

Standard on the Valuation of Properties Affected by Environmental Contamination

Approved November 2016

International Association of Assessing Officers

This standard replaces the July 2001 *Standard on Properties Affected by Environmental Contamination*. IAAO assessment standards represent a consensus in the assessing profession and have been adopted by the Executive Board of the International Association of Assessing Officers (IAAO). The objective of the IAAO standards is to provide a systematic means for assessing officers to improve and standardize the operation of their offices. IAAO standards are advisory in nature and the use of, or compliance with, such standards is voluntary. If any portion of these standards is found to be in conflict with national, state, or provincial laws, such laws shall govern. Requirements found in the *Uniform Standards of Professional Appraisal Practice (USPAP)* also have precedence over technical standards.

Acknowledgments

At the time of the 2016 revision (approved November 2016) the Technical Standards Subcommittee comprised Alan Dornfest, AAS, Subcommittee Chair, Josh Myers, Carol Neihardt (associate member); Wayne Forde, August Dettbarn, Bill Marchand, and Chris Bennett, staff liaison. The chair of the Research and Standards Committee was Doug Warr. The subcommittee thanks Tom Jaconetty for contributing the findings of his extensive legal research to the 2016 update of the standard.

Revision Notes

The 2016 revision provides updates to case law.

Published by
International Association of Assessing Officers
314 W 10th St
Kansas City, Missouri 64105-1616

816/701-8100
fax: 816/701-8149
<http://www.iaao.org>

ISBN 978-0-88329-224-2

Copyright © 2016 by the International Association of Assessing Officers
All rights reserved.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher. However, assessors wishing to use this standard for educating legislators and policymakers may photocopy it for limited distribution.

Published in the United States of America.

Contents

1. Scope	5
2. Introduction	5
2.1 Changes in Lists and Definitions of Hazardous Substances or Other Contaminants.....	5
2.2 Technology and Public and Private Sector Money	5
2.3 Public Awareness and Perception.....	6
2.4 Government Regulations.....	6
3. Definitions.....	7
3.1 Contamination.....	7
3.1.1 Physical Contaminants	7
3.1.2 Nonphysical Contaminants.....	7
3.2 List of Contaminants.....	7
3.3 Examples of Special Situations.....	7
3.3.1 Underground Storage Tanks (USTs)	7
3.3.1.1 Change in Commercial Industrial Property Value	8
3.3.1.2 Effect on Residential Property Value	8
3.3.2 Asbestos and Other Insulating Materials.....	8
3.3.3 Lead Paint and Products	8
3.3.4 Radon.....	8
3.3.5 Nuclear Facilities	8
3.3.6 Air Pollution	9
3.3.7 Noise Pollution	9
3.3.8 Toxic Substances in the Home	9
3.3.9 Surface Water and Groundwater Quality Requirements.....	10
3.3.10 Waste Disposal Facilities and Practices.....	10
3.3.11 The Effects of Illegal Drug Manufacturing on Property Value.....	10
3.4 Testing.....	10
4. General Areas of Impact on Value	11
4.1 Concepts of Value	11
4.2 Costs	11
4.2.1 Cost of Physical Cleanup.....	12
4.2.2 Continued Costs of Monitoring.....	12
4.2.3 Legal Costs	12
4.2.4 Ongoing Costs	12
4.2.5 Indirect Costs	12
4.3 Financing.....	12
4.4 Liability	12
4.4.1 Use of Property.....	13
4.4.2 Selling Contaminated Property.....	13
4.4.3 Who May Be Liable?	13
4.4.4 Innocent Landowner	13
4.4.5 Indemnification Agreements	14
4.5 Stigma	14
4.5.1 Reduced Market Value.....	14
4.5.2 Stigma versus Cost to Cure	14
5. Specific Factors Influencing Value.....	14
5.1 Extent and Nature of Contamination.....	15
5.2 Type and Location of Property	15
5.3 Demand for Alternative Uses.....	15
5.4 Presence of Assumable Financing	15
5.5 Liquidity Problems Caused by Lack of Marketability	15
5.6 Availability of Bond to Pay Cleanup	15
5.7 State and Regional Environmental Regulations	16
6. Approaches to Value	16
6.1 Sales Comparison Approach.....	16
6.2 Cost Approach.....	16
6.2.1 Cost to Cure as Functional or Economic Obsolescence.....	16
6.2.2 Specialized Costs	17
6.3 Income Approach	17
6.3.1 Capitalization Rates	17
6.3.2 Income Stream	17
6.4 Alternative Approaches to Value.....	18
7. Other Considerations.....	18

7.1 Proof of Contamination	18
7.1.1 Burden of Proof on Taxpayer	18
7.1.2 Certification	19
7.1.3 Alternative Solutions.....	19
7.2 Assessment Practices versus Environmental Policy	19
7.3 When Is Value Affected?.....	19
7.4 Intrinsic Value of Property.....	19
7.5 Failure to Pay Taxes.....	19
8. Summary of Considerations	20
8.1 Current Use.....	20
8.2 Future Value	20
8.3 Adjustments to Value	20
9. Public Relations.....	20
9.1 Assessment Process	20
9.2 Effect on Other Taxpayers in Jurisdiction	21
10. Example of Map of Contaminated Area.....	21
Appendix A. Glossary.....	21
Appendix B. Bibliography	22
Appendix C. United States Federal Environmental Regulatory Acts.....	24
Appendix D. Pertinent Court Cases	24

Standard on the Valuation of Properties Affected by Environmental Contamination

1. Scope

This standard provides information and guidance concerning the effect of environmental contamination on the valuation of property for assessment purposes. The standard includes definitions of types of environmental contamination that may affect value, discusses types of impact on value, and lists numerous considerations of which the assessor should be aware. The standard is divided into several sections, including a glossary and a bibliography. Unless otherwise indicated, statutes and regulations referred to in this standard are from the United States.

2. Introduction

Environmental factors are increasingly important in property valuation as the market has become more aware of the potentially detrimental effects of chemical, radiation, noise, and other contaminants on air, water (surface water and groundwater), soil, and overall environment. In certain cases, especially when incomplete information is available on the effects of a contaminant, the market may overreact, and prices may be depressed more than is rational. In other cases, knowledge about a particular contaminant is so new or limited that there is a virtual absence of market data, and effects on value are difficult to ascertain. The property owner (taxpayer) may tend to press for a lower assessment in many of these cases. However, the market often recognizes that contaminated properties can be redeemed and redeveloped into valued assets. In fact, there is a growing national, state, and local effort to revitalize urban brownfields.

To deal with all of these issues, to respond effectively to appeals and value property equitably, it is important for the assessing officer to become knowledgeable about contaminants and their effect on property values. As courts or tribunals, for example, in California (*De Luz Homes, Inc. v. County of San Diego* [1955]); *Redevelopment Agency of City of Pomona v. Thrifty Oil Co.* [1992]) Georgia (*Stafford v. Bryden County Board of Education* [1995]), New Jersey (*Methode Electronics* [2015]), and Pennsylvania (*Harley Davidson* [2016]) have noted, the general environmental condition of a property requiring remediation is a relevant factor in valuation.

To understand the effect of environmental contaminants on property value, the assessor must have some background knowledge on this subject. In addition to merely recognizing contaminating substances, the assessor must understand the potential for changes in lists of substances or conditions currently thought to produce contamination. The current state of detection, monitoring, and cleanup technology must be recog-

nized. Public awareness is a somewhat intangible factor that nevertheless may affect value. Finally, the state of current and proposed federal, state, or local regulations and court decisions can greatly affect the marketability and value of property. At least twenty-four states enacted voluntary cleanup legislation between 1988 and 1995, bringing the current total to more than thirty. Several additional factors may be pertinent, including any disruption of normal activities occasioned by the remediation as well as the visibility, severity, duration, of the contamination, the continuing utility of the property, the cost and liability for clean up, and diminution in market value which may result (Sherwood [2005]; Carver & Crowell [1999]).

2.1 Changes in Lists and Definitions of Hazardous Substances or Other Contaminants

Lists and characteristics of substances that are hazardous, as well as amounts of substances considered harmful, change frequently as new information becomes available. Information on specific hazardous waste is often available from state or local environmental agencies. The International Association of Assessing Officers (IAAO) maintains a searchable online bibliography that includes materials relating to pollution and property value. See also the bibliography at the end of this standard.

The assessor should also pay close attention to court cases on environmental issues, many of which involve federal courts and have the potential to affect value in new areas as new contaminants are implicated. A list of many pertinent federal regulatory acts and current court cases is found in appendices A and B, respectively. Additional court cases are synopsized in the *Assessment Journal*, and many are on file in the IAAO library.

2.2 Technology and Public and Private Sector Money

Both currently available and new technologies have the potential to influence the effect of contaminants on value positively or negatively. Technology that permits safe, efficient, and inexpensive cleanup of contaminants tends to minimize any decrease in property value. Often, cleanup costs are prohibitively expensive, given current technology, but new developments may dramatically improve cleanup operations. However, new technology may also make it possible to detect quantities or types of contamination that were previously undetectable. In addition, as more contaminants are identified, new, more restrictive regulations may be written. Thus,

a "clean" property may suddenly have a major problem that affects value. The assessor should keep abreast of regulations and technological advances.

Because costs may change with technological advances, the assessor should follow developments and may wish to obtain estimates of cleanup costs independent from those provided by the property owner. This step is no different from providing independent appraisals to defend values on appeal. In most circumstances, however, cost information provided by the taxpayer can be corroborated through regulatory agencies; several courts require further independent estimates. Enormous sums, well in excess of several billion, are now available for remediation and brownfield revitalization efforts. Public/private sector commitments may eliminate sites that had been viewed as environmentally lost properties. As one Tennessee court has observed, the effect certain conditions have in the mind of the buying public may be critical (*State of Tennessee v. Brandon* [1994]).

2.3 Public Awareness and Perception

The public can be aware of certain contaminants but uninformed about others. Residential buyers would typically give some consideration to asbestos in a house; they would also probably be concerned if the house were located near a nuclear power plant. They may not, however, be particularly aware of radon gas, especially if they are moving from an area where this substance is rare. They may be aware of, but not concerned with, the potential effects of electromagnetic radiation from proximity to overhead power distribution lines because the effect of this contaminant is currently under debate in the scientific community. The potential exists, however, that electromagnetic radiation or some other, yet unknown, substance will be found harmful, and values of various properties could be affected suddenly.

Public overreaction may create a gap between cost to cure and decline in value. Even though it may cost \$10,000 to cure a particular problem, the potential sale price may decline initially by \$20,000. The assessor might view this as a form of functional or economic obsolescence, or perhaps as a negative locational influence. However, the initial overreaction may not properly reflect value and usually does not reflect value after resolution of environmental problems. The assessor, therefore, needs to compute the present value of residual future value after cleanup and must endeavor to explain the valuation process and concepts to the taxpayer (see section 8.2 and the definition of "residual value" in the glossary).

2.4 Government Regulations

Federal, state and provincial, and local agencies regulate hazardous substances and other contaminants and respond to violations. The principal organization in the United States is the Environmental Protection

Agency (EPA), which administers the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendment and Reauthorization Act of 1986 (SARA). Many state or local agencies are also involved. Often, local requirements are more stringent than federal requirements. The assessor should maintain periodic contact with these various agencies to stay current with all regulations and changes.

United States federal environmental regulatory acts are subject to congressional review and amendment. Changes that are promulgated through this process may affect value, and the assessor should remain aware of such changes.

In Canada, the Canadian Environmental Protection Act, the Fisheries Act, and the Waste Management Act are pertinent federal statutes. Provinces may enact additional legislation. Appraisers are subject to a "positive duty to investigate" responsibility.

Properties may be located within designated contaminated areas, known as "Superfund" sites. Values of such properties may be affected differently from values of equally contaminated properties outside a designated site. Within Superfund sites, there generally is greater certainty about the extent of contamination. Depending on severity and projected cleanup timetable and costs, the effect on value may be positive or negative. However, as one New Jersey decision notes, such costs are site specific and should not be presumed by considering other, allegedly comparable properties (*Badische Corp. v. Town of Kearny* [1996]). Accurate mapping of areas of contamination is vital to understanding potential effects on value (see section 5.2).

The present and anticipated status of environmental discharge permits held by a taxpayer may also affect property value. A discharge permit has value to a company and may offset the negative effects of environmental considerations, if permit requirements can be easily met. A property with a discharge permit is usually more valuable than a similar property without such a permit because the permit may be necessary for the company to be able to operate as expected.

