

On the Appraisal of
Residential Properties
Near Undesirable
Land Uses

ABSTRACT

An increasingly common appraisal assignment is to determine the impact of local, undesirable land uses (LULUs) on nearby housing prices. The appraiser given such an assignment faces many challenges including: a determination of the *stigma zone*; the selection of appropriate comparables sales for the subject property; and, whether other, co-located undesirable land uses may also affect the subject property's value.

This article proposes several methodologies for refining and improving estimates of the housing price effects of undesirable land uses, especially in those areas where multiple LULUs exist. When more than one undesirable land use may contribute to a negative house price effect, the article emphasizes the need to establish the *relative* contribution of each land use to the overall price effect.

KEYWORDS: Undesirable land uses - effects on nearby house prices.
Stigma - identifying the areas affected by undesirable land uses.
Appraisal - selecting suitable comparables for stigmatized properties.
Estimating economic harm - caused by undesirable land uses.
LULU - local, undesirable land use, impact on nearby house prices.

On the Appraisal of Residential Properties Near Undesirable Land Uses

Introduction

A local, undesirable land use (LULU) may negatively affect the ability of nearby residents to use and enjoy their homes. The presence of this land use may create an adverse public perception which reduces the marketability (and, therefore, the value) of properties located within the *stigma zone* around the land use. An appraiser may be called upon to render an opinion on the reduction in a property's value by various parties. Qualified homeowners may seek appraisals to collect financial compensation under "homeowner guarantee" programs offered by, for example, landfill operators. Plaintiffs in class-action lawsuits may require appraisals of their homes when seeking compensation for presumed economic harm caused by undesirable land uses. Individual homeowners may simply wish to know how their home's value is affected by the undesirable land use.

The appraiser has a challenging assignment. The appraiser must determine the dimensions (for example, sight smell and/or sound) on which the undesirable land use creates an adverse public perception. The appraiser must define the boundaries of the area in which this negative public perception is likely to affect home prices. The appraiser must then select appropriate comparable sales, and determine whether other, co-located undesirable land uses may also adversely affect property values.

The appraiser must exercise great care in each of these areas, particularly when more than one undesirable land use is present. This is especially true when the appraisal is to be used in support of a claim that a specific undesirable land use has caused the homeowner economic harm. An appraisal that does not consider the potential price effects of other undesirable land uses may

allocate the entire price effect to the specified land use. In essence, the unidentified LULUs become “free riders.”

This article presents several methodologies for estimating economic harm with recommendations on the appropriateness of each methodology to any particular situation.

Literature Review

The literature is rich with studies on the economic impacts of undesirable land uses on nearby residential properties. Authors have variously studied airports¹, sanitary landfills², hazardous waste sites³, Superfund sites⁴, and leaking underground storage tanks⁵ to name just a few. Most of these studies involve the use of either a hedonic pricing model, or sales comparison approach to identify differences between the selling prices of homes near an undesirable land use and homes not near the undesirable land use.

Defining the Appraisal Problem

For the purposes of this article, an undesirable land use will be defined as any land use that creates a stigma for at least some nearby properties. *The Dictionary of Real Estate Appraisal* defines stigma as: “An adverse public perception regarding a property with some type of opprobrium (environmental contamination, a grisly crime) which exacts a penalty on the marketability of the property and hence its value.”⁶ A variety of land uses may create stigma including, but not limited to: toxic waste sites; landfills; airports; prisons; concentrated animal feeding operations (CAFOs); petrochemical refineries; nuclear power plants; and, abandoned manufacturing facilities.

The important distinction to be made is that this article only considers those situations in which the adverse public perception (stigma) of a subject property is due to the presence of an undesirable land use, and not due to a direct problem with the subject property itself. Thus, the focus is not on the appraisal of, for example, a contaminated property, but rather on how the

presence of the contaminated property may affect the appraisal of nearby properties. An excellent example is the case study performed by Flynn, MacGregor, Hunsperger, Mertz and Johnson regarding the perceived stigma created by a sanitary landfill and the effects of that perceived stigma on the value of nearby residential properties.⁷

Defining the Components of the Stigma

Undesirable land uses tend to affect three human senses - sight, hearing and smell. A correctional facility, for example, surrounded by a high fence topped with razor wire, primarily affects the sense of sight. An airport generally affects the sense of hearing, and a sanitary landfill mostly affects the sense of smell. Some land uses affect more than one human sense, as in the case of a petrochemical refinery that may be unpleasant to look at, create significant levels of noise, and emit odors.

In addition to their effects on the human senses, undesirable land uses may also be perceived to represent a threat to human health (as in the case of an industrial facility emitting pollutants into the air, ground, or water), or a potential threat to safety (as in the case of a prison). Further, some undesirable land uses may have a relatively short tenure, as in the case of a contaminated property in the final stages of cleanup, while other undesirable land uses may be reliably long-lived as in the case of an airport. Thus, the tenure of the undesirable land use may be an indicator of whether the price effect is temporary or permanent.

In designing the appraisal of a property potentially affected by the stigma of an undesirable land use, it is helpful for the appraiser to begin by creating a checklist of the ways in which the undesirable land use is likely to affect perceptions. One such checklist is illustrated in Figure 1 below.

Where there is widespread concern about the potential stigma created by an undesirable land use (as in the case of a class action lawsuit), the appraiser may also wish to conduct a survey to

further understand how peoples' perceptions about the undesirable land use may translate into market prices, and to elicit additional tangible and intangible variables that impact on market prices.^{8,9}

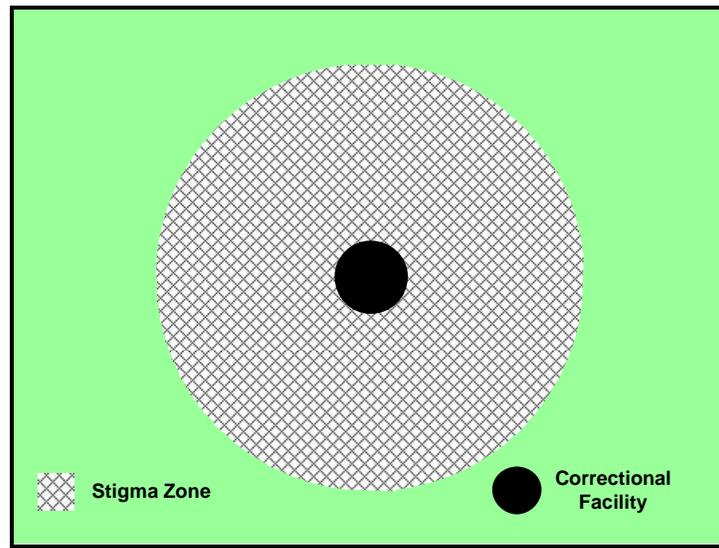
Figure 1 - A Components of Stigma Checklist

Comments	
Sight	
Sound	
Smell	
Health	
Safety	
Tenure	
Other	

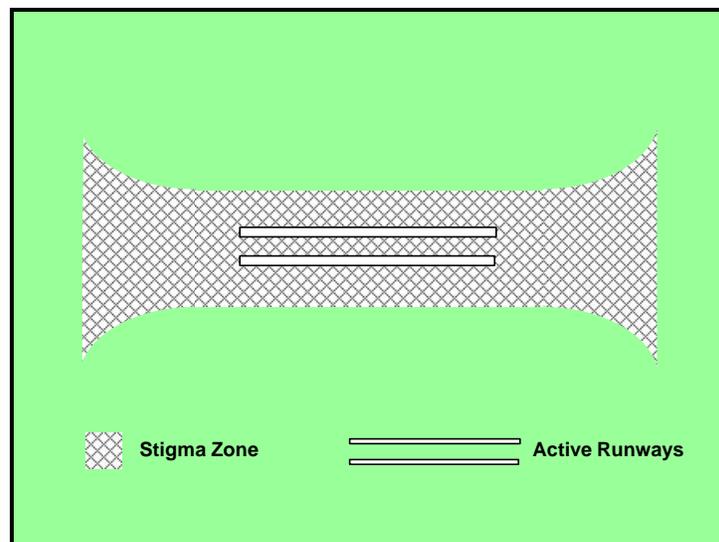
Defining the Stigma Zone

Once the appraiser has established the components of the assumed stigma, attention then turns to defining the stigma zone, that is, the area around the undesirable land use where housing prices are likely to be affected. Just as different land uses have differing effects on the human senses, different land uses also have different stigma zones.

