



Historical Archaeology Advisory Committee

An Advisory Body of the Governor's Archaeology Advisory Commission

DOWN IN THE DUMPS

CONTEXT STATEMENT AND GUIDANCE ON HISTORICAL-PERIOD WASTE MANAGEMENT AND REFUSE DEPOSITS



First Revised Edition

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Prepared by
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Contributions from the
Historical Archaeology Advisory Committee

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First Revised Edition

Cover: Photograph of AZ FF:9:89(ASM), an abandoned, twentieth century open dump affiliated with the communities of Bisbee, Warren, and Lowell in Cochise County (photograph courtesy of Archaeological Consulting Services, Ltd.)

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INTRODUCTION

The purpose of this document is to provide a framework for evaluating the National Register of Historic Places (National Register) eligibility of historical-period solid waste properties. For historical archaeologists, the proliferation of refuse from the mid-1800s through the mid-1900s is both a source of information and a source of difficulties in determining the National Register eligibility of historical-period trash deposits. The Industrial Revolution resulted in an ever-increasing amount of inexpensive mass-produced, disposable products, which eventually end up as refuse. Refuse disposal sites range in size from large landfills to small trash scatters. They may be found in isolation or as components of larger sites, properties, or districts. Seemingly isolated historical-period trash deposits are particularly problematic. It often becomes a question of whether a refuse deposit can make an important contribution to our knowledge of the past and address important research issues. If the property is a large historical-period dump associated with a community, the answer may not be difficult, but what if the refuse is a small, seemingly isolated refuse scatter? What if further research determines that the scatter is associated with a historical-period sheep driveway or a Frank Lloyd Wright desert camp? The State Historic Preservation Office's (SHPO) Historical Archaeology Advisory Committee (HAAC) identified a need for guidance on National Register eligibility and documentation for “isolated historical-period refuse deposits” (Gates et al. 2004).

As HAAC and SHPO developed this guidance, it became apparent that any discussion of isolated historical-period refuse deposits needed to take place within the larger framework of waste management systems. The purpose of this document is to provide guidance for agency officials and consultants on the identification, evaluation, and documentation of historical-period properties associated with solid waste management. While the histories of solid waste (i.e., garbage and rubbish) and liquid waste (i.e., cesspools, sewage, etc.) are closely related, this document primarily focuses on solid waste management systems dating from the mid-1800s to the mid-1900s. This temporal focus is justified, not only because of the relatively large number of historical-period trash disposal sites dating to this time period, but also because of the difficulty researchers have experienced in determining the National Register eligibility of these properties.

Organization

The organization of this document includes an overview on the history and character of trash disposal behavior, a discussion of the property types associated with waste management, National Register eligibility guidance for property types, site identification and recording of waste piles and open community dumps, and a bibliography. Waste management definitions and additional reference materials are listed in Appendix A. Appendix B contains examples of trash-related ordinances and time lines for a number of Arizona communities. These tables provide some patterns and time markers, but do not represent exhaustive information on each community. In researching refuse disposal practices, it became apparent that communities and historians were not particularly interested in writing about garbage. Most of the information in Appendix B was compiled using Council Meeting Records and Ordinance books from larger communities that were available at the Arizona State Library, Archives, and Public Record, from the cities of Flagstaff, Florence and Phoenix, and data from a number of archaeological reports. Appendix C includes an updated map and inventory of all active and abandoned landfills in Arizona. In 2021, the Arizona State Museum (ASM) published a new policy regarding the treatment and documentation of isolated waste piles (Arizona State Museum 2021). Recognizing that professional archaeologists and land managing agencies would have questions about this new policy, HAAC and SHPO prepared a set of Frequently Asked Questions (FAQ) about this policy, which is presented in Appendix D.

A HISTORICAL OVERVIEW OF TRASH DISPOSAL AND COLLECTION PRACTICES

One of the basic facts about material culture is that sooner or later it outlives its usefulness and is discarded. Discarded organic and inorganic waste products provide archaeologists with one of the major sources of information used to address questions about past human behavior. For most of history, deciding how to dispose of waste was an individual decision. For garbage, the most common method of disposal was to spread it in the area surrounding a house or business where livestock—particularly pigs—would feed on the waste. This was not an exclusively rural practice. Garbage and slop were regularly cast into the streets of urban areas, providing feeding grounds for pigs and other scavengers.

As the population size and density of cities exploded in the late 1800s, the health dangers and basic offensiveness of this practice became impossible to ignore. It was during this time that waste management systems were developed to facilitate the storage, transfer, treatment, and disposal of items that were deemed to be no longer useful. By the early 1900s, casual discard of garbage and slop was largely prohibited in urban areas. Table 1 provides a time line for national and international trash disposal and collection practices.

While most garbage could be disposed of by broadcasting, this method was not suitable for everything. Rubbish that was not suitable for animal consumption and larger durable items had to be transported out of the way of home and commercial activities. The most common disposal alternative for these items was to use an open dump. Material that was no longer needed was hauled to the edge of communities for disposal. Later, as disposal of garbage by scattering in streets was prohibited, this waste also ended up in the large dumps. Here the established practice of allowing pigs and other animals to feed on the organic materials was continued. Throughout the country, cities often established piggeries at dumps to house the herds of pigs that fed on the garbage.

The open dump, with its exposed masses of waste, created some serious problems. Most noticeable was the foul smell resulting from the decomposition of the organic wastes. This waste also provided a rich, damp environment in which flies, mosquitoes, rats, and other disease spreading pests flourished. In an effort to resolve this problem, communities turned to burning. While burning the waste entering the dump reduced its volume, reduced vermin, and increased the use life of the facility, it also produced large amounts of smoke. Burning in open dumps eventually was recognized as a major contributor to local air pollution and health problems (United Nations Environment Programme 2000).

Open dumps continued to be the primary disposal method until the 1960s, when landfills became widespread. Landfills are much better for the environment and public health than open dumps. In landfills the waste is compacted rather than burned, and each day's deposit is covered with soil to prevent pests and odor. The concept was used by the military during World War II (WWII). After the war, health issues made landfills increasingly common. The first American landfill was opened in Fresno, California, in 1937. The environmental laws of the 1960s and 1970s reinforced their use. In 1979, the federal government prohibited open dumping, thus ending the era of dumps. The operation of a landfill requires a level of control on waste processing not practiced at an open dump. In addition, laws constrained the once-common methods of private on-site disposal by spreading, burning, and dumping. Access to the community waste disposal facility was now controlled. Individuals either had their waste collected and disposed of by an official waste management system or had to remove the material to the landfill during its hours of operation, and in many cases pay disposal fees.

Outside of these official systems, waste has always been informally disposed of at the edges of rural and urban communities or on lands surrounding isolated rural habitations. As motorized vehicles and transportation routes improved, disposal of waste outside the official dumps and landfills began to take

Table 1. Waste Management Timeline

Year	Comments ¹
Ca 1710	Colonists in Virginia commonly bury their trash. Holes are filled with building debris, broken glass and ceramics, oyster shells, and animal bones.
1860s	In Washington, D.C., people dump garbage and slop in the street, while pigs, rats, and cockroaches flourish.
1866	New York City's Metropolitan Board of Health declares war on garbage, forbidding the "throwing of dead animals, garbage or ashes into the streets."
1880	New York City scavengers remove 15,000 horse carcasses from the city streets.
1885	The nation's first garbage incinerator is built on Governor's Island, New York. By 1908, 180 incinerators have been built in the U.S.
1895	The New York City Street Cleaning Commissioner sets up the first comprehensive system of public sector garbage management in the country.
1900s	"Piggeries" are developed in small to medium-sized towns in the U.S. At these facilities, swine eat fresh or cooked food waste. It is estimated that 75 pigs consume 1 ton of refuse per day. Food waste is recycled as pig feed until the late 1960s. Greater acceptance of the germ theory of disease begins to shift the job of garbage removal from health departments to public works departments. Health officers, it is felt, should spend their time battling infectious diseases, not cleaning up "public nuisances" such as garbage.
Early 1900s	American cities begin to estimate and record collected wastes. According to one estimate, each American city produced annually: 80-100 pounds of food waste; 50-100 pounds of rubbish; and 300-1,200 pounds of wood or coal ash (up to 1,400 pounds per person).
1902	Of 161 U.S. cities surveyed in a Massachusetts Institute of Technology study, 75 percent provide regular collection of waste materials from people's homes.
1909	102 of the 180 incinerators built since 1885 are abandoned or dismantled. Many had been inadequately built or run. Also, America's abundant land and widely spaced population made dumping garbage cheaper and more practical.
1914	Incinerators increase in popularity in North American cities. About 300 incinerators operate in the U.S. and Canada.
1916	Major cities estimate that of the 1,000 to 1,750 pounds of waste generated by each person per year, 80 percent is coal or wood ash.
1920s	Using wetlands located near cities as garbage disposal facilities becomes popular. Garbage is placed in the wetlands in layers, with ash and dirt layers placed on top as cover.
1935	General Electric begins producing and marketing a garbage "disposal." Increasing use of disposals decreases amount of food waste entering the waste stream.
1939	Coal and wood ash make up 43 percent of New York City's refuse.
1940s	The Fresno, California director of Public Works leads the effort in developing sanitary methods for disposing of trash in large urban areas. Approximately 700 incinerators exist in the U.S.
1945	Almost 100 cities in the U.S. are using sanitary landfills.
1950s	Many urban areas use close-in, open-burning dumps because they reduce the volume of refuse and extend the usability of the site. By the end of the decade, open burning of refuse is prohibited in many areas.
1959	The American Society of Civil Engineers publishes the standard guide to sanitary landfilling. To guard against rodents and odors, the guide suggests compacting refuse and covering it with a new layer of soil each day.
1965	The first federal solid waste management law, the Solid Waste Disposal Act, authorizes research and provides for state solid waste grants. These include site inventory programs, resource recovery systems, and constructing new or improved waste disposal facilities.
1968	More than 33 percent of U.S. cities collect waste that is separated in some manner.
1970	The Environmental Protection Agency (EPA) is created by President Nixon. The Federal Clean Air Act is enacted. New regulations lead to the shutdown of incinerators.
1972	The Federal Clean Water Act is passed to restore and maintain the chemical, physical, and biological integrity of the nation's waters.

Table 1. Waste Management Timeline

Year	Comments ¹
1975	All 50 states have some form of solid waste regulations in place, although the requirements vary widely.
1976	The Resource Conservation and Recovery Act (RCRA) create the first significant role for the federal government in waste management. The law emphasizes recycling, resource conservation, and proper waste management. The Toxic Substances Control Act (TSCA) is passed. Before TSCA and RCRA went into effect, any individual or business could legally dump any kind or amount of hazardous chemicals in landfills.
1979	The EPA prohibits open dumping and sets the first standards of landfills.
1988	The EPA estimates that more than 14,000 landfills, or 70 percent of the landfills operating at that time, have closed since 1978. The landfills were full, unsafe, or the owners declined to adhere to the new federal standards.
1989	Twenty-six states have comprehensive laws making recycling an integral part of solid waste management.
1991	The EPA sets improved solid waste landfill standards that include requirements for location, groundwater protection, monitoring, and post-closure care.
1993	Municipal solid waste landfill criteria become effective for most U.S. landfills.
1996	The nation reaches a 25 percent recycling rate.

¹ Information in this table was retrieved from the following resources:
 Association of Science Technology Centers Inc., Smithsonian Institution Traveling Exhibition Services (1998);
 Hickman (1999); United Nations Environment Programme (2000)

place farther from the source of generation. The rate of this type of disposal has increased as official control over community waste disposal has increased. Individuals dumping materials outside the official system are seeking to dispose of waste at times other than community dumping facility hours of operation, when they wanted to avoid fees, or when the landfill is not conveniently located.

During the past 200 years, the nation’s system of waste management has changed dramatically. For most of this time, the collection of waste was done on a household or business level. In rural areas and among the urban poor, the individual or household that generated the trash dealt with its removal, while urban dwellers who could afford it used the services of a professional waste collector. These early waste collectors, known as scavengers in some places, made collections on an irregular basis (Hickman 1999). This left trash standing in open containers for hours or even days waiting for removal. The dramatic increase in urban populations in the late 1800s coupled with increased acceptance of the germ theory of disease exposed the dangers inherent in this haphazard method of waste collection.

Things began to change in 1875 when legislation in Great Britain set up the first collection and disposition of community waste by local authorities (Chartered Institution of Wastes Management 2007). By 1910, a number of towns in the U.S. had established collection systems run by the local government, but most communities still continued individual or contracted trash collection (Hickman 1999). This changed by the 1950s, when most cities throughout the country had set up a municipal trash collection system. Health and environmental laws in the 1960s and 1970s increasingly constrained waste disposal outside the official regional waste management systems. This was true even in rural communities.

Today waste collection by either local authorities or by waste management firms contracted by the local authority is present in nearly every community in the country. The more rural areas still contain a vestige of the old system in that many residents are responsible for collecting and removing their trash to bulking (transfer) stations for eventual disposition within a regional waste management system.

Sanitation as a Public Interest

In the 1800s, public attitudes toward disease were influenced by two theories—the miasmatic (or anti-contagionist theory) and the germ theory. The miasmatic theory hypothesized that disease was caused by foul gases created by sewers and garbage. This theory, which developed in England, was championed in the U.S. by Lemuel Shattuck through his 1850 publication consisting of a comprehensive plan and recommendations on state public health programs. His work, as well as the work of other adherents to miasmatic theory, led to the establishment of more sanitation standards in urban centers by the end of the 1800s (Pizzi 2002:51-55).

Unlike the miasmatic theory, the germ theory was based on scientific research and associated disease with microorganisms. The work of Louis Pasteur in the 1860s on microorganisms and decomposition, as well as the work of Robert Koch in the 1870s on the spread of disease, helped to discredit the miasmatic theory and began to slowly influence public health standards and policies. The largest impacts of germ theory on the public did not happen until after the turn of the century. Germ theory was gradually accepted by the public as well as policy makers during the early part of the twentieth century. A number of epidemics and concerns about diseases caused both the general public and public officials to be more proactive in the area of community sanitation standards.

By the 1950s, the general public had a basic understanding and acceptance of the causes of the transmission of infectious diseases. They also believed that poor sanitary conditions could spread disease and that good sanitary practices could help prevent the spread of disease. In addition to continued concerns about tuberculosis, there were serious and widespread fears about the spread of polio. Children are particularly susceptible to polio, which is spread by physical contact with infected persons, infected feces, and flies that have been in contact with infected feces.

The general public, as well as community planners, recognized the public health hazards posed by open community dumps. The methods used at sanitary landfills provided a way to seal in trash daily, reducing debris, rodents, and flies. Early landfills helped to address issues related to the spread of diseases but did not protect the public from health risks related to chemical toxins. The earliest landfills accepted all types of materials, including items made from or containing hazardous materials, which could cause risks to both public health and the environment.

