

Searchable Clearinghouse of Wastewater Technologies (SCOWT) Terms and Definitions

EPA has compiled the following glossary of key terms used throughout SCOWT. When available, existing definitions from EPA programs, other federal agencies, or sector sources were included. This glossary is not intended to serve as an official definition for included terms.

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- 1. Adopted Technologies:** Technologies that have demonstrated effectiveness via a minimum of two years of performance data for a particular application.
- 2. Alternative Technology:** Fully proven wastewater treatment systems that reclaim or reuse wastewater, productively recycle wastewater components, recover energy, or eliminate pollutant discharge. Specific alternative technologies include onsite treatment or alternative wastewater conveyance systems for small communities, land treatment of wastewater and sludge, direct reuse (non-potable) of treated wastewater, direct and indirect potable reuse, aquifer recharge, composting, co-disposal of sludge, and refuse, and methane recovery and use. Alternative technologies typically provide cost savings compared to conventional treatment because of lower operation and maintenance costs or cost recovery through productive use of wastes.¹
- 3. Asset Management:** Asset management is a systematic process that water and wastewater utilities can use to cost-effectively develop, maintain, upgrade and replace capital assets throughout the life cycle of each asset. Asset management helps to ensure that planned maintenance is conducted, and that capital assets (pumps, motors, piping, structures, etc.) are repaired, upgraded or replaced on time and that there is enough money to pay for it.²
- 4. Biosolids Reuse:** A product of the wastewater treatment process. During wastewater treatment, the liquids are separated from the solids. Those solids are then treated physically and chemically to produce a semisolid, nutrient-rich product known as biosolids. The terms 'biosolids' and 'sewage sludge' are often used interchangeably.³
- 5. Case Studies:** Analysis of persons, groups, events, decisions, periods, policies, institutions, or other systems that are studied holistically by one or more methods.⁴
- 6. Centralized Wastewater Treatment:** A managed system consisting of collection sewers and a single treatment plant used to collect and treat wastewater from an entire service area. Traditionally, such a system has been called a publicly owned treatment works (POTW) as defined at 40 CFR 122.2.⁵

¹ EPA (2020) Alternative Technology definition

² EPA (2020) Asset Management definition

³ EPA (2020) Biosolids Reuse definition

⁴ Press Academia (2020) Case Studies definition

⁵ EPA Office of Water/Office of Wastewater Management (2004) Centralized Wastewater Treatment definition

7. **Commercial Activities:** Activity undertaken as part of a commercial enterprise.⁶
8. **Cost-Benefit Analysis:** A process by which organizations can analyze decisions, systems, or projects, or determine a value for intangibles. The model is built by identifying the benefits of an action as well as the associated costs and subtracting the costs from benefits. When completed, a cost-benefit analysis will yield concrete results that can be used to develop reasonable conclusions around the feasibility and/or advisability of a decision or situation.⁷
9. **Cost Comparison:** The process of comparing the price of different products or services.⁸
10. **Cost-Effectiveness:** The relationship between monetary inputs and desired outcome, such as between the expenditure on an advertising campaign and an increase in sales revenue.⁹ Cost-effectiveness for a wastewater technology can refer to the benefits over time as related to the cost. A cost-effective project provides the required function at a reasonable life cycle cost.
11. **Conventional Gravity Septic System:** A conventional septic system is typically installed at a single-family home or small business. The gravel/stone drain field is a design that has existed for decades. The name refers to the construction of the drain field. With this design, effluent is piped from the septic tank to a shallow underground trench of stone or gravel.¹⁰
12. **Decentralized Wastewater Treatment:** Consists of a variety of approaches for collection, treatment, and dispersal/reuse of wastewater for individual dwellings, industrial or institutional facilities, clusters of homes or businesses, and entire communities.¹¹
13. **Decentralized/Onsite Wastewater Community:** Onsite (decentralized) wastewater treatment systems treat sewage from homes and businesses that are not connected to a centralized wastewater treatment plant. Septic systems and other decentralized technologies serve approximately 25 percent of the U.S. population and one-third of new development.¹²
14. **Drain Systems:** A system of watercourses or drains for carrying off excess water.¹³
15. **Emerging Contaminants:** Substances and microorganisms including manufactured or naturally occurring physical, chemical, biological, radiological, or nuclear materials, which are known or anticipated in the environment that many pose newly identified or re-emerging risks to human health, aquatic life, or the environment. These substances, microorganisms or materials can include many different types of natural or manufactured chemicals and substances – such as those in some compounds of personal care products, pharmaceuticals, industrial chemical, pesticides, and microplastics.¹⁴
16. **Energy Conservation:** The decision and practice of using less energy. The use of LED and motion-detection lighting, high-efficiency motors and variable frequency drives are examples of energy conservation.¹⁵ Energy efficient wastewater technologies can help deliver equal or better services using less energy through energy conservation.
17. **Energy Management:** The process of tracking and optimizing energy consumption to conserve usage in a treatment process, pumping facility or building.¹⁶ For wastewater technology, this can mean tracking energy use over time and taking steps to optimize a given technology's energy consumption.