Consider three simple examples. First, a correctional facility on slightly elevated ground that is surrounded by relatively flat terrain in an area where there are few trees and other sight line obstructions. This land use primarily affects the human sense of *sight*. In this case, the stigma zone may be described as a circular area surrounding the facility. The stigma zone for such a facility may be represented by Figure 2 below.

Figure 2 - Potential Stigma Zone - Human Sense of Sight

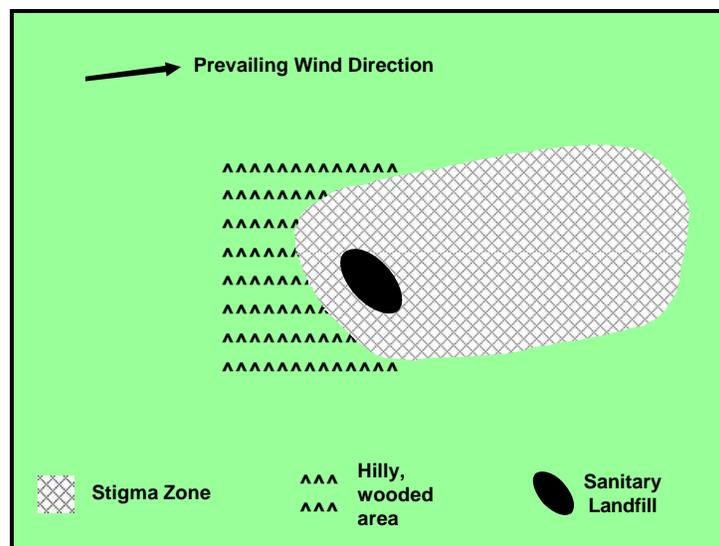
Consider next an airport. Although neighboring residents may not necessarily perceive an airport to be attractive to look at, the primary effect on nearby properties is noise from aircraft taking off and landing. In this example, the stigma zone encompasses the areas affected by the flight patterns of aircraft. If the airport consists of parallel runways, the stigma zone might look something like that illustrated in Figure 3 below.

Figure 3 - Potential Stigma Zone - Human Sense of Sound

Finally, consider a sanitary landfill. In this example, assume the prevailing winds are from the west southwest and that there is a hilly, wooded area directly to the west of the landfill.

Although some neighbors to the southeast and northeast of the landfill may be affected by noise from the landfill, and by the sight of the landfill, the primary stigma is odors emanating from the landfill. Residents due east of the landfill are those primarily affected. The stigma zone might be as illustrated as in Figure 4 below.

Figure 4 - Potential Stigma Zone - Human Sense of Smell



Other land uses may affect a combination of the human senses. The key point is that, for every land use, there exists a unique stigma zone. The appraiser must exercise extreme care in defining the boundaries of the LULU's stigma zone, especially when using paired sales data. To estimate the price effect of the LULU on a nearby property, the appraiser must be careful to select comparables that lie outside the stigma zone. The use of comparables that lie within the stigma zone is likely to underestimate the LULU's effect on nearby home prices as comparables within the stigma zone will also be affected by the LULU.

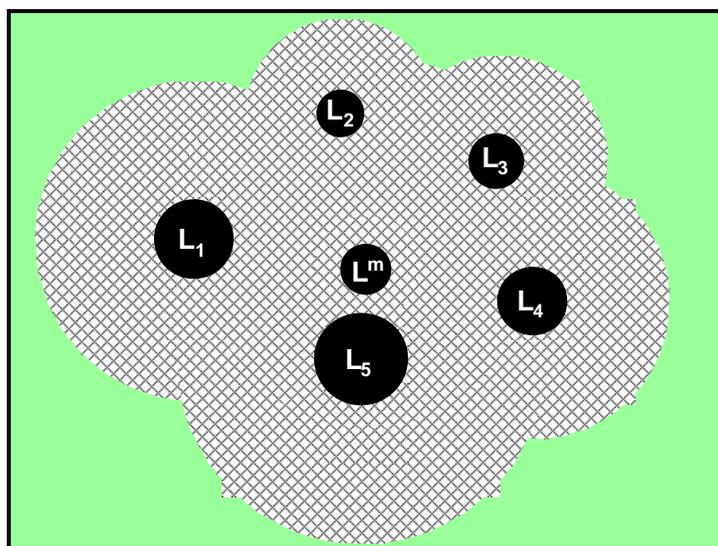
Unfortunately, if the stigma zone covers a wide area, suitable comparables may be at a substantial distance from the subject property. The possibility that differences between the

subject and the comparable, such as differences in neighborhood demographics, schools, access to public services and the like, might be significant. In such a circumstance, differences in observed selling prices between the subject and comparables may be due to factors other than the LULU itself. Even in the presence of a large number of comparables located reliably outside the stigma zone, it may be difficult to control for other factors that operate on the observed selling prices.

Estimating Housing Price Effects in the Presence of Multiple LULUs

Now consider a situation in which an undesirable land use is co-located with several other LULUs (L_1, L_2, \dots, L_N). Call this land use, L^m . As an example, take an area containing a petrochemical refinery, a sanitary landfill, and a sewage treatment plant as well as other industrial uses. The appraiser now faces a greater challenge, as the area in which house prices are negatively affected by L^m may also be negatively affected by other LULUs. An example where 5 other LULUs (L_1 through L_5) are co-located with L^m is illustrated in Figure 5 below.

Figure 5 - Other Undesirable Uses Co-Located with Land Use (L^m)



In such a situation, isolating the marginal effect of L^m on housing prices becomes problematic, at best, as the joint effects of all the other LULUs must be considered in two ways. First, the

stigma zone for each LULU must be determined. As suggested by Figure 5, the radius from each LULU at which point housing prices are not affected by the LULU may be unique to each LULU.¹⁰ The set of comparables will then come from the irregularly shaped area that is reliably outside *every* LULU's stigma zone. If the number of co-located LULUs is sufficiently large, and sufficiently dispersed, the set of suitable comparables may be a substantially larger distance away from subject properties within a particular stigma zone than in the more simple case involving a single LULU. Clearly, as one must move further away to find comparables, the likelihood that neighborhoods differ between subject properties and suitable comparables increases.

Second, the relative contribution to the subject property's reduced market value must be determined for each LULU when a subject property is located within the stigma zone of more than one LULU. The relative contribution cannot be determined by selecting comparables outside every stigma zone as this will only demonstrate the joint (total) effect of the multiple LULUs on the subject property's market price. So, what to do in the presence of multiple, co-located LULU's?

The following presents several alternative methods for estimating the relative contribution of each LULU to the total price effect. The methods are presented in order of desirability. That is, Method 1 is preferred to Method 2; however, a particular situation may not permit the application of Method 1. Thus, an appraiser should begin with Method 1 and step down until a workable method is found.

Method 1 - Find Comparable, Pure-Play LULUs

For the purposes of this discussion, a "pure-play" LULU is defined as an undesirable land use that, within a distinct area, is the only undesirable land use potentially affecting nearby housing prices. To establish the housing price effect of a similar land use (L_m) in an area

with multiple LULUs (as set forth in Figure 5), a possible methodology is to find a comparable, pure-play LULU, identify that pure-play LULU's stigma zone, and then compare housing prices within the pure-play LULU's stigma zone with housing prices outside the stigma zone.

These estimates may then be applied to the case of a similar land use in an area with multiple LULUs. In fact, if corresponding "pure-play" LULUs can be found for every LULU in a multiple LULU area, it may be possible to allocate the total housing price effect across the spectrum of nearby LULUs.

Method 2 - Determine Whether a Dominant Land Use Exists

In certain situations, the pattern of real estate development for an entire area may be traced to a single, dominant land use. Take, for example, an airport. The location of that airport motivates all manner of commercial development - warehouses, hotels, restaurants and the like - that may be undesirable in terms of their effects on nearby housing prices. In turn, both the airport and subsequent supporting commercial real estate developments generate demand for road and highway improvements to accommodate the increased vehicular traffic load that may further negatively affect housing prices.

One could make the case that whatever housing price effect is observed may be entirely attributed to the airport itself. One could argue that, absent the airport, the succeeding pattern of development for the area might have had a substantially different, presumably more positive, effect on housing prices.