A BRIEF SUMMARY OF ARIZONA'S TRASH DISPOSAL, COLLECTION PRACTICES, AND POLICIES

The purpose of this section is to provide the researcher with a state level contextual framework for identifying and evaluating historical-period trash deposits. The overview is organized by arbitrary temporal units that correspond in a general way to major changes in trash disposal practices and policies. The variables presented are discussed separately within each time period along with a summary of the implications these variables may have on the archaeological record.

Although public attitudes and trash disposal practices in Arizona generally followed national trends, the rate of change was influenced by a number of variables including population density, transportation, commercial development, public health, and public policies. Changes in trash disposal practices began in urban centers and moved to smaller less populated communities.

Arizona remained predominately rural with low population densities throughout most of the 1800s. Population growth and density in a number of urban centers during the 1900s necessitated the implementation of better trash disposal practices to manage the increased volume of trash. Transportation improvements at the local and national levels provided access to more goods that ultimately entered the waste stream. Improvements in modes of transportation and roads at the local level effected the distances trash could be hauled from the source of the trash to disposal areas. National and state commercial developments also contributed to the volume and diversity of goods.

Public knowledge and attitudes about the relationship between sanitation, the transmission of disease, and public health influenced the development of better trash disposal policies and practices. Public policies and laws regarding trash disposal practices began with community ordinances in the mid-1800s. By 1900, the state enacted its first legislation regarding trash disposal. Federal legislation began to influence trash disposal in the second half of the 1900s.

Arizona Territory: 1850–1899

Population Growth

The need for trash disposal policies did not become an issue in communities until the late 1800s. Prior to this time, the rural nature of the state and its sparse population resulted in low levels of trash generation. There was abundant space to discard trash away from living and working areas. Better waste management became necessary in the late 1800s because of increases in population and closer living conditions in urban areas. The growth of the Territory was fueled by a number of events, including the California Gold Rush, the Gadsden Purchase, homesteading legislation, and the establishment of military posts.

The 1849 California Gold Rush brought thousands of people through the New Mexico Territory (which then included the area that would become Arizona) on their way to the gold fields. While some prospectors stayed in the Territory never making it to the gold fields, others returned from California to mine the gold, silver, and copper discovered in Arizona, leading to the rapid growth of mining towns during the latter part of the 1800s.

In 1853, the Gadsden Purchase added Tucson and southern Arizona to the U.S. and New Mexico Territory, thereby opening the newly-acquired area for settlements, farming, and ranching to Americans. The National Homestead Act of 1862 resulted in a number of patents for agricultural land beginning in 1863. A change in this law in 1872 made homesteading more attainable for Civil War veterans by allowing Union veterans the right to have their years of service count toward residency requirements.

All of these events encouraged settlement in Arizona communities. This increase in population is evident in the census records between 1860 and 1890. The 1860 census recorded Arizona's population as 6,482. In 1870, the population had increased to 9,658. By 1880 the state's population had grown to 40,440 and by 1890, it had more than doubled to 88,243. Most of the population growth was in larger communities like Tucson and Phoenix. Tucson became Arizona's first incorporated city in 1877. The population of Phoenix grew between 1885 and 1892, fueled by the completion of the Arizona Canal in 1885 and a campaign to market the "Garden City" for development and opportunity (Janus Associates, Inc. 1989a). The arrival of transcontinental railroad in the late 1800s to Tucson, the Pima villages just south of Phoenix, and Flagstaff brought both people and goods to these and other growing communities.

Expanded Transportation

The primary mode of transporting goods and supplies to the Territory before 1880 was by boat and 20-mule team overland transport. Goods were shipped from international and national centers by boat to the mouth of the Colorado River, where they were taken by steamers and barges to river port cities. Six steamers and five barges were in operation floating up the Colorado River in 1870 (Walker and Bufkin 1979). Goods were then transported from the ports to inland locations by 20-mule-team wagons. Yuma was the major port where goods entered Arizona. Erhenberg became a port city serving areas north of the Gila River in 1869. Goods, passengers, and mail could also be transported overland by two other routes—from the Missouri Valley via the Santa Fe Trail and from San Diego through the California desert; however, both of these routes were costly, slow, and dangerous.

Beginning in 1880, Arizona was connected to other areas of the country by transcontinental railroad service. The Southern Pacific Railroad serviced Tucson, the Pima villages, and the southern part of the state. Construction began in 1887 on the Maricopa, Phoenix and Salt River Valley Railroad that linked Phoenix and the Salt River Valley to the Southern Pacific Line. The northern part of Arizona and the developing

city of Flagstaff were serviced by the Atchison, Topeka and Santa Fe Railroad. The railroads made it easier for people and supplies to reach communities in Arizona. Although most of the goods transported during the early years of railroad connections were building supplies and equipment for farming and mining, there was also an increase in the diversity and quantity of manufactured goods from national and regional markets.

The railroads also created a demand for better local transportation to move both people and goods. Local transportation was primarily by horseback and horse-drawn wagons and buggies. Most roads were unpaved even in urban centers. Local transportation was improved beginning in the 1890s, with projects such as the construction of Tempe Bridge linking Tempe and Phoenix, and road improvement projects in urban centers. Both Phoenix and Tucson developed trolley systems to service the downtown commercial area. The first trolley systems in Tucson and Phoenix were horse and mule drawn, but later they were converted to electric cars. Initial construction of the Phoenix trolley system began on Washington Street in 1887.

Commercial Development

The railroads provided Arizona residents increased access to regional and national manufacturing markets. Prior to the establishment of national rail connections, most goods came from international markets, as well as eastern and western U.S. coastal centers. During the late 1800s, there was a shift toward developing Midwestern and California coastal markets that were accessible by the railroads. The impact of the Industrial Revolution on production in national commercial centers increased the volume and diversity of goods that were available and affordable to the general public. Goods shipped to Arizona were still predominately construction, mining, and agricultural related, but the availability of household related products from American markets increased as a result of cheaper, faster, and more reliable transportation and a growing consumer base.

Some local manufacturing began to develop as retailers gained access to a larger number of local customers and larger regional and national markets. Most manufacturing and business development centered in larger communities with railroad access, like Tucson and Phoenix. Bottling was one of the first manufacturing industries to develop in both Phoenix and Tucson. The Phoenix Bottling Works began operations in 1884. In addition to bottling, the Phoenix “boom years” between 1885 and 1892 resulted in a number of other businesses including two flour mills, two brick manufacturing companies, a lumber company, blacksmith and hardware businesses, and 48 other retail establishments (Janus Associates Inc. 1989a). The Wieland Bottling Works was established in the Tucson warehouse district in 1896. Other manufacturing business in Tucson during this period included Noble & Hall manufacturers and distributors of machinery, safes and pipes, Wm. B Hooper & Co. liquor distributors, Union Ice Company, and A. Goldsmidt & Co., a distributor of grocery products and other goods (Hushour and Klucas 2010).

Commercial growth in Flagstaff and Yuma was fueled by their strategic locations along major land and railroad transportation corridors. Construction of the Atlantic and Pacific Railroad was a major catalyst for the development of the lumber industry in Flagstaff. Other major commercial activities centered around cattle and sheep ranching and, after a number of catastrophic fires, quarrying for stone building materials. Tourism began to develop in the late 1890s primarily for visitors to the Grand Canyon. In 1894, Percival Lowell purchased land for an observatory. This, and the establishment of the Normal School (currently Northern Arizona University), led to two new areas of commercial development. By 1899, Flagstaff businesses included two saw mills, the Babbitt Mercantile, and a number of saloons, hotels, restaurants, churches, and schools.

Yuma was known as Colorado City and Arizona City during this period. After the establishment of Fort Yuma in 1852, the settlement became an important river port for the transport of supplies and goods to both military posts and civilian settlements. It was also a major transportation corridor for the Gold Rush of 1849, as well as a stage route and railroad corridor. By the time the Yuma Territorial Prison was established in 1876, the settlement had grown to include numerous hotels, restaurants, saloons, and stores.

The Territorial Capital of Prescott grew as a community just outside of Fort Whipple. In addition to business related to government, Prescott was home to a number of businesses including hotels, restaurants, dry goods stores, and mining supply companies. An electric light plant was built in 1889.

Public Policies

City charters and councils were established in many Arizona communities during the second half of the 1800s (Appendix B). New local governing bodies instituted ordinances to improve community safety and comfort. Along with fire ordinances, building codes, and controls on carrying and discharging of weapons within city limits, sanitary ordinances were among the first ordinances passed. These sanitation ordinances placed the primary responsibility and cost for trash disposal on the individual property owner or tenant, while the municipality was responsible for the promulgation and enforcement of laws and regulations. The importance of these ordinances can be inferred from the rather substantial penalties for violations, which often included fines of up to \$300 dollars and/or up to three months in jail.

Early sanitation ordinances addressed a number of different health and safety issues such as prohibitions on slaughterhouses or animal rendering in the city limits, proscriptions on running livestock and dogs in the city limits, restrictions on draining privies; treatments and restrictions concerning people with infectious diseases; and prohibitions on depositing trash, filth, and garbage on public streets, highways, or private premises. Ordinances also provided specific regulations on the disposal of ash from fireplaces and stoves. In 1883, Prescott Ordinance No. 2 prohibited the disposal of wood or ash in wood containers, and instead required metal containers to be placed at least 6 inches from structures.

The earliest ordinances for controlling the disposal of trash were established in Tucson in 1871 and 1872 (Diehl et al. 1997). Prior to the 1870s, trash disposal was undertaken at the discretion of individuals, resulting in trash-filled lots and filthy streets. The first Tucson ordinances for trash disposal were passed to prohibit slaughterhouses within the city limits; set fines for improper disposal of dead animals; require “persons occupying or owning a house or lot to keep the lot and adjoining streets and alleys” clean and trash free; and order that refuse be placed in pits and removed under the direction of the city marshal every Saturday (Diehl et al. 1997). Therefore, Tucson became the first city to mandate municipal involvement in organized trash pickup.

Garbage disposal and sanitation was not any better in Phoenix in the 1870s. Irrigation ditches in and around Phoenix were used for washing, swimming, and trash disposal (Luckingham 1989), and trash was deposited in lots and on the streets. Phoenix was incorporated with the signing of the Phoenix Charter Bill in 1881. In that same year, the City Council passed its first trash-related ordinance, which prohibited depositing filth on the streets and sidewalks or in canals and ditches. In the 1885 City Charter, the city marshal was charged with enforcing the ordinances to keep the city streets, alleys, lanes, and common areas clean and unobstructed. The City of Phoenix also created the position of health officer to oversee matters of public health.

By the late nineteenth century, most communities had a designated health officer position and/or a board with responsibilities for health issues. A physician, whose duties included the establishment and sometimes the enforcement of regulations concerning trash disposal, sewers, water, and infectious diseases, usually held the position. Tombstone established a head of health position in 1882. The duties of the physician that held the position were to establish sanitation laws and regulations. In 1899, Jerome created a health officer position to enforce ordinances related to sanitary conditions. By the end of the century, the primary roles of the health officer in most communities became more focused on issues related to infectious diseases and sewage rather than solid waste disposal.

The first territorial standard for trash disposal was enacted on March 13, 1889. The 15th Territorial Legislature became involved in trash disposal issues by approving Act No. 9, *To Provide Sanitation Regulations for Towns and Villages*. The provisions of the law were as follows (Territory of Arizona 1897:12–13):

- 1) Unincorporated towns and villages with 50 or more electors constituted a Sanitation District;
- 2) An elected or appointed qualified constable residing in the district was to be the Sanitary Inspector;
- 3) It was the duty of the Sanitation Inspector to inspect all homes, businesses, and structures in the district at least once a week for filth, garbage, and other conditions that could be a detriment to health and safety. If unsanitary conditions were present, the Inspector was to issue a written notice to the owner, occupant or user of the property requiring removal of the trash and filth from the premises within six hours to a place at least one mile beyond the limits of the district. If the trash was not removed within six hours, the property owner, occupant, or person using the premises was deemed guilty of a misdemeanor and fined \$10 plus prosecution costs. A second misdemeanor and fine was to be issued if the property was not cleaned-up within six hours of the first citation;
- 4) It was the duty of the Board of Supervisors of each county to prescribe and define the limits of the Sanitation District;
- 5) Any Justice of the Peace in the Sanitation District could issue an arrest warrant for offenders of the provisions of the law;
- 6) All fines collected were paid to the Justice of the Peace;
- 7) Sanitation Officers were to be paid \$4 per day when making inspections; and
- 8) The regulations would take effect 30 days from enactment.

Arizona in the Twentieth Century: 1900–1950

Population Growth

Arizona had explosive increases in population throughout the twentieth century. Growth between 1900 and 1950 was primarily in urban centers, particularly Phoenix and Tucson. Much of the growth was the result of the completion of the Roosevelt Dam in 1913, which provided a reliable source of water and power to the Salt River Valley, and WWII, which brought both military bases and personnel to the Phoenix and Tucson areas. Other catalysts for growth included the relocation of the capital from Prescott to Phoenix and Arizona statehood on February 14, 1912. Phoenix also began a campaign in the early 1900s to attract tourists. According to the 1910 Phoenix business directory, the city had an estimated permanent population of 15,000 and about 4,000 winter visitors. In addition to tourism, Arizona was gaining a reputation as a healthy environment for sufferers of respiratory ailments. Both Tucson and Phoenix had influxes of people seeking the curative effects of the dry climate. By the 1930s, the population of Phoenix reached more than 50,000 people, and by 1950, it had 105,000 residents (City of Phoenix 2018). In comparison, Tucson's population at the turn of the century was 7,531. It doubled by 1910 and reached 45,454 by 1950. These rapid population increases in Arizona's two largest cities had implications for trash disposal practices and policies.

Expanded Transportation

Dramatic changes took place in transportation between 1900 and 1950. These changes contributed to an increase in both people and goods entering Arizona. By 1900, two transcontinental railroads provided both freight and passenger service to Arizona. The Atchison, Topeka and Santa Fe Railroad passed through Flagstaff and serviced northern Arizona, and the Southern Pacific Railroad serviced the southern part of the state and had direct connections to Phoenix and Tucson. Additionally, the completion and expansion of numerous smaller rail lines connected central Arizona locations to the two transcontinental lines. This gave Arizona rail access to national markets for receiving goods and shipping locally produced items. While rail transport remained a primary means for the transportation of goods, air travel also became increasingly important as a new means for transporting goods and people.