Rights to pollute are similar to permits and have value. For example, the Clean Air Act provides "tradable allowances," which are exchangeable between facilities and permit one property to raise pollutant discharges if another reduces its pollutants. Property with such rights will be more resistant to decline in market value caused by environmental contamination, provided such contamination is related to the specific rights. Rights to pollute constitute salable, although intangible, assets that may contribute to the value of property (see section 7.4 and "offsets" in the glossary).

It is important to realize that EPA regulations tend to focus on significant problems. Virtually any property could be considered contaminated given sufficient in-

vestigation. It is necessary to differentiate between contamination problems already discounted by the market and those from extraordinary influences that result in additional loss of value.

Some naturally occurring contaminants may be present in an area. Presence of contaminants at their natural "baseline" levels is generally not sufficient for the EPA to require cleanup. However, the presence of such contaminants may affect value; if so, the effect should be considered as due to locational, not environmental, influences.

3. Definitions

3.1 Contamination

In assessment usage, contamination is any recognized physical or nonphysical environmental influence that must be considered to determine value. Contamination may take various forms including physical, aesthetic, and perceptual. Contamination is recognized through federal, state, or local agencies that regulate environmental contamination. Contaminants not recognized by the various regulatory agencies (such as light pollution) may produce locational influences on value.

3.1.1 Physical Contaminants

Physical contaminants are substances present in, on, or near a subject property in measurable quantities and identified as having a harmful environmental impact (see section 3.2). Some substances are deemed hazardous because they are ignitable, corrosive, toxic, or reactive.

Substances not accepted by the regulatory community as harmful should not be considered physical contaminants. The market may still respond to these substances, however, and value may change. However, because the change would result from only a perception, the contaminant would not be defined as physical.

3.1.2 Nonphysical Contaminants

Contaminants, such as intrusive light, that have no tangible, physical substance are considered nonphysical. These take many forms and must be considered as "real" as physical contaminants because they may affect property value. For example, proximity to noise sources often diminishes utility and therefore property value. Another example is electromagnetic radiation originating from nearby power lines or radio wave transmission devices.

Also included would be prevailing market perceptions of substances or situations. For example, toxic substances may have been completely cleansed from a property. However, the stigma attached to this property may not immediately disappear, and value may be affected by this nonphysical condition. The assessor should watch for additional (post-cleanup) efforts (such as new wells) by property owners or public agencies because these often lessen the stigma and result in a more rapid recovery of value.

3.2 List of Contaminants

The substances listed in table 1 or associated perceptual issues may affect value and should be considered in the valuation process. Many of these are specific to certain types of property and would not need to be looked for in every case. Each contaminant must be considered in its potential for physical, nonphysical, or perceptual effect. Although the list of contaminants shown in table 1 is not comprehensive, examples are given of suspect industries and situations in addition to selected physical substances.

Table 1. Examples of Environmental Contamination

Acid rain	Intrusive light
Air contaminants	Lead paint
Airborne substances, indoors	Mining byproducts
Airport noise	Nitrates
Asbestos	Noise-airport, road traffic
Carbon black	Noxious odors
Chlorine and related compounds	Nuclear material and industry
Diminished quality of drinking water	Oil refinery
Dioxin	Organic and inorganic compounds
Dry-cleaning fluids and solvents	PCBs
Empty containers that previously stored hazardous materials	Pesticides, herbicides, and other agricultural chemicals
Fertilizer	Pipelines
Floodwater	Power lines and microwave sources
Fluorine and related compounds	Radon
Formaldehyde	Suspect industries
Heavy metals, including lead and mercury	Underground storage tanks
Industrial byproducts	

3.3 Examples of Special Situations

Some environmental contamination situations that have become particularly important or widespread are discussed in greater detail in this section. In evaluating the effect of these conditions on market value, consideration should be given to public perception and fear, which may affect values in the marketplace. However, appraisers should not make assumptions about market effects without market data. Numerous studies have been done on the market effects of asbestos contamination, electromagnetic towers, radiation, landfills, noise, public fear, traffic, and other environmental factors. Appraisers should be aware of these studies.

3.3.1 Underground Storage Tanks (USTs)

These are tanks typically used for storage of liquids, usually petroleum products. Although such tanks are termed "underground," the Resource Conservation and Recovery Act (RCRA) states that a tank will meet this classification if more than 10 percent of the volume of the tank and associated piping is underground. Contamination may occur from tank leaks or from spills during the filling of the tank. Depending on substances involved as well as soil and bedrock characteristics, contamination may spread to adjoining areas. Wells and other water resources may be contaminated.

Secondary air pollution may result from fumes released by evaporation of leaking substances. Additional toxic substances may result from chemical reactions between leaking substances or between these substances and the environment contacted. In this situation, cleanup may be more difficult and costly.

Maps are usually available to show areas where groundwater has been contaminated by the spread of substances leaking from USTs (see sections 5.2 and 10).

Petroleum products are not regulated under "Superfund" authority; rather, liability is governed by separate, special statutes.

3.3.1.1 Change in Commercial Industrial Property Value

Property value may change for several reasons as a result of contamination from leaks from USTs. Direct loss of income may occur, for example, if oil is stored to be used or sold by a business as part of its operation. Property components may need to be dug up and replaced, and contaminated soil removed. Property owners may be liable for fines or cleanup of adjacent property and affected groundwater and other water resources. Even after cleanup is completed, owners may be liable for additional cleanup of contamination not discovered initially. Often costs exceed initial estimates and affect marketability of property and income streams for a long time.

In some areas, governmental agencies have established insurance funds to protect existing properties with USTs from future liability. When these programs are available, certification of current tank conditions will be provided to the owner. Such certification, as well as availability of this type of insurance, may increase the value of properties with these tanks. Large insurance deductibles may offset this gain.

3.3.1.2 Effect on Residential Property Value

The EPA has not enforced environmental regulations with respect to residential property. For this reason there has been little direct effect on residential property value from USTs (or other environmental contamination problems). However, residential property value may be affected because of proximity to commercial or industrial properties. There is also a potential for significant future impact, which would occur if regulations were extended to include residential property. The assessor should be aware of developments in this area.

3.3.2 Asbestos and Other Insulating Materials

Insulating material containing asbestos or urea-formaldehyde creates potential contamination problems that often affect value. Although asbestos has not been used for many years, older structures often contain the material. This substance is dangerous when deterioration allows the asbestos to enter the living areas of a structure. It is particularly dangerous when it is in "friable" condition. It is far less of a threat when it has been encapsulated.

Urea-formaldehyde foam insulation (UFFI) has not been in general use for several years, so the formaldehyde level is typically below hazardous thresholds, and the insulation does not have to be removed. Energy efficient homes may be suspect, however, even if recently constructed. Formaldehyde byproducts can also enter indoor air from glues used in wood particle and carpeting products. Concentrations are usually minimal, and public response is usually relatively mild, indicating little effect on value.

3.3.3 Lead Paint and Products

Lead is a heavy metal that is found in paint, especially in older structures, and in pipes and some solder used to join lead or copper pipes. Dust or chips of lead paint may contaminate living areas. Where lead is in contact with drinking water, contamination will result. Lead paint usually requires a replacement with less toxic paint; piping may also need replacement with polyvinyl chloride (PVC) or copper with non-lead solder connections.

Because public awareness of lead contamination is high, property value is affected by cleanup costs and the stigma associated with lead. There is probably less of a stigma associated with lead than with other, more exotic forms of contamination.

3.3.4 Radon

Radon is a naturally occurring radioactive gas released during decay of radioactive elements generally found in granitic rock. In recent years, public awareness of this substance and associated risks has grown. Because the substance is denser than air, it may accumulate in basements and lower portions of structures. Often, ventilation or air exchange systems can be constructed to remove the gas and cure the problem. Energy-efficient structures, especially underground homes, are particularly susceptible because underground construction often restricts exchange of indoor and outdoor air. In some localities, favorable radon test results may increase market value.

Radon is common in certain, typically mountainous, areas of the United States and uncommon in most other areas. If detected in trivial concentrations, foundations or crawl space sealants or improved ventilation will usually eliminate the problem, adding only minor costs. The effects of stigma are not usually present. At least twenty-one states require disclosure of radon to prospective purchasers.

3.3.5 Nuclear Facilities

Nuclear facilities use, store, or dispose of radioactive material. These facilities include power plants, private and governmental research sites, hospitals, and disposal sites, as well as equipment used to transport radioactive material. Proximity of property to nuclear power plants and other nuclear facilities is likely to produce

negative value effects. Aside from the obvious risks of nuclear accidents, additional risks are associated with decommissioning, waste disposal, and contaminated areas. To some extent, the problems are no different from those associated with proximity to conventional heavy industry. However, because radioactive waste often remains toxic for a very long time and tends to be more difficult to dispose of, a greater stigma may result. Finally, current radioactivity research indicates more risk from less exposure than was previously believed. Nuclear facilities with little current effect on value may someday be considered heavily contaminated, and values may decline.

Although proximity to a nuclear power plant may reduce the value of adjoining properties through the stigma alone, this concern does not reduce the value of the plant itself. Most regulatory commissions require public utilities to provide buffer zones around nuclear power plants. If the cost of the buffer zone property is included in the rate base, the capitalized earnings indicator reflects the value of the buffer zone. No deduction or discount should be made in the cost approach because of the buffer zone requirement. If there is actual contamination of the buffer zone, this would affect land values inside the zone. Also, because the total amount of land is fixed, less land will be available outside the zones for other purposes, which may raise land costs elsewhere.

Regulatory bodies generally require public utilities to make annual payments into dedicated nuclear plant decommissioning trust funds. When these payments are deducted as expenses, the capitalized earnings indicator reflects the impact of the present value of the decommissioning costs on the unitary value (when the plant is part of the unit and a unit value is estimated). No further adjustments are necessary. Whatever influence the stigma may have on plant value is reflected in the unitary value of the operating utility.

Groundwater or surface water dispersal from seepage of radioactive material is common and may affect value far from the original contamination site.

Regardless of potential or actual contamination, an operating nuclear power plant represents a valuable property, and future cleanup costs are mandated and should be reflected in the income stream used to determine value.

Enterprises not normally associated with the nuclear industry may use radioactive materials in significant quantities. As awareness of this use increases, values may be affected. For example, the most common user of radioactive (and other toxic) material close to residential areas is often a hospital. Proximity may affect value through the stigma or real contamination.

3.3.6 Air Pollution

Air becomes polluted when contaminants are released into the atmosphere or when nontoxic substances react

with other substances or light to produce contaminants. The degree to which values are affected by air pollution depends on the economic cost to escape the pollution. For example, air pollution may occur equally throughout a major center. Because of distance to alternative work sites or other costs of doing business, it may be noncompetitive or undesirable to locate in less polluted locations. In this case, the effect of air pollution will be constant and already accounted for in the market. No additional adjustment will be necessary, unless regulatory agencies mandate reduction of pollution. Added expenses will then affect the income stream and reduce market value in the short run. These same expenses may, however, improve industry competitiveness in the long run or have no effect if competition is among similar industries, all having to deal with the same level of pollution and with the same regulations.

3.3.7 Noise Pollution

Noise pollution includes unwanted sound generated by airport, road traffic, and heavy industry. Effects should be considered similar to other locational and neighborhood desirability influences and may be incurable economic obsolescence. However, data on the market effects are essential before any conclusions can be drawn. (See *Friends of Lincoln Lakes v. Board of Environmental Protection* [Maine 2010]).

3.3.8 Toxic Substances in the Home

Many toxic substances are used in the home, including insecticides, mothballs, motor oils, antifreeze, wood preservatives, rust removers, polishes, batteries, deodorizers, degreasers, weed killers, drain cleaners, disinfectants, pool chemicals, paints, hobby products, bleaches, nail polish remover, and car wax. In addition, residential construction may involve lead and other toxic substances, or products that break down and release such substances. Particleboard, carpet glue, and certain insulation may release formaldehyde, for instance.

Fortunately, many of these toxic substances are not structural, but transient, being removed from property when transfer of ownership occurs. However, residuals may be left behind along with toxic substances related to construction materials. Ultimately, the market will determine how much these factors influence value, the presumption being that additional functional or economic obsolescence may be recognized if buyers pay less for properties with contamination. Aside from construction-related materials and residual contamination, however, the presence of transient materials should be ignored. These could be viewed as management factors, with "good" home managers keeping fewer toxic materials. Assuming typical management, it would be unnecessary to investigate the owner's practices in determining value.

3.3.9 Surface Water and Groundwater Quality Requirements

Most property uses require availability of adequate water supplies. This is true for optimum use of residential property, where tests showing contamination may become locational factors and may influence value. Water quality is also important in agricultural uses, where crops or livestock cannot otherwise be maintained, and the income-producing capability of the land can be affected (Food Security Act of 1985).