⁶ Definition Org (2020) Commercial Activities definition

⁷ Smartsheet (2020) Cost-Benefit Analysis definition

⁸ Definition Org (2020) Cost Comparison definition

⁹ Investopedia (2020) Cost Effectiveness definition

¹⁰ EPA (2020) Conventional Gravity Septic System definition

¹¹ EPA (2015) Decentralized Wastewater Treatment definition

¹² NEIWPCC (2020) Decentralized/Onsite Wastewater Community definition

¹³ Free Dictionary (2020) Drain Systems definition

¹⁴ CSWRF (2022) Definition of Emerging Contaminants

¹⁵ Constellation (2020) Energy Conservation definition

¹⁶ Enertiv (2020) Energy Management definition

- 18. Environmental Full Cost Analysis:** Brings together non-market goods, such as environmental and social assets, into the development equation, to allow analyzing the costs and benefits of business and/or policy decisions. To this end, aspects such as (among others) ecosystem services or health must be given a monetary value.¹⁷
- 19. Green Infrastructure:** The range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspiration stormwater and reduce flows to sewer systems or to surface waters.¹⁸
- 20. Intelligent Wastewater Systems:** A small part of the water system helps in analyzing and processing data both historical and real-time data while others see its integration as an opportunity to overhaul their entire decision-making or performance management approach.¹⁹
- 21. Innovative Technology:** Wastewater treatment processes or components that are not fully proven in the circumstances of their intended use but, based upon documented research and demonstration projects, appear to offer the promise of benefits that outweigh the potential risks of failure. Projects are designated as innovative on a case-by-case basis if they are significantly different from proven conventional or alternative technologies and if they offer the potential to significantly advance the state-of-the-art in terms of lifecycle costs, environmental benefits, or more efficient use of energy and resources.²⁰
- 22. Life Cycle Cost:** Life cycle cost (LCC) is an approach that assesses the total cost of an asset over its life cycle including initial capital costs, maintenance costs, operating costs and the asset's residual value at the end of its life.²¹
- 23. Mound Systems:** The mound is a drain field that is raised above the natural soil surface in a specific sand fill material. They are an alternative to a conventional drain field in areas of shallow soil depth, high groundwater, or shallow bedrock.²²
- 24. Nutrient Recovery:** The practice of recovering nutrients such as nitrogen and phosphorus from used water streams that would otherwise be discarded and converted into an environmentally friendly fertilizer use for ecological, agricultural and other useful purposes.²³
- 25. Nutrient Removal:** The process used for nitrogen and phosphorus removal from wastewater before it is discharged into the surface or groundwater.²⁴
- 26. Operational Control Systems:** Operational control systems are designed to ensure that day-to-day actions are consistent with established plans and objectives. It focuses on events in a recent period.²⁵
- 27. Organics (BOD) Removal:** Biochemical oxygen demand, or BOD, measures the amount of oxygen consumed by microorganisms in decomposing organic matter in stream water. (EPA, 2016). In turn BOD removal is the amount of oxygen needed by organisms to break down the organic material in wastewater.²⁶
- 28. Resiliency:** An important framework for understanding and managing complex systems of people and nature that are subject to abrupt and nonlinear change.²⁷