Public policy decisions should also be considered. The whole pattern of real estate development is often the result of a single decision (or series of decisions) made by governments, for example, the location of a major new highway, and the subsequent zoning of land adjacent to that highway. To the extent that these public policy decisions may have

While the *distance* from the subject property to the land use may be presumed to be inversely correlated with the price effect (the further away from the subject, the lesser the effect), this may not always be the case. Prevailing winds and topographic features (such as hills and forests) may substantially affect the shape of the stigma zone, as illustrated earlier. The *size* of the land use, not only in terms of square area, but also with respect to height, may also have a substantial effect.

This grid method has the benefit of assisting in estimating the *relative* contribution of each LULU to the overall price effect similar to the way regulatory agencies assess penalties to polluters based on relative emissions levels.¹¹

Method 4 - Treat The Multiple Land Uses as a “Team”

In many situations, there may exist several nearby undesirable land uses where no single land use is dominant. This might be the case in a large, industrial-zoned area with several developed commercial parcels. The appraiser’s prospective solution would be to allocate the total price effect on houses located near the undesirable land uses *equally* across all LULUs. “Penalizing” all undesirable uses equally would give those operators of land uses that are less offensive an incentive to identify their price effect on nearby homes. This is especially true in the example of a class-action lawsuit where the plaintiffs (homeowners) name the operators of several LULUs as defendants. It would also serve the purpose of encouraging undesirable land use operators to “clean up” their properties.

Treating the multiple land uses as a team would also send an important message to regulatory agencies, such as municipal zoning boards. These agencies often permit additional undesirable land uses to proceed, even if the consequent effect on housing prices is negative, if the payoff in tax revenues from the undesirable land use is sufficiently positive to offset the diminished property tax revenues from the affected homes. In other

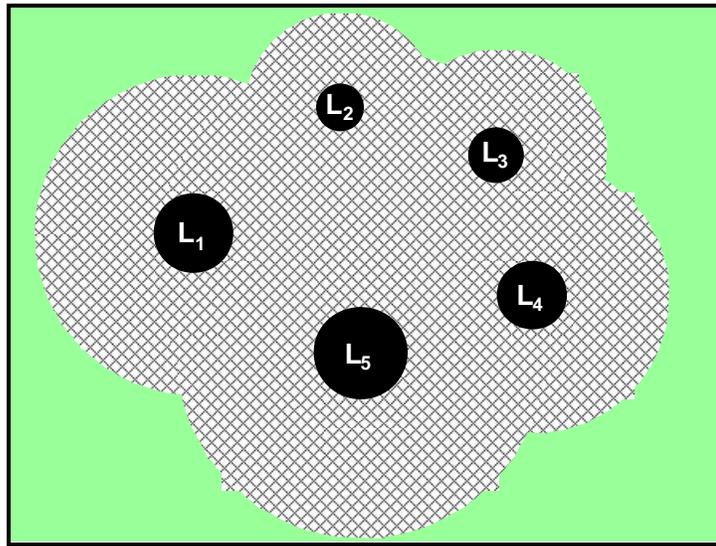
words, homeowners may “pay the price” for increased tax revenues through diminished property values unless they are armed with information on how a particular land use is likely to affect housing prices.

Treating the undesirable land uses as a team leads to the establishment of a “harms/benefits” analysis for each incremental land use where approval for the land use is granted only if the economic benefits outweigh the economic harms.

Such an analogy is hardly straightforward, however. Consider the example of a body of water that is polluted by multiple sources. Suppose the level of emissions is so great as to diminish the utility of the water to zero - it is not potable, it is not suitable for irrigation, for industrial uses, or for recreation. In this situation, the introduction of an additional polluter (presumably) causes no further harm - the water already has zero utility. The incremental source of pollution might argue that, since no additional harm is caused by their presence, no additional penalty should be imposed.

Conversely, consider the appraiser’s problem of attempting to allocate the price effect of a single undesirable land use in the presence of multiple LULUs. The task for the appraiser is to determine what the value of the subject property would be, *if that single undesirable land use were not there*. Figure 7 below modifies Figure 5 by removing the single undesirable land use, L^m .

Figure 7 - Land Use L^m “Disappears”



The possibility exists that the area has become so stigmatized, not only by L^m , but also by L_1 , L_2 , L_3 , L_4 and L_5 that the removal of L^m may have no marginal, positive effect whatsoever on nearby housing prices. May one then conclude that L^m bears no responsibility (or cost)?

Such a conclusion is hardly satisfactory to either homeowners, or regulatory agencies. It may, however, be the only reasonable conclusion that may be reached in the absence of a methodology that reliably estimates the individual land use's contributions to the overall housing price effect.

A Warning: The Appraiser Must Determine Who Was First

Regardless of which method may be appropriate in any particular appraisal, the appraiser must also establish the chronology of land development. In particular, two questions need to be answered. First, in what sequence did the undesirable land uses develop? Second, what was the pattern of housing development prior to and after the introduction of undesirable land uses?

The answer to the first question seeks to establish whether the area containing the undesirable land uses was developed piecemeal, or whether regulatory actions (such as rezoning) stimulated

the development of particular land uses. One would expect that, if the land uses were developed piecemeal, the estimated negative effect on housing prices is highly time dependent. Therefore, measurement of estimated price effects both prior to and after the introduction of a land use may aid in establishing the incremental price effect of each LULU.

On the other hand, if a regulatory action stimulated undesirable land use development, it also becomes necessary to estimate housing prices immediately before and immediately after the regulatory action to determine whether that regulatory action itself caused a measurable change in housing prices.

The answer to the second question proceeds from the answer to the first question. If the housing stock was largely developed prior to the development of undesirable land uses, and prior to any regulatory actions that may have stimulated the further development of land uses, one may reasonably conclude that any current, estimated price effect may be attributed to the LULUs. However, if portions of the housing stock were developed subsequent to the development of the LULUs, one may suggest that those homes' values were already at a discount when they were built. Thus, measuring the effect of an undesirable land use on a home's current price is a function of which came first - the land use or the house.

The Importance of Time Series Analysis

The preceding discussion demonstrates that, even if a paired sales analysis of *current* housing prices shows a significant negative effect on the prices of houses near undesirable land uses, and, even if the relative contribution of every undesirable land use to the overall negative effect may be estimated, a paired sales analysis alone is not sufficient to establish the economic harm that may have been caused by any particular land use.

To establish the level of economic harm, it is necessary to perform an analysis of the trend in housing prices through time. For example, even if it were determined that a home located near a

LULU was priced at a discount relative to comparable homes not near the LULU, it is necessary to establish when that discount first occurred. That may only be accomplished by measuring housing prices through time. Indeed, it may be the case that the house sold at a relative discount prior to the development of the undesirable land use in question. In such a circumstance, one may reach the conclusion that the undesirable land use has caused no economic harm to the owners of that particular home.

Moreover, if the current homeowner purchased the home subsequent to the development of the undesirable land use, that purchase was with the full knowledge of the existence of that undesirable land use. The claim of economic harm becomes problematic at best.

Summary

The appraisal of a residential property presumed to be affected by a neighboring undesirable land use requires great care, particularly in the identification of the stigma zone surrounding the undesirable land use, and in the selection of suitable comparable properties. Paired sales analysis also requires the use of historic paired sales data to determine if observed differences in selling prices have persisted for a period of time. When more than one undesirable land use may contribute to the price effect, some allocation method of the *relative* contribution of each land use to the overall price effect must be employed. The choice of an allocation method is a function of a variety of factors including: the availability of pure-play, comparable land uses; the existence of a single, dominant undesirable land use; and, the dimensions on which any particular land use may be expected to affect housing prices. The appraiser must also determine the sequence of land use development to establish when the price effect first appeared.

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⁸ See, for example, Flynn, MacGregor, Hunsperger, Mertz, and Johnson, 36-39, and Randall Bell, *Real Estate Damages: An Analysis of Detrimental Conditions*, (Chicago: Appraisal Institute, 1999), 27-31.

⁹ See the Appendix for an illustrative example of the application of this checklist.

¹⁰ For example, the size and visibility of each LULU as well as the traffic, noise and odors generated by each is likely to be different.

¹¹ See the Appendix for an illustrative example of the application of this grid.