Water quality can be affected by factors as diverse as industrial point source contamination, faraway groundwater contamination, excessive rainfall resulting in flooding or siltation, runoff from land to which agricultural chemicals and fertilizers have been applied, and infiltration of salt water in coastal areas. The effect on present and future productivity of the land must be determined. If problems can be cured, income-producing capacity may be restored, and the present value of this future worth can be computed. Water quality problems are similar to other problems related to agricultural land, such as slope, water availability, and erosion. These problems may alter the income-producing capability of the land, thus changing its value. Environmental contamination problems must be differentiated from management problems in determining value.

One of the problems associated with groundwater contamination relates to the liability of commercial property located above spreading groundwater contamination. Provided the property in question did not contribute to the contamination, current EPA rules do not hold this property liable for cleanup costs. Lenders may still be reluctant, however, to provide financing and unfavorable financing arrangements may affect value. In addition, there is some conflict between federal statutes and EPA rules, and assessors should be alert for new developments in this volatile area. Local regulations or statutes may also lead to liability. Residential property is less subject to liability, but financing considerations and stigma may still affect value.

If groundwater contamination does not directly influence the water supply of the subject property, it is not appropriate to adjust value to reflect complete cleanup. The utility of the property should be the primary concern and will rarely be affected if adequate clean water can be assured.

3.3.10 Waste Disposal Facilities and Practices

Facilities for waste disposal include incinerators, landfills, and associated transfer sites. Although intended to remediate pollution, these facilities are focal points for pollution and may become sites from which air or groundwater contamination can spread. The assessor may be required to value the disposal facility itself or any surrounding property. In either case, additional monitoring costs and effects of the stigma may affect value. The disposal of medical waste and other highly publicized substances in such facilities can add to the

stigma. However, studies have shown that, in many cases, the value of property near landfills is unaffected. Market trends must be observed to determine if values are actually affected.

Waste disposal practices can contribute to the degree of value loss. For example, establishments that have used dry-cleaning solvents and other chemicals are often suspect as potential sources of contamination because of former improper disposal practices. Although these practices may not have violated any laws or regulations in force at the time of disposal, hazardous chemicals may have entered the surrounding environment through soil contamination, leading to groundwater contamination. Present levels of contamination may violate current environmental statutes. Because sites may have been abandoned or the contaminating business may no longer exist on the original site, accurate historical maps (Sanborn maps used for fire insurance purposes are often available) and chain of ownership information should be referenced in determining areas of possible contamination. Values of nearby properties may be affected; adverse financing effects are possible.

3.3.11 The Effects of Illegal Drug Manufacturing on Property Value

Illegal drugs are often manufactured in small, mobile units, often in remote areas. Typically, little effort is made to dispose of toxic materials properly, which often are byproducts of illegal drug manufacture. These materials may contaminate adjacent properties or be disposed of indiscriminately and contaminate property never involved in the production of the drugs.

Although the chemicals used in illegal drug manufacture may not be more toxic than those produced by many legitimate industries, discovery is made more difficult by the impracticality of tracking down anyone with specific knowledge about the contamination of a given site. Even if the manufacturers could be found and were cooperative, they would have had no incentive to keep track of or determine the exact nature of byproducts, so little precise information is likely to be forthcoming. Cleanup will therefore be more costly and less successful. Because of added uncertainty, prospective buyers will be more reluctant, and the value of the property may suffer possibly out of proportion to the actual cost of cleanup.

Also, the remote nature of many manufacturing sites may make access difficult, further reducing the likelihood of adequate cleanup. Time lag between contamination and discovery is likely to be significant, leading to increased chances for dispersal of contaminants from the original location and even less successful cleanup.

3.4 Testing

The assessor should not rely solely on statements of the property owner estimating the loss in value due to environmental contamination problems. Results of inde-

pendent (private or governmental) testing and governmental certification of a site as contaminated should be reported as proof of contamination. To help determine the actual effect on value, files of test results should be maintained so that comparable levels of contamination can be treated comparably. Test reports should include information on the extent of the problem regarding adjacent property, water contamination, and so on. Soil characteristics should also be included. The burden of providing test results and proving contamination is on the taxpayer attempting to demonstrate the effect on value.

4. General Areas of Impact on Value

The basic provisions of regulations requiring cleanup of contaminated properties assign the costs to responsible parties. Where this cannot be done, the chain of title is followed to establish liability. CERCLA, as amended by SARA, allows certain exceptions. For example, the current owner would not be held liable, provided that before purchasing the property this owner made all appropriate inquiries without discovering existing contamination.

Contamination can range from mild, requiring minimal cleanup costs and having little, if any, effect on value, to severe, with virtually no use of the property possible for the present or the foreseeable future and with prohibitive costs to correct the problem. The degree to which contamination affects the present and future utility of the property must be established.

When regulations require the same improvement to be made by all in an industry, the effect is uniform and costs become part of the typical expenses of the business. Often, extra costs for pollution are part of start-up or development costs associated with a new facility and, in this case, will not reduce property value. In any other situation requiring plant improvements, costs may be amortized over expected life and computed in terms of present worth; in this way, high costs incurred in the year of installation will not be weighted improperly. These principles would apply, for instance, if additional air pollution control equipment were required to meet new standards.

Many states offer partial or full property tax exemptions (and other cost-related tax credits or state-funded financing) to industry for equipment and improvements used to control pollution. At least two states (Idaho and New Jersey) provide an incentive for remediation by allowing remediated land to retain part of any lower value it was assigned to reflect contamination. Exemptions of this type reduce the effective costs of dealing with contamination and reduce the impact of cleanup on both the income stream and property value. Sixteen states not only have voluntary cleanup programs but also provide financial assistance and tax credits to attract business development. Eleven states have negotiated Superfund agreements with the EPA that permit site

remediation plans, issue no further action letters, and the like. Several states have adopted a variety of flexible approaches to revitalizing blighted properties.

4.1 Concepts of Value

Two concepts of value that must be considered in reference to environmentally distressed property are the unencumbered value and the value in use of the property.

The unencumbered value is the value that the property would have if no adjustment were made for any environmental encumbrance. This value can be obtained using standard appraisal methods. There is a tendency to discount this value based on costs related to remediating or isolating environmental contamination. Fully deducting the costs may overstate the decline in value because the value in use concept would then be ignored. Value in use suggests that a property which is still in use, or which can be used in the near future, has a value to the owner. This would be true even if costs to cure environmental problems exceed the nominal, unencumbered value. The value in use will most nearly reflect the market value of the property (see discussion of costs versus value in section 4.2).

4.2 Costs

The first cost associated with environmental contamination is the cost of discovering the presence or extent of any problem. To enable the new owner to use the "innocent landowner" defense (see section 4.4.4), and as a preliminary step in establishing cleanup costs, an environmental assessment report must be obtained before purchase.

The cost to cure a particular problem must be determined, but may overstate or understate the effect on value. For example, property may be able to maintain an income stream while costs are incurred, and costs may be amortized over a longer period. This will increase debt, but not affect present worth on a dollar-for-dollar basis. Costs may often be amortized over expected improvement life, and the present worth of the costs computed. Costs are often not fully recognized when contamination is discovered. Difficulty in estimating costs is greater in certain types of environmental problems, groundwater contamination being more difficult than soil contamination. If initial estimates are low and additional or ongoing expenses are involved, the effect on value may be greater. Alternatively, costs may result in capital improvement; a more efficient, less polluting system may be installed, and residual property value may increase. The potential for either decreasing or increasing value must be recognized (see "residual value" in glossary).

The cost to cure a contamination problem includes all costs necessitated by and associated with the cleanup. These can include costs for physical cleanup, monitoring, legal fees, and ongoing costs. Complete cleanup

may be impossible; costs to control contamination may be substituted for costs to cure the problem. Many states (including Illinois and Minnesota) permit remediation to a certain defined level of "clean" that depends upon the new use intended for the property.

Whenever possible, costs should be determined from the market. It is often possible to obtain comparable costs for cleanup of similar situations. Files of cleanup cost information should be developed and maintained. Often, information outside the particular jurisdiction or region may be necessary. In determining costs, it is important to recognize that higher costs will be incurred if the EPA is involved because its overhead must be absorbed by those liable for the cleanup. This factor can alter the baseline costs determined from comparable cleanup situations.

4.2.1 Cost of Physical Cleanup

Actual costs must be ascertained. Estimates provided by a property owner may be overstated. For example, regulatory agencies may grant permission to use less expensive alternatives, such as isolation rather than cleanup. Deferrals may be granted, and these allow more time for cleanup and reduce current costs, although the present value of the property may also be reduced.

4.2.2 Continued Costs of Monitoring

The costs of testing and monitoring may be added to the expenses; thus the costs are subtracted from the income of property subject to cleanup. These costs may be substantial and should be established or predicted from evidence provided by the property owner and regulatory authority.

4.2.3 Legal Costs

The contaminated property may incur legal costs in dealings with regulatory agencies and other potentially responsible parties. In addition, lawsuits may be filed by other affected property owners or by third parties seeking to share their own liability.

Ordinary legal costs can be viewed as part of management and not as an influence on property value. Legal costs associated with contamination may be considered part of the cost to cure the problem. However, to be considered, these costs must exceed costs of customary legal advice. The potential for litigation or pending litigation may affect marketability and value by deterring prospective buyers.

4.2.4 Ongoing Costs

Final costs are often unknown before completion of cleanup. These costs often exceed original estimates, especially when future, more stringent regulations are anticipated. In addition, perceived or actual risks remaining after completion of cleanup may result in higher insurance costs and reduced ability to use the

property as security for loans. Certain types of costs may be amortized over a period corresponding to anticipated improvement life or the time to implement the cure.

4.2.5 Indirect Costs

These can include anything that affects the property's income-producing ability during or after the cleanup. For example, tenants may not be able to live in a rental unit during lead paint removal. Another income restriction would occur if one portion of an industrial plant could not be used because of toxic contamination, and an intermediate product manufactured in that area could no longer be created on site. Additional expenses could be incurred, and the plant's earnings could suffer accordingly. Although this impact would be somewhat transient, it should be included in the same manner as other costs (see sections 4.2 and 7.4).

As the field of environmental law matures, cleanup costs will become easier to predict. Private insurance companies may become more willing to provide coverage. Insurance costs, which appear prohibitive today, may become more reasonable, and the cleanup could have less effect on value.

4.3 Financing

Financing is known to affect property value. The impact is particularly significant when favorable or unfavorable financing is obtained because the market has already accepted the influence of typical financing costs.

In the case of environmentally contaminated properties, two types of financing effects need to be considered: the ability of a prospective buyer to finance the purchase of the property and the terms for financing the actual costs to cure contamination problems. If prospective buyers cannot obtain typical financing due to the problem, the cash equivalency value of the property will be diminished. If terms for financing the costs to cure problems are poor, additional liability or unfavorable debt will reduce buyer income anticipation and thereby reduce market value (see section 5.4). (Additional information on financing adjustments is found in IAAO 1990 and Gloudemans 1999). Many lenders, particularly in Region 5 EPA (which includes Illinois, Indiana, Michigan, Minnesota, and Wisconsin) are developing innovative programs to help finance blighted land revitalization. However, lender approaches may differ from region to region.

4.4 Liability

Liability for costs associated with environmental contamination often lies with property owners. Liability may affect the use of the property and its future sale and may contribute to any stigma (see section 4.5). The EPA will assume liability only in the event that no other potentially responsible party can be discovered; even

then the EPA will usually hold the property owner liable for some portion of the cleanup cost (unless the owner qualifies under the "innocent landowner" defense).

Alaska, Massachusetts, and Michigan provide for joint and several liability. However, Arkansas, California, Illinois, Maryland, and Ohio have recently adopted proportionate liability. Colorado, Indiana, Michigan, Minnesota, and Ohio have limited liability for nonresponsible owners and prospective buyers. Illinois, Indiana, Minnesota, and Ohio have extended that protection to commercial lenders. Thus, the effect of liability on value may be more or less pronounced, depending on state actions.

4.4.1 Use of Property

The highest and best use of property that has suffered contamination may be altered. Contamination of farmland, for example, may make it impossible to grow edible crops. Industrial contamination may make production as originally established impossible. When determining the highest and best use of the property, it is important to recognize that current use may need to be modified or abandoned. However, seldom is property so contaminated that the highest and best use indicates no value. Very rarely, where contamination is extreme, but proper soil conditions exist and regulatory permits can be obtained, the property may still be used as a toxic waste disposal site. Even this represents use and value. This particular use is limited, however, because the EPA is authorized to require corrective action to remove or remediate contaminants that have leached into soil or groundwater.

