



# Standard Guide for Beneficial Use of Landfills and Chemically Impacted Sites<sup>1</sup>

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## INTRODUCTION

Over the last half-century, environmental protection programs have withdrawn from use properties posing significant adverse human health impacts, yet some with lesser potential impact continue to be heavily used [for example, pedestrian; recreational; or outdoor entertainment-related, concert audience seating] without evaluation. Assessment of environmental conditions for properties undergoing ownership transfer is now common (and often required), yet those of historic ownership are not similarly evaluated. This guide serves the need for a forward-looking program that allows a knowledgeable environmental professional to complete an evaluation of a proposed beneficial use, utilizing readily available information and her/his professional judgment whether property usage restrictions are necessary to be protective of human health. Two outcomes of such an evaluation include finding that the proposed beneficial use is acceptable, or a finding that the proposed beneficial use request is not acceptable. The environmental professional may condition her/his finding of acceptability of beneficial use with institutional and engineering controls based on actual or potential soil chemical concentrations, known background chemical concentrations, and other approaches that provide a barrier between a chemical and a site user or limit times of use.

## 1. Scope

1.1 This guide provides a beneficial, *acceptable use* framework for the *development* of: (1) Inactive and *pre-RCRA* (or *pre-regulatory*) *solid waste landfills* that are considered *orphan* or *latchkey* to be repurposed, despite having offsite migration impacts of *landfill gases* and/or *leachate*, albeit at *de minimis* levels; (2) other types of unregulated *waste landfills*; (3) sites impacted by chemical releases; (4) *legacy* or ongoing, intentional, or unintentional fill placement; (5) *closed*, open, or operating *post-RCRA landfills* or *landfills* in the planning stages such that materials may be placed in ways that optimize a *landfill's* use in future years; and (6) underutilized or heavily used (for example, pedestrian; recreational; or repetitive, entertainment, single event) *chemically impacted sites*. Also, this guide identifies land usage and conditions of adjacent/non-waste portions of a *landfill* (that is, *buffer* areas not within the footprint of an actual *landfill* or *chemically impacted site* itself) that should be evaluated before a *site use* is considered *acceptable*.

1.2 Provided herein is instruction on evaluating and judging the *acceptability* of: (1) Chemical exposure barrier(s) (and

other *engineering and institutional control* measures) in place between actual or potential chemically impacted soil; and/or (2) time of use restriction(s) established at a *waste / chemically impacted site*.

1.3 Additionally provided is instruction on assessing the *terminal conditions* at a *municipal solid waste (MSW) landfill*; that is, flows of methane below which passive rather than active venting is recommended, and flows of *leachate* of a long-term, consistent quality that is clean enough to allow direct discharge of the liquid to surface waters. See [Appendix X3](#) for additional information.

1.4 This guide complements *solid waste* regulatory programs where guidance on beneficial usage is unavailable or insufficient, thereby improving the chance that such sites may be repurposed for public and/or private benefit.

1.5 This guide may be implemented in conjunction with ASTM's Standard Guide for Integrating Sustainable Objectives in Cleanups (Guide [E2876-13](#)) with respect to *community engagement* activities. See Guide [E2876](#) for more information.

1.6 This guide should not be used as a justification to avoid, minimize, or delay implementation of specific cleanup activities as required by law or regulation.

1.7 This guide should not be used to characterize (that is, environmentally assess) a site for the purpose of ownership transfer, although it could supplement other environmental assessments that are used in such a transfer.

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee [E50](#) on Environmental Assessment, Risk Management and Corrective Action and is the direct responsibility of Subcommittee [E50.03](#) on Beneficial Use.

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1.8 Users of this guide make professional judgments that only apply to a particular site, at a particular date and time, and do not warrant safe conditions existing beyond that date. It is not impossible that a significant environmental exposure condition exists at a site but was missed by the user of this guide or the *Environmental Professional* who led the evaluation, or that the condition was introduced subsequent to the evaluation. The evaluation of a site by an *Environmental Professional* is not intended to be exhaustive; there may be significant unknown conditions that may not be apparent through reasonable site characterization efforts. Further, the user of the guide should advise the site owner to maintain any *Environmental Professional*-recommended *engineering* and *institutional controls* and any *established* signage into the future for the planned, identified beneficial use. Those who use the final reports generated through the use of this guide are cautioned to understand the limits of what the *Environmental Professional's Completed Site Evaluation* describes. Compared to a *waste / chemically impacted site* NOT evaluated (in the manner described herein) before a use activity is implemented is clearly subject to greater *potential adverse impacts to human health, public safety, or welfare* than a *waste / chemically impacted site* that is. See 3.1.24 for a discussion of the *Due Diligence Threshold of the Environmental Professional* and 4.4 for additional information.