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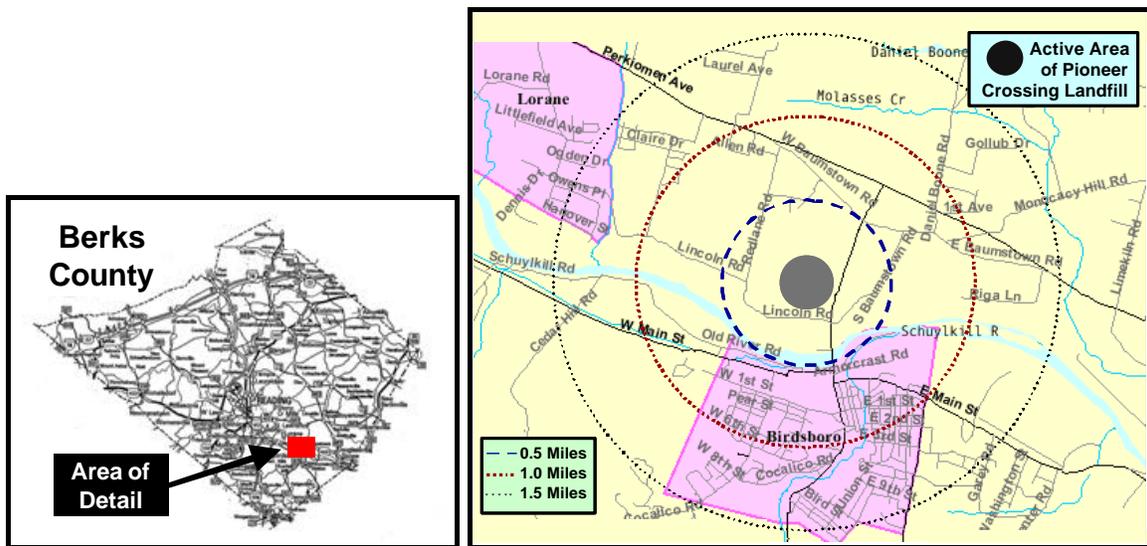
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Appendix

A Case Study - Pioneer Crossing Landfill

In the southeastern corner of Exeter Township in Berks County, Pennsylvania USA, Pioneer Crossing Landfill is located in an area with medium population density. Because the immediate surrounding area is relatively flat and relatively unwooded, Pioneer Crossing Landfill is quite visible, even at large distances.

Figure A-1 - Pioneer Crossing Landfill, Berks County, Pennsylvania USA



There are more than 3,300 single family homes situated within 2 miles of Pioneer Crossing, most of which are in subdivisions or well-defined neighborhoods in three principal areas: neighborhoods immediately surrounding the landfill; neighborhoods in Exeter Township to the west of the landfill; and, several different neighborhoods and subdivisions in Birdsboro Borough to the south of the landfill.

The single family housing stock consists of a variety of different construction types: “stick-built” homes; manufactured homes on masonry foundations; and, manufactured homes on temporary foundations (cinder blocks, for example).

Neighborhoods Surrounding Pioneer Crossing

An overview of the land uses immediately adjacent to Pioneer Crossing is best illustrated by the aerial photograph below which was taken from a point northwest of the landfill. The photograph itself has a generally south southeasterly orientation.

Figure A-2 - Aerial Photograph of Pioneer Crossing Landfill and Surrounding Area



Pioneer Crossing is bounded on the north by US Rte 422 East (West Baumstown Road), on the east by State Road 82 (Center Road), on the south by Lincoln Road, and, on the west by Red Lane.

The single-family homes that are closest to the landfill are those along South Baumstown Road (identified in the upper-left of the photograph above), and, homes in the Ada Drive/Grandview Avenue neighborhood to the north and west of the landfill (identified in the lower-right of the photograph above).

There are some homes directly to the east of the landfill along SR 82; however, a deed search revealed that nearly all the single-family homes on SR 82 between West Baumstown Road and Lincoln Road are now owned by the landfill operator, or by a company owned by the landfill operator.

The Eddie Smith Trailer Park formerly operated immediately to the south of the landfill along Lincoln Road. That trailer park permanently closed on January 5, 2003. That trailer park - and the circumstances surrounding its closing - will be discussed in detail in a later section of this case study.

Ada Drive/Grandview Avenue Area

The Ada Drive/Grandview Avenue neighborhood is in what may be (charitably) described as an “aesthetically challenged” area. In addition to its close proximity to the landfill, this neighborhood is also adjacent to: a large equipment maintenance yard operated by Baumstown Road Partners on the east side of Red Lane; a site containing discarded manufactured homes on the west side of Red Lane; the Pagoda Motorcycle Club (which operates a large, motocross dirt track) on the east side of Red Lane; and, US Rte 422 East. US Rte 422 East is a very busy highway. According to the Pennsylvania Department of Transportation (PennDOT), more than 13,000 vehicles a day pass this neighborhood on US 422 East.

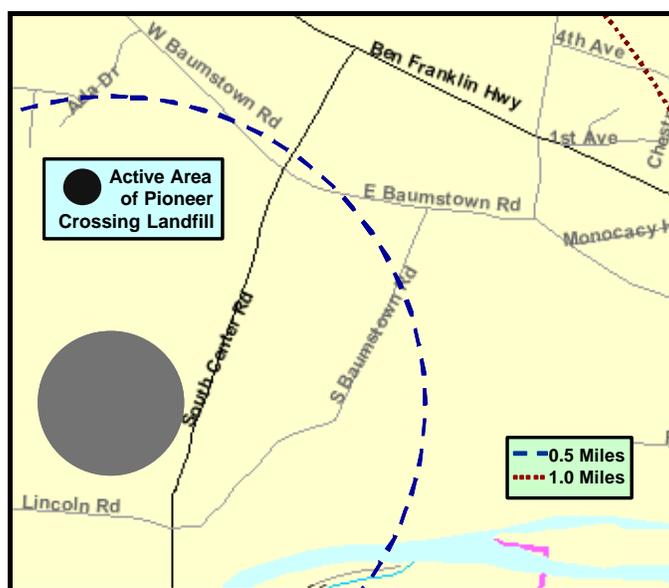
The neighborhood consists mainly of older, manufactured homes on masonry foundations. Several homes in this neighborhood are owned by the landfill operator, or, by a company owned

by the landfill operator. Some are also owned by a company called Exeter Associates. However, many homes in this neighborhood are privately-owned. The quality of the single-family homes in this neighborhood may be described as “poor” to “very poor.”

South Baumstown Road Area

To the east of the landfill is South Baumstown Road. South Baumstown Road begins at US Rte 422 East, meandering in a generally southerly direction, and then jogging to the west to its intersection with SR 82 at Lincoln Road.

Figure A-3 - South Baumstown Road Area



The neighborhood consists almost entirely of older, detached homes. Practically all of the homes on South Baumstown Road are privately-owned. The homes in the South Baumstown Road area are of better quality than homes in the Ada Drive/Grandview Avenue neighborhood. However, the South Baumstown Road area lacks amenities such as sidewalks, and curbs and gutters. Most homes do not have attached garages. Some homes do have detached garages and/or other outbuildings. The neighborhood appears to be far from affluent.

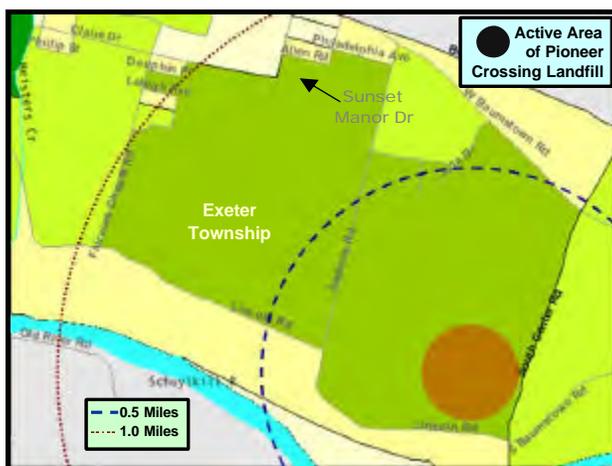
This neighborhood has been the source of a great number of complaints regarding odors emanating from Pioneer Crossing. Pioneer Crossing's operator, FR&S, Inc., and its wholly-owned company, MB Investments, have purchased several homes on South Baumstown Road and on the east side of SR 82 between US Rte 422 East and Lincoln Road during the last several years.

It is extremely difficult to accurately measure the effect of the Pioneer Crossing landfill on house prices in the South Baumstown Road area when the operators of the landfill are the principal owners of homes in this neighborhood.