The use of property is further affected by environmental permits, which, in effect, grant property the "right to pollute." This right has value as an asset and can sometimes be traded between facilities. These rights can increase property value and are further described in the Clean Air Act and in many state and local laws.

4.4.2 Selling Contaminated Property

Buyer reluctance often focuses as much on the potential for additional undisclosed problems as on contamination already known and discounted. To facilitate a sale, the seller may be required to include indemnity as a contingency for future liability. This provision often reestablishes a market and a market value where none seemingly existed. However, in cases of severe contamination, with ongoing cleanup anticipated, the seller may not be able to obtain a bond or provide indemnification for the full amount of the anticipated costs. In these cases, a sale may not be possible or the sale price may have to be reduced, although the property may retain a value in use (see section 4.1 and 7.4). As the Washington Board of Tax Appeals held in *Salmon Bay Terminals v. Noble* (1996), the sale of a contaminated property should be given great weight because it indicates the risks associated with that property.

4.4.3 Who May Be Liable?

Liability for cleanup of contamination nominally rests with current and past owners of the property, as well as the generators or transporters of hazardous substances, or the party responsible for the contamination, typically the current user. However, if insolvency occurs, liability can be transferred to the entities listed below:

- Current owner or operator
- Previous owners or operators at the time of contamination
- Foreclosing entity or a secured creditor Lessors or lessees
- Trustees
- Corporate officers/stockholders Parent corporations

The "Superfund" becomes available as a source of cleanup funds only if no other responsible party can be found or where immediate cleanup action must be taken by the EPA, as in an emergency situation. In this case, the EPA can seek to recover costs from the above parties.

EPA regulations exempt lending institutions and other creditors from liability in most foreclosures, provided that these lenders were not directly involved in the management of the contaminated property and do not actively manage the property or contribute to the contamination once they take ownership. Under these regulations, governmental jurisdictions that take involuntary ownership of property as a result of unpaid taxes are exempt from direct cleanup cost liability. However, these jurisdictions may still be named in third-party lawsuits and may be liable for cleanup of additional contamination occurring after acquisition of the property.

The courts are somewhat divided on the liability issue. One recent court decision found that, in most cases, parent companies may not be held responsible for their subsidiaries' hazardous waste cleanup liabilities (*Joslyn Manufacturing Co. v. T. L. James & Co.* [1990]). Other decisions, including *State of Idaho v. Bunker Hill Co. and Gulf Resources* (1986), have held that parent companies are liable for a subsidiary's actions. Liability may be based upon federal, state or local statutory schemes. It may also be based upon a variety of common law legal theories (Buck, *The Common Law and the Environment in the Courts*).

4.4.4 Innocent Landowner

Under CERCLA (see glossary), section 107(b)(3) and 101(35)(B), it is established that current owners may be considered "innocent" and not responsible or liable for contamination under certain circumstances. Such "innocence" would be established if, after making all appropriate inquiries into the condition of the property (exercising due diligence), the current owner had no

reason to know of the existence of contamination prior to purchase of the property and had not contributed to the contamination. Presumably, regulatory agencies would incur curative costs (this is the purpose of the "Superfund") unless other responsible parties can be found. Value may still be affected because marketability could be reduced until the problem is corrected.

This issue is far from certain, although the assessor should be aware that CERCLA liability has been upheld by several courts (for example, *United States v. Olin Corp.* [1997], *Continental Tile Co. v. Peoples Gas Light and Coke Co.* [1997], and *Raytheon Co. v. McGraw Edison Co.* [1997]) to apply retroactively to hazardous disposals occurring before its enactment. To the contrary, several courts have insulated current owners from liability for mere passive migration of contaminants (for example, *ABB industrial Systems, Inc. v. Prime Tech, Inc.* [1997], *United States v. CMDG Realty* [1997], *Joslyn Manufacturing Co. v. T. L. James & Co.* [1990], and *United States v. Cordova Chemical Co.* [1997]).

There has also been litigation in Texas (*Caffe Ribs I, II, and III*) centering on quantifying the responsibility of a prior owner to future owners for environmental cleanup. In New Jersey, the tax court has sanctioned a transaction in which sophisticated parties bargained at arm's length clearly knowing the extent of a prior owner's statutory obligation of remediation as well as the anticipated associated costs and reached a purchase agreement taking into account all environmental risks (*Orient Way II* [2014]).

4.4.5 Indemnification Agreements

In an indemnification agreement, the seller agrees to retain responsibility for current and future costs related to environmental contamination. This is usually done in the form of a bond or contractual agreement that would provide for contamination-related costs. If agreements of this type become typical in an area or for a particular class of property, their effect will automatically be capitalized into the market value of the property, and further adjustment will be necessary only if terms vary from typical (similar to financing adjustments-see section 4.3).

4.5 Stigma

Stigma is an intangible factor, which may not be measurable in terms of cost to cure, but may affect market value, at least as determined through the sales comparison (market) approach. It may be seen as a blight or perceived blemish or stain on a property resulting from real or perceived risk associated with the property. The Kentucky Supreme Court has characterized "stigma" as "damage to the reputation of the property" (*Smith v. Carbide and Chemicals Corp.* [2007]). Where contamination problems are not obvious, the stigma is likely to be overstated, and value effects may be minimal. For general discussions concerning "stigma" see e.g. *Chan* [2001],

Carver and Crowell [1999]; *Davis and Longo* [1999]; *Jaconetty* [1996], *Mundy* [1992], and *Patchin* [1991].

4.5.1 Reduced Market Value

A stigma may make property less desirable, even though complete cleanup has been accomplished. This creates a situation similar to obsolescence because, if the market will pay less for a once contaminated, but now restored property, the value of the property has been diminished. Effects of this nature may be transitory, declining over time or perhaps after additional restorative efforts are demonstrated. For example, even though the water from a previously contaminated well now meets all environmental standards and passes all tests, property value may be reduced until the seller builds a new well in a different location or establishes an independent, alternative water supply.

Stigma can also affect property neighboring previously contaminated areas, especially if regulatory agencies declare the neighboring property to be in a "border zone." The stigma in these cases may, however, be overstated because value is often not demonstrably affected despite the presence of nearby contaminated sites.

Any adverse effect of stigma must be supported by the marketplace. Where sales data, expert testimony, appraisal analyses, and case studies have been accepted into evidence, stigma-related reductions were found appropriate by courts or tribunals in Pennsylvania (*Harley-Davidson* [2015]); Michigan (*Sweepster, Inc. v. Seco Township* [1997]), Minnesota (*Alomor Corp. v. County of Hennepin* [1997]), and New Jersey (*Custom Distribution Services, Inc. v. City of Perth Amboy* [1997]).

4.5.2 Stigma versus Cost to Cure

Because of the intangible nature of the stigma attached to a contamination problem, the effect on value may be out of proportion to the cost to cure the problem. If the property owner makes no attempt to overcome the stigma, however, and thereby accepts a lower price for the property, this price may not accurately reflect market value. Similar problems, in comparison with curative costs, should be reviewed in determining effect on value. Appraised values should be adjusted to reflect typical costs of overcoming the stigma. However, in some markets, time alone may reduce or eliminate the stigma. If this appears to be the case, the assessor may wish to treat stigma as a type of time adjustment and ignore additional costs incurred.

5. Specific Factors Influencing Value

Specific conditions or characteristics relating to contamination must be established for each property. These factors and their impact on value are often quite different from property to property. Courts or tribunals in Vermont (*In re Bilmar Team Cleaners* [2015]), Texas (*Houston Unlimited, Inc.* [2014]), Oregon (*Geary v. Clackamas County Assessor* [2013]), Minnesota (*Moorhead*

Economic Development Authority [2010], *Ford Motor Company v. County of Ramsey III* [2014], *Ford Motor Company v. County of Ramsey II* (2013)], U.S. Virgin Islands (*Henry v. St Croix Alumina* [2009]), New Hampshire (*Hazelton* [1996]), Florida (*Finklestein v. Dept. of Transportation* [1995]), Georgia (*Hammond v. City of Warner Robbins* [1997]), Illinois (*Techalloy Co., Inc. v. Property Tax Appeal Board* [1997]), Iowa (*Bockeloo v. Board of Review of City of Clinton* [1995]), Massachusetts (*Reliable Electric Finishing Co. v. Board of Assessors* [1991]), and Ohio (*Vopelgesang v. CECOS international, Inc.* [1993]), as well as the federal district court in Arkansas (*MCS, LLC* [2009]) have all held that the mere allegation of unmarketability, a continuing environmental nuisance or a stigma effect is not enough. Loss or diminution of value must be proven by market data.

5.1 Extent and Nature of Contamination

The property owner must provide clear documentation of the nature and extent of environmental contamination. Accurate and detailed maps must be included as part of this documentation. Without information, property must be valued as if uncontaminated. Some contamination, such as air pollution, may be universal throughout a jurisdiction. In all other cases, contamination should be viewed as a special circumstance, particular to a property. The contaminated property must be compared to typical, unencumbered property, and differences established. To be granted special consideration affecting value, the owner must substantiate the contamination through an independent party (typically, an engineering firm testing for contaminants or a regulatory agency). Evidence is the key. Where it is particularly strong, it has been possible (albeit rare) under extraordinary circumstances in New Jersey (*Methode Electronics* [2015]), Pennsylvania (*Monroe County Board of Assessors v. Miller* [1990]), Michigan (*Comerica Bank Detroit v. Metamora Township* [1987]), and Minnesota (*Westling v. County of Mille Lacs* [1998]) even to find that a property has a zero or nominal value. Conversely, where it is only a temporary and abatable nuisance a North Carolina court found that may be proper to simply consider the diminution in value (*BSK Enterprises* [2016]). Further, Vermont and Wisconsin courts have held that mere uncertainty regarding cost to cure, the potential impact of a regulatory scheme, or simply identifying or listing a property as contaminated is not sufficient to support a speculative determination of an impaired or nominal value (*In re Bilmar Team Cleaners* [2015]); *State of Wisconsin ex rel. Collison v. Milwaukee* (2014)].

5.2 Type and Location of Property

Location of property can make a significant difference in the amount of utility lost due to environmental contamination. For example, the amount of contamination that may be tolerated in an industrial plant located

fifty miles from the nearest population center may be considerably greater than contamination from a source within an urban center or in a largely residential suburban area. The remote plant would stand to lose little value. It is not enough, therefore, to establish the extent of contamination; locational influences must also be determined and evaluated.

Accurate hazard maps are necessary to understand fully the extent of environmental contamination (see example in section 10). These are often available from regulatory agencies. A valuable, and often overlooked, source of maps and other information is a local historical society. These organizations often maintain maps dating back to the founding of a locality. Information about previous land use can be most informative during an attempt to ascertain the extent of environmental contamination.

Maps, such as Sanborn maps, created years ago for fire insurance purposes, often contain this kind of information as well.

5.3 Demand for Alternative Uses

Often industrial contamination results in closure of all or part of a plant for cleanup. After cleanup the site may no longer be amenable to the original use. Other uses must then be considered. The demand for these uses in a particular area must be evaluated. If other uses are apparent and in demand, there will be less effect on marketability and value.

5.4 Presence of Assumable Financing

The loss in value is often less if assumable financing is available. For obvious reasons, lenders may not be willing to offer financing at all or at acceptable terms once contamination is disclosed. Assumable financing eliminates this problem.

5.5 Liquidity Problems Caused by Lack of Marketability

Capital that cannot be liquidated quickly tends to be less valuable. The period during which curative efforts will be made must be established. This will help define the extent of liquidity problems, which may also be affected by associated stigma (see section 4.5).

5.6 Availability of Bond to Pay Cleanup

Existence of bonding improves marketability of property and diminishes the effect of environmental contamination on value. However, in cases of severe contamination, the seller may be unable to obtain such a bond because it may be difficult to give necessary assurances that solvency can be maintained and cleanup costs provided.

5.7 State and Regional Environmental Regulations

Zoning regulations have restricted property use for many years. Similarly, local or regional environmental regulations may restrict use of property and thereby affect value by reducing utility. Environmental assessments are often required by various agencies to evaluate potential problems.

6. Approaches to Value

Valuing contaminated properties is complex because circumstances are different for each affected property and because sufficient comparable sales may be unavailable, difficult to obtain, or subject to unreasonable or unsupported adjustments for varying conditions and situations. Nevertheless, as in all other types of property valuation, three approaches to value are recognized and should be used. Highest and best use must be established so unencumbered value can be found. Adjustments can then be market-justified and made.