¹⁷ FAO (2020) Environmental Full Cost Analysis definition

¹⁸ EPA (2020) Green Infrastructure definition

¹⁹ WEF (2017) Intelligent Wastewater Systems definition

²⁰ EPA (1980) Innovative Technology definition

²¹ Building and Environment (2020) Life Cycle Cost definition

²² EPA (2020) Mound Systems definition

²³ Water World (2015) Nutrient Recovery definition

²⁴ Water Online (2020) Nutrient Removal definition

²⁵ Strategic Control (2020) Operational Control Systems definition

²⁶ Clear Cover Systems (2020) Organics (BOD) Removal definition

²⁷ EPA (2016) Resiliency definition

29. **Resource Recovery:** Practices and technologies designed and implemented to recover resources such as nutrients, energy, and valuable metals from the waste streams processed by WW utilities.²⁸
30. **Subsurface Dispersal System:** The method of distributing effluent uniformly into an unsaturated (vadose) zone within the soil allowing for the effective treatment of bacteria and nutrients along with the local reuse of the treated water.²⁹
31. **State Onsite Programs:** Programs that help ensure septic, and other decentralized, systems are safe and operate as intended. These programs provide functions such as evaluating site conditions, setting permitting conditions, and issuing permits for on-site systems.³⁰
32. **System Operation:** A system that takes an input, changes it according to the system's use, and then produces an outcome.³¹
33. **Technology Performance Analysis:** Compares technical accomplishments against the targets during project execution. Technical performance measures such as system response time, data retrieval time, height, weight, number of errors per thousand transactions, etc. are used for the comparison.³²
34. **Wastewater Collection System:** The piping transmission system for collecting and transporting water-carried wastes from residential, commercial, and industrial sources to a wastewater treatment plant.
35. **Wastewater Conveyance:** Wastewater conveyance refers to wastewater collection and transport from producers to the wastewater treatment plant.
36. **Wastewater Treatment – Advanced:** Treatment processes that utilize physical, chemical, and/or biological processes to remove nutrients and other compounds that are not (sufficiently) removed by primary and secondary treatment processes.
37. **Wastewater Treatment – Cluster Systems:** Decentralized/Onsite systems that treat wastewater from a group of household and commercial sources, typically using a Septic System.³³
38. **Wastewater Treatment – Liquids:** Wastewater Treatment processes that produce a liquid effluent throughout the treatment process.
39. **Wastewater Treatment – Nutrient Removal:** Advanced Wastewater Treatment processes that remove nutrients, primarily nitrogen species, and phosphorus species from wastewater.³⁴
40. **Wastewater Treatment – Primary:** Usually involves gravity sedimentation of screened, derogated wastewater to remove settleable solids; slightly more than one-half of the suspended solids ordinarily are removed. BOD in the form of solids removable by sedimentation (typically about one-third of total BOD) is also removed. Primary treatment is used as an economical means for removing some contaminants before secondary treatment.³⁵
41. **Wastewater Treatment – Secondary:** Treatment processes that typically utilize biological processes to remove suspended, dissolved, and colloidal organic compounds from primary-treated wastewater.³⁶
42. **Wastewater Treatment – Septic Systems:** Individual onsite (residential or commercial) or small community cluster systems for treating relatively small volumes of wastewater, typically from residences and businesses that are not served by a centralized wastewater treatment system.