Neighborhoods West of Pioneer Crossing

To the west of Red Lane, there are additional neighborhoods within 1 mile of the landfill. This area, bounded mainly by Fairview Chapel Road on the west, US Rte 422 on the north and Lincoln Road on the south, is illustrated in the figure below.

Figure A-4 - Neighborhoods West of Pioneer Crossing Landfill



Directly to the south of US Rte 422 and to the east of Sunset Manor Drive is the Philadelphia Avenue neighborhood. Exeter Bible Church (which is located on the south side of Philadelphia Avenue) operates a school in this area.

This neighborhood consists primarily of manufactured homes on masonry foundations. The homes are of varying vintages - ranging from fairly new to quite old. This neighborhood noticeably lacks amenities such as paved driveways, sidewalks, curbs and gutters, and garages. A portion of Philadelphia Avenue is not paved. The quality of the single-family housing in this neighborhood to be marginally better than the housing in the Ada Drive/Grandview Avenue neighborhood directly to the east only because some manufactured homes in the neighborhood are of a more recent vintage.

To the west of Sunset Manor Drive and to the east of Fairview Chapel Road is another neighborhood that is bisected (north-south) by very large high-voltage transmission lines owned by Metropolitan Edison Corporation (MetEd).

So large are these transmission lines, MetEd actually owns the land surrounding these transmission lines (a total of nearly 18 acres) from US Rte 422 to the Schuylkill River.

In addition to the land owned by MetEd, a large portion of the (undeveloped) land in this area is owned by Exeter Associates - roughly 34 acres. This land is immediately adjacent to the land owned by MetEd - both to the east and to the west. The history of the uses of this land will be the subject of discussion later in this case study.

To the east of the high-voltage transmission lines, there are a few homes on Claire Drive - mostly recent vintage manufactured homes, some of which may be on masonry foundations; others of which are clearly resting on cinder blocks.

Immediately to the west of the high-voltage transmission lines is another neighborhood that has the intersection of Claire Drive and Dauphin Place as a locus. Homes in this neighborhood are almost exclusively older, manufactured homes.

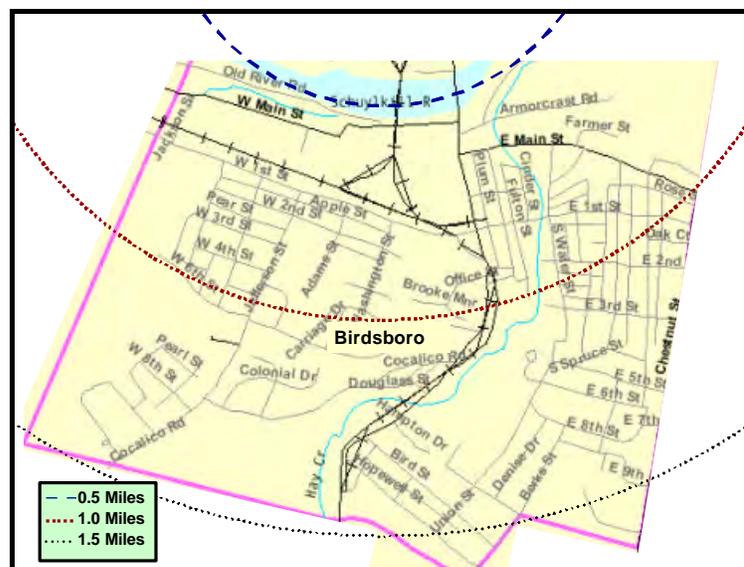
This neighborhood also lacks amenities such as sidewalks, curbs and gutters, driveways and garages. I would characterize the quality of single-family homes in the neighborhoods to the west of Sunset Manor Road and to the east of Fairview Chapel Road to be equivalent to the housing found in the Philadelphia Avenue neighborhood.

The housing stock in all of these neighborhoods is of generally poor quality. This is unsurprising given the numerous aesthetic challenges in each of these neighborhoods.

Birdsboro Borough

Directly south of Pioneer Crossing Landfill and across the Schuylkill River is Birdsboro Borough. Birdsboro is the most densely populated area near Pioneer Crossing, and more than half of all single-family homes within a mile-and-a-half of Pioneer Crossing are within the borough limits of Birdsboro.

Figure A-5 - Map of Birdsboro Borough



Birdsboro is bisected by SR 82 (which is named Furnace Street in the northern half of the borough and Hay Creek Road in the southern half of the borough). The principal east-west route through

Birdsboro is SR 724 (labeled West Main Street to the west of SR 82, and labeled East Main Street to the east of SR 82).

Birdsboro may be described as an aging, industrial town not unlike so many others that dot the Pennsylvania landscape. The (largely unoccupied) former Birdsboro Corporation steel mill is one of the first sights one views as you enter Birdsboro from the north on SR 82. Traveling a few blocks further south on Furnace Street - just past First Street - one encounters the FM Brown's Sons Feed Mill.

Directly across the street from FM Brown's Sons is an abandoned railway station. Also across Furnace Street from the feed mill is a public housing area. In the northeast corner of the boro, adjacent to the Schuylkill River, are the former Armorcast manufacturing plant (abandoned at the end of World War II) and the boro's sewage treatment plant.

Birdsboro evidences little in the way of commercial activity such as shops and restaurants, and very little in the way of professional services such as doctors' and dentists' offices, insurance agencies, law offices and the like. There is only one professional building in the borough - that being at the intersection of SRs 82 and 724 on the far northern boundary of the borough. There is one supermarket - on the eastern boundary of the borough.

There is very little, if any, undeveloped land left in the borough, although, suffice to say, there is extensive *underdeveloped* land as indicated by the abandoned and largely unused manufacturing facilities described earlier.

As a result, Birdsboro's property tax base is primarily from single-family residences, and, with little developable land, the prospect for Birdsboro increasing its industrial tax base does not appear very bright.

Single-family homes near the borough's main thoroughfares (SRs 724 and 82) are principally older, attached row homes, or, older, detached homes. Housing density is very high across the northern tier of Birdsboro - from SR 724 south to Third Street. Lots sizes in this area are commonly 0.1 acres or less. This is exactly what one would expect in an old mill town where workers, lacking both private and public transportation, usually walked to work.

The quality of the housing across this northern tier is certainly better than most housing directly adjacent to Pioneer Crossing Landfill, but far from luxurious. These homes do have amenities such as sidewalks, street lights and curbs and gutters. Few have attached garages. Many have detached garages, usually at the rear of the lot on an alleyway. A very large percentage of homes in the northern section of Birdsboro were built prior to World War II.

The high density of the housing in the northern tier of Birdsboro, and the age of that housing suggests that, at one time, Birdsboro was a prosperous mill town - with local factories, especially the steel mill, employing large numbers of workers earning decent wages. However, with the demise of the steel mill, those jobs disappeared, necessitating that its displaced workers either relocate elsewhere to find employment, or travel larger distances from their homes in Birdsboro to find work.

The demise of the steel mill and the resulting worker dislocation effects could only have had a negative impact on house prices in the northern tier of Birdsboro. That negative impact most certainly first manifested itself many years ago. The fact that the borough currently evidences little in the way of commercial activity (especially shopping and restaurants) suggests that very few present-day Birdsboro residents actually work in Birdsboro.

As one travels southward from Third Street and away from SR 82, housing density lessens and the housing is noticeably newer with a couple of exceptions. The Cocalico Road/Windsor Street

areas in the southwest section of the borough, and the Hopewell Street area east of SR 82 along the borough's southern border, consist mainly of older homes of generally poor quality.

Neighborhoods containing recent vintage duplexes, and recent vintage detached homes, may be found in the southeast part of the borough near the intersection of Union Street and East Eighth Street.

The most recent vintage homes may be found in the southwest portion of the borough, particularly near the borough's boundary with Robeson Township. Developers were provided financial incentives by the borough, particularly with respect to water and sewer hookup fees, to encourage development of the areas in which these homes are located. Obviously, if developers received financial incentives to develop these homes (and passed along at least a portion of the cost savings to the buyers of these homes), we would expect the sales prices of these homes to be lower than in areas where no financial incentives were provided.