1.9 Users of this guide should comply with all applicable federal, State, and local statutes and regulations requiring and/or relating to protection of human health. This includes, and is not limited to, laws and regulations relating to health and safety of the people using a *developed waste / chemically impacted site*, the surrounding community, and/or public sector and private sector personnel who are involved in the management or oversight of *waste / chemically impacted sites*. See (1)<sup>2</sup> for useful information on land revitalization and (2) for information on chemical safety.

1.10 Use of this guide is considered a *sustainable urban governance* practice as identified by Rowland (2008) (3).

1.11 This guide is composed of the following sections: Referenced Documents; Terminology; Significance and Use; Planning and Scoping; Site Use Activity Evaluation and Selection Process; and Site Use Activity Evaluation, Reporting, and Documentation.

1.12 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>3</sup>

- E1527 Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process
- E2201 Terminology for Coal Combustion Products
- E2247 Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property
- E2876 Guide for Integrating Sustainable Objectives into Cleanup
- E2893 Guide for Greener Cleanups

## 3. Terminology

### 3.1 Definitions:

3.1.1 *active use, n*—typically expressed as “active recreational use,” this term could be used to describe a use that has similar potential for exposure to chemicals in bare soil. See 4.1.1 for a discussion on this type of activity.

3.1.2 *acceptable use, n*—an *Environmental Professional's* description of a proposed beneficial use, characterized by the nature and duration of activities involved, for a property that is evaluated and determined to be protective of human health, public safety, and welfare with, if necessary, specified *engineering and institutional controls* and *established* signage.

3.1.3 *acceptable site conditions, n*—a descriptive condition for a site proposed for beneficial use (either *active use* or *passive use*) using Guide E3033 when concentrations of chemicals [listed in Appendix X5 as Soil Cleanup Objectives (SCOs)] are less than those listed but may otherwise be known to exist in surface soils, and no *imminent threats to human health, public safety or welfare* exist.

3.1.4 *applicable local, state, or tribal (regulatory agency) organization, n*—the political or official authority concerning the use of land for public or private purposes where there are *potential adverse impacts to human health, public safety, or welfare* or other objectionable conditions, such as odors, smells, or poor visual qualities.

3.1.5 *beneficial use of a coal combustion product, n*—the use of or substitution of the coal combustion product (CCP) for another product based on performance criteria. For purposes of this definition, beneficial use includes but is not restricted to raw feed for cement clinker, concrete, grout, flowable fill, controlled low strength material; structural fill; road base/sub-base; soil modification; mineral filler; snow and ice traction control; blasting grit and abrasives; roofing granules; mining applications; wallboard; waste stabilization/solidification; soil amendment; and agriculture. See Terminology E2201 and US EPA, 2015 (4) for more information.

3.1.6 *buffer area, n*—a geographically linear land parcel that blocks the adverse visual, auditory, or odiferous effects of *waste management*.

3.1.7 *caps and liners, n*—natural (for example, compacted clay liners) or synthetic (for example, HDPE) materials placed on the top, bottom, and sidewalls of a *landfill* to totally contain *leachate*, prevent rainwater and groundwater infiltration, and direct the flow of gases to a venting system on top (and the flow of leachate to the base, for extraction) of a *municipal solid waste landfill*.

<sup>2</sup> The boldface numbers in parentheses refer to a list of references at the end of this standard.

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.1.8 *caretaker mode*, *n*—long-term management scheme of a non-operating *landfill* in which *terminal conditions* for migrating methane, *leachate*, and low-density buried solids have been attained. See 3.1.42 and Appendix X3 for additional information.

3.1.9 *charrette*, *n*—an intensive planning session where *stakeholders* (including property owners and neighboring land-owners) collaborate on a vision for a use at a *chemically impacted site*. It provides a forum for ideas and offers the unique advantage of giving immediate feedback to the users of this guide. See Guide E2876 for more information.

3.1.10 *chemically impacted site*, *n*—an area where chemicals have been placed intentionally or by nature, upon the ground surface or at depth, not containing putrescible, organic wastes of a *municipal solid waste landfill*; includes sites with *historic*, *urban fill* and urban land areas impacted by lead emissions from automobiles and lead paint chips from building surfaces. It is common to label such sites as brownfields, as opposed to land that is not *chemically impacted* that are known as a greenfields.

3.1.11 *closed site*, *n*—see 3.1.39, *landfill closure*.