²⁸ EPA (2020) Resource Recovery definition

²⁹ Missouri State (2020) Subsurface Dispersal System definition

³⁰ Washington King County Onsite Sewage System Program (2020) State Onsite Programs definition

³¹ Investopedia (2020) System Operations definition

³² Brainbok (2020) Technology Performance Analysis definition

³³ NOWRA (2020) Wastewater Treatment Cluster Systems definition

³⁴ WEF Nutrient Roadmap (2020) Wastewater Treatment Nutrient Removal definition

³⁵ EPA (2020) Wastewater Treatment Primary definition

³⁶ Wastewater Engineering, Metcalf & Eddy (2020) Wastewater Treatment Secondary definition

These systems typically use septic tanks to settle out wastewater solids and utilize soil dispersal systems for wastewater treatment.³⁷

- 43. Wastewater Treatment – Soil-Based Dispersal Technologies:** Decentralized/Onsite wastewater technologies that use soil treatment to ultimately return the wastewater to the soil rather than treating and returning it to surface waters (stream, rivers, lakes, etc.).³⁸
- 44. Wastewater Treatment – Solids:** Treatment processes that concentrate, stabilize, dewater and/or beneficially reuse the suspended and dissolved solids removed in liquid stream wastewater treatment processes.
- 45. Wastewater Treatment:** Any process to which wastewater is subjected to remove or alter its objectional constituents and thus render it less offensive or hazardous to human health and the environment.³⁹
- 46. Wastewater Utilities – Large:** Publicly or privately owned water resource recovery utilities that typically collect, treat, and often produce products from an annual average daily flow of over 10 million gallons of wastewater per day.
- 47. Wastewater Utilities – Midsize:** Publicly or privately owned water resource recovery utilities that typically collect, treat, and often produce products from an annual average daily flow of between 5 and 10 million gallons of wastewater per day.
- 48. Wastewater Utilities – Small:** Publicly or privately owned water resource recovery utilities that typically collect, treat, and often produce products from an annual average daily flow of over less than 5 million gallons of wastewater per day.
- 49. Water Reuse:** Also known as water recycling, is the process of intentionally capturing wastewater, stormwater, saltwater, or gray water and cleaning it as needed for a designated beneficial freshwater purpose such as drinking, industrial processes, surface or groundwater replenishment, and watershed restoration.⁴⁰
- 50. Water Reuse – Direct Potable:** Water is distributed directly into a potable water supply distribution system downstream of a water treatment plant or the source water supply immediately upstream of the water treatment plant.⁴¹
- 51. Water Reuse – Indirect Potable:** Water is blended with other environmental systems such as a river, reservoir, or groundwater basin before the water is reused.⁴²
- 52. Water Reuse – Non-Potable:** Refers to reclaimed water that is not used for drinking but is safe to use for irrigation, industrial uses, or other non-drinking water purposes.⁴³
- 53. Wet Weather “Flow” Management:** The management of wastewater transmission and treatment, and stormwater during wet weather events that impact wastewater collection and treatment systems. There are two types of wet weather systems, 1) Combined Sewer Systems and 2) Separate Sewer Systems. In Combined Sewer Systems, the infrastructure is designed to intentionally combine the collection of both wastewater and stormwater into one combined collection system, for treatment at a downstream treatment plant. In Separate Sewer Systems, the infrastructure provides for two separate collection systems, one for wastewater and a second for stormwater. However, due to unintended groundwater infiltration into aging sewers coupled with stormwater inflow from illegal connections, stormwater nevertheless enters into wastewater collection systems. In some extreme cases, more than 90% of the flow during storm events can be wet weather caused.