Commercial air travel was introduced during this period. Although it initially had a minimal impact on both the influx of people and goods entering the state, after 1950 its impact was much more significant. Tucson led the state and nation in aviation transportation. The first municipal airfield was established in Tucson in 1919 at what is now the site of the Rodeo Grounds. The airfield was moved to Davis Monthan Air Force Base in 1925 and dedicated by Charles Lindbergh in 1927. The first commercial air service began in that same year with Standard Airlines, which later became American Airlines. The City of Tucson purchased the current site of the Tucson International Airport in 1941 and transferred operation of the airport to the Tucson Airport Authority in 1948. The Phoenix Sky Harbor International Airport was initially opened in 1935 with one runway. The Winslow-Lindbergh Regional Airport, designed by Charles Lindbergh, was established in 1929 with transcontinental air service.

Automobile travel became more important after 1910. As car ownership increased, so did the demand for better local roads and improvements in regional, and ultimately national, road systems. Between 1915 and 1920, paved streets in Phoenix increased from 6.75 miles to 25 miles (Henry and Ritz 1983:221). Both Tucson and Phoenix had electrified trolley systems to service the communities. Improved local travel helped with local commercial development and the transportation of goods between communities. The Arizona Highway Department was created in 1912, but initially lacked sufficient funding to meet needed road improvement projects (Pry and Andersen 2011). In 1916, the first Federal Highways Aid Bill provided funding for improving states road systems. By 1920, Arizona had 335 miles of permanent roads (Pry and Andersen 2011). New Deal funds provided aid for public works projects in the mid 1930s, including state and Forest Service roads.

Improvements in the national roads systems had a long-term effect on the transportation of goods. Beginning in the early 1900s, business interests and the military saw the potential benefits of a national highway system (Pry and Andersen 2011). In 1914, private business interests in Arizona and bordering states proposed a national road system through Arizona, which would be created by linking together five existing named highways. Congress passed a Federal Aid Highways Act in 1921 that increased funds to states and required that seven percent of the highway system be part of a national network. By 1938, the Arizona highway system included 3,500 miles of road and two East-West interstate highway systems were 80 percent paved. Even with the reduction of road construction during WWII, Arizona had built a network of roads that would support the transportation of goods within and outside of the state for a growing consumer base and tourism industry (Pry and Andersen 2011).

Commercial Development

From 1900 to 1950, Arizona had increasing access to local, national, and international markets and consumers. The diversity and quantity of manufactured goods increased contemporaneously with the number of people purchasing and consuming these goods. Improved production techniques reduced the price of goods, which made it more affordable for individuals to buy more products. Increasing consumerism resulted in a larger volume of goods entering the waste system. In addition to the overall increase in goods, patterns for commercial development began to transition from a predominantly downtown urban core, to a more dispersed pattern associated with transportation corridors.

By the middle of the 1900s, new automobile related businesses were developing along roadways to service the increasing numbers of travelers. In 1912, 3,098 vehicles were registered in Arizona (Pry and Andersen 2011:41). By 1950 that figure had grown to 294,139 (Pry and Andersen 2011:41). New business included gas stations, repair shops, car dealerships, restaurants, and motor lodges. Car travel and improved roads also enabled more urbanization outside of the city centers. New smaller commercial enterprises developed outside of the downtown areas to serve new neighborhoods (Janus Associates Inc. 1989a). Growth in businesses also continued near railroad stops. The railroads formed Colonization Departments to promote homesteading near railroads (Stein 1990: 8). While many of these homesteads were short lived, they did for a time become part of the state's important agricultural business and did leave remnants in the archaeological record.

Small-scale agriculture ventures, such as homesteads, and larger-scale commercial agricultural operations continued to be a prominent industry in the state throughout the first half of the twentieth century. Homesteading increased in Arizona during the Great Depression between 1930 and 1936. The demand for cotton during World War I led to an increase in cotton farming, which was followed by a collapse in the market in the early 1920s. A more diversified agricultural market, including citrus, grew throughout the first half of the twentieth century. Larger agricultural operations required a seasonal work force to harvest the crops. Cotton camps and other agricultural camps were constructed to house workers. These camps were generally less substantial than ranch worker housing, but would have left behind residential trash from their seasonal use. Most farms and ranches were in rural areas outside of the boundaries of urban sanitation ordinances. Unlike urban centers, trash disposal was carried out primarily by the property owner.

Mineral mining remained an important industry in Arizona, but gold and silver mining became secondary to copper mining. Small-scale gold and silver mines had a brief resurgence during the Great Depression years, but it was the larger copper mines that resulted in the establishment of a number of permanent communities. These communities had all of the sanitation and trash disposal issues as other urban centers and followed the same path toward more and more municipal involvement in trash disposal.

The construction industry expanded throughout the state in the early part of the 1900s especially in urban centers where there were the greatest needs for housing for a growing population. Urban construction growth slowed during the Great Depression, but quickly picked up again following WWII. As residential and commercial construction expanded outside of original town sites, the designated areas for community trash disposal had to move farther from the ever-expanding boundaries of the community.

At the same time that urban residential and commercial construction was declining in response to the Great Depression, federally funded public works projects were increasing throughout the state. Construction camps associated with these projects were intensively used for a relatively short period of time. They were not intended to be permanent settlements, but they generated enough trash to require areas for trash disposal.

WWII resulted in the construction of a large number of national defense projects. These projects included military installations, prisoner of war camps, and Japanese internment camps. Each of these properties housed large numbers of people and functioned like self-contained communities. These installations and camps had to develop organized trash disposal systems.

Public Health

Seasonal tourism and the health industry grew during this period. Arizona's dry climate and mild winters in the southern part of the state attracted "health seekers" and individuals who wanted a respite from the harsher winter climate in other parts of the country. In addition to tourist courts and hotels along major highways and in urban centers, more remote hot springs, automobile camps and natural areas were developed to house visitors. The health care industry and associated facilities also expanded to serve the needs of "health seekers." A large number of these facilities serviced patients with respiratory diseases such as tuberculosis.

Tuberculosis had a profound effect on Arizona's development (Barnes 2012). St. Mary's Hospital, the first hospital established in Arizona, opened a 24-bed tubercular cottage in 1880 in Tucson. In 1900, a circular two-story tubercular sanatorium was built at St. Mary's to serve patients afflicted with tuberculosis. Many hospitals serving Arizona communities today began as facilities serving sufferers of tuberculosis and other respiratory diseases. These include: St. Luke's Hospital, which was established in 1907 in Phoenix; St. Joseph's Hospital, which initially opened in 1895 in a rented six-room cottage; Good Samaritan Hospital that was opened in 1911 as the Deaconess Hospital and Home, and the Tucson Medical Center, which began as the Desert Sanatorium in 1927. In addition to hospital facilities, tubercular patients were housed and treated in tent communities, convalescent homes, and boarding houses (Levstik 2012). Some health seekers took advantage of Homesteading Laws to establish residence in Arizona.

“Health seekers” were looking for a healthier environment that would promote healing. In the early 1900s, that environment included fresh air, healthy food, a dry climate, sanitary conditions, and open space. Healthy populations were seeking community sanitation conditions that would prevent the spread of contagious diseases. The Arizona Territorial Health Department, which later became the Arizona State Health Department, was established in 1903 to develop health standards and prevent the spread of infectious diseases. In 1907, the Department appointed physicians as public health officers in every county. They issued regulations for the handling of garbage in 1917. Free Tuberculosis clinics were established in Phoenix, Tucson, and Prescott in 1922. Because of concerns about the sanitary conditions in automobile camps, the department began a survey of the conditions at these camps in the later part of 1924.

Public Policies

In the early 1900s, municipal governments became more directly involved in organized garbage and trash collection. Because of concerns about the influenza epidemic of 1918–1919 and tuberculosis, the responsibilities of the “health director” or “public health department” in many communities became more focused on issues related to infectious diseases. New bureaucratic structures were established to address issues of solid waste, water, and sewer systems. In some communities, street construction and repair were combined with garbage collection.

By the early 1900s, most incorporated communities had some type of ordinance relating to the disposal of garbage. Governments were directly involved in regular collection of household and business trash and garbage. The government structure for trash disposal varied from community to community, but most moved from a simple contractual agreement with an individual for the removal of garbage to creating a governmental position or department that was responsible for trash removal issues and accountable to the mayor or city/town council. As part of the City Beautification Movement, many communities also sponsored “cleanup days,” which encouraged all members of the community to volunteer to help beautify the town or city.

Ordinances for sanitation and public health laws became more comprehensive during this period. Many earlier ordinances were combined, expanded, and/or revised. Ordinances required covered metal containers of specific sizes for garbage and often required separate containment of different types of materials, such as separate containers for ash, garbage, and trash. Many ordinances also specified locations where garbage was to be stored on a property and specific days for garbage pickup. A number of communities prohibited the transport of garbage within the city without a city permit. Communities also began to charge fees for garbage pickup and designated specific locations outside of the city for the disposal of collected garbage (Figure 1). Outside of incorporated communities, trash disposal remained largely the responsibility of the person who owned or used the property.

As cities and larger communities struggled to deal with an increasing amount of solid waste, they searched for new ways to reduce the volume of trash. Burning trash offered one way to reduce trash volume. Incinerators were introduced to assist in volume reduction, but also to contain the burning and better direct the resulting smoke. For a time, incinerators gained popularity in the U.S., but concerns about smoke and the spread of disease caused them to fall out of favor. Incinerators helped to reduce the volume of trash in the dumps, but they did contribute to air pollution. At least two communities, Tucson and Phoenix, planned for garbage incinerators. Tucson’s brick incinerator with an 80-foot chimney was constructed on St. Mary’s Road in the early 1930s (Diehl et al. 1997). The incinerator was demolished in 1950. No references were found concerning the actual construction of an incinerator in Phoenix. Fort Tuthill also had an incinerator to service the installation.

The most significant innovation in trash disposal that impacted public policy was the introduction of the sanitary landfill. The first sanitary landfill opened in Fresno, California in 1937. Sanitary landfills became the most common community trash disposal method in the U.S., but were continuously improved to address health and environmental issues after 1950.



Figure 1. Tucson garbage wagons dumping trash in the early twentieth century.

Referenced in Diehl et al. (1997:Figure 2.3)
(photographs courtesy of Arizona Historical Society [Inventory nos. 73815 and 73816].)

Arizona in the Postwar Period: 1950–1985

Population Growth

Arizona experienced tremendous growth during this period, which was fueled in part by a healthy post war national economy, continuing military defense jobs in Arizona after WWII, and a thriving tourism industry. By 1950, the state's population had grown to more than 700,000. There were more than one million residents by 1960 and more than two million in the 1970s. This rapid growth had implications for trash disposal needs and practices, particularly in Arizona's two largest cities, Tucson and Phoenix. As communities expanded in size, residential developments encroached on existing community dumps, exposing the population to dust, smoke, odor, and potential hazardous materials. The increasing population generated more waste materials, which in turn created stress on the entire trash disposal system, from collection to final disposal.

Expanded Transportation

Car ownership also increased in the decades after WWII. In 1954, 413,000 motor vehicles were registered in Arizona and by 1959 that number had increased to 649,000 (Pry and Andersen 2011:57). Car ownership continued to increase dramatically through the 1970s and early 1980s. As more of the expanding population in Arizona purchased motor vehicles, there was an increased need for road improvement and construction projects.

Arizona Highway Department projects between 1950 and early 1960 included improvements to existing roads, rebuilding sections of U.S. Routes 60 and 66 and the Beeline Highway to Payson, and the construction of new highways, such as, State Routes 79 and 80 (Pry and Andersen 2011:59). Projects were not, however, keeping up with the increasing number of motor vehicles and the demand for more and better roadways. There was a need for better state and interstate highways to move goods and people between communities and states, and local roadways to move traffic within communities. In 1956, the Federal-Aid Highway Act appropriated twenty-five billion dollars to build the National System of Interstate and Defense Highways, authorizing construction funding on a pay-as-you-go basis (Pry and Andersen 2011:60). With assistance from the federal Highway Fund, Arizona's interstate and state highway systems continued to be expanded and improved through the 1980s.

Local traffic was improved by the addition and expansion of community roads. In Phoenix, new freeway construction helped move traffic from one end of the valley to the other. Phoenix began construction on the Black Canyon and Maricopa Freeways in the 1950s. The Maricopa, Phoenix's first freeway, was completed in 1971. The city and state had plans for a larger freeway system connecting the larger Phoenix metropolitan area. Part of this planning included the Papago Freeway, connecting the Maricopa and Black Canyon freeways with Interstate 10 (Pry and Andersen 2011).

Tucson citizens were not as enthusiastic about the construction of a freeway system in their city. Interstate 10 passes through Tucson on the western side of the city, and was completed by about 1971 (Zoellner 2019). An interchange south and west of the city connects Interstate 10 and Interstate 19. Instead, Tucson has relied on the widening of existing roadways within the city to move traffic.

The implications for improved transportation include the ability to move trash longer distances for disposal, location of community trash depositories farther from the city limits, more and larger municipal trash collection vehicles, and more roadside trash.

Commercial Development

The volume and diversity of manufactured goods continued to increase during the second half of the twentieth century. New products and materials were introduced. Planned obsolescence and an increase in disposable goods resulted in a shorter use life for products from production to discard into the waste stream. A number of new manufactured materials, such as lead paint, plastic, and insecticide contained chemicals that posed threats to public health and the environment. A better understanding of the health risks of

improper disposal of these materials became a serious issue during this period and led to new innovations in solid waste disposal methods.

Public Policies

By the second half of the twentieth century, national environmental laws established standards for the treatment and disposal of solid waste, which would affect communities throughout Arizona. Prior to federal involvement, disposal of solid waste was a local issue in the U.S. Local rules directed the dumping and burning of household and commercial waste at sites located away from population centers. After WWII, as population exploded and urban, suburban, and rural centers rapidly expanded, it became apparent that there were problems with this system. In 1948, concerns about the spread of disease, especially polio, prompted the U.S. Public Health Service to target for elimination suspected disease sources such as open dumps. These efforts began a movement to close open dumps and use sanitary landfills as the preferred alternative. By the middle of the 1960s, Congress issued a statement that “[s]olid waste collection and disposal activities create one of the most serious and most neglected aspects of environmental contamination affecting public health and welfare” (Brown et al. 1997:260).

As a result, in 1965, Congress passed the first law to address the issue, the Solid Waste Disposal Act. The goal of this law was to aid states, local governments, and agencies in planning, installing, and operating solid waste management programs. With this legislation, the federal government stepped into this traditionally local operation. At this point, federal regulations acknowledged the health and safety issues posed by traditional dumping behavior, but did not address the local and state rules that permitted the activity. An example of local controls in a rural area during the 1960s is available in a description of Quartzsite’s trash disposal practices (Allen 1982:13):

Health and Sanitation Committee reported garbage disposal service available by cooperating with Yuma County on the proposed area 2 miles north of Quartzsite on Highway 95. For a short time garbage collection was available, but not enough residents took advantage of it, preferring to either bury their garbage or take it to the dump.