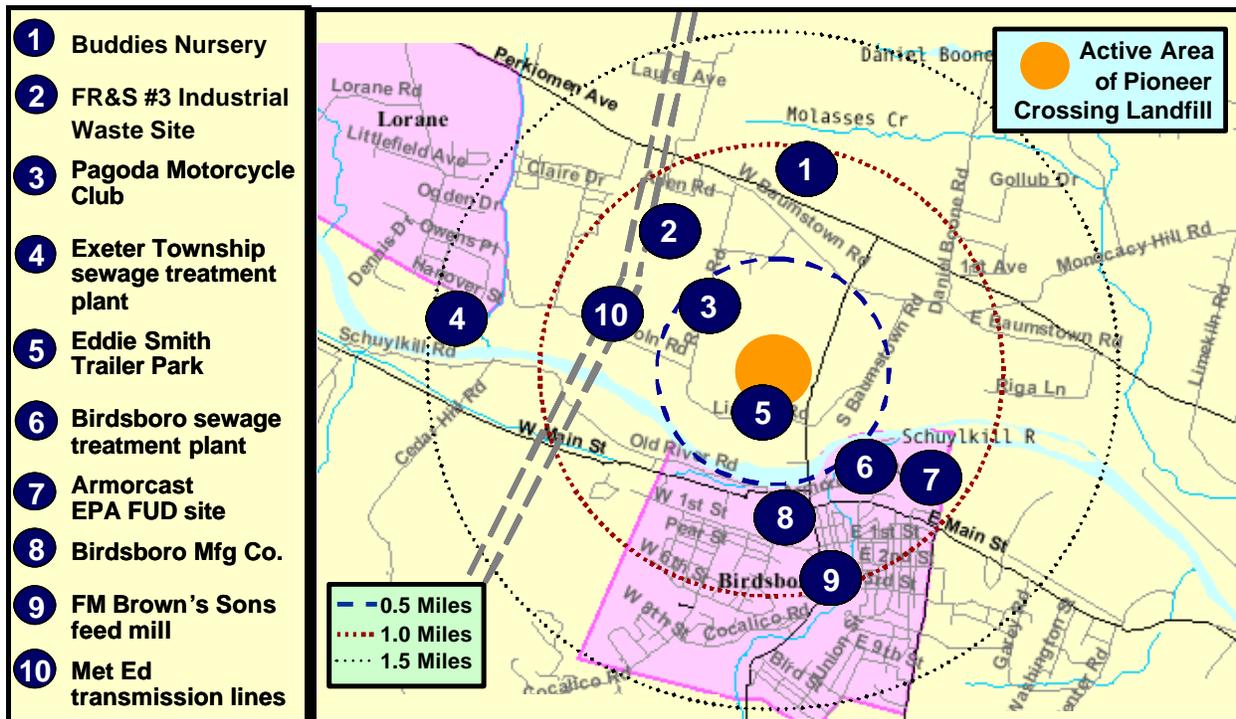
It is also important to note that construction of these homes post-dates the establishment of Pioneer Crossing Landfill. Homebuyers in these neighborhoods knew, or should have known, there was a landfill a mile or so away, especially since the landfill is visible from some of the homes - particularly those homes in the Creekside development in the photo on the right above.

Other Disamenities Co-Located with Pioneer Crossing

There exist (or existed) other disamenities near Pioneer Crossing that may have negatively impacted nearby single-family home prices. To the extent that these excluded disamenities are co-located near the landfill, it becomes entirely impossible to definitively identify the negative impact on single-family home prices that is strictly due to the landfill. Any observed negative impact on single-family home prices would be due to the combined effects of the various disamenities nearby - not just the landfill. And, perhaps, not even the landfill.

Figure A-6 below revisits Pioneer Crossing Landfill. There are at least 10 other disamenities that may have an effect on nearby single-family home prices. This list of disamenities should not be considered comprehensive.

Figure A-6 - Pioneer Crossing Landfill and Co-Located Disamenities



Nine of the 10 disamenities are reliably within one mile of the center of the active area of the landfill, while the 10th is less than a mile-and-a-half from the center of the active area of the landfill, and about a mile from the nearest boundary of the landfill. After reviewing Pioneer Crossing's relationship with the surrounding neighborhoods, each of the other disamenities will be discussed separately.

Pioneer Crossing

Pioneer Crossing Landfill had a rather contentious relationship with nearby residents, as well as with local, state and federal officials, during the past decade.

In July 1999, the Pennsylvania DEP levied a fine of \$450,000 against Pioneer Crossing for 45 separate, confirmed odor violations that occurred between July 1997 and March 1999. This was on top of another \$352,000 in fines levied against Pioneer Crossing in October 1996 for a variety of violations. A substantial portion of that fine (\$334,500) was upheld by the DEP Environmental Hearing Board in May of 1999, and by Commonwealth Court in September 2000. In August 2002, the US EPA cited Pioneer Crossing for exceeding federal limits on methane gas emissions, and for failure to conduct adequate air pollution monitoring. The EPA sought a \$71,500 penalty against Pioneer Crossing.

All told, Pioneer Crossing was levied penalties or had penalties upheld totaling more than \$850,000 during this period. All of these penalties were well-publicized.

It was during this same period (July 2000), coincidentally, that Pioneer Crossing filed for a permit to expand the size of the landfill by 67 acres. On October 30, 2000, the Exeter Township Board of Supervisors voted 3-2 to approve a new host agreement between Pioneer Crossing and Exeter Township.

After the DEP issued a harms/benefit report in January 2002 stating that the expansion would cause more harm than good, Pioneer Crossing constructed a revised benefits package that would, presumably, total \$160 million in fees and other economic incentives to Exeter Township and Birdsboro as well as other neighboring communities. Pioneer Crossing also agreed to reduce the proposed height of the landfill from 459 feet to 385 feet, reduce truck noise, and construct a 50-foot high fence to control litter.

Despite the proposed benefits package, many local leaders, including two Exeter Township supervisors and the Birdsboro Borough Council president and Borough manager continued to express concern about the expansion permit. In March 2002, a sitting Exeter Township

supervisor and former Exeter Township supervisor presented the DEP with a 20-page document disputing the benefits proposed by Pioneer Crossing. On March 27, 2002, DEP issued a revised harms/benefits analysis that indicated that, with the new benefits offered by Pioneer Crossing, the benefits of the expansion now outweighed the harms. Berks County Commissioners filed an appeal in April 2002.

In May 2002, the DEP granted a 10-year permit for the expansion, and granted a 50% increase in the daily waste volume Pioneer Crossing could accept. The permit was appealed a month later by both the Berks County Commissioners and the Exeter Township Citizens Action Committee.

The Buddies Nursery

Just north of US Rte 422 West and less than a mile due north of Pioneer Crossing is a business known as The Buddies Nursery, co-owned by Donald Peifer (now deceased) and Harold C. Hart. Sometime prior to November 1996, Mr. Peifer began receiving sewage sludge at the site of The Buddies Nursery from A&M Composting of Lancaster County. A&M Composting is owned by the same company that owns Pioneer Crossing Landfill - JP Mascaro & Sons.

Mr. Peifer apparently believed he could create “topsoil” by mixing the sewage sludge with crushed red shale. DEP estimates that as much as 57,000 cubic yards of sewage sludge was deposited on land along US Rte 422.

In January 1998, the DEP warned Mr. Peifer that an order dictating how the sludge was to be composted was not being followed. Soil tests by the DEP in February 1998 indicated that the compost exceeded state guidelines for fecal coli form. Water tests in March 1998 showed discharge from the composted sludge piles polluted a stream leading to Molasses Creek.

In early August 1998, the DEP ordered the nursery to dispose of about 3 acres of the compost. Peifer refused to comply and challenged the DEP to take him to court. On August 25, 1998, Mr.