³⁷ NOWRA (2020) Wastewater Treatment Septic Systems definition

³⁸ NOWRA (2020) Wastewater Treatment Soil-Based Dispersal Technologies definition

³⁹ CASA (2020) Wastewater Treatment definition

⁴⁰ Water Reuse (2020) Water Reuse and Water Reuse Direct, Indirect Potable definition

⁴¹ Water Reuse (2020) Water Reuse and Direct Potable definition

⁴² Water Reuse (2020) Water Reuse and Indirect Potable definition

⁴³ Water Reuse (2020) Water Reuse and Non-Potable definition

References

- (n.d.). Retrieved November 17, 2020, from <https://www.kingcounty.gov/depts/health/environmental-health/piping/onsite-sewage-systems.aspx>
- (n.d.). Retrieved November 18, 2020, from <https://nepis.epa.gov/Exe/ZyNET.exe/91022RW8.txt?ZyActionD=ZyDocument>
- (n.d.). Retrieved November 18, 2020, from https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=
- (n.d.). Retrieved November 19, 2020, from <https://dnr.mo.gov/pubs/pub2435.htm>
- (n.d.). Retrieved November 19, 2020, from <https://www.kingcounty.gov/depts/health/environmental-health/piping/onsite-sewage-systems.aspx>
- (n.d.). Retrieved November 19, 2020, from <https://study.com/academy/lesson/what-is-a-technological-system.html>
- Basic Information about Biosolids. (2020, October 05). Retrieved November 18, 2020, from <https://www.epa.gov/biosolids/basic-information-about-biosolids>
- Allen, C., A. Garmestani, AND D. Angeler. Resilience. Resilience. Oxford University Press, Cary, NC, 00, (2016).
- Asset Management for Water and Wastewater Utilities. (2020, July 02). Retrieved December 7, 2020, from <https://www.epa.gov/sustainable-water-infrastructure/asset-management-water-and-wastewater-utilities>
- Basic Information about Biosolids. (2020, October 05). Retrieved November 17, 2020, from <https://www.epa.gov/biosolids/basic-information-about-biosolids>
- Basic Information about Biosolids. (2020, October 05). Retrieved November 18, 2020, from <https://www.epa.gov/biosolids/basic-information-about-biosolids>
- CASA. (2020, October 21). Retrieved November 19, 2020, from <https://casaweb.org/>
- “Conveyance System Improvement.” *Conveyance System Improvement - King County*, www.kingcounty.gov/services/environment/wastewater/csi.aspx.
- Cost-Benefit Analysis: An Expert Guide. (n.d.). Retrieved November 18, 2020, from <https://www.smartsheet.com/expert-guide-cost-benefit-analysis>
- Decentralized Systems Technology Fact Sheet Mound Systems. (2015, June). Retrieved 2020, from <https://www.epa.gov/sites/production/files/2015-06/documents/mound.pdf>
- Definition of commercial activity. (n.d.). Retrieved November 18, 2020, from <https://definition.org/define/commercial/activity/>
- Definition of cost comparison. (n.d.). Retrieved November 18, 2020, from <https://definition.org/define/cost/comparison/>
- Definition of Proven Technology. (2013, November 06). Retrieved November 17, 2020, from <https://www.iadclexicon.org/proven-technology/>

Drainage system. (n.d.) *Dictionary of Military and Associated Terms*. (2005). Retrieved November 19, 2020, from <https://www.thefreedictionary.com/drainage+system>

Ganti, A. (2020, September 16). Asset Management Definition. Retrieved November 18, 2020, from <https://www.investopedia.com/terms/a/assetmanagement.asp>

E. (2004). *Primer for Municipal Wastewater Treatment Systems* (pp. 1-30, Rep.). EPA.

E., O., & O. (1980). *Innovative and alternative Technology Assessment Manual* (pp. 1-440, Rep.). The United States Environmental Protection Agency. Retrieved from: <https://www.epa.gov/sites/production/files/2019-12/documents/innovative-alternative-tech-manual-1980.pdf>

EPA Communications Stylebook: Writing Guide. (2020, August 13). Retrieved from <https://www.epa.gov/stylebook/epa-communications-stylebook-writing-guide>