The first federal law that placed limitations on companies involved in waste management was enacted in 1970 when the Clean Air Act set standards for large-scale burning of solid waste. The law did not address the problem of backyard burning, but focused on commercial and major disposal site incineration. Emissions from these large-scale burning operations were being released directly into the atmosphere without being treated or filtered. The issue of backyard burning fell under the purview of state and local authorities.

Another step in the growing federal involvement with solid waste disposal came in 1972 when the Clean Water Act was passed. The act made it unlawful to release pollutants into navigable waters, unless a permit was obtained. While not directly aimed at municipal waste disposal sites, the act did serve notice that pollutant discharges from these sites were not acceptable.

With the passage of the RCRA in 1976, the federal government directly recognized solid waste management as a national issue. The RCRA was the first federal statute regarding solid waste management that encouraged environmentally sound solid waste management practices and provided regulation for procedures and treatments. It required the disposal of waste in sanitary landfills and prohibited the establishment of new open dumps. Existing open dumps were directed to close or upgrade to meet the environmental standards. The act also encouraged regional planning for solid waste management. With RCRA in place, the EPA officially prohibited open dumping and set landfill standards in 1979. This was the first step in closing all open dumps. The 1984 Hazardous and Solid Waste Amendments to RCRA gave the EPA regulatory authority over landfills and the development of landfill criteria.

Based on requirements set forth in RCRA, closed landfills are covered and monitored to ensure pollutants do not escape the multiple sediment layers, or leach into the local groundwater supply. Many abandoned landfills have been reclaimed for public use. For example, portions of the closed Deer Valley landfill in Phoenix and the Silverbell Landfill in Tucson were reclaimed as the Cave Creek Municipal and Silverbell Golf Courses (City of Tucson 2019).

The transition from open dumps to landfills was not easy for Arizona communities. The closing of open dumps on the Tonto National Forest caused a crisis for Payson, Star Valley, Pine, and Christopher Creek in 1974 (Appendix B, Table B.6). The Star Valley and Ponderosa dumps were closed in March of 1974 and then reopened, because a local landfill was not yet available, and residents were illegally dumping along Fossil Creek. On July 2, 1974, the Pine and Christopher Creek open dumps were closed permanently under a federal order. A transfer station was established at the old Pine Dump where trash was hauled to the Star Valley Landfill; an additional transfer station was established between Christopher Creek and Kohl's Ranch. The *Payson Roundup* reported that landfills went into operation at Gisela, Tonto Basin, and Pinto Creek (see Appendix B, Table B.6). While it appears that a solid waste facility did operate at Gisela and Tonto Basin for a time, there is no record of such a facility at Pinto Creek (Appendix C, Table C.4). A transfer station may have been established at Pinto Creek rather than a permanent facility.

Implications for the Archaeological Record

This historical overview presents a number of conditions within specific time periods that will have implications for patterns of trash disposal in the archaeological record. Understanding the conditions that existed within specific time periods, may help in the identification of the location and sources of historical-period trash deposits in the field. It can also guide archival research.

Territorial Period Sites (ca. 1850–1900)

Trash disposal during the period between 1855 and 1890 would have occurred primarily on or near residences and commercial businesses. Privies and small trash pits offered convenient and accessible places for trash disposal particularly for smaller items. Once local ordinances required removal of accumulated trash from properties, trash deposits occurred outside commercial and residential areas.

Because the primary form of transportation was by wagon or cart and roads were unimproved, disposal sites are expected to be a short distance from the source of the trash and individual dumping would not exceed the amount that could be carried in a wagon. Trash disposal would be expected adjacent to or only a short distance from roadways. Natural features such as arroyos and river beds offered attractive disposal sites. After the passage of state legislation in 1889, trash on the premises of residences and businesses in incorporated communities should have decreased and trash removed from properties should have been deposited at a distance of one mile beyond the limits of the sanitation district.

The quantity and diversity of materials in the deposited trash is expected to increase after railroad connections were established, particularly in communities with direct access to railroad stops. Manufactured materials should also begin to reflect changes in the proportions of goods from foreign, national, regional, and local markets. By the end of the 1800s, a larger percentage of goods from local, regional, and national markets should be represented in deposits.

Early Twentieth Century Sites (1900–1950)

In incorporated communities and urban centers, community open dumps and organized trash collection and disposal would be practiced. Based on state legislation, established community dumps would most likely be located at least one mile from the boundaries of the community or sanitation district. Automobile transportation and better roads made it easier to transport trash farther from the property or community that generated the trash.

Trash disposal in rural areas outside of established community ordinances would still be primarily the responsibility of the person living on the property. The expansion of roadways and increased automobile travel increased the amount of trash along these roadways and highways. Illegal dumping would be expected to occur in more obscured areas off roadways. The new highway systems also attracted new businesses related to travel and tourism, which were often outside of established community trash disposal areas. In these situations, trash disposal would have been at the discretion of the owners of the property or the traveler. An increase in the volume of trash along highways is expected for this period. Some of this could be associated with evidence of established tourist related facilities or less clearly defined rest areas such as automobile camps and camp sites.

Some of the tubercular facilities of this period were also located on the outskirts of established communities. Tent facilities would have had minimal if no permanent structures. Trash deposits from these facilities should have a higher percentage of medical related refuse.

Postwar Period Sites (1950–1985)

New ordinances and regulations at the local, state, and federal levels greatly reduced the disposal of solid waste in streets and on property within urban centers. Laws concerning littering on highways and illegal dumping on private and public lands also reduced disposal in unauthorized areas. Unauthorized dumping continued to occur, particularly in rural or undeveloped areas.

The expansion of roadways and use of motorized vehicles made it easier to transport trash a greater distance from its source of generation. Landfills were located farther from urban areas. Unauthorized dumping could occur at greater distances from the source, making it more difficult to connect waste with its source.

THE WASTE MANAGEMENT SYSTEM

Any organized waste management system is, at its core, a process of accumulation. Items that are used are placed in designated disposal areas with other material that is no longer needed. In more complex systems, these gathered items are discarded into a series of increasingly cumulative transfer or “bulking” points, where they are stored before being removed to a final depository. At each transfer point, waste from more locations is accumulated, resulting in larger, more generalized deposits, as individual contributions are mixed. Dumps and landfills, the largest and most generalized of these deposits, are the endpoints of the waste management system.

Storage and Transfer

Every waste management system begins with someone using something and then throwing it out. Household garbage from food preparation and other household-related activities are bulked together in waste receptacles located at or near the point of use. Production rubbish from manufacturing venues is stored in 50-gallon drums near the work area. These storage locations are known as transfer points (see Appendix A for definitions). The waste deposited at transfer points is not intended to stay there. In most cases it stays there for a very short time. As soon as the receptacle is filled, the waste is removed. It is unusual, but possible, for the material in the initial transfer point to be directly placed into a final depository. It is more common, however, for material to be taken to a secondary transfer point.

At secondary transfer points, waste is mixed with waste from other generators (e.g., individuals, households, etc.) and/or with waste from earlier episodes of transfer from the same generator. As with the initial transfer facility, any particular set of waste does not stay long at these secondary transfer facilities. As the amount of waste reaches the capacity of the facility, or as the management schedule of the facility dictates, the material is moved to the next higher-order transfer station or to the final disposition point. The number of transfer points waste will pass through on its way to the final disposition point varies. A household-based waste management system may not need more than one or two transfer points, while a large urban system would be more complicated.

While initial and secondary transfer sites may be on the lower end of the organized waste management system, they rate very high in archaeological information potential. Because these sites are related to a single or small set of activities resulting from the actions of an equally small set of generators, they offer the best opportunity to examine fine-scale behaviors.

The drawback, as stated above, is that it is unusual for waste to remain for anytime at these early points in the system. The intent is to move items down the line. The archaeologist is dependent on the fact that seldom is the removal process perfect. Some items get left behind and the transfer point becomes the site of final disposition for some waste. Over time, “escaped” waste can develop into a midden, which is the archaeological signature of the transfer point. In general, larger pieces of “escaped” waste will be noticed and returned to the waste receptacle. Therefore, the resulting deposit will contain only small objects and small fragments of larger items.

Later transfer points will be larger than the initial transfer points. The deposits will be more generalized, because waste from multiple initial sources is combined. As with the initial transfer points, the trash held in these areas does not stay long. Unlike the initial points, however, these areas are usually located away from daily activities, so the trash is already out of the way. Because these transfer points are not in the way, there may be less-rigorous policing of the site, which can result in an increase in the unintentional end deposition of items.

Final Depositories

Final depositories are the end product of a waste management system. There are two types of final depositories: dumps and landfills. The largest and most generalized deposits in the system, dumps and landfills can range in size from a waste pile pushed off the end of a pickup in the backcountry to a large, engineered sanitary landfill. Regardless of their size, these final repositories are where all the items that did not escape at the earlier stages come to rest. The deposit will have large items that are lacking at the transfer sites. Final depositories are the most removed from the source of the material contained in them. Being the endpoint, they have a long-life span. It is not surprising, therefore, that these are the most conspicuous waste deposits encountered by archaeologists.

Treatment

In relation to waste disposal, the term “treatment” means methods used to change the physical characteristics of waste materials. In most cases, the desired result is to reduce the bulk of the material entering the depositories. The primary methods used for accomplishing this goal are relatively simple: recycling, burning, and compaction.

Recycling

Recycling of waste material attempts to lessen the amount of material entering depositories. Classes of waste are separated from the waste stream to be reused. Bulk is reduced simply because some materials do not reach the waste site. Before the industrial and transportation revolutions, recycling was necessitated by isolation and lack of access to manufactured products. Particularly in isolated rural areas, reusing items saved individuals from purchasing or manufacturing a new piece. As industrial manufacturing and improved transportation brought more and cheaper products into rural areas, the intensity of recycling waned. Just the opposite was happening in the large urban areas. The advent of complex manufacturing created a need for raw materials. The larger population centers produced enough waste so that culling the dumps for materials the factories needed (especially cloth and metal) became a viable occupation. Scavenging for a living could only occur in the most densely populated cities. Arizona had neither the level of manufacturing or population to make scavenging a lucrative occupation.

Prior to the 1960s, household recycling for use beyond the home was limited to times of national emergencies—particularly wars. While the gathering of material to make bandages was common during times of war, the role of recycling was taken to another level during WWII. Encouraged by national publicity efforts, communities across the country became involved in drives to collect a variety of materials. While historians have questioned whether the material gathered had much of an effect on the war effort, all agree that the program did a lot to strengthen community and national ties during a period of great stress.

After WWII, home and community recycling effectively disappeared. In addition, scavenging in dumps was rapidly disappearing with the increased availability of needed materials during the post-war boom. It was not until the environmental movement in late 1960s that recycling began developing into an integral part of the solid waste management process. Today few trash collection programs do not include a recycling component.

Burning

Bulk waste is most effectively reduced through burning. Until recently, the treatment of waste through burning was common at open dumps, particularly in municipal areas. While open burning did reduce the bulk, it was not very thorough or efficient and it created problems with smoke, odors, and uncontrolled fires.

In 1885, the first formal incinerator was opened at Governor's Island, New York. Because the incinerator did a more complete job than open burning and could coincidentally be used to generate power, 180 incinerators were built by municipalities during the late 1800s and early 1900s. However, most were poorly constructed or managed, and by 1909 many of the incinerators were no longer in use (Association of Science Technology Centers Inc., Smithsonian Institution Traveling Exhibition Services 1998).

Urbanization in the early 1900s dramatically increased the amount of material entering municipal dumps. This resulted in renewed attempts by communities to reduce bulk waste through burning. Cities promoted generator-based incineration to reduce bulk and odors. Residents not only used the ever-popular burn barrel, but also could buy specially designed domestic incinerators that were installed at the home. Schools, hospitals, and factories all had on-site incinerators. By the 1940s, there were about 700 community incinerators and countless home and business incinerators operating throughout the country (Hickman 1999).

Open burning continued in communities where incinerators were not available. While this decreased bulk, the reduction was achieved at the cost of air quality. As a result, federal, state, and local governments began to ban incineration during the 1950s and 1960s. The Federal Clean Air Act of 1970 forced the closure of incinerators and ended open dump burning. Even the burn barrel came under attack, and by the 1970s, burning as a waste treatment method had been greatly curtailed. By the end of the twentieth century, there was renewed interest in incineration, mostly to exploit the energy production properties of waste burning. Today, there are about 100 waste-to-energy incineration facilities across the country.

Compaction

Reductions in burning resulted in more bulk entering waste sites and created a need for more waste site capacity. To accomplish that goal, compaction became an increasingly popular method of waste treatment. Fortunately, this need coincided with the development of heavy motorized equipment. In order to effectively compact waste material, the deposits had to be put under heavy weight. Dozers, tractors, and other machinery developed after WWII made this possible. While not as efficient in reducing bulk as burning, compaction did extend the life of landfills (open dumps having been prohibited in 1979) while avoiding air pollution. Compaction has slowly expanded from landfills to industrial and household compaction. While not as popular as the dishwasher, household trash compactors are present in many homes.

FEATURE AND PROPERTY TYPES

A variety of sources are associated with the generation of waste. These include domestic, commercial, industrial properties, or a combination thereof. It is at these sites where objects first enter the waste disposal system, where they are first collected, and from where they are removed for off-site disposal. Table 2 summarizes the National Register characteristics of these features and resource types.

Waste Storage Features

Trash scatters and middens are waste storage features that are located at, or adjacent to, the point of generation. Features such as wells, privies, basements, and root cellars were not intended for the deposition of trash and garbage; nonetheless, they may have been used as an on-site waste depository as a secondary or final function. For purposes of trash disposal, privies, pits, wells, trash-scatters, and middens located adjacent to the primary source of garbage (such as a home or a business) should be considered features of the primary property or site with which these individual features are associated. In some cases, material escaping from the initial collection containers form unintentional trash scatters or middens. In other instances, a pit may have been dug on-site to store waste or waste may have been deliberately piled with no intention of removing it from the site.

Waste Storage Sites

Dumps

Dumps are the final depositories in the waste system. They are uncovered sites where waste is deposited. Rubbish and garbage in dumps usually represent secondary deposition and occur at a distance from the source of the trash. For the purposes of National Register eligibility, this document identifies two different types of dumps: waste piles and open dumps. These two property types differ in scale, duration of use, association with the source of the waste, and the behavior resulting in the creation of the dump. Waste piles usually result from only one or two dumping episodes by one or a few individuals and do not represent a communally recognized disposal location. Open dumps are recognized locations within a communal disposal system. They are generally used repeatedly over a period of time with multiple sources generating the garbage.