3.1.12 *coal ash*, *n*—collective term referring to any solid materials produced primarily from the combustion of coal (a type of *industrial waste*). Examples include fly ash, bottom ash, and boiler slag.

3.1.13 *coal ash dry management unit*, *n*—*coal ash landfill*, a material management unit that is characteristically more stable (that is, has a higher load bearing capacity) and therefore is potentially available for the eight types of beneficial *site uses* identified herein.

3.1.14 *coal ash wet management unit*, *n*—*coal ash* surface impoundment; a material management unit less stable than a *dry management unit*, associated with sidewall failures and spills into the environment. These types of units are not to be considered for any of the eight types of beneficial *site uses* identified herein. See Katz (2015)(5) and US EPA (2015) (6), for more information.

3.1.15 *community engagement*, *n*—pro-active reaching out to neighbors of a *waste / chemically impacted site*, adjacent property owners, *stakeholders*, and civic leaders by the owner of the *waste / chemically impacted site*, the guide user, *Environmental Professional*, and the *Project Team* for the purpose of selecting an *acceptable site use* activity. See Guide E2876 for more information.

3.1.16 *completed site evaluation*, *n*—the end of this guide’s process; a report (prepared by an *Environmental Professional*) that *accepts* or *rejects* a proposed beneficial use of a *waste / chemically impacted site*. If *accepted*, one or more of the Appendix X4 forms are completed as described therein. See 7.2 for additional information.

3.1.17 *concurrence*, *n*—agreement among two or more individuals or organizations that a course of action provides *acceptable* protection of human health, public safety, and welfare.

3.1.18 *conditional expedited use*, *n*—a timely approval (that is, between 2 weeks and 90 days) for a proposed beneficial use.

See Appendix X2 for a discussion of the conditional expedited use process and guidance on filling out Form 2 – Conditional Expedited Use, and Appendix X4 for Form 2 that an *Environmental Professional* uses to identify an *acceptable* conditional expedited use. See 7.2.2 for additional information.

3.1.19 *construction & demolition debris*, *n*—a *waste* that includes wood, metal, glass, concrete, asphalt, and other materials associated with constructing buildings or tearing them down. This is a type of *industrial waste*.

3.1.20 *cover*, *n*—see 3.1.32, *generic cover*.

3.1.21 *de minimis*, *adj*—that which has an effect or quality that is *acceptable* and measurable; for example, human chemical exposure below an OSHA threshold limit value or US EPA concentration limit for water discharge to a river. See Appendix X5 for a listing of chemical concentrations in bare, surface soil considered *acceptable* for two types of recreational activities; generally, concentrations lower than those listed are considered *de minimis*. Also *de minimis* are concentrations of *pollutants* beneath a *generic cover* or *cap* that provide a barrier to exposure. Note that a concentration limit for water discharge to a river may not be *acceptable* with respect to direct human contact; the user or *Environmental Professional* using this guide does not identify as *acceptable*, activities for anything other than land-based uses.

3.1.22 *development*, *n*—act of taking a greenfield or restoring a *waste / chemically impacted site* and providing living space, recreational space, nature preserves, commercial / employment opportunities, agricultural products, and/or opportunities for recovering value from a site.

3.1.23 *due diligence*, *n*—the reasonable, environmental professional approach to research of *readily available information* and documents and interviews with available current or past owners or operators of property for the purpose of creating knowledge regarding the known or likely presence of *pollutants* in assessing *potential adverse impacts to human health, public safety, or welfare* at a specific site that includes consideration of: (1) past land usage; (2) *releases* of chemicals on the site or upon adjacent properties that might be expected to migrate onto the site; and (3) past placement of fill soils or *waste* and, if known, the origin of those materials. The performance of a Phase I environmental site assessment (in accordance with Practice E1527 or Practice E2247) is not required by this guide, but information resources referenced in those Practices should be considered. See 5.6.3 for a description of the *due diligence* process.

3.1.24 *due diligence threshold of the environmental professional*, *n*—the criteria used by an *Environmental Professional* for rendering judgment that sufficient knowledge has been reached whereupon the *Environmental Professional* may offer recommendations concerning what is an *acceptable use* at a selected *landfill* or *chemically impacted site*. The *Environmental Professional* should only offer beneficial use recommendations until she/he has reviewed *readily available information* and the eighteen considerations listed in Appendix X6.

3.1.25 *easements, buffers, and rights-of-way*, *n*—typically, narrow but long corridors of land that are used by municipal service or public or private utility vehicles for maintenance,