6.1 Sales Comparison Approach

The sales comparison approach to value requires property to be appraised via a comparison with similarly affected properties recently sold. When adequate data exist for similarly affected properties, this approach is considered the most objective and supportable. Court decisions in Ohio (*Columbus City Schools* [2015]), New Jersey (*Route 21 Associates* [2013]), Oregon (*Clackamas County Assessor v. Geary* [2012]; *Anderson v. Lane County Assessor* [2009]), California (*Firestone Tire and Rubber v. County of Monterey* [1990]), New Hampshire (*Appeal of Great Lakes Container Corp.* [1985]), and Minnesota (*Westling v. County of Mille Lacs* [1998]) have given serious consideration to, or upheld expert testimony relying primarily on, the sales comparison approach, and it is possible to find, as the Washington Tax Tribunal did, that a particular property in its present condition is not marketable (*Bamford v. Brown* [1992]). However, the appraiser must provide appropriate explanation in support of adjustments to allegedly comparable properties (Texas: *Houston Unlimited* [2014]; Oregon: *Clackamas County Assessor* [2013]; *GP W.3rd Ave., LLC v. Lane County Assessor* [2012])). Further, while a single sale is generally not conclusive of value, under unique circumstances, that of the subject might be the best evidence of value (*Orient Way I* [2013]). Finally, the Assessor might take into account the sufficiency of marketing efforts for a particular property as did the Oregon Tax Court (*Anderson v. Lake County Assessor* [2009]).

The sales comparison approach requires sufficient sales of similar properties. As in the general sales comparison approach when data on comparable contaminated properties are limited, the assessor should expand strata, the period from which sales are drawn, and

geo-economically defined areas. However, appropriate adjustments must be made to ensure that proper comparability is achieved. The Court of Appeals of Maryland has ruled that an expert may not ignore or discard ample available market sales but must either make appropriate adjustments or provide a reasonable explanation regarding their unsuitability or unreliability (*Exxon Mobil Corporation v. Albright* [2013]).

Rather than relying only on the limited data available for similarly contaminated property, sales of similar un-contaminated property can also be used. In this way a benchmark, unencumbered value can be established for the subject property, after which adjustments can be made for the contamination. Such adjustments should be based on the cost to cure (properly discounted or amortized), imposed limitations on use, increased insurance and financing costs, and potential liability.

6.2 Cost Approach

The cost approach is based on the premise that the market value of an improved parcel is equal to the market value of the land plus the current construction costs of the improvement less accrued depreciation. The cost approach is often applicable in cases of environmental contamination, provided the present worth of direct and indirect costs is calculated and used and provided adjustments are made for overestimation or underestimation of costs and impact. The cost approach, however, may ignore the value-in-use concept and thereby overstate the impact of costs to cure contamination problems (see section 4.1). There have been decisions in Florida (*Roden v. Estech* [1987]), Massachusetts (*Reliable Electric Finishing Co. v. Board of Assessors* [1991]), Minnesota (*Nicollet Restoration, Inc. v. County of Hennepin* [1992]), Pennsylvania (*B. P. Oil, Inc. v. Board of Assessment Appeal of Jefferson County* [1993]), and Vermont (*In re Bilmar Team Cleaners* [2015]) that have focused on the cost approach.

6.2.1 Cost to Cure as Functional or Economic Obsolescence

The cost to cure a problem reduces the utility of property and should be considered a form of functional or economic obsolescence of improvements. This would then be added to the accrued depreciation because current replacement cost new would be based on the assumption of a typical, presumably clean, environment.

Cost to cure includes all expenses associated with a cleanup, including some that may not be mandated but that reduce stigma (see section 4.5). Cost to cure must be recognized, but it is usually not appropriate to subtract such costs on a dollar-for-dollar basis, as an owner's expenditures are not conclusive of value (*Inmar Associates v. Borough of Carlstadt* [1988]; *Alladin, Inc. v. Blackhawk County* [1997]; *Hotel Staler* [1997]; *Route 21 Associates* [2013]). However, there have been decisions

in California (*Mola Development Corp. v. Orange County Assessment Appeals Board No. 2* [2000]), Illinois (*Manufacturer's Life Insurance Co. v. DuPage County Board of Review* [1994]), New York (*Commerce Holding Co. v. Board of Assessors* [1996]), and New Jersey (*University Plaza Realty Corp. v. City of Hackensack* [1993]) that have employed a dollar-for-dollar offset. But again, the Minnesota Supreme Court has taken the contrary view in condemnation cases (*Moorhead Development Authority* [2010]), and so has the Colorado Appellate Court (*E.I. Du Pont de Nemours & Co.* [2003] in valuation cases. Cost estimates must have a factual basis in expert testimony (*Ford Motor Co III* [2014]). Great care should be taken in this regard to gauge and interpret the marketplace adequately. In some cases it may be appropriate to treat these costs as capital improvements, to be depreciated over the useful life of the property or the improvements (if their life is shorter).

6.2.2 Specialized Costs

Contamination-related legal and insurance expenses, above those that would be typical for ordinary operation, must be considered. In addition, provision should be made for the cost of discovery of contamination and future monitoring to watch for recurrence of contamination (see section 4.2.2).

6.3 Income Approach

The income approach to value estimates property value by determining the present value of the projected typical income stream for the type of property. Income-producing properties are the most common property type influenced by environmental regulations and subject to contamination. Often, the greatest and most easily measured effect is on the ability of the property to continue to generate income. For this reason, the income approach is often the most suitable approach for contaminated properties.

The income approach is also effective in dealing with the situation that occurs when even the present worth of the cost to cure a problem far exceeds the replacement cost of the property. Courts have held that there is a "value in use" to the owner even where no other market exists, "so long as the owner continued to operate the facility" (*Inmar Associates v. Borough of Carlstadt* [1988]). The Utah Supreme Court adopted a similar view of value in use as establishing current value (*Schmidt v. Utah State Tax Commission* [1999]). The Assessor might also consider that an argument is often advanced that most property has an intrinsic value or that the existing improvements have a contributory value to the real estate (*ACP Partnership* [2016]; *Lake County Assessor* [2011], *Wurtzler*; section 7.4 below). Value in use, however, may be impaired by temporary closure or loss of customers. For this reason, some adjustment in income stream and income-determined value is likely. While in certain cir-

cumstances, the use of discounted cash flow analysis may be appropriate (Texas: *Caffe Ribs I and II* [2014]), it has also been viewed as speculative and unreliable (Connecticut: *Rock Acquisition* [2009]).

6.3.1 Capitalization Rates

Properly developed income capitalization rates, derived from the market and including both debt and equity components, can be used to determine the value of contaminated properties. The capitalization rate is based on the equity yield rate, mortgage terms, and anticipated future appreciation or depreciation. Mortgages may be unobtainable and future appreciation not applicable in some cases. This leaves equity yield as the major capitalization rate component (*Patchin* 1988). In developing this rate, the presumption must be that the property is still capable of producing income. Adjusted rates may be developed for property not currently producing income, but expected to do so at a predictable level at a predictable time in the future. The capitalization rate must reflect the difference between comparable contaminated and uncontaminated properties. Increasing the capitalization rate to reflect added risk has been employed by courts and tribunals in Minnesota (*Ford III* [2014]), Massachusetts (*Woburn Services, Inc. v. Board of Assessors of City of Woburn* [1996]), North Carolina (*Camel City Laundry Co. v. Forsyth County Board of Equalization and Review* [1994]), and Washington (*Northwest Cooperage, Inc. v. Ridder* [1990]). In general, as noted by in a New Jersey decision, the traditional income approach may be tempered by the costs incurred to address the environmental condition (*ACP Partnership* [2016]).

6.3.2 Income Stream

Use of market rental data assumes that the property is still in use (or will be shortly) and is capable of commanding rent. When these conditions are met, market rental data should be obtained for establishing the base capitalization rate. The income stream must be modified to account for the cost to cure the contamination problem and any loss of utility. Modification should be based on the amortized present worth of actual costs, recognizing that permissible alternatives may limit costs to those necessary to satisfy the regulatory agency, not necessarily the full cost to cure the problem. Further income modification may be necessary to account for more expensive substitute processes or materials that can no longer be manufactured on site. Adjustments to reflect temporary closure or loss of customers must also be considered (see section 4.2.5). The Assessor might also consider the fact that a property allegedly environmentally impaired is, in fact, supporting an income stream, as courts or tribunals have done in Vermont and Oregon (*In re Bilmar Team Cleaners* [2015]; *Henderson v. Washington County Assessor* [2007]).

Expenses must be taken into account, and income and rate adjustments made accordingly. Expenses must be those typical to cure a particular problem and include the amortized present worth of the cost to cure the contamination, including discovery, legal expenses, monitoring, and the amortized present worth of any cost to eliminate stigma. Some expenses should be taken immediately; others, amortized over time. One New Jersey decision has discounted the costs over a five-year period (*Ciba Specialty Chemicals* [2013]) while another did the same finding support in the letters of credit, insurance, and cost estimates provided by the taxpayer (*Metuchen* [2004]). A New Hampshire case found the income approach offered by both the competing appraisers reasonable (*Hazleton* [1996]).

Physical plant changes may ultimately improve operation. For example, in the course of replacing or adding electronic scrubbing devices to remove particulates from discharged air, a more efficient incineration system might be installed. Future costs may be lower than if the original system had been left intact. Costs involved and subsequent adjustments to the income stream should be considered (at least partially) as capital improvements, and both increases and reductions in these costs should be factored into value. Economic incentives to reduce air pollution must also be considered (Clean Air Act).

Preliminary estimates may differ from the actual costs to cure problems. Additional, undisclosed problems may be found, especially as improved technology with increased detection sensitivity is developed. Some contaminants, such as asbestos, however, are often more easily treated than many initial estimates assume. However, unproven problems must be treated as unknown costs. Impact on value should not be anticipated. It must be proven by objective data collected from the marketplace.

Ongoing monitoring is often expensive. Inflation will increase costs, which often are incurred over lengthy periods. These factors should be included when modified income streams are developed. It is important to note, however, that all allowable costs should be considered, while not ignoring the principle of future benefits, which may give the property present worth in anticipation (*Appeal of Great Lakes Container Corp.* [1985]).

Expenses (costs) that are allowable should include those that can be documented as actual, current, or reliably anticipated. Expenses to be used should be based on current cleanup mandates, not ones that are invoked only upon sale of property or change in use, as is sometimes the case. Documentation provided by the property owner should be verified through environmental regulatory agencies.

6.4 Alternative Approaches to Value

Because of difficulties in establishing comparative market data and correctly adjusting a contaminated prop-

erty's income stream, certain nontraditional valuation methods have been examined as possible means of valuing contaminated property. An example of an alternative procedure is use of "contingent valuation methods" (CVM), in which survey methods are employed to investigate and determine values. Although not specifically endorsed in this standard, such alternative methods should be investigated when absence of reliable information lessens the applicability of more conventional techniques. One Minnesota decision (*Hubbard Milling Co. v. County of Blue Earth* [1994]) sanctioned a reduction of cost to cure from all three of the traditional approaches to value. Conversely, an Ohio Court criticized an appraiser who, although heavily relying upon the income approach, then also deducted the cost of asbestos remediation from the sale comparison approach even though none of those sales were considered truly comparable (*Hotel Statler* [1997]). The New Jersey Tax Court has indicated that in certain circumstances while the "normal assessment techniques" of the income approach to value are "an effective tool" the "cost of the remediation" is also a factor in determining true market value (*ACP Partnership* [2016]). Another New Jersey case applied discount and entrepreneurial factors to a professionally established range of costs over a 10 year remediation period to determine the present worth value of vacant land as impaired (*Route 21 Associates* [2013]).

7. Other Considerations

7.1 Proof of Contamination

Proof of contamination and associated expenses should be required before value is adjusted for such consideration. It is possible that the cost of remediation may exceed the value of the property and render it a "white elephant" or valueless or significantly diminished in value (see *Whitney v. Scott* [Conn. 2014]; *In re Equalization Appeals of Total Petroleum* [Kan. 2000]); *BSK Enterprises* [North Carolina 2016]) but such a conclusion should never be presumed or accepted without solid evidence (see 5.0 and 5.1 above).

7.1.1 Burden of Proof on Taxpayer

Often, detailed technical information privately held by the property owner is the only evidence of contamination. If the owner wants contamination information to be taken into account in developing an assessed value, the owner should provide the necessary financial information, including a balance sheet of costs. Proof that less costly alternatives are not acceptable to the regulatory agency should also be provided. The assessor is encouraged to approach the taxpayer cooperatively on this subject to demonstrate that the goal is to achieve fair and equitable value, not to penalize for environmental considerations (see section 7.2). The taxpayer always will have been required to obtain an environmental assessment report. Much useful information can be derived from this document.

7.1.2 Certification

Certification or verification of contamination should be available from involved federal, state or provincial, or local agencies. This should be required from the property owner before consideration for environmental contamination is given.