EPA. *Decentralized Wastewater Treatment: A Sensible Solution* [Brochure]. Author. Retrieved June 2015, from <https://www.epa.gov/sites/production/files/2015-06/documents/mou-intro-paper-081712-pdf-adobe-acrobat-pro.pdf>

Ganti, A. (2020, September 16). Asset Management Definition. Retrieved November 18, 2020, from <https://www.investopedia.com/terms/a/assetmanagement.asp>

Ganti, A. (2020, September 16). Asset Management Definition. Retrieved November 18, 2020, from <https://www.investopedia.com/terms/a/assetmanagement.asp>

Kenton, W. (2020, September 12). How Cost-Benefit Analysis Process Is Performed. Retrieved November 19, 2020, from <https://www.investopedia.com/terms/c/cost-benefitanalysis.asp>

L., & W. (2017). *Intelligent Water Systems: The Path to a Smart Utility* (pp. 1-20, Publication No. Copyright © 2017 Water Environment Federation. All Rights Reserved. WSEC-2016-WP-002). Water Environment Foundation.

NOWRA: National Onsite Wastewater Recycling Association. (2020). Retrieved November 19, 2020, from <http://www.nowra.org/content.asp?admin=Y&sl=25&contentid=40>

Onsite (Decentralized) Wastewater Systems • NEIWPCC. (2020, April 08). Retrieved November 17, 2020, from <https://neiwpc.org/our-programs/wastewater/septic-and-onsite-systems/>

Operating Control. (n.d.). Retrieved November 19, 2020, from <https://www.strategic-control.24xls.com/en117>

Press Academia. Retrieved November 17, 2020, from <https://www.pressacademia.org/definition-of-case-study/>

Regional Infiltration and Inflow Control Program. (2020). Retrieved November 19, 2020, from <https://www.kingcounty.gov/services/environment/wastewater/ii.aspx>

Resource Conservation and Recovery Act (RCRA) Overview. (2020, October 29). Retrieved November 17, 2020, from <https://www.epa.gov/rcra/resource-conservation-and-recovery-act-rcra-overview>

Technical Performance Analysis. (n.d.). Retrieved November 19, 2020, from <https://www.brainbok.com/guide/pmp/glossary/technical-performance-analysis/>

- Types of Septic Systems. (2018, November 23). Retrieved November 17, 2020, from <https://www.epa.gov/septic/types-septic-systems>
- Septic Systems Overview. (2018, December 04). Retrieved November 19, 2020, from <https://www.epa.gov/septic/septic-systems-overview>
- Sesana, M., & Salvalai, G. (2013, June 05). Overview on life cycle methodologies and economic feasibility for nZEBs. Retrieved November 21, 2020, from <https://www.sciencedirect.com/science/article/pii/S0360132313001674>
- Understanding and Maintaining Mound Systems. (n.d.). Retrieved November 21, 2020, from <https://humboldt.gov/2208/Understanding-and-Maintaining-Mound-Syst>
- Water Reuse 101. (n.d.). Retrieved from <https://watereuse.org/educate/water-reuse-101/>
- What is BOD? (2014, January 14). Retrieved November 17, 2020, from <http://www.clearcovesystems.com/what-is-bod/>
- What Is Energy Conservation? (n.d.). Retrieved November 19, 2020, from <https://www.constellation.com/energy-101/what-is-energy-conservation.html>
- What is Green Infrastructure? (November). Retrieved November 17, 2020, from <https://www.epa.gov/green-infrastructure/what-green-infrastructure>
- What is Nutrient Removal? Retrieved November 18, 2020, from <https://www.waterworld.com/international/article/16193822/nutrient-recovery-technology-transforms-worlds-largest-wastewater-treatment-plant>
- Wilson, C. (2019, January 16). What is Energy Management? Retrieved November 19, 2020, from <https://www.enertiv.com/resources/faq/what-is-energy-management>