
231	2320	191	91.8%	14.3	41.2	40.9	1	11	1	13
1	6374	2609	59.1%	7.9	8.8	9.7	0	1	1	2
21	3596	268	92.5%	11.2	11.7	12.6	0	1	2	0
88	1852	787	57.5%	13.5	21.9	27.1	0	6	0	6
67	3717	820	77.9%	11.9	43.1	48.4	1	3	0	4
8	4147	1608	61.2%	8.5	23.4	23.3	2	1	2	5
87	4287	1411	67.1%	11.8	33.3	34.5	2	5	1	8
232	3525	166	95.3%	17.9	43.4	42.4	1	3	2	6
25	3316	54	98.4%	12.4	10.3	15.7	2	0	0	2
7	6464	1540	76.2%	12.1	22	22.8	2	2	1	5
42	2970	1	100.0%	10.9	44.9	44.4	1	1	0	2
77	2463	1780	27.7%	6.2	10.9	16	0	1	0	1
5	2015	895	55.6%	4.4	18.2	22.8	4	2	1	7
97	5176	2200	57.5%	8.6	18.1	17.8	2	3	0	5
22.02	3515	235	93.3%	14.4	7.4	9.6	1	0	3	4
41	2864	115	96.0%	13.7	23.7	23	1	0	0	1
37	2170	113	94.8%	9.9	27.6	22.6	1	1	0	2
96	4197	1679	60.0%	3.9	32.3	38.1	2	5	0	7
75.01	3890	1962	49.6%	7.9	19	19.8	3	5	3	11
76	2894	1981	31.5%	5.4	12.3	17.3	2	1	0	3
68	5030	1938	61.5%	10.8	31.7	31.2	4	4	0	8
48.02	3341	304	90.9%	14.5	52.5	56.9	3	6	1	10
70	3587	2445	31.8%	5.1	14.4	15.2	2	1	5	8
79	3983	2757	30.8%	3.2	13.1	12.4	1	9	1	11
3	2787	1322	52.6%	8.2	23.8	30.4	3	2	2	7
94	5939	3298	44.5%	10.3	11.3	17.6	1	2	0	3
73	5525	3561	35.5%	3.6	13.7	14.5	1	2	1	4
72	3479	2602	25.2%	4.3	10.3	13.1	1	1	1	3
229	3671	876	76.1%	9.6	32	40.6	3	10	2	15
81	3278	282	91.4%	10.7	8.4	24.8	3	11	1	15
15	2197	50	97.7%	15.9	40.7	42.1	0	5	0	5
75.02	3845	1645	57.2%	8.8	30.3	29.8	2	6	1	9
227	3154	351	88.9%	12.3	53	56.8	0	3	1	4
50	2933	176	94.0%	12.3	44.8	42.6	3	12	0	14
16	1822	176	90.3%	12.5	16.7	19.5	1	0	2	3
92	2934	705	76.0%	11.1	24	33.1	2	1	1	4

NEWARK, NJ										
Census Tract	Population	White Only Population	% Minority	Unemployment rate	% Families Below Poverty	% Individuals Below Poverty	Env Rec	No Env rec	active gas station	Total
57	3124	983	68.5%	14.4	40	40.8	4	13	3	20
9802	849	154	81.9%	0	100	85.7	2	6	1	9
80	1616	675	58.2%	8.4	21.2	25.3	1	9	6	16
74	6168	2629	57.4%	5.1	19.4	16.7	0	3	1	4
22.01	6982	1455	79.2%	8.9	10.2	15	0	0	0	0
28	1413	332	76.5%	2.4	18.3	22.9	0	0	0	0
31	1856	37	98.0%	10.4	38.5	29.1	0	0	0	0
47	4766	22	99.5%	8.2	11.6	14.3	0	0	0	0
62	2036	175	91.4%	7.8	36.8	36.4	0	0	0	0
66	1543	36	97.7%	10.9	36.3	32.1	0	0	0	0
90	2235	448	80.0%	5.3	24.1	22.1	0	0	0	0
95	6334	2651	58.1%	3.3	11.8	16.5	0	0	0	0
9801	2140	505	76.4%	0	-	-	0	0	0	0