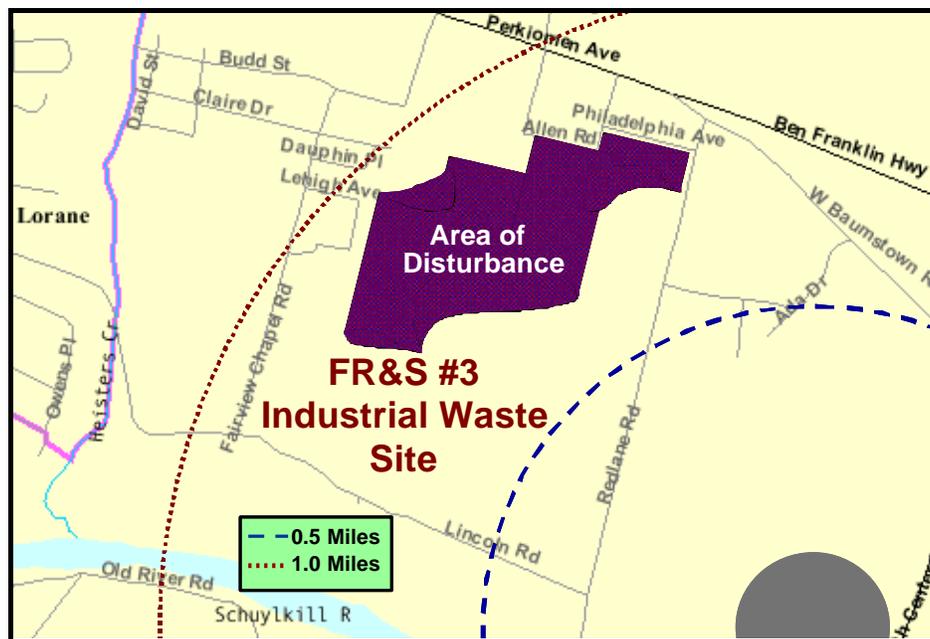
Peifer died. In August 2000, The Buddies Nursery agreed (in Commonwealth Court) to comply with the order to remove the compost. The compost was disposed of at Pioneer Crossing. The removal was completed by early November 2000.

It is worth noting that companies owned by Mr. Peifer (and now his heirs), and companies owned by JP Mascaro & Sons are, by far, the two largest owners of real estate in the southeast portion of Exeter Township.

FR&S #3 Industrial Waste Site

Another company owned by Mr. Peifer, Exeter Associates, owned all of (and still owns a portion of) a 173 acre site bounded by Red Lane on the east, Fairview Chapel Road on the west, Claire Drive and Philadelphia Avenue on the north, and Lincoln Road on the south. This land encompasses what are now the athletic fields for the school operated by Exeter Bible Church as well as much of the land occupied by the MetEd high-voltage transmission lines mentioned earlier.

Figure A-7 - Map of FR&S Industrial Waste Site



According to the DEP, between 1968 and 1977, this site was operated as an unpermitted industrial waste disposal area. Privately-owned generators and transporters dumped liquid industrial wastes onto the ground, into trenches, and into a ditch/stream that flows to the Schuylkill River. Chemicals disposed of included chloroform, toluene, dyes, fluorocarbon plastics, pesticides, insecticides, fumigants, adhesives, sealants, varnishes, lacquers and enamels. Exeter Township Police conducted an investigation in October 1976 based on citizen complaints of liquid waste dumping causing nauseous odors, burning sensation in the eyes and nose, and dry throats. The investigation documented industrial liquid waste disposal incidences and a list of potential responsible parties.

From that police report and an interview with Mr. Peifer, DEP estimates that 300,000 gallons of industrial waste per week were dumped on the site.

Liquid waste dumping ceased on the site in January 1977.

Subsequently, the US EPA conducted an Expanded Site Investigation in December 1987. The EPA concluded that the trace levels of organic and inorganic contaminants found in the soil and groundwater did not pose any human health or environmental concerns at that time.

However, on May 11, 2001, the Pennsylvania DEP ordered that a follow-up investigation, under the protocol of the Hazardous Substances Cleanup Act “HSCA” was warranted “...to be protective of human health and the environment.”

DEP based its order on:

“...the facts that: a) a release of hazardous substances has occurred at the site as defined by the HSCA; b) the observed release poses a potential threat to human health and/or the environment by multiple exposure pathways; c) previous soil sampling was restricted to surface soils; d) soils at the site have been historically disturbed by heavy

earth moving equipment; and, e) current surface water conveyances and surface water bodies have changed since the EPA Expanded Site Investigation...”

Concurrently, the Exeter Township Zoning Officer denied building permits to Exeter Associates to situate manufactured homes on lots in the site area. Following legal action by Exeter Associates, the building permits were eventually issued. Those manufactured homes include the ones previously described on Claire Drive near the MetEd transmission lines.

Eddie Smith Trailer Park

Immediately south of Pioneer Crossing, on Lincoln Road, is the former Eddie Smith Trailer Park. Mr. Smith purchased this three-and-a-half acre tract in 1973 and located 40 trailer homes there. In 1993, during the drilling of a well on the property, it was discovered that the trailer park was directly above a covered landfill that operated on the property from the 1950s until the early 1970s.

In 1999, Pioneer Crossing personnel placed four gas monitoring probes in the trailer park and discovered methane-to-air levels as high as 45%. For reference, a methane-to-air ratio of as little as 10% in a 1,000 cubic foot closed space within a mobile home would destroy the home if ignited by, say, the striking of a match, or the lighting of gas stove. Mr. Smith reached an agreement with the DEP to correct problems with the leaking methane by December 31, 1999.

Eradication of the problem proved costly, and methane problems persisted into the year 2000 when JP Mascaro & Sons purchased the trailer park from Mr. Smith and began relocating residents. In July, 2002, Mascaro notified the remaining residents that the trailer park would be permanently closed on January 5, 2003. The last residents vacated the trailer park later in the month of January 2003. Shortly afterward, Mascaro commenced clean-up of the site.

In summary, the area immediately adjacent to Pioneer Crossing Landfill - a licensed, permitted, modern landfill - is impacted on three sides (north, west, and south) by unlicensed, unpermitted sanitary waste, industrial waste, and sewage sludge sites that have drawn the attention and monitoring of the Pennsylvania DEP. These sites also drew the attention of local officials, residents and the press.

One may only conclude that this area is “environmentally challenged” - a perception not lost on any Realtor[®], long-term resident, or prospective homebuyer who conducted minimal market research (such as simply reading the local newspaper on a regular basis).

It is also important to note that illegal dumping activity at the FR&S #3 Industrial Waste Site, and the landfill beneath the Eddie Smith Trailer Park both existed *prior* to the opening of the Pioneer Crossing Landfill. Pioneer Crossing first opened for business around 1975. It was purchased by JP Mascaro & Sons from one Donald Peifer around 1985.

To the extent that property values in this area were already low, and diminished by the unpermitted disposal sites when Pioneer Crossing first opened for business, it becomes even more difficult to ascribe any (presumed) lower property values in the area today to Pioneer Crossing Landfill.

Other Disamenities in the Area

In addition to the environmental challenges detailed above, there are also two sewage treatment plants near Pioneer Crossing – the Exeter Township Sewage Treatment Plant on Lincoln Road, slightly more than a mile west of Pioneer Crossing, and Birdsboro Sewage Treatment Plant on Armorcast Road in Birdsboro, approximately one-half mile southeast of Pioneer Crossing.

Another disamenity very near Pioneer Crossing is the Pagoda Motorcycle Club and motocross dirt track on Red Lane directly west of the landfill.

Pagoda conducts sanctioned motocross races on the track. It also holds a liquor license. In 1997, a motocross racer died from injuries suffered during a race at Pagoda Motorcycle Club.

In addition to the noise associated with vehicular traffic traveling to the site to witness motocross races, the noise and dust generated during those races must be considerable. Visually, the dirt track itself is rather unattractive, and is only obscured from Red Lane by a tall, chain link fence. And weeds.

Of the remaining disamenities identified, three are within the boundaries of Birdsboro Borough. They are: the (largely) unused Armorcast plant in the northeast corner of the borough; the (largely) unused Birdsboro Steel Company mill on Furnace Street in north central Birdsboro; and, the FM Brown's Sons Feed Mill approximately one-quarter mile further south on Furnace Street in Birdsboro. As noted earlier, there is also an abandoned railway station directly west across Furnace Street from the feed mill.

The Armorcast plant was used to manufacture heavy armor - mainly tanks - during World War II. Since the end of World War II, the plant has been largely unused. The Armorcast plant is on the US EPA's FUDS (Formerly Used Defense Sites) list. Armorcast occupies a rather large tract of land, and, as an unutilized, decaying structure, is aesthetically unpleasing.

The Birdsboro Corporation mill, as previously noted, is one of the first sights one sees as one enters the borough from the north. The Pennsylvania DOT estimates that somewhere between 8,400 and 11,000 vehicles per day pass by this aging, rusting steel mill, using either East Main Street or Furnace Street. This mill is only the largest of several aging (and sometimes abandoned) industrial and commercial buildings at the entrance to Birdsboro. To the extent that first impressions matter, insofar as one's perceptions of the relative affluence (or lack thereof) of a community are concerned, Birdsboro does not score high marks.