7.1.3 Alternative Solutions

Less costly solutions or partial solutions are often available and may be acceptable to regulators. Often, these involve isolating contamination with fencing or protective covering. Management of the contamination, rather than complete remediation, may be permitted. Costs for a partial solution will be lower and should be reviewed to be sure that effect on value is not overstated. Partial solutions may have a negative effect if prospective buyers perceive the problem as not yet solved or as insolvable, with a potential impact on future income.

7.2 Assessment Practices versus Environmental Policy

Jurisdictions have sometimes argued that assessment practices which respond to contamination with lower value in effect reward environmental regulation violators, shifting taxes to other, arguably more environmentally sound properties, which retain higher values. The argument has been made that the effect of contaminants on value should be ignored to penalize the polluter.

Courts have generally disagreed with this reasoning, arguing instead that assessment of property is an independent function, which, to be uniform, must be undertaken without regard for public policy issues in other areas, for example, the environment (see *Inmar v. Carlstadt* [1988]). The assessor should be concerned with interpreting the market and establishing the most accurate market value for the property in question. Just as it is inappropriate to value the person (higher value for rich, lower for poor), so, too, it is inappropriate to conduct or support environmental policy with altered assessments or by ignoring the effect of these policies on value. The expenses associated with environmental policy should be viewed as part of the cost of doing business (although these may exceed ordinary costs). These expenses affect the income stream and, therefore, the value of the property. For assessment purposes, the issue becomes one of obsolescence rather than management.

One approach that attempts to balance all of these policy, valuation, and assessment issues is that employed in Washington as a result of the decision in *Weyerhauser v. Easter* [1995]. In Washington, the property owner must prove the existence of contamination, a requirement for cleanup dictated by a government fiat or business necessity, a reasonably certain cost of remediation, and a formal cleanup plan and timetable.

7.3 When Is Value Affected?

The period during which value is affected must be established. This should be related to the time when expenses are clearly incurred or definitely to be incurred. The shorter the period, the less the probable effect on value because disruption to the income stream is less pronounced, and perception of the property as "clean" will occur sooner. The period of impact can also be important because it may be inappropriate for the assessor to take into account costs that are incurred later than a certain date (perhaps January 1 or some other "assessment date"). In such a case, adjustment of value for contamination may have to wait until the next assessment year. The Texas Supreme Court has also ruled that government action (e.g. condemnation) and its regulatory scheme (for remediation) may have an adverse impact on property value which should be considered (*Caffe Ribs II* [2016]). Similarly, where an owner "shirks its responsibility" and deliberately avoids or postpones triggering its clean-up obligations by scaling down operations to invoke statutory benefits, the court may decline to permit an assessment reduction (New Jersey: *Pan Chemical* [2009]).

7.4 Intrinsic Value of Property

Does a property have remaining value that exists even when the cost to cure the problem exceeds apparent market value? If not, it would be appropriate to assign zero value to property in such a case. The question that needs to be answered to decide this issue is that of utility. If the property can be used, value must exist. With use comes market demand, at least at some point in time.

To determine value in use, several factors should be reviewed, including current income stream, predicted future income stream, demand for alternative uses, and cost to modify operation for alternative uses. The concept of value in use appears to conflict with the concept of value in exchange, which statutes in many jurisdictions require be assessed. However, many recent court decisions have held that property that has use has value, even though a traditional market may not be immediately apparent.

Property is often permitted to pollute to a certain extent. Acceptable amounts of pollution are defined in permits granted by regulatory agencies. These "rights" to pollute enable a business to operate when no operation would be possible if zero pollution were required. This then contributes to the income-producing ability of the business and enhances its value. Both the "rights" and the business will therefore have value (see section 2.4 and 4.4.1).

7.5 Failure to Pay Taxes

Although not strictly an assessment issue, a related issue is the response of the assessing jurisdiction if taxes owing go unpaid. Usually, in property with value, all or

part of the delinquent taxes would be recouped upon confiscation and sale by the jurisdiction. In the case of severely contaminated property, however, the ability to sell the property may be so limited that delinquent taxes will not be recovered. In addition, the jurisdiction will now own the property and may risk liability for costs to cure the contamination problem if the original owner or contaminator (or any other potentially responsible party) is insolvent and if additional contamination or even active management occurs while the jurisdiction is the owner. However, provided that the governmental entity has not caused or contributed to the contamination, under CERCLA (as amended by SARA in 1986), "the term owner or operator does not include a unit of state or local government which acquired ownership or control involuntarily through bankruptcy, tax delinquency, abandonment, or other circumstances in which the government involuntarily acquires title by virtue of its function as a sovereign."

The EPA has regulations restricting the degree of liability in cases of foreclosure by private or governmental entities. However, these regulations do not protect if the entity is actively managing or contributing to the contamination. It is also permissible for states to have stricter laws than those established at the federal level. These would take precedence and must be understood to determine potential liability fully.

Regardless of the liability issue, the jurisdiction may be unable to sell the property to satisfy the tax lien without remediation of contamination.

8. Summary of Considerations

The valuation of contaminated properties requires the assessor to ascertain all of the components of value, as if the property were unencumbered, and then to determine appropriate adjustments. Market reaction and high immediate costs may overstate impact on value and reduce the usability of the comparable sales and cost approaches to value. Additional reliance should be placed on the income approach, with costs discounted and treated as part of the income stream. Some costs will result in improved operations, and these costs should be treated like any capital expenditures. The principles of current use and future value apply in these cases, as does the principle of value in use. However, some adjustment to value is likely and should be considered.

8.1 Current Use

If some use exists, value must exist; property should be valued as if uncontaminated, and the present worth of amortized costs, which do not increase future efficiency and value, should be deducted. Debt and equity components may be increased to account for increased risk.

8.2 Future Value

If no present use exists, there may still be value, based on expectations of future value after cleanup. The present value of residual future value after cleanup must be determined.

8.3 Adjustments to Value

Courts have tended to reject arguments that cleanup costs remain with people rather than property. Most rulings find that the assessor must determine the most accurate value for the property. This would not allow value determinations that disregard the influence of contamination. The conclusion is that the assessor does not have a role to support environmental policy. In interpreting the market, the assessor must respond to all measurable influences on value; environmental contamination is one such influence.

9. Public Relations

As with all other aspects of assessment, effective communication with all parties is critical. The effect of environmental contamination on value must be discussed knowledgeably with representatives from the affected property, concerned regulatory agency officials, other governmental officials, and the public. Skills and methods are discussed in the *Standard on Public Relations* (2001). Issues include discussion of the assessment process as it relates to the individual taxpayer and uncontaminated properties within the jurisdiction.

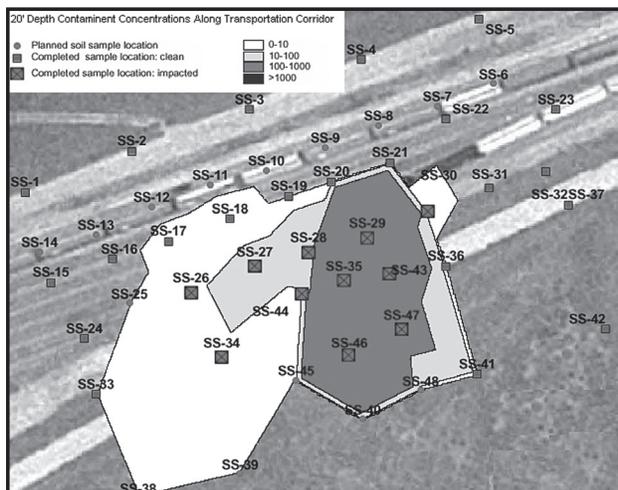
9.1 Assessment Process

Both political and legal ramifications must be understood. The assessor should be proactive in seeking meetings with the owner of the contaminated property and with governmental officials involved with this property. Meeting with the owner makes cooperation in obtaining needed cost and other information more likely. An appeal may be less likely if the owner believes that pertinent facts have been carefully reviewed and taken into consideration. The owner must be allowed to present all pertinent information. An appropriate explanation must be given for value decisions. If there is suspicion of contamination at the time of assessment, a contract specifying all determinable information should be developed. This will help protect the jurisdiction from future liability. Various governmental officials within the jurisdiction may wish preferential treatment to be given or withheld. A city manager may be concerned that a business employing many residents is about to be lost and may hope to stave off this possibility with a lower assessment. Environmentally concerned citizenry may wish to penalize a polluter further by means of an unchanged or higher assessment. Public hearings and explanations are important for all parties.

9.2 Effect on other Taxpayers in Jurisdiction

Tax shifts may result from lower assessments for properties with newly discovered environmental contamination. If these are large industrial properties, the jurisdiction may lose much value, and this can result in tax shifts to uncontaminated property or even loss of revenue to governmental units (such as schools and cities). The relationship between the assessment process and the generation of revenue and distribution of taxes should be discussed with the public, as well as with representatives from governmental units. The assessor's role in providing fair market value for all property, regardless of other considerations, should be emphasized, but the reality of tax effects should be analyzed and made public to avoid loss of credibility.

10. Example of Map of Contaminated Area



Appendix A. Glossary

All terms are defined in accordance with usage in this standard.

CERCLA

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended by the Superfund Amendment and Reauthorization Act (SARA) of 1986; known as the "Superfund" and administered by the EPA.

Cost to cure

Cost or expense of cleaning up environmental contamination. Cleanup would result in levels of contamination that met standards of regulatory agencies. Complete cleanup may not be required, if contamination can be isolated. Costs include future monitoring and costs to reduce stigma (*see* Stigma). In many cases complete cure is impossible, and cost to cure is actually cost to control.

Electromagnetic radiation

Waves emitted by various sources, including power lines, radio transmitters, and microwave sources. Value of property may be affected by proximity to sources.

Environmental assessment

A report showing the results of investigation into environmental contamination. This report is often required by the EPA and other regulatory agencies to establish the extent of contamination suspected. "Phase I" or more extensive "Phase II" assessments may be required (*see* Phase I and II reports).

Environmental contaminant

Any tangible substance or intangible occurrence that may degrade property, resulting in decreased utility or having an effect on value (*see also* Physical contaminant and Nonphysical contaminant).

EPA

United States Environmental Protection Agency.

Formaldehyde

Chemical constituent of certain insulating materials and glues. May enter air and become contaminant.

Hazardous substances

Any substance designated under various federal acts as toxic or hazardous, including hazardous solid waste, toxic air pollutants, and imminently hazardous chemicals and mixtures. This term does not include petroleum and natural gas products or synthetic fuel gas.

Hazardous waste

A solid waste that may pose a present or potential hazard to health or to the environment. This includes any solid waste that is ignitable, corrosive, toxic, infectious, or reactive.

Indemnification

Bonds established to provide security against future costs resulting from previously existing contamination. This is usually provided by the seller to facilitate a sale of contaminated property.

Innocent landowner

A landowner who purchased property subsequent to contamination, but who had no knowledge of and did not contribute to the contamination. The landowner must have made all "appropriate inquiries" into the property prior to purchase. If qualified, the "innocent landowner" is not liable under CERCLA.

Intrinsic value

Value that remains when cost to cure a contamination problem exceeds original market value (*see* Value in use).

Liability

Responsibility for cleanup costs associated with environmental contamination. This usually rests with the party originally responsible for the condemnation, but may transfer to the current owner.

NAPL

Nonaqueous-phase liquids-liquid contaminants often trapped in soil or bedrock.

National Priorities List (NPL)

The list of sites determined to pose enough risk to become "Superfund" sites.

Nonphysical contaminant

Any recognized contaminant that does not consist of any tangible, physical substance.

Offsets

Environmental permits allow certain amounts of air pollutants to be released into the environment. If an industry wishes to expand, it may first be required to reduce its current level of emissions, so that the expanded plant will not emit more air pollution than did the original plant. A company may also trade air pollution allowances with another company to facilitate expansion of the first company.

Phase I and II reports

Phase I reports include historical information about the subject property and the neighborhood, and a review of pertinent government records to determine any prior violation pertaining to hazardous wastes or substances. This report requires physical inspection of the property. Phase II reports are required when potential problems are identified in the Phase I study. Phase II is an in-depth study of groundwater, air, soil, and improvements to determine existence of any hazardous waste or substance, or other contaminants (*see* Environmental assessment).

Physical contaminant

A substance recognized as hazardous by the EPA or local or regional authorities (*see* Hazardous substances).

Radon

Radioactive gas, which may enter structures from beneath the ground and contaminate air.

Remediation

The act or process of eliminating environmental contamination on, in, or under property to restore the property to an uncontaminated state.

Residual value

The value of the property after cleanup of environmental contamination. This may be more or less than the original value depending on counterbalancing effects of stigma and improvements to plant efficiency.

Stigma

An unfavorable perception, which may influence value, that continued contamination remains after cleanup has been effectuated.

Toxics

Recognized hazardous substances in the environment.

Tradable allowances

See Offsets

Treatment, storage, and disposal facility (TSDF)

Business that treats, stores, and disposes of hazardous waste. Regulated by the Resource Conservation and Recovery Act (RCRA).

Underground storage tank (UST)

Any tank and associated piping that has more than 10 percent of its volume underground. If leaking, these tanks are known as LUSTs.

Unencumbered value

The value of property without consideration of any detrimental environmental contamination.

Value in use

The ability of property to generate income or otherwise retain some value or use to the owner, regardless of the presence of contamination and even with related expenses exceeding the apparent market value of the property.

Appendix B. Bibliography

American Bankers Association. 1990. *ABA guide to the environmental liabilities of fiduciaries*. Washington, DC: American Bankers Association.

American Bar Association. 2008. *Tackling the Tough Toxic Waste Problems: CERCLA, RCRA, and Brownfields*. ABA Satellite Seminar Materials (May 5, 1998).

Appraisal Foundation. 2012–2013. *Uniform Standards of Professional Appraisal Practice, Advisory Opinion 9*, "The Appraisal of Real Property That May Be Impacted by Environmental Contamination."

Appraisal Institute. 2013. *The Appraisal of Real Estate* 211–216, 14th ed.

Bell, R. 1999. *Real Estate Damages: An Analysis of Detrimental Conditions*. Chicago: Appraisal Institute.

Bell, R., O.C. Anderson, and M.V. Sanders. 2008. *Real Estate Damages: Applied Economics and Detrimental Conditions*, 2nd ed. Chicago: Appraisal Institute.

Buck, S. 2008. The Common Law and the Environment in the Courts. *Case Western Reserve Law Review* 58(3): 621–646.

Cameron, T.A. 1991. Interval estimates of nonmarket resources values from referendum contingent valuation surveys. *Land Economics* 67(4):413–21.

Carver, R.P. and A.W. Crowell. 1999. Toxic Tax Assessments: The Ad Valorem Taxation of Contaminated Property. *Real Estate Issues* Fall: 10–19.

Chan, N. 2001. Stigma and its Assessment Methods. *Pacific Rim Property Research Journal* 7(2):126–140.

Davis, A.N. and S. Longo. 1995. Stigma Damages in Environmental Cases: Developing Issues and Implications for Industrial and Commercial Real Estate Transactions. *ELR News and Analysis* July: 10345–10349.

- Diskin, B.A., J. B. Haynes, and M.A. McElveen. 1990. Lender perceptions of value influences of asbestos contamination in income-producing buildings. *Assessment Digest* 12(6):10–15.
- Dornfest, A. 2016. The IAAO Standard on Valuation of Contaminated Properties: 36th Annual Legal Seminar (Boston, December 11, 2015).
- Dybvig, L.O. 1991. Legal liability and toxic real estate. *Canadian Appraiser* 35(2):25–31.
- Fersko, J. and J.J. Reilly. 2006. Condemnation: The Impact of Environmental Contamination on Property Valuation. Greenbaum, Rowe, Smith & Davis LLP, www.arce/.org/Documents/Seminars/2005%20F
- Ferruggia, Frank. 1991. Valuation of contaminated property: New Jersey's *Inmar* decision. *Assessment Digest* 13(2):2–6.
- Ferrugia, F. 1997. Stigma and market value: Woburn Services, Inc. v. Board of Assessors of the City of Woburn, Massachusetts. *Journal of Property Tax Management* 9(2):1–8.
- Galvin, D., and S. Toreff. 1986. Toxics on the home front. *Sierra* 71(5):44–48.
- Garippa, J.E., and S. Davenport. 1992. Environmental contamination: A legal perspective on its effects on property values. *State Tax Notes* January:13:50–57.
- Gloude-mans, R.J. 1999. *Mass appraisal of real property*. Chicago: International Association of Assessing Officers.
- Groves, R. 1990. Do America's state cases answer the question: How should you value contaminated properties? From a paper presented at 10th Annual Legal Seminar. Grenelefe, FL: International Association of Assessing Officers.
- Guidotti, G.L., and P. Jacobs. 1993. *American Journal of Public Health* 83(2):233–39.
- Harrison, G. 1998. Environmental considerations in mortgage lending. *Appraisal Review and Mortgage Underwriting Journal* 17(1):70–81.
- International Association of Assessing Officers (IAAO). 1990. *Property appraisal and assessment administration*. Chicago: IAAO.
- International Association of Assessing Officers (IAAO). 2001. *Standard on public relations*. Chicago: IAAO.
- Jackson, T.O. 2001. The Effects of Environmental Contamination on Real Estate: A Literature Review, *Journal of Real Estate Literature*, 9(2) 91-116.
- Jaconetty, T.A. 1996. Stigma, phobia, and fear: Their effect on valuation. *Assessment Journal* 3(1):51–67.
- Jaconetty, T.A. 1999. Revitalizing urban brownfields—A national, state, and local effort to reclaim blighted properties. *Assessment Journal* 6(4):56–67.
- Jaconetty, T.A. 2000. Property Tax Trends: Approaches to the Valuation of Contaminated Property. *Journal of Property Tax Management* 11(4):84–88.
- Kelley, R.E.V. and S.J. Morley. 1998. Challenging Tax Assessments on Contaminated Property in Florida. *The Florida Bar Journal* LXXII July/August:(7).
- Kempner, J. 1990. National Multi Housing Council, *Environmental Update* 1-4 + glossary. February (16):202/659–3381.
- Kilpatrick J.A. and B. Mundy. 2003. Appraisal of Contaminated Property in the United States, *Journal of Japan Real Estate* (October 2003).
- Kinnard, W.N., Jr., P.S. Mitchell, G.L. Beron, and J.R. Webb. 1993. Market reactions to an announced release of radioactive materials: The impact on assessable value. *Assessment Journal* 15(1):18–25.
- Kinnard, W.N., Jr., S.A. Dickey, and M.B. Geckler. 1994. Fear and property value: Opinion survey results vs. market sales evidence. Conference Proceedings, Sixtieth Annual Conference on Assessment Administration, Seattle, October 16–9, 1994, 171-88. Chicago: International Association of Assessing Officers.
- Kinnard, W.N. and E. M. Worzala, 1999. How North American Appraisers Value Contaminated Property and Associated Stigma, *Appraisal Journal* (July 1999: 269-279.
- Koncelik, J.P. 2015. Uncertainty in Valuing Contaminated Property Complicates Brownfield Redevelopment, Octero 6. www.ohioenvironmentallawblog.com/2015/10/articles/brownfields/uncertainty-in-v
- Lusvardi, W.C. 2000. The dose makes the poison: Environmental phobia or regulatory stigma? *The Appraisal Journal* 68(2):184–94.
- Mitchell, P.S. 2000. Estimating economic damages to real property due to loss of marketability, rentability, and stigma. *The Appraisal Journal* 68(2):162–70.
- Mundy, B. 1992. The impact of hazardous and toxic material on property value: Revisited. *The Appraisal Journal* 60(4):463–71.
- Mundy, B. 1992. Stigma and Value. *The Appraisal Journal* 10.
- Mundy, B, D. McLean, and J.A. Kilpatrick. 1999. The brownfield challenge. *Valuation Insights and Perspectives* 4(1):14–16, 18, 45.
- Patchin, P.J. 1988. Valuation of contaminated properties. *The Appraisal Journal* 56(1):7–16.
- Patchin, P.J. 1991. Contaminated Properties—Sigma Revisited. *The Appraisal Journal* 167- 172.
- Patchin, P.J. 1994. Contaminated properties and the sales comparison approach. *The Appraisal Journal* 62(3):402–9.

Peters, B.T. 1990. The cost of cleanup and its impact on property values. *Assessment Digest* 12(6):2-9.

Rinaldi, A.J. 1991. Contaminated properties—Valuation solutions. *Appraisal Journal* 59(3):377-81.

Roddewig, R.J. 2002. *Valuing Contaminated Properties: An Appraisal Institute Anthology* Vol. I.

Roddewig, R. J. 2014. *Valuing Contaminated Properties: An Appraisal Institute Anthology* Vol. II.

Schwarz, S. 2014. *Houston Unlimited, Inc. v. Mel Acres Ranch*, Florida State University College of Law, sas13g@my.fsu.edu.

Sherman & Sterling 1999. Environmental Practice Briefing: The Impact on Commercial Transactions of Environmental “Stigma Damage,” July.

Sherwood, D.F. 2005. Bender’s State Taxation Principles and Practice: Part 5 Property Taxation, *Chapter 20 State Taxation of Real Property, Sec. 20.08*.

Simons, R. 1994. How clean is clean? *The Appraisal Journal* 62(3):424-38.

Smart, M.M., and D.L. Wynes. 1990. The impact of environmental conditions on real property. *Assessment Digest* 12(6):22-25.

Wilson, A.R. 1990. Environmental risk valuation and evaluation. Part IV-A valuation model for environmental risk. *Focus* 2(3):17-24.

Wilson, A.R. 1994. The environmental opinion: Basis for an impaired value opinion. *The Appraisal Journal* 62(3):410-23.1998).

Wood, G. (Aug. 2) 2015. Assessment of Contaminated Properties. <http://slideplayer.com/slide/17319991>.

Wurtzler, G. L. 1999. Calculating Worth—Environmental Law: Even Contaminated Land Invariably Has Some Value. *The Daily Journal* 1999 (reprinted with permission of *The Colorado Journal*. www.dgslaw.com/images/materials/291570.pdf).

Appendix C. United States Federal Environmental Regulatory Acts

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Creates liability for the cleanup of sites contaminated with hazardous substances. Provides "Superfund" for cleaning contaminated sites for which no responsible party can be found. Also specifies liability for potentially responsible parties.

Clean Air Act (CAA)

Provides national air quality standards and regulations.

Clean Water Act (CWA)

Regulates quality of water and point source pollution of waterways.

Food Security Act of 1985

Regulates water quality and requires erosion control.

Fungicide and Rodenticide Act (FIFRA)

Regulates fungicide and rodenticides.

Resource Conservation and Recover Act (RCRA)

Regulates solid and hazardous waste management and underground storage tanks containing petroleum products.

Superfund Amendments and Reauthorization Act (SARA)

Strengthened authority to effect cleanup of contaminated sites. Created "innocent landowner" defense.

Toxic Substances Control Act (TSCA)

Regulates toxic materials.

Appendix D—Pertinent Court Cases

ABB industrial Systems, Inc. v. Prime Tech, Inc., 120 F.3d 351 (2nd Cir. 1997).

ACP Partnership v. Garwood Borough, Nos. 009227 2010, 002452-2011, 000971-2013, 003566-2014, 00431-2015, 2015 N.J. Tax LEXIS 7 (2016).

Alladin, Inc. v. Blackhawk County, 562 N.W.2d 608 (1997).

Alomor Corp. v. County of Hennepin, 566 N.W.2d 696 (1997).

Anderson v. Lane County Assessor, No. TC-MD- 0920298, 2009 Ore. Tax LEXIS 253 (2009).

Appeal of Camel City Laundry Co. ii, 472 S.E.2d 402 (1994).

Appeal of Great Lakes Container Corp., 126 N. H.167 (1985).

Badische Corp. v. Town of Kearny, 14 N.J.Tax 219 (1994), 672 A.2d 186 (1995), 288 N.J.Super. (App.Div. 1996).

Bamford v. Brown, Nos. 39962-39966 (Wash. Bd. Tax Appeals 1992).

Bielat v. Macomb Twp., Michigan Tax Tribunal, Docket No. 93707 (1987).

Bockeloo v. Board of Review of City of Clinton, 529 N.W.2d 278 (1995).

B. P. Oil, Inc. v. Board of Assessment Appeal of Jefferson County, 159 Pa.Cmwlth. 414, 633 A.2d 124 (1993).

BSK Enterprises, Inc. and B. Kelley Enterprises, Inc. v. Beroth Oil Company, 2016 N.C. App. LEXIS 243 (2016).

Caffe Ribs, Inc. A Utah Corporation v. Texas, No. 14-12-00401-CV, 2014 Tex, App. LEXIS 229,328 S.W.3d 919 (2010) (Caffe Ribs I).

Caffe Ribs, Inc. A Utah Corporation v. Texas, No. 14-12-00401-CV, 2014 TexApp. LEXIS 513, 468 S.W.3d 94 (2014) (Caffe Ribs II).

Caffe Ribs, Inc. v. Texas, 2016 Tex. LEXIS 229, (Supreme Court of Texas 2016) (Caffe Ribs III).