Both types of dumps occur at a distance from the source of the garbage. The distance can depend on a number of factors, including modes of transportation, geography, demography, wind patterns, and the location and condition of roads in the area. Without a comprehensive study of the location of dumps with reference to the source(s) of the garbage, it is difficult to make any firm statements about expected patterns of distance. A cursory review of reports for this guidance document did indicate that there might be some patterning. Communal open dumps in historical period urban settings did seem to be located between one and three miles from the community generating the materials in the dump. Waste piles being less community structured are more variable in their location. Many occur closer to the sources of trash than open dumps. Improved transportation networks and the increasing availability of automobiles and trucks pushed out the limits of this unauthorized dumping. It is not uncommon to find later period waste piles a mile or more from the source. City and town regulations can also influence the location. For instance, Flagstaff's Ordinance No. 1, passed in 1894, required garbage be removed from the town to a location someplace 0.5 mile from the town limits and not less than 200 yards from any road.

Waste Piles

Waste piles are roughly bounded, open, mostly surficial, deposits of rubbish, garbage, or both. These piles may be identified as integral parts of the source property or at a distance from the source. They represent a single or a minimal use of an area by an individual or group.

Table 2. Waste Management Feature and Resource Types

Property/ Feature Name	Property Type	Association	Generator (Source)	Proximity to Generator	Use	Duration	Area & Size	Character of Waste	Deposits
<i>Storage Features/Sites/Districts/Structures</i>									
Trash scatters/ middens	Features/ contributing elements to associated property	Homes, businesses	Single family/ business	Direct proximity or association with generator, within property boundary	Multiple dumping episodes	Long term	Small area, dispersed surface	Domestic/ commercial	Small items, larger items usually removed
Privies/ wells	Features/ contributing elements to associated property	Homes, businesses	Single family/ business	Direct proximity or association with generator, within property boundary	Multiple dumping episodes	Long term	Concentrated subsurface	Domestic/ personal	Small items, larger items usually removed
Dump: Waste Piles	Isolated Occurrence / Sites/ Discontiguous districts	Homes, businesses, farmsteads, ranches	Single family/ business	Usually on vacant land/ distant from original generator	Single or minimal dumping episodes	Short term	Concentrated surface scatter	Domestic/ personal/ commercial	Large to medium sized items
Dump: Open Dumps	Sites/districts	Communities, ranches, long term camps, industrial sites	Multiple	Associated with a community/ located a distance from point of generation	Multiple dumping episodes	Long term	Concentrated large area; often has depth	Mixed domestic & commercial/ industrial	Large, medium and small items
Landfills	Structures	See Treatment Properties							
<i>Transport Sites and Structures</i>									
Transfer Station	Sites/Structures	Community	Multiple	Located a distance from point of generation	Multiple dumping episodes	Long term	Surface scatters	All solid waste	Small items
<i>Treatment Features/Sites/Structures</i>									
Piggeries	Features/sites/structures	Community dump, industrial facility	Multiple	Located at a distance from point of generation	Multiple use episodes	Long term	Varies	Domestic/ commercial	Organic, small items (bite-sized)
Landfills	Structures	Cities and towns	Multiple	Located at a distance from point of generation	Multiple dumping episodes	Long term	Concentrated large area, deep, compacted, covered (federal legislation)	Mixed domestic & commercial/ industrial	Large, medium, and small items
Incinerators	Structure or contributing element of an associated property	Community dump, industrial facility, or landfill	Multiple generators or single business	Located at a distance from point of generation	Multiple burning episodes	Long-term	Ash scatter, remains of structure	Mixed domestic & commercial/ industrial	Large, medium, and small items

Waste piles are more variable than any other waste deposition properties. Like trash scatters and midden features, they can be found in proximity to the property generating the garbage or they may be located at considerable distances from their source. When located at the point of generation they should be considered features of the overall property. Isolated waste piles present a more difficult problem, as noted in the recent *Policy and Procedures Regarding Historical-Period Waste Piles* (Arizona State Museum 2021) (see Appendix D). When the source of the garbage and the waste pile have no clear physical proximity, it is difficult to establish an association. Without an association, a waste pile has limited or no research potential.

Factors that can influence the distance between the source of the garbage and the waste pile include: modes of transportation, road patterns, proximity of convenient disposal areas such as rivers and washes, availability of open land, and local trash ordinances and disposal systems. With improved transportation systems it became more convenient to dump garbage at a greater distance from the source. Determining how the material was brought to the site of deposition can greatly aid in finding the source.

In rural areas without organized waste management systems, garbage was spread for the livestock to feed on, and rubbish was gathered into a location out of the way in anticipation of eventual removal from the site. At a point when enough rubbish had accumulated, it would be loaded onto a vehicle and taken for final deposition off-site. This final depository was often at the edges of the property where a small open dump would form. At other times, the material was removed to the available surrounding vacant or public land resulting in isolated waste piles.

Urban areas developed more formalized waste management systems. Garbage ordinances were some of the first enacted in urban communities. These formalized systems brought controls and costs for the deposition of waste in official dumps. This did not, however, eliminate isolated waste piles. Individuals or groups might decide to rid themselves of waste by depositing it in unsanctioned locations for any number of reasons, including the need to dispose of items too large to fit in official garbage receptacles or material not accepted at the official site. Items could be deposited outside the official waste management system because the operating hours were not convenient or to avoid fees.

Open Dumps

Typically, open dumps are large areas where there has been repeated dumping of solid waste by a number of different individuals over a sustained period of time. An open dump may be designated and managed by the community or it may be a communally recognized area used for dumping with no clear management. They are like waste piles in that they are roughly bounded and open. They differ from waste piles by representing long-term deposition from a wide variety of sources. Open dumps associated with communities may have significant depth resulting from buildup over time.

Locations for dumps vary, but are most often found at a distance from the community they serve. Drainages, stream banks, and other low-lying areas are the most popular sites for dumps. These locations are marginal lands to the community, allow some informal bounding of the area, and are out of sight. All dumps will have one or more routes providing residents access to the sites.

Open dumps in urban areas created a number of problems. They were unsightly, created foul smells, emitted dangerous gases and smoke, attracted pests, such as rodents and insects, and spontaneously combusted. In order to reduce odor and pests, burning of deposits was a common occurrence. In some community dumps trenches were dug, filled with waste, and then covered with clean fill. These sites are transitional between dumps and landfills. Environmental laws in the 1960s began to force the closure of all open dumps in the country. The EPA banned open dumps in 1979.

Landfills

Like dumps, landfills are community-based properties where waste materials from multiple sources are gathered together. Landfills are located far enough from the community to minimize visual, health, or odor problems, but close enough for convenient access. Unlike dumps, landfills are engineered structures designed for the final, environmentally sensitive, deposition of waste material. Waste is spread in layers that are compacted to reduce volume. At the end of each day, the new layer is covered with clean dirt. Deposition and filling take place in specific cells of the landfill at specific times to maximize the life of the facility. In recent years, regional landfills have become common. These sites bring together waste from multiple communities, creating a generalized deposit representing the depositional activities of many individuals. It is relatively easy to determine the source areas with which dumps and landfills are associated. That source area, however, can be rather large and varied.

Solid Waste Transport Properties

Transfer Stations

A transfer station is a facility intended to collect bulk waste from multiple sources for eventual removal to a dump or landfill. These sites usually include bins and compactors. Formal transfer stations became common in the 1980s as the management of community waste fell under regulatory control. At first, small isolated homes or communities without the ability to construct or operate environmentally sensitive waste facilities used transfer sites to enter their material into the formal waste stream. These are seen most often serving rural communities that lack access to a landfill. The recent development of regional landfills has resulted in a new type of transfer station. Urban areas have begun to construct large transfer stations where massive amounts of waste are brought for storage, initial compaction, and removal to these regional landfills.

Solid Waste Treatment Properties

Incinerators

Incinerators began to be used as a method to reduce municipal trash volume through burning in the late 1800s. They were associated with trash dumps. The smell and smoke generated by the incinerators lead to concerns about public health and, ultimately, the abandonment of the type of incinerator feature described in this section by about the middle of the 1900s. Incineration continues to be used to treat solid waste, but with newer technologies and environmental protections. Modern waste-to-energy facilities use incineration of solid waste to create electricity and other useful by-products.

An incinerator is a feature of a waste treatment facility where material is bulked and burned. The intent is to reduce volume, odor, and disease potential of raw waste in order to extend the life of the dump or landfill and make it a safer facility. Incineration of waste involves feeding the furnace, burning the waste, exhausting the gases into the atmosphere, and removing the residue from the furnace (Department of the Army 2001). The major components of a simple incineration system include (Department of the Army 2001) (Figure 2):

- Combustion chambers where waste is burned. These are typically constructed of an outer shell and an inner refractory material lining. Older built-up units usually have brick shell materials, while newer units will have steel or cast iron. Older incinerators will typically have a single combustion chamber. Newer units usually have two combustion chambers (a primary for initial waste reduction and a secondary for gas combustion). The main combustion chamber will have a fixed grate or hearth, a waste charging door, ash removal doors, and a primary burner.
- Burners to ignite the waste. Incinerator burners are usually natural gas or oil fired, with controls ranging from manual on/off operation to fully automatic modulating systems.
- Fans to supply air for combustion and aid in exhausting gases.
- Stack or chimney for final venting of gases.

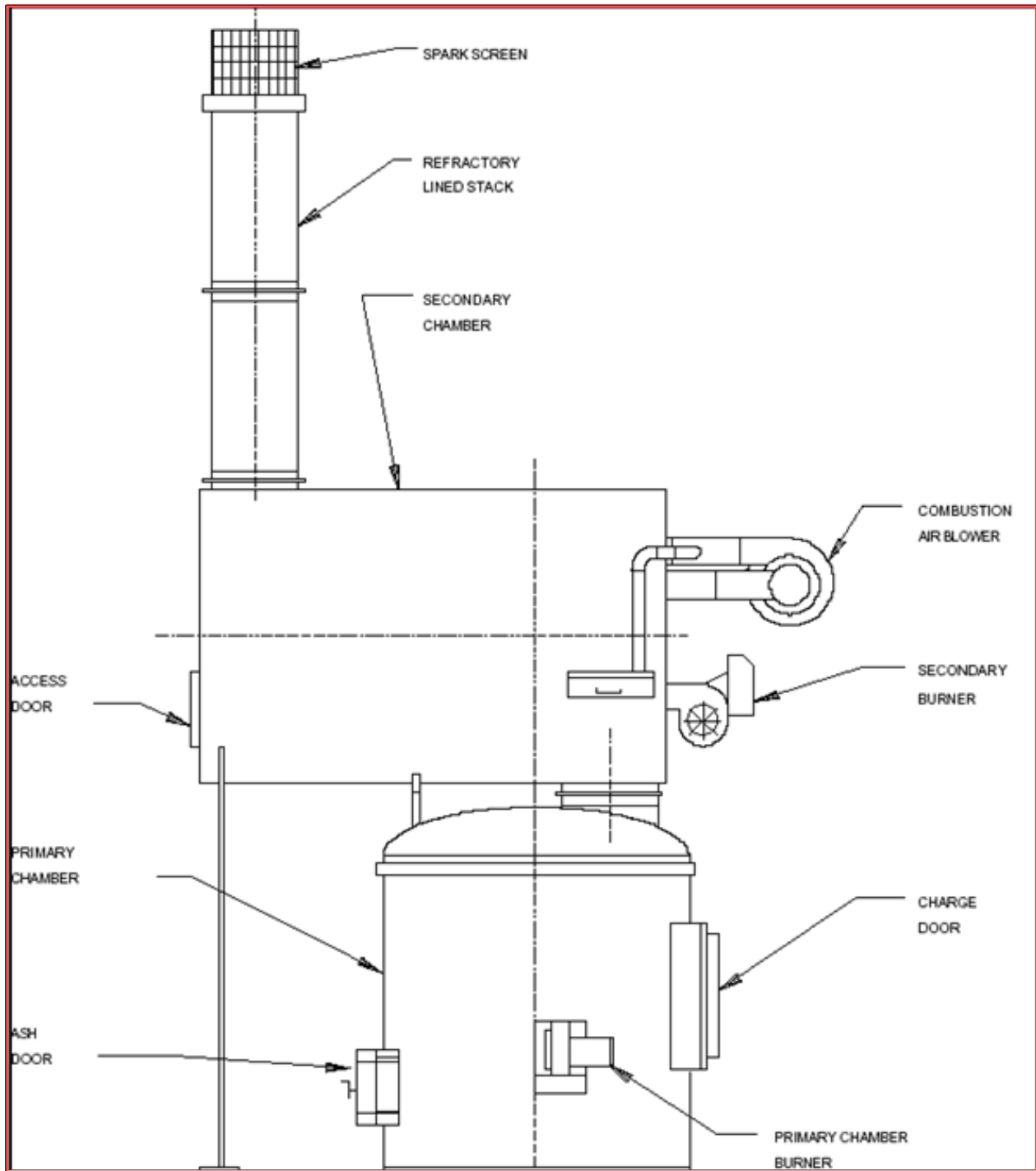


Figure 2. Diagram of a vertical dual chamber incinerator.

(Department of the Army 2001:10-2).

Piggeries

Piggeries are pig farms used as waste treatment facilities, where pigs feed on organic kitchen trash. Historically the practice could involve having a piggery's pens and corrals adjacent to or in close proximity to an open dump and allowing the pigs to roam the dump feeding on trash. A practice that was more common in Arizona involved the collection of kitchen waste by pig farmers who transported waste to their farms as feed for the pigs. This freed the piggery of the constraint of having to be located next to the dump. Pictures from a piggery in New Jersey show a number of wooden enclosures and structures, as well as metal sterilization chambers (Figure 3).

ARCHIVAL RESEARCH, SURVEY AND DATA RECOVERY FOR WASTE PILES AND OPEN DUMPS

Site Recording and Documentation: Class III Survey

Pre-Survey Research

Archival research prior to archaeological survey is intended to establish the use history of the study area. This research will heighten the awareness of field archaeologists to the range of possible historical-period resources. Research into land use is required to identify historic contexts as well as potential property types. Guidance for assessing and using sources of archival information is provided in *Historical Archaeology in Arizona: A Research Guide*, available on the Arizona State Parks and Trails website (Ayres et al. 2013). Archival research should include:

Map Research: Archival research should at a minimum include a search of historical-period map resources, including but not limited to General Land Office (GLO) cadastral maps and Master Title Plats (MTP), U.S. Geological Survey maps, any applicable Sanborn-Perris Fire Insurance maps, SHPO and agency inventories, and AZSITE.

Identify Historic Contexts Based on Land Use Histories: Check established state context studies, local histories, land-use records of federal and state land managing agencies, and tribal land-use histories.

Identify Transportation Routes: Identify transportation routes within and near the survey area that may link the archaeological deposits with a source.

Basic Field Survey Recording

Site or Feature Size: Describe the area of dispersal and make an assessment of depth and estimated number of artifacts present.