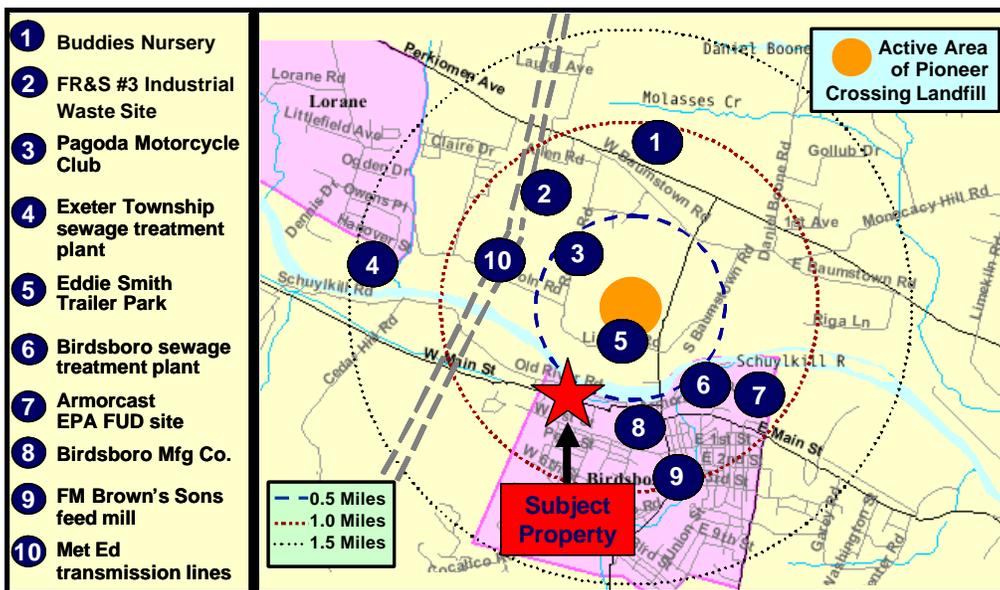
This is reinforced by the FM Brown’s Sons Feed Mill a short distance down Furnace Street which is not only aesthetically displeasing, but also a source of noise, heavy truck traffic, and odors.

The final disamenity is one referenced earlier - the MetEd high-voltage transmission lines which cross Exeter Township north-south approximately three-fourths of a mile to the west of the center of the active area of Pioneer Crossing. Several high-voltage transmission lines cross the east central part of Berks County, mainly on a north-south route. However, the MetEd high-voltage transmission lines in this section of Exeter Township are the largest. And they are the most conspicuous not only due to their size, but also because the surrounding terrain is generally flat, making them visible from relatively long distances.

An Appraisal Problem

Suppose you are an appraiser who is assigned the task of evaluating the relative impact of Pioneer Crossing landfill on a home located on West Main Street in Birdsboro. The location of the subject property is identified with a red star in Figure A-8 below.

Figure A-8 - Subject Property and Nearby Disamenities



Since Pioneer Crossing landfill may be the most obvious LULU for this subject property, the appraiser might begin by utilizing a “Components of Stigma Checklist” similar to the one suggested in Figure 1. For Pioneer Crossing, that checklist might look as follows:

Figure A-9

Components of Stigma Checklist for Pioneer Crossing Landfill		
Subject Property: 4xy W. Main St. - Birdsboro		
Landfill	Comments	
Distance	0.6 mi	Although more than a half mile from the subject property, it is clearly visible from subject.
Size	Large	The landfill's area (including active and inactive parts) totals several hundred acres.
Sight	Yes	The active area of the landfill is elevated relative to the subject property and clearly visible.
Sound	Yes	Refuse trucks pass by the subject property to and from the landfill. Noise from the landfill is also audible.
Smell	Yes	Although the prevailing winds are from the west, northerly winds will send odors from the landfill to the subject property.
Health	Yes	Potential environmental concerns, especially since the landfill accepts sewage sludge.
Safety	Yes	Landfill creates truck traffic on subject property's street. Trucks carry hazardous materials.
Tenure	=15 years	Landfill operator recently received permit to continue operating for at least 15 more years. Could operate for a longer period.

The appraiser has identified several key characteristics of the landfill that could negatively impact the selling price of the subject property. These include the landfill's: *Distance* from (proximity to) the subject; *Size*; *Sight* (visibility from subject); *Sound* (noise); *Smell* (odors); *Health* concerns (especially environmental health concerns); *Safety* issues; and, the estimated remaining *Tenure* of the landfill. For each component, the appraiser has provided comments that amplify the potential stigma (and price effect) the landfill creates.

However, the appraiser is aware that at least 10 other disamenities are within a reasonable distance of the subject property (as identified in Figure A-8). Therefore, in addition to completing a checklist similar to Figure A-9 for the landfill, the appraiser completes the same checklist for the 10 other nearby disamenities. The appraiser may then summarize these 11 separate checklists using a grid similar to Figure 6. An example is provided in Figure A-10, along with summary comments on each disamenity.

Figure A-10 - Summary Land Use/Price Effect Grid and Summary Comments

	Landfill	Other Disamenities									
	Pioneer Crossing	Buddies Nursery	Industrial Waste Site	Motorcycle Club	Sewage Plant #1	Abandoned Trailer Park	Sewage Plant #2	Abandoned Defense Plant	Steel Mill	Feed Mill	Transmission Lines
Distance	0.6 mi	1.6 mi	1.3 mi	1.0 mi	1.5 mi	0.5 mi	0.7 mi	1.0 mi	0.4 mi	0.6 mi	0.6 mi
Size	Large	Medium	Large	Medium	Medium	Medium	Medium	Large	Large	Medium	Large
Sight	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes
Sound	Yes	No	No	Yes	No	No	No	No	No	Yes	No
Smell	Yes	No	No	Yes	Yes	Possibly	Possibly	No	No	Possibly	No
Health	Yes	Yes	Yes	Possibly	Possibly	Yes	Possibly	Possibly	Possibly	Possibly	Possibly
Safety	Yes	Possibly	Possibly	Possibly	Possibly	Possibly	Possibly	No	Possibly	Possibly	Possibly
Tenure	=15 years	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

Summary:

The subject property’s value may be negatively impacted, to some extent, by at least 11 separate undesirable land uses located within 1.5 miles of the subject. While Pioneer Crossing landfill is the largest and most visible of these undesirable land uses, the widely known environmental issues associated with The Buddies Nursery, the FR&S Industrial Waste Site and the Eddie Smith Trailer Park may be a concern to any potential buyer of this property. In addition, there are two sewage treatment plants within 1.5 miles of the subject property. Although neither is visible from the subject, the Exeter Township Plant (#1) is directly upwind from the subject and may cause odor problems. The (largely) vacant Birdsboro Steel mill is less than a half mile to the east of the subject and is visible from the subject. Similarly, the FM Brown’s Sons feed mill is only slightly more than a half mile away, and creates noise and traffic issues for the subject property in addition to being visible from the subject property. The motorcycle club generates traffic along West Main Street along with noise and dust. The abandoned defense plant in northeast Birdsboro creates no immediate sight, sound or smell problems for the subject property. However, its environmental status and its aesthetically displeasing appearance may be concerns for any potential buyer of the subject property.

“Bulls-Eye” or Target Practice?

In the above example, no single, dominant undesirable land use is solely responsible for whatever diminished price effect may be operating on the subject property. While the landfill may be the most obvious local undesirable land use, the area around the subject property contains so many other disamenities, it may be a practical impossibility to statistically define, with any degree of accuracy, the extent to which the landfill (or any of the other 10 identified undesirable land uses) may have negatively impacted the subject property's price.

Further, if the landfill were to close tomorrow, it is problematic to suggest that the subject property's price would increase (on a relative basis) in any measurable way.

The stigma attached to this area by the unpermitted disposal activities at The Buddies Nursery, at the FR&S #3 Industrial Waste Site, and at the landfill over which the Eddie Smith Trailer Park was built may have created such a negative perception in the minds of Realtors[®], developers, and Berks County homebuyers that a *permanent stigma* may exist - a stigma so profound that even the removal and/or remediation of several of the undesirable land uses may have no measurable, positive price effect.