- Camel City Laundry Co. v. Forsyth County Board of Equalization and Review*, 115 N.C.App. 469, 444 S.E.2d 689 (1994).
- Ciba Specialty Chemicals Corp. v. Township of Toms River*, and *BASF Corp. v. Township of Toms River*, Nos. 005634-2004, 001986-2005, 001501-2006, 003458-2007, 005340-2008, 005210-2009, 004487-2010, 002155-2011, 2013 N.J. Tax LEXIS 47 (2013).
- Clackamus County Assessor v. Geary*, No. TC-MD-120298 D, 2012 Ore. Tax LEXIS 307 (2013).
- Columbus City Schools Board of Education v. Franklin County Board of Revision*, No. 2014-0723, 2015 Ohio 3633, 2015 Ohio LEXIS 2345 (2015).
- Comerica Bank-Detroit v. Metamora Twp., Michigan Tax Tribunal*, Docket No. 103325 (1987).
- Commerce Holding Co. v. Board of Assessors*, 216 A.D. 466, 628 N.Y.S.2d 186 (1995) and 88 N.Y.2d 724, 649 N.Y.S.2d 932, 673 N.E.2d 127 (1996).
- Community Consultants, Inc. v. Bedford Twp.*, 3 MITTR 593 (1985).
- Company at 34 v. Lake County Board of Revision*, No. 92-T-763 (Ohio Board of Tax Appeals 1994).
- Continental Tile Co. v. Peoples Gas Light and Coke Co.*, 959 F.Supp. 893 (N.D. Ill. 1997).
- Custom Distribution Services, Inc. v. City of Perth Amboy*, 1997 W. L. 795825 (Bankr. D. N.J. 1997).
- Dealers Manufacturing v. County of Anika*, 615 N.W. 96 (Minn. 2000).
- E.I Du Pont de Nemours & Co. v. Douglas Board of Equalization*, 97 P.3d 1129, 2003 Colo. App. LEXIS 3 (2003).
- De Luz Homes. Inc. v. County of San Diego*, 45 Cal.2d 546, 290 P.2d 544 (1955).
- Equity 96, LLC v. Newington*, 2003 Conn. LEXIS 2763 (2003).
- Exxon Mobil Corporation v. Albright*, 433 Md. 303, 71 A.3d 30, 2013 Md. LEXIS 694 (2013).
- Finklestein v. Dept. of Transportation*, 656 So.2d 921 (1995).
- FIP Realty Co., Ltd v. Franklin County Board of Revision*, Nos. 2014-1120, 2014-1121 (Ohio Board of Tax Appeals 2015).
- Firestone Tire & Rubber Company v. County of Monterey*, 223 Cal.App.3d 382, 272 Cal. Rptr. 745 (6 Dist. 1990).
- Ford Motor Company v. County of Ramsey*, Nos. C5-07-4696, 62-CV-08-3719, 62-CV-09-6357. 62-CV-10-4801, 62-CV-11-4129, 2014 Minn. Tax LEXIS 84 (2014) (Ford III).
- Ford Motor Company v. County of Ramsey*, Nos. C5-07-4696, 62-CV-08-3719, 62-CV-09-6357. 62-CV-10-4801, 62-CV-11-4129, 2013 Minn. Tax LEXIS 72 (2014) (Ford II).
- Ford Motor Company v. County of Ramsey*, Nos. C5-07-4696, 62-CV-08-3719, 62-CV-09-6357. 62-CV-10-4801, 62-CV-11-4129, 2013 Minn. Tax LEXIS 25, WL 3242880 (2013) (Ford I).
- Friends of Lincoln Lakes v. Board of Environmental Protection*, 989 A.2d 1128 (Maine 2010).
- GAF Corp. v. Borough of South Bound Brook*, 112 N. J. 593 (1988).
- Geary v. Clackamus County Assessor*, No. TC-MD-120653D, 2013 Ore. Tax LEXIS 16 (2013).
- Hammond v. City of Warner Robbins*, 224 Ga.App. 684, 482 S.E.2d 422 (Ga.App. 1997).
- Harley Davidson Motor Company v. Township of Springettsbury*, 2014 Pa. LEXIS — , Docket J-102-2014 (Supreme Court 2015)
- Hazelton v. Town of Derry*, No. 14962-93-PT (New Hampshire Board of Tax and Land Appeals 1996).
- Henderson v. Washington County Assessor*, No. TC-MD-060762C, 2007 Ore. Tax LEXIS 20 (2007).
- Henry v. St. Croix Alumina, LLC*, No. 9-25-2009, WL 2329223 (D Virgin Island 2009).
- Hotel Statler v. Cuyahoga County Board of Revision*, 79 Ohio St.3d 299, 1997 Ohio 388, 681 N.E.2d 425 (1997).
- Hubbard Milling Co. v. County of Blue Earth*, Nos. C4-93-641-R, C6-93-642 (Minn. Tax Ct. 1994).
- Houston Unlimited, Inc. v. Mel Acres Ranch*, 57 Tex, Sup.Ct. J 1223 (Tex. 2014).
- Inmar Associates v. Borough of Carlstadt*, 112 N.J.593, 549 A.2d 38 (N.J. 1988)
- In re Bilmar Team Cleaners*, No. 13-414, 2015 VT 10, 114 A.3d 483, 2015 VT LEXIS 6 (2015).
- In re Equalization Appeals of Total Petroleum*, 28 Kan. App.2d 295, 16 P.3d 981 (2000).
- In re Custom Distribution Services*, 216 B.R. 136 (Bankruptcy Court, D.N.J. 1997).
- Joslyn Manufacturing Co. v. T. L. James & Co.*, 893 F.2d 80 (5th Cir. 1990).
- Lake County Assessor v. McDougal and Babcock Properties*, 2011 Ore. Tax LEXIS 269 (2011).
- Mallinckrodt v. Department of Environmental Protection*, 90 A.3d 428 (Supreme Court Maine 2014).
- Method Electronics, Inc. v Township of Willingboro*, Nos. 019012-2010, 014098-2011, 28 N.J. Tax 289, 2015 N.J. Tax LEXIS 2 (2015).
- Metuchen I, LLC v. Borough of Metuchen*, 21 N.J. Tax 283 (2004).
- McDonald Local School District Board of Education v. Trumbull County Board of Revision*, No. 94-A-757 (Ohio Board of Tax Appeals 1996).

STANDARD ON THE VALUATION OF PROPERTIES AFFECTED BY ENVIRONMENTAL CONTAMINATION 2016

- Mola Development Corp. v. Orange County Assessment Appeals Board* No. 2, 80 Cal.App. 4th 309, 95 Cal. Rptr.2d 546 (2000).
- Manufacturer's Life Insurance Co. v. DuPage County Board of Review*, Nos. 90-2290-C-3 and 91-3218-C-3 (1994).
- Monroe County Board of Assessors v. Miller*, 131 Pa.Cmwlth. 538, 570 A.2d 1386 (1990).
- Moorhead Economic Development Authority v. Anda*, 789 N.W.2d 860 (Minn. 2010).
- MSC, LLC v. Transmontaigne, Inc.*, No. 07-5153 (DC WD Ark, 2009).
- Metuchen I, LLC v. Borough of Metuchen*, 21 N.J. Tax 283 (2004).
- Murray Pacific Corp. v. Brown*, No. 38037 (Wash. Bd. Tax Appeals 1990).
- Nicollet Restoration, Inc. v. County of Hennepin*, No. T. C. 12361 (4th Dist. 1992).
- Northwest Cooperaage Company, Inc., v. Ridder*, Wash. Board of Tax Appeals, Docket Nos. 36278-36280 (1990).
- Nutra Sweet Company v. X-L Engineering*, 227 F.3d 776 (7th Cir. 2000).
- Orient Way Corp. and Red Roc Realty, LLC v. Township of Lyndhurst*, No. A-0008-13T4, 28 N.J. Tax 272, 2014 N.J. Tax LEXIS 30 (2014) (Orient Way II).
- Orient Way Corp. and Red Roc Realty, LLC v. Township of Lyndhurst*, Nos. 003985-2006, 004343-2007, 003219-2008, 27 N.J. Tax 361, 2013 N.J. Tax LEXIS 14 (2013) (Orient Way I).
- Pan Chemical Corp. v. Borough of Hawthorne*, 404 N.J. Super. 401, 961 A.2d 1219 (App. Div.), cert. denied, 198 N.J. 473, 968 A.2d 1189 (2009).
- Peterson v. Amherst*, N. H. Slip Opinion, Docket No. 1239-81 (1982).
- Raytheon Co. v. McGraw Edison Co.*, 979 F.Supp. 858 (E.D.Wis. 1997).
- Redevelopment Agency of City of Pomona v. Thrifty Oil Co.*, 4 Cal.App. 4th 469, 5 Cal. Rptr.2d 687 (1992).
- Reliable Electric Finishing Co. v. Board of Assessors*, 410 Mass. 381, 573 N.E.2d 959 (1991).
- Rock Acquisition Limited Partnership v. Commissioner*, 2009 Conn. Super. LEXIS 2066 (2009).
- Roden v. Estech*, 508 So.2d 728 (1987).
- Route 21 Associates v. Township of Belleville*, Black 9103, Lot 1, Nos. 001224-2008, 00370-2009, 005266-2010, 2013 N.J. Tax Unpub. LEXIS 720 (2014).
- Salmon Bay Terminals v. Noble*, Nos. 45939-45940 (1996).
- Schmidt v. Utah State Tax Commission*, 1999 Utah 48, 980 P.2d 690 (1999).
- Smith v. Carbide & Chemicals Corporation*, 226 S.W.3d 52 (Ky. 2007).
- Stafford v. Bryden County Board of Education*, 219 Ga.App. 750, 466 S.E.2d 637 (1995).
- State of Idaho v. Bunker Hill Co. & Gulf Resources*, 635 F. Supp. 655 (D. Idaho, 1986).
- State of Tennessee v. Brandon*, 878 S.W.2d 224 (Tenn.App. 1994).
- State of Wisconsin ex rel. Collison v. City of Milwaukee Board of Review*, 2014 WI App. 110, 357 Wis.2d 721, 855 N.W.2d 903, 2014 Wisc.App. LEXIS 720 (2014).
- Sweepster Inc. v. Seco Township*, 225 Mich.App. 497, 571 N.W.2d 553 (1997).
- Techalloy Co., Inc. v. Property Tax Appeal Board*, 291 Ill. App. 3d 86, 683 N.E.2d 206 (1997).
- United States v. CMDG Realty*, 96 F.3d 706 (3rd Cir. 1997).
- United States v. Cordova Chemical Co.*, 113 F.3d 572 (6th Cir. 1997).
- United States v. Olin Corp.*, 107 F.3d 1506 (11th Cir. 1997).
- University Plaza Realty Corp. v. City of Hackensack*, 12 N.J. Tax 354 (1992), aff'd 264 N.J. Super. 353, 624 A.2d 1000 (1993), cert. den. 134 N.J. 481, 634 A.2d 527 (1993).
- Vopelgesang v. CECOS international, Inc.*, 85 Ohio App. 3d 339, 619 N.E.2d 1072 (1993).
- Westling v. County of Mille Lacs*, 543 N.W.2d 91 (Minn. 1996).
- Westling v. County of Mille Lacs*, 588 N.W.2d 815 (Minn. 1998).
- West Orange v. Goldman's Estate*, 2 N.J. Tax 582 (1981).
- Weyerhaeuser v. Easter*, 126 Wash.2d 370, 894 P.2d 1290 (1995).
- Whitney v. J.M. Scott Associates, Inc.*, No. LLIC-VO095007099S, 2014 Conn. Super. LEXIS 2789 (2014).
- Woburn Services Inc. v. Board of Assessors of City of Woburn*, Nos. 212519, 212521, 212523-212531 (Mass. App. Tax Board 1996).
- Wyckoff Company v. Carol Belas*, Kitsap County Assessor, Docket No. 39107 (1991).

Assessment Standards of the International Association of Assessing Officers

Guide to Assessment Standards

Standard on Assessment Appeal

Standard on Automated Valuation Models

Standard on Contracting for Assessment Services

Standard on Digital Cadastral Maps and Parcel Identifiers

Standard on Manual Cadastral Maps and Parcel Identifiers

Standard on Mass Appraisal of Real Property

Standard on Oversight Agency Responsibilities

Standard on Professional Development

Standard on Property Tax Policy

Standard on Public Relations

Standard on Ratio Studies

Standard on Valuation of Personal Property

Standard on Valuation of Property Affected by Environmental Contamination

Standard on Verification and Adjustment of Sales

To download the current approved version of any of the standards listed above, go to:

[IAAO Technical Standards](#)