Source: 2007-2011 American Community Survey 5-year estimates


TRENTON GAS STATION INVENTORY
LEGEND
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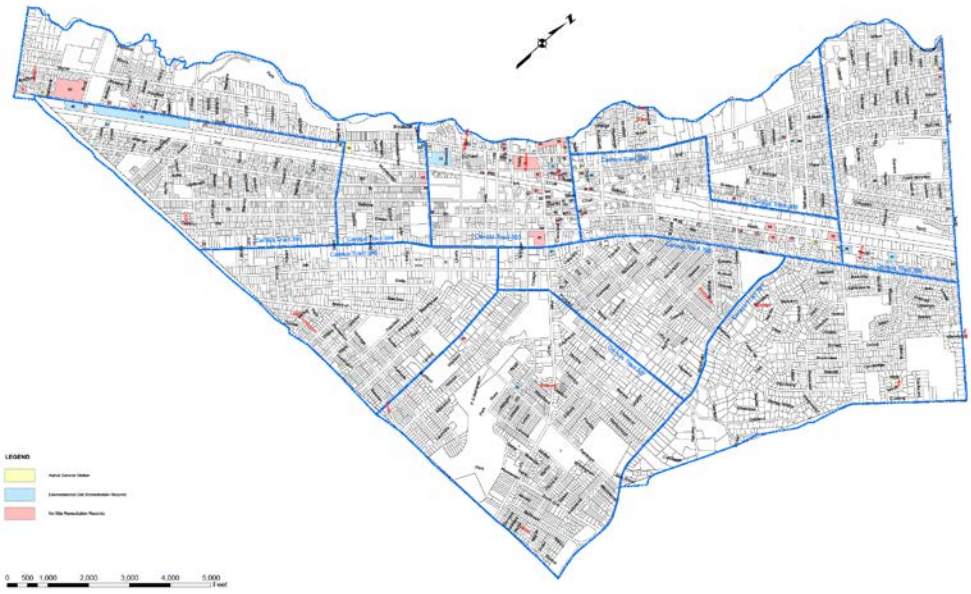
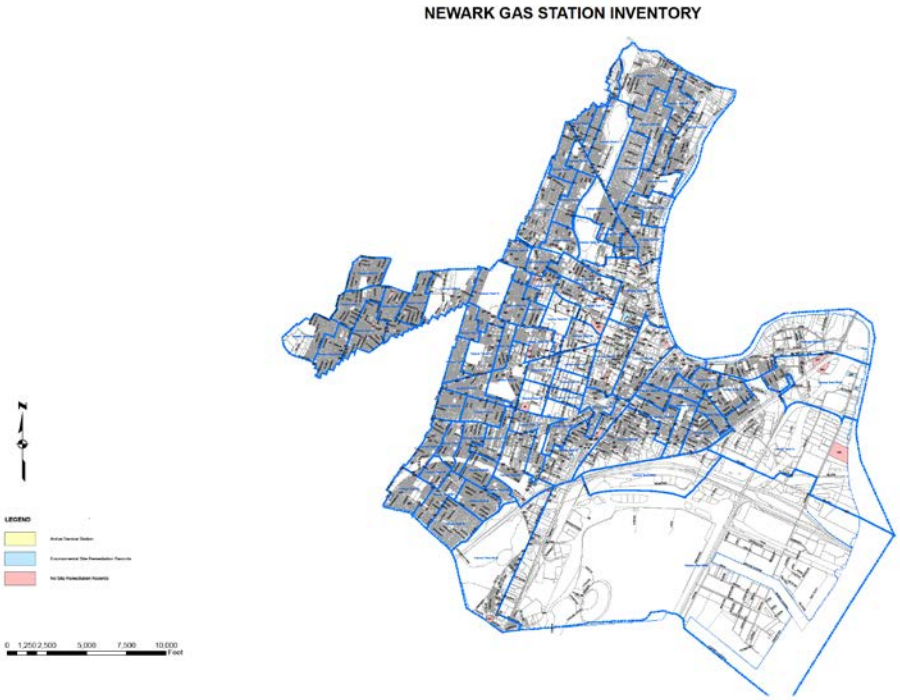
Feet

PLAINFIELD GAS STATION INVENTORY

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LEGEND
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Feet