Description of Artifacts:

- Artifact types: Provide an estimated percentage of the number of artifacts by material or functional class, such as the percentage of metal cans to glass bottle, domestic versus industrial.
- Temporally Diagnostic Information: Note any product names, manufacturing and technological characteristics, maker's marks, etc. to assist in temporal placement. Provide a listing or table of representative diagnostic artifacts. Photographs of maker's marks, etc., are also recommended. Note any temporally distinct areas on a site map.
- Postfield Research: Provide follow-up research on diagnostic artifacts observed in the field to obtain information such as production dates, location of production, etc.

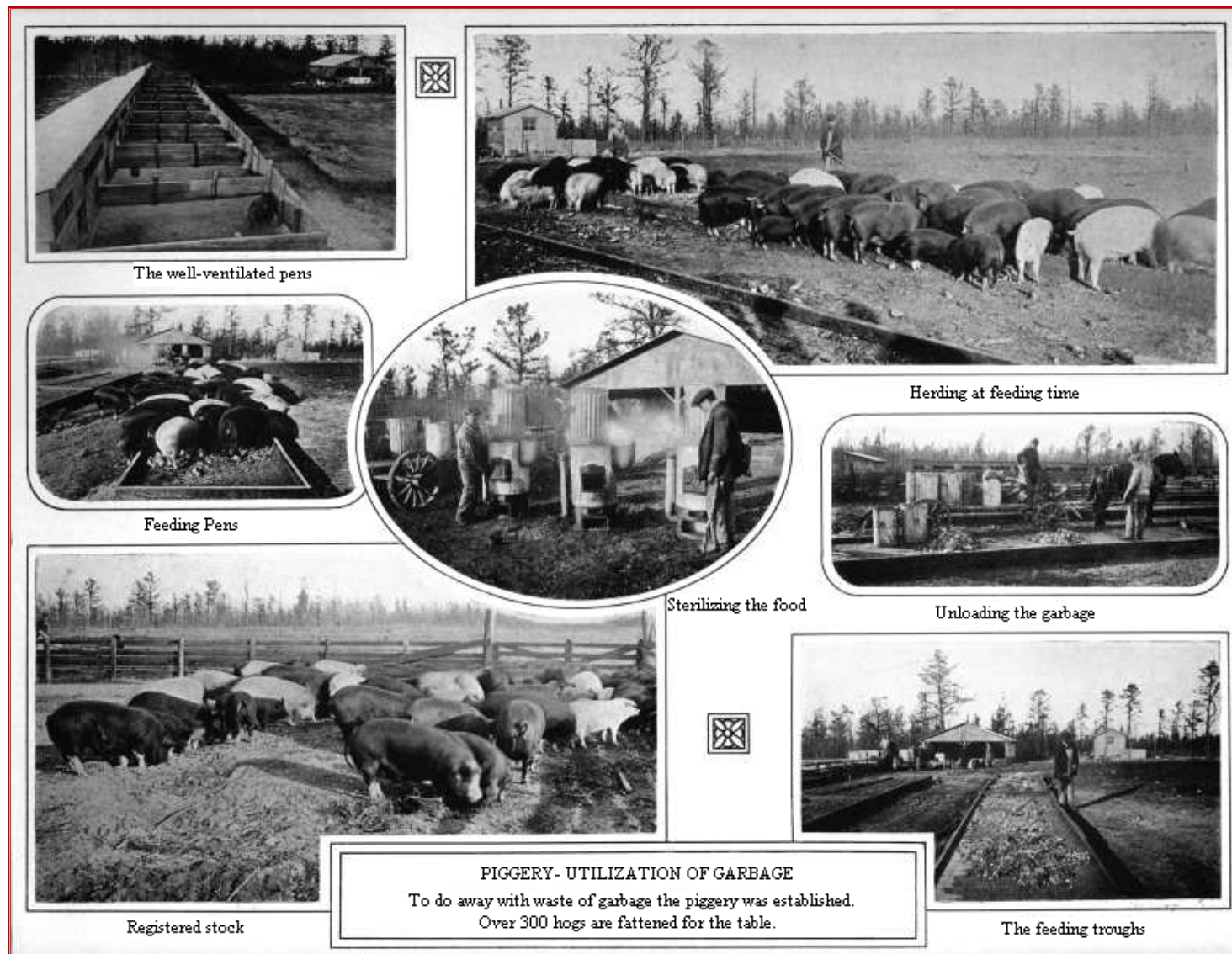


Figure 3. Structures and features at a New Jersey piggyery (Hammel 1918:324).

General Observations on the Character of the Trash: Provide a general characterization of the trash (domestic, industrial, etc.) and the duration of use (single episode, periodic use, long-term use). Note any impacts to the site (integrity).

Setting: Describe the geographic area, proximity to nearest settlement or towns, the presence of access routes, other site-specific information, and any other properties in the area.

Mapping: Record the site and features using GPS coordinates and photographs. Plot the site and survey areas on a USGS map or in the AZSITE electronic GIS and data-entry module. If the deposit is a feature of a larger site, record the boundaries of the deposit in relation to the larger site's boundaries, datum, and other features.

Photographic Documentation: Provide photo documentation of the site, features, loci, artifacts, and viewshed. Photographs may be in black and white, color, or a digital format, as long as they are clear. Color photographs or a good description of color should be used when color is an important diagnostic attribute, such as the color of maker's marks on historical-period ceramics.

National Register Eligibility Recommendations: Provide initial recommendations for National and State Registers of Historic Places. All steps taken and resources investigated to reach recommendations of National and State Registers of Historic Places need to be clearly documented. This information is needed by Federal and State agencies and the SHPO in making Register eligibility determinations.

Please note that in specific circumstances, isolated waste piles may be documented as isolated occurrences (IOs) (Arizona State Museum 2021); in such cases, field documentation should follow the steps outlined above. Appendix D includes a FAQ compilation to aid archaeologists and researchers for making a determination of how waste piles should be recorded.

Post-Survey Research

The goal of postfield archival research is to obtain sufficient information with which to evaluate historical resources documented in a survey for eligibility in the National Register. Observations should have been made in the field about the general character of a trash deposit (domestic, industrial, etc.), as well as transportation and geographic features in the area that may aid in associating a trash deposit with properties identified through field observation or archival research. Based on this information, additional archival research may include checking local histories and additional map resources and establishing dates for diagnostic artifacts identified in the field.

Site Recording and Documentation: Phased Data Recovery

Documentation methods for testing and/or data recovery may include non-collection (in-field analysis), limited collection (including field analysis) and/or collection. These approaches require an approved treatment plan and research design. Decisions about the use of collection versus non-collection approaches (or a combination of both) to field documentation will be made on a project-by-project basis during the consultation process with the federal or state agency, other consulting parties, and the SHPO or Tribal Historic Preservation Office (if the project is on Tribal land.)

Non-collection Documentation

Non-collection documentation may be used to maximize information while reducing long-term storage and curation needs. Its application is more appropriate for surface sites. Because artifacts are not collected, it requires careful, detailed documentation in the field and survey personnel knowledgeable in the identification of historical-period material culture. With non-collection documentation, artifacts are not curated for future research; as such, this may not be the best approach for sites that will be totally destroyed.

Documentation with Limited Collection

This approach may be advantageous if temporally diagnostic historical remains are present on the site that require more detailed analysis or research. As with non-collection documentation, detailed analysis in the field by a qualified historical archaeologist is essential for those materials that will not be collected.

Documentation with Collection

Documentation with collection is more appropriate for historic properties that will be totally destroyed and/or may be deeply stratified. The following provides information on the minimum level of information that should be recorded and methods that could be helpful during testing and data recovery for historical-period waste piles and community open dumps. This guidance is specific to these property types and is intended to supplement, but not replace, other guidance and requirements of the Arizona State Museum and the SHPO, such as the Secretary of Interior's Standards and ASM Standards for Site Recording on State Land and for State Projects (Arizona State Museum 1993; Fish 1995):

Site Size: Describe the dispersal area(s) and make an assessment of the depth, and estimated number of artifacts present.

Detailed Observations of the Character of the Trash: Provide a general impression of the character of the trash (domestic, industrial, etc.) and the length of use (single episode, periodic use, long-term use). Note any impacts to the site (integrity). Note the ratios of different categories of trash, such as the ratio of domestic trash to construction related trash.

Setting: Describe the geographic area, the presence of access roads, and any other properties in the area that could be or are the source of the materials in the dumpsite.

Map: Record the site using GPS coordinates and photographs. Map the trash scatter on a USGS map or in AZSITE. If the deposit is a feature of a larger site, record the boundaries of the deposit in relation to the larger site's boundaries, datum, and other features. Indicate the location of any collection or diagnostic units/quadrants.

Photographic Documentation: Provide photo documentation of the site, features, loci, artifacts, and viewshed. Photographs may be in black and white or color as long as they are clear. Color photographs or a good description of color should be used when color is an important diagnostic attribute, such as the color of Maker's marks on historical-period ceramics.

Sampling Strategies (may include but are not limited to):

Sample Units: Identify the sampling strategy and units. Characterize the artifacts within the unit by material class. Perform an on-site analysis of diagnostic artifacts within each unit (see *Description of Artifacts* under Basic Field Survey Recording). Record and/or photograph diagnostic artifacts.

Characterization Quadrants (Sternner and Majewski 1998): Divide each locus into quadrants. Perform on-site or laboratory analysis of artifacts within each quadrant. Artifacts are characterized by material class. Diagnostic artifacts are recorded in detail. This approach is useful with large trash disposal areas, multiple trash loci, and where there appears to be multiple episodes of dumping over a long period of time.

Artifact Analysis: In-field analysis and laboratory analysis may require additional research to identify technical aspects, such as production dates and manufacturing locations for maker's marks, product names, patents, etc. This information is key for addressing research issues related to temporal parameters.

Factors to Consider

Observations regarding the character of artifacts in the trash scatter may be useful in identifying a historic context. Size, variety, and density of the artifacts may provide clues as to the origin of the trash. Consider the following:

- At more permanent sites, trash will generally be removed from the immediate activity area. Often this will involve more than one episode of deposition. Items may be discarded close to the source initially and then moved to a distance somewhat farther away, but still within the boundaries of the property. As trash accumulates in this secondary location, it may be moved again to an area even more distant from the original site. The act of moving the trash will result in different artifact patterning. Larger items will be removed farther and farther from the original site of disposal. The area closest to the activity area will be cleared of most trash except for the smaller items that will be left behind. The final trash disposal area should have a higher percentage of larger artifacts.
- The artifacts in trash deposits associated with a single or a few sources will reflect the activities that generated them. For example, habitation sites will produce artifacts that reflect domestic activities whereas industrial sites will have higher proportions of items related to production and products.
- As transportation improves (better roads and vehicles), the final deposition of trash will tend to be farther from the source.
- The longer and larger the occupation, the greater the diversity and density of the trash dump.
- The longer and larger the occupation, the farther the trash will be from the original point of generation, except in situations where there is a natural feature where trash can be deposited.
- Urban areas may have had organized trash pickup as early as the mid to late 1800s (Appendix B).
- Burning and burying of trash was common in urban areas in the 1800s and early 1900s, but may still be practiced in some rural areas.
- Advances in waste management began in urban areas and moved to rural areas.

Health and Safety Concerns for Archaeological Field Staff

Archaeologists working with solid waste disposal properties need to be aware of possible threats to health and safety. Most waste properties encountered by archaeologists are safe for investigation. Knowledge of the type and age of the deposit, land use in the area, and awareness of site conditions will go a long way toward understanding the risk waste property may pose. A wide variety of potentially hazardous chemicals, materials, and other matter may be found at these properties. It is important that an assessment of possible risk be conducted before any close investigation of these properties is undertaken. If it is felt at any time that a possible risk exists, all work should stop and the proper authorities should be notified. Let the experts determine whether or not the area is safe. Tetanus inoculations should be current for all personnel who are likely to handle sharp-edged objects during fieldwork. The following are a few, but not the only, points to consider when investigating a waste property.

- Any property that contains strange odors, odd soil discolorations, or other out-of-the ordinary conditions should be avoided.
- Properties with depth have a much higher possibility than surface sites of retaining liquids and decomposing materials, which may produce methane gases.
- Open dumps contain a wider variety of materials from more sources than isolated waste piles.
- Waste properties associated with source areas, such as mines, mills, or other processing plants that commonly use chemicals are of special concern.
- Care needs to be used in handling large, sharp, or rusted materials.

United States Environmental Protection Agency

ADEQ Arizona Department of Environmental Quality

IRON KING MINE – HUMBOLDT SMELTER SUPERFUND SITE

CAUTION!

Areas beyond this sign may contain harmful levels of lead, arsenic, and other contaminants. These contaminants are present in soil and water on the property. The United States Environmental Protection Agency (EPA) advises avoiding contact with these materials. EPA is currently studying this property under the federal Superfund program.

Individuals who would like more information or who would like to report suspicious activity may call EPA's toll free number:
(800) 231-3075

You Are Here

Humboldt Smelter Site Map

EVALUATION OF WASTE MANAGEMENT RESOURCES

National and Arizona Registers of Historic Places

The National Register is the Nation's list of properties that are significant in the areas of history, architecture (including landscape architecture), archaeology, engineering and culture. To be eligible for inclusion in the National Register, properties must be 50 years or older and have significance under one or more of the following criteria:

- A. The property is associated with an event or events that have made a significant contribution to the broad patterns of history.
- B. The property is associated with the lives of persons significant in the past. In the case of a burial place for an important person(s), the person(s) must be of outstanding importance.
- C. The property embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or that represents a significant and distinguishable entity whose components may lack individual significance
- D. Properties that have yielded, or may yield, information important in prehistory of history.

The National Register also requires that the property have integrity. Integrity refers to the ability of a property to convey its historic values through retention of original characteristics. The National Register recognizes the following seven qualities of integrity: location, design, setting, materials, workmanship, feeling, and association.

The Significance to Waste Properties

In order to establish the eligibility of historical-period resources associated with waste management systems, it is critical to establish the significance of the property within a broader context and theme. In the case of Criterion D, it is also necessary to identify important research issues. A historic context is based on a specific historic theme or activity that occurred during an identifiable time period and within a specific geographic area. Identifying a historic context for trash-management properties requires:

- An understanding of the historical-period land use of the area. Establishing a historic context for a project area will usually require looking at land use beyond the boundaries of the specific project.
- Identification of other sites, IOs, features, buildings, or structures in the area that may be associated with the property.
- Familiarity with characteristics of the artifacts and artifact patterning within trash disposal areas that may provide clues to the source of the trash.

At a minimum, a culture history of the area should be consulted, and a review of available maps should be conducted (e.g., GLO cadastral maps, MTPs, topography maps, regional maps, and applicable Sanborn-Perris maps).

Integrity of Waste Properties

A second aspect of establishing the National Register eligibility of a property is an assessment of the property's integrity – its ability to convey its significance. This assessment must take into account the physical features of the property and how they relate to its significance. If Criterion D is used, research goals will need to be identified.

Historical-period sites related to waste disposal contain distinctive aspects of integrity. By definition, the waste has been removed from its initial point of use and may be mixed with other deposits; as such, the importance of the contextual relationship among and between items is vastly diminished. Therefore, the association of the deposit with the source of the trash is very important. The formalized structure of landfill deposition provides a better, albeit gross, stratigraphic relationship between deposits not seen in other large waste sites.

Because waste disposal sites are primarily composed of artifacts, the information that can be gathered by an analysis of the technological, stylistic, chronological, and functional attributes of the artifacts is of great importance. Waste disposal properties will need to have integrity of materials to be eligible under Criterion D. Waste treatment, especially burning, however, can have a severe impact on artifacts, reducing many to an unidentifiable state. At properties where these destructive treatments have been routinely practiced, the archaeological information potential of the deposits can be compromised.

GUIDANCE FOR EVALUATING WASTE MANAGEMENT FEATURES AND RESOURCE TYPES

Waste Storage Features

Trash Scatters/Middens/Pits

Trash scatters and middens are contributing resources to another primary property. As such they are not individually eligible; rather, their eligibility is associated with the eligibility of the primary property.

Association with a Single Property (Examples 1 and 2): Trash scatters will be in close physical proximity to the source of the material and will primarily contain small items. Larger items and accumulated trash from the property will usually have been transported to a more distant location, but smaller items will remain as surface trash scatters and/or in small trash pits within the property boundary (Figure 4). Trash scatters and middens on residential and commercial properties were less prevalent after communities passed ordinances mandating organized trash collection and the use of trash containers (Appendix B).

Trash scatters may also be associated with properties such as temporary camps and transportation corridors. In these cases, the trash scatter may be the only feature left to define the property. In order to determine eligibility of a trash scatter, the following steps should be taken:

1. Determine the significance of the primary property within a historic context;
2. Determine the association of the trash scatters with the primary property; and
3. Determine how and if the trash scatter contributes to the significance of the primary property.

Association with a District: Trash scatters and middens may also be contributing features or resources in a historic district, such as middens associated with households within a residential historic district.

Example 1.

*Features Associated with an Eligible Property/Home Site,
AZ T:4:55 (ASM) (Ayres and Seymour 1990)*

The 1930s Brown Homestead in Yavapai County was first identified in a survey for the New Waddell Dam sponsored by the Bureau of Reclamation. The site was primarily archaeological with very few structural remains of original buildings. Ten features were identified. These included the remains of a privy, an adobe room, a trash scatter adjacent to the house, a frame house, a rock wall, an L-shaped pit, a trash scatter located at the edge of the property at the foot of a terrace, a stock tank, a well, and a cobble alignment. (Figure 3) The trash scatter adjacent to the adobe room and frame house consisted of “a moderate scatter of fragmentary glass, ceramics, and cans” covering a diameter of about 30 feet. The trash scatter at the edge of the site contained some smaller metal items, such as cans, but also a number of larger items such as automobile seat springs and a muffler, a 50-gallon drum, and the head end of a bed frame. The entire site was determined eligible for the National Register under Criterion D because of its potential to yield important information on homesteading activities and lifeways.

Example 2.

*Feature Associated with an Eligible Property:
Transportation Corridor and Temporary Camps, AR-03-12-05-511,
Tonto National Forest (Sullivan 1988)*

This site is a dense scatter of historical-period waste located in an isolated spot a couple of miles north of Young, Arizona. The majority of the material on the site is domestic in nature (cans, bottles, and ceramics). Temporal indicators point to a deposition date between the late 1930s and the early 1940s. Immediately east of the site is a two-track road that ends a mile north of the site and which, on the south, ties indirectly into the road system leading into Young. Research into land use in the area revealed that the site was located within the boundaries of the Heber-Reno Sheep Driveway used to drive sheep from above the Mogollon Rim to the Salt River Valley. This area of the driveway served as a bedding ground where the sheep were allowed to rest. Archaeological survey of the bedding grounds identified several sites containing historical-period materials very similar to those found at site 05-511. It became clear that these sites were the remains of camps used by shepherds while the sheep were resting. Being temporary camps, no remains of shelters or structures were present. The discarded food and serving items were all that existed to mark the use of the site. For purposes of National Register evaluation, the trash scatter would be considered a contributing feature of the Heber-Reno Sheep Driveway, which is eligible for the National Register under Criteria A and D for its association with commercial Basque shepherding in Arizona between 1900 and 1960. Associated state historic contexts would include Arizona commerce, sheep herding, historic trails, and Basque history.

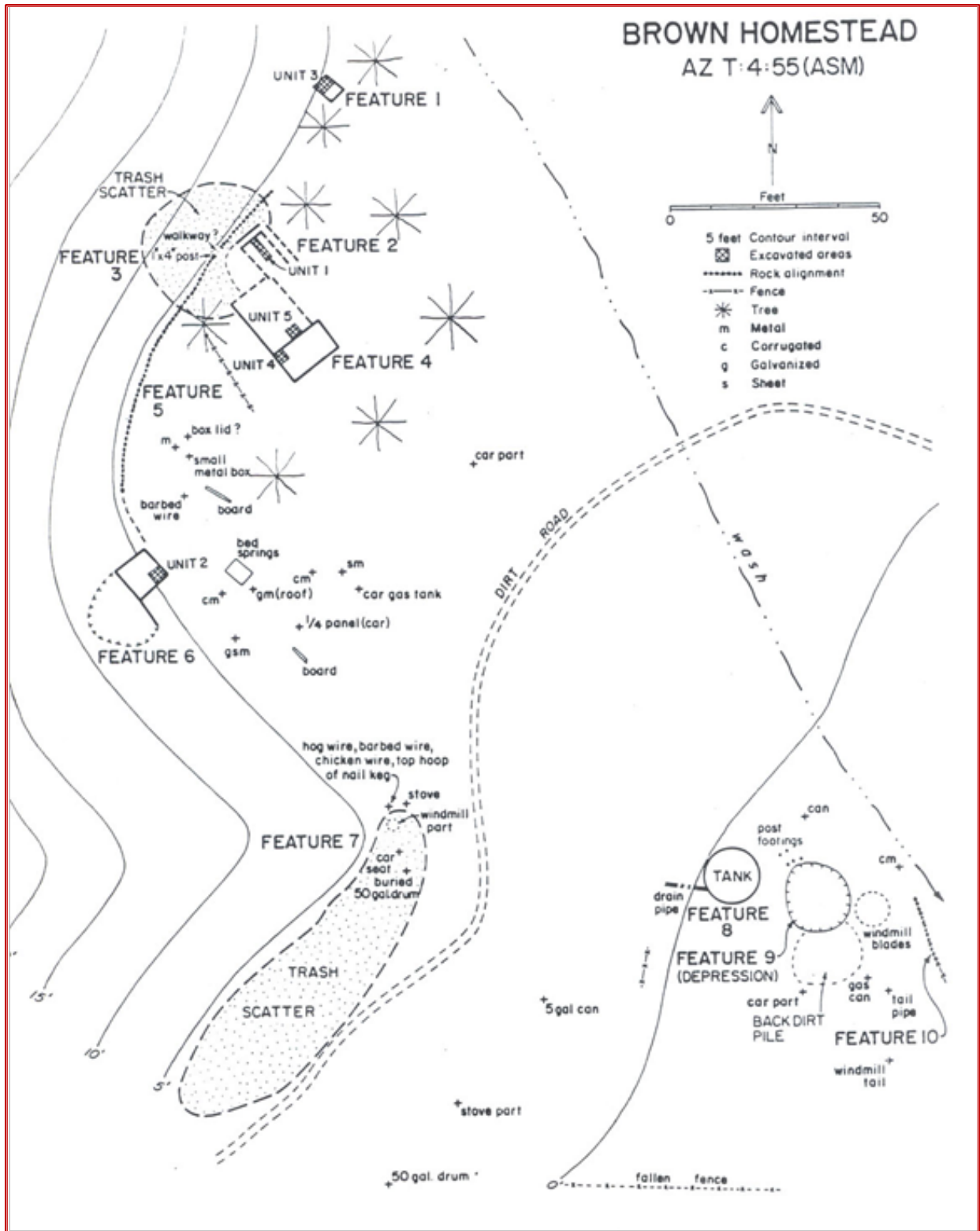


Figure 4. Site map of AZ T:4:55 (ASM), the Brown Homestead.

(Ayres and Seymour 1990: Figure 6).

Privies

Trash is intentionally and accidentally deposited in privies (Example 3). These assemblages provide a good source of temporal and material culture information about the larger property. For a discussion of the history, construction, and interpretation of privy deposits see *Archaeological Investigations of Blocks 139 and 159 in Barrio Libre, Tucson, Arizona* (Diehl et al. 2003).

Association with a Single Property: Privies are secondary resources (features) related to a primary resource, which was the source of the trash (generator). Privies are found in close physical proximity to the primary property, usually within the boundaries of the property.

Association with a District: Privies may also be contributing resources to a historic district, such as a historic residential or commercial district. The eligibility of the privy or privies will be dependent on the significance of the district as a whole.

Wells

While the primary use of a well is not for trash disposal, those that are out of use often become convenient trash receptacles. Wells will usually be a secondary feature or contributing element to a primary property and subject to the eligibility of that primary property.

As engineered structures, wells may also be individually eligible under Criterion C for their construction characteristics. A discussion of well typology and eligibility is beyond the scope of this document, but historical-period trash deposited in a well may contribute to an understanding of the age of a well and its association with other properties.

Example 3.

Features Associated with an Eligible District (Diehl et al. 2003)

A redevelopment project in Tucson included Block 139, which was part of a larger historical-period Mexican-American neighborhood known as Barrio Libre. A portion of Barrio Libre still has standing architectural properties and is listed in the National Register as a historic district. Although Block 139 is outside the boundaries of the architecturally defined Barrio Libre National Register District, it is adjacent to the district and within the original historical-period neighborhood. The late 1880-1950 buildings in Block 139 were demolished in the 1960s but subsurface archaeological remains associated with these former buildings could contribute important information about life in the barrio and the early history of Tucson. An archaeological investigation of Block 139 identified 35 features. These features included five privies, four trash pits, and one trash-filled depression. The information obtained from these features was used to address research issues related to material culture, land use, ethnicity, and dietary practices.

Waste Storage Sites

Dumps are final depositories in the waste system. For determinations of eligibility, two different types of dumps have been identified: waste piles and open dumps. These have been identified as two variations of a property type because they differ in scale, duration of use, and association with the generator.

Waste Piles

Of the two types of dumps, determining National Register eligibility is more difficult for waste piles. They occur when accumulated discarded items are removed from the point of generation. Waste piles usually represent single or, at most, a few episodes of dumping. Most importantly they are not part of a communally recognized garbage disposal area. In specific circumstances, isolated waste piles may be documented as isolated occurrences (IOs) (Arizona State Museum 2021) (see Appendix D). Whether documented as a site or IO, procedures for evaluation of National Register do not change.

When considering National Register eligibility, a waste pile has historical meaning or significance through association with the source property. Because waste piles usually do not occur in close proximity to the source, for management purposes they may be viewed as individual sites or properties and assigned site numbers. Determining the association between the waste pile and its source of generation is critical to establishing a National Register context. Identifying the associated property can be difficult and will require archival research, often of an area larger than the immediate project area.

Knowing the eligibility of the source property will aid in determining the eligibility of the associated waste pile. In many survey situations, it may be impossible, due to land-jurisdiction issues, project boundaries, etc., to evaluate the eligibility of the property that generated the trash pile. In these cases, identify the context for the associated property. If the associated property has significance within a historic context and the trash pile can contribute important research information about the property, then the trash pile is eligible. The steps in evaluating a waste pile for the State and National Registers are:

1. Identify the property that was the source (generated the materials) of the waste pile.
2. Identify the historic context(s) for the source property and waste pile.
3. If possible, determine the National Register status of the source property.
4. Evaluate the integrity of the waste pile and its potential to contribute important information about the associated source property or associated context.

Eligible: If an association is established with an eligible property and context, the waste pile is most likely to be eligible under Criterion D (Example 4). To be eligible under Criterion D, the waste pile must have the potential to yield important information that would contribute to an understanding of the associated property and context. The waste pile would have to have integrity of location, materials, and association.

Not Eligible: If the associated source property or context cannot be identified, the waste pile cannot be recommended eligible for inclusion in the State and National Registers (Example 5). Before making a recommendation of “not eligible,” the steps taken and resources investigated to reach this recommendation need to be clearly documented.

If the associated source property is identified, but the waste pile lacks integrity, it will not provide important information or will only provide redundant information, and it should be recommended as not eligible.

Exceptions: There may be situations where information about a particular period or theme in history is so rare that the waste pile may be significant enough to be eligible without its associated property. An example of this is a trash pile associated with the early Spanish Colonial period.

Example 4.

*Eligible Waste Pile with Known Source Property
Site AR-03-12-04-1470, Tonto National Forest (Weaver 1998)*

This site, located just off State Route 260 about 12 miles east of Kohl's Ranch, Arizona, consists of an extensive concentration of domestic refuse, construction debris, and automotive parts. Notable among the assemblage are numerous large maple syrup cans. Examination of the site indicated that the material was deposited between the late 1940s and mid-1950s. The character and density of the waste suggested that the source was not primarily a household or households, but instead was related to construction activities. Possible source areas for the waste included random dumping by highway users, Kohl's Ranch, a Boy Scout camp located nearby, or the community of Christopher Creek. A closer examination of the site, including moving some materials in search for source indications, revealed discarded signs used at the Boy Scout camp. This established the source identity with a high degree of confidence. The National Register eligibility of this site is therefore tied to that of the source area. Unfortunately, the source area is located on private land and not accessible for National Register evaluation. Nonetheless, it is possible to say that the waste site is eligible under Criterion D for the information it contains in relation to the historic contexts of recreation and the history of Boy Scouting in Arizona.

Example 5.

*Ineligible Waste Pile, Source Property Unknown
Site AR-03-12-04-1397, Tonto National Forest (Hathaway et al. 1999)*

This site consists of a small (approximately 200 artifacts) concentration of primarily domestic trash deposited adjacent to State Route 87 north of Payson. The majority of the material was manufactured in the 1930s and 1940s and was probably deposited at the site in the late 1940s. Among the cans, bottles, and other artifacts was a metal plate with "J. LAZEAR" formed by holes punched through the plate. This plate provided the best opportunity to establish an association for this trash deposit. The Lazear's are a pioneer family in the Pine and Payson areas. Some basic research into the family established that they had settled in the Pine area with later generations moving to Payson and Star Valley areas. There are several members of the family whose first name began with the letter "J." Unfortunately, all of these had either relocated far from the Payson and Pine area or had died prior to the probable deposition date of the trash. No family landholdings or residences were located within several miles of the site. The closest of these had no direct road connection to the area where the material was found. As a result, while it is possible to make a connection between the site and the Lazear family, this connection is limited to the name being on the artifact. No direct association of the site to any individual Lazear or to any property used by the Lazear family was possible. The source of the trash was not identified. The site has not been formally evaluated for National Register eligibility in the hope that additional research will be able to establish an association with a source property, but based on current information it would be not eligible.

Discontiguous District: State and National Register districts are usually bounded geographic areas of contiguous historical-period or archaeological properties. A historic district may contain discontiguous elements, when visual continuity is not a factor of historic significance, when resources are geographically separated, and when intervening space lacks significance (Shrimpton 1997:6). Waste piles may be contributing features or resources to a discontiguous historic district, such as a ranch or mining property. In order to establish a discontiguous district, the entire district must be evaluated for eligibility.

Open Dumps

Like waste piles, open dumps occur at a distance from the original source of the trash. Unlike waste piles, open dumps result from intensive use (repeated dumping) by more than one generator and are in locations that are recognized as part of a formal or informal trash disposal system. Open dumps occur at different scales and have different time depth. They may be associated with smaller properties such as ranches, farms, businesses, industries, or military installations that have used a single area for the dumping of trash over a period of time. At its largest scale, an open dump is associated with a town or city. A mining camp, military post, etc. may use a designated dump intensively for a few years, while a community may use a designated dump for decades.

Materials in an open community dump will represent a range of different activities, while materials at an industrial site may reflect limited activities. Garbage deposits may be primarily concentrated in one area, dispersed widely over an area, or made up of a number of distinct smaller concentrations of trash. The community dump in Superior consists of a continuous linear deposit of trash and garbage. The Slash Z Ranch dump consists of a number of different loci within a 150 by 75-yard area (Example 6). Although community dumps are usually located at a distance from the generators, the source of the trash is usually easily identifiable because of the dump's size, general proximity to a populated center, and volume and character of diagnostic artifacts. There may also be archival references to the dump.

Eligible: For State/National Register considerations, an open community dump is a site and may be individually determined eligible for the National Register. Because of the volume and diversity of artifacts contained in open community dumps, they may be used to address a wide variety of research issues at the community, regional, and national levels. For this reason, they will most often be eligible under Criterion D. Important research issues include but are not limited to: trade, production, socioeconomic status, dietary habits, ethnicity, health/hygiene, technology, trash disposal methods, and demography. In order to be eligible under Criterion D, an open dump must have integrity of location, materials, and association (Examples 6–8; Figure 5).

Because dumps, unlike waste piles, are community based, more consideration needs to be given to the possibility that they may be eligible under Criteria A, B, or C. To be eligible under Criterion A, an open dump needs to be associated with an important event such as a crisis in trash management, a major policy change in trash disposal, the location of a study or a technological innovation that resulted in changes in policy or practices in waste management, etc. The site needs to have, at a minimum, integrity of location, association, and materials. To be eligible under Criterion B, the site would have to be associated with an important person in the history of trash disposal, research, or policy. The dump has to be the primary or only site associated with the person's accomplishment. At a minimum, the site needs integrity of association, location, and materials. In order to be eligible under Criterion C, an open dump would need to embody distinctive construction or design characteristics. Open communal dumps usually are not designed or constructed in any way, but cut-and-fill methods were used in some open dumps as a means of dealing with problems like trash volume, smell, and air pollution. This was a transitional technology used before the introduction of engineered and designed landfills. An open dump that

provided the earliest or best example of the cut-and-fill method could be eligible under Criterion C if it retained integrity of location, material, association, and design.

Districts: Open Dumps could have a number of associated properties and/or features, such as incinerators, processing areas, piggeries, etc. All of these properties together would represent a district.

Example 6.

*Eligible Dump Associated with a Ranch Property,
AZ EE:7:201 (ASM)
(Stern and Majewski 1998)*

The Slash Z Ranch Dump site was identified and investigated by Stern and Majewski (1998). The site, which was located about 0.6 miles from the Slash Z Ranch, was a garbage disposal area for the ranch from the 1930s to the 1950s. The communal open dump consisted of six concentrated loci of garbage representing both single and multiple refuse disposal episodes spread over a 150 by 75-yard area (Figure 4). The integrity of the site was good with no evidence of disturbance. The site, referred to in the report as a “support-level” site, was determined eligible for the National Register under Criterion D for its potential to provide important information related to research issues about the Slash Z Ranch in relation to the historic contexts of ranching and homesteading in the area. Because the ranch headquarters had few remaining artifacts, the open dump site provided the primary source of material culture information for the ranch.

Example 7.

*Eligible Dump Associated with a Town Site,
AZ U:9:91 (ASU) (Griffith 1987)*

AZ U:9:91 (ASU) was a small trash dump located on the north bank of the Salt River across from the town of Tempe. It was eligible under Criterion D because it provided important information about the material culture of Tempe from the late 1800s to early 1900s, as well as information related to national commercial trade networks during that period. The dump was only used periodically during the historical period when the vehicular bridge across the Salt River was operational. Materials at the dump consisted of domestic, commercial, and medical trash. No references to the dump were identified during archival research. The association of the dump with Tempe was identified on the basis of artifacts at the site that came from the Tempe Normal School (later Arizona State University) and the Laird and Dines Drug Store in downtown Tempe.

Example 8.

*Eligible Dump Associated with a Town AR-02-12-02-1167
(Old Superior Town Dump), Tonto National Forest
(Stone and Hathaway 1992; Stokes 2002)*

Located just outside the town of Superior, this site was used by the residents and businesses of the town as a community open dump from the 1920 until the early 1970s. The site is eligible under Criterion D because it contains information important to our understanding of demography, exchange/trade/commerce, and subsistence during the late historic period.

As is typical of a long-term communal dump, the site is large, encompassing approximately 452,000 square feet (10.38 acres). The dump is situated on the bank of a large drainage and extends as much as 300 feet away from this bank. Within this area there is a continuous heavy scattering of artifacts with several large concentrations. The vast majority of the artifacts are domestic; however, building debris, business and industrial material, and automobiles are all common. The dump reaches its greatest depth (4 to 5 feet) along the drainage bank.

Landfills

Landfills exhibit the same constraints of location, duration, intensity of use, and the highly generalized nature of deposits that characterize open dumps. They differ in several significant ways from open dumps. Landfills are engineered so that the material deposited is kept in an environmentally sensitive position. This engineering necessitates the waste being buried on a daily basis, resulting in a deposit with considerable depth. The cost of these environmental controls and the need for more formal operational procedures favors centralized facilities. As a result, landfills are usually large. They are not directly associated with smaller communal properties, but rather with urban and suburban communities. Their association with rural areas is less direct, because multiple rural communities use the same centralized landfill. Recently, the concept of shared landfill use has spread to urban and suburban areas where several communities share the use and costs of massive regional landfills.

Following State and National Register guidelines, landfills are considered to be structures, which may be individually eligible. They are engineered constructions made for a purpose other than human shelter. In order to provide an environmentally safe facility, landfills contain a variety of liners, drains, dams, monitoring devices, and vents. In addition to the daily operation, a landfill requires coordination and planning to ensure that each day's waste is deposited correctly, compacted, and covered with dirt at the end of the day. The structural aspects of a landfill are most important in considering National Register eligibility under Criterion C. Landfills that contain distinctive design, construction, or operational characteristics would be eligible under this criterion. To be eligible under Criterion C, a landfill must contain integrity of location, design, material, workmanship, and association. In addition, the large amount and diversity of waste contained in a landfill may be used to explore a wide range of research questions at community, regional, and national scales. Because of this, landfills can also be considered eligible under Criterion D. Under this criterion, landfills have the same research issues as dumps. Studies of dietary habits, socioeconomic relations, trade, ethnicity, health and hygiene, technological issues, and demography all are valid research themes when examining landfill deposits. Integrity of location, materials, and association are critical under this criterion.

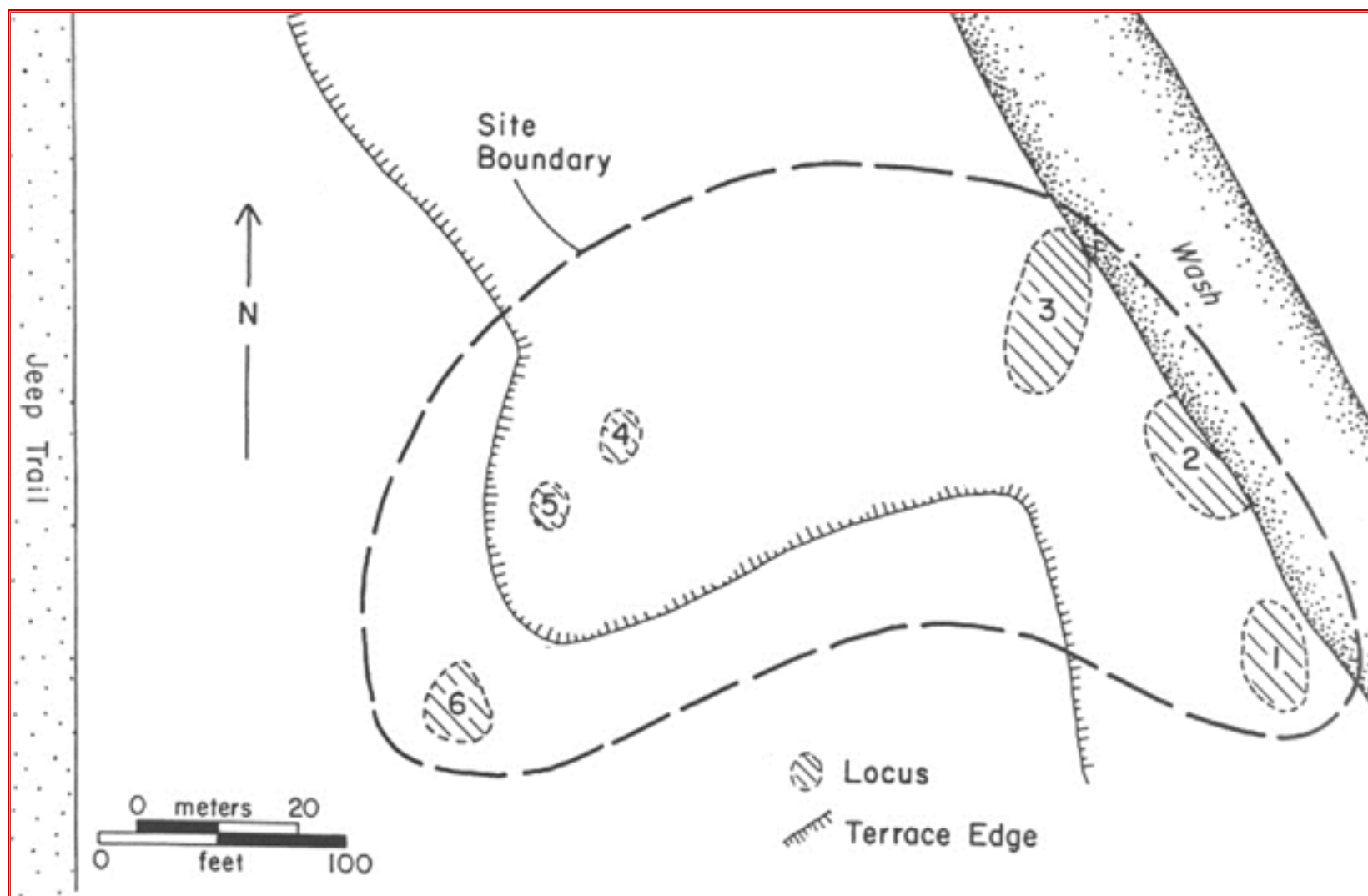


Figure 5. Site map of AZ EE:7:201 (ASM), the Slash Z dump site (Sterner and Majewski 1998: Figure 53).

It is possible for a landfill to be eligible under either Criteria A or B (Example 9). To be eligible under Criterion A, a landfill would need to be associated with an important event involving solid waste management, such as administrative or operational advances, a critical historical point at which the landfill played an important role, or important policy changes widely impacting how waste is managed. At a minimum, the landfill would need to have integrity of location, association, and materials. Under Criterion B, the landfill's association with an important person is paramount. That individual's importance would have to be directly related to the landfill and the history of solid waste management. Location, materials, and association are the important aspects of the property that must retain integrity in order for the landfill to be eligible for the State and National Registers under this criterion.

Example 9.

*National Register-Listed Sanitary Landfill
(HistoricFresno.org 2010)*

The Fresno Sanitary Landfill operated between 1937 and 1987. It covers an area of about 140 acres and is located three miles from Fresno, California. The landfill is significant as the "oldest true" sanitary landfill in the U.S. It is also significant for its association with Jean Vincenz (1894-1989) who is the man responsible for the development, implementation, and dissemination of the principles of the sanitary landfill in the U.S. He served as the commissioner of public works, city engineer, and manager of utilities in Fresno between 1931 and 1941. The Fresno Sanitary Landfill was designated a National Historic Landmark in 2001.

Solid Waste Treatment Resources

Incinerators

Incinerators were used at facilities such as community dumps, military bases, schools, hospitals, and even homes. The number of existing historical-period incinerators in Arizona is currently unknown. Two incinerators are listed on the National Register as contributors (Example 10) to military base districts. Incinerators are structures that may be eligible individually. In most situations they will be contributing elements to a district, such as a military base, a school, hospital, or a community open dump. In these situations, the significance of the incinerator will be tied to the significance of the district. Based on current information, there seem to be only a few existing examples of this once-common property type (e.g., Fort Tuthill Historic District [Example 10]). Individually eligible incinerators may be eligible under Criterion C as rare examples of a once-common type or for distinctive construction, design, or engineering. At a minimum, to be eligible under Criterion C an incinerator should have its walls and smoke stack. To be eligible for construction, design, or engineering, it should have integrity of materials, design, feeling, and workmanship.

Example 10.

Eligible Incinerator (Criteria A and C), Contributor to a District, Fort Tuthill Historic District

A stone incinerator, AZ I:14:340(ASM), constructed at Fort Tuthill in 1930, is adjacent to a historical-period trash dump, AZ I:14:339 (ASM). A recent visit to the dump confirmed that it no longer exists. The incinerator is one of the earliest structures built at the site and one of only two stone structures at the fort. Although it is in partial ruin, it still retains its stone walls and smoke stack. It was listed as a contributing property to the Fort Tuthill Historic District on April 4, 2004. The district is eligible under Criteria A and C.

Piggeries

As summarized above, a piggery may simply be a pig farm that was also used as a waste treatment facility. In many instances the large pens and corrals were located immediately adjacent to a dump. James E. Ayres identified a number of references in Tucson papers related to pigs and pig farming in the Tucson. Specific newspaper references to hog and pig farms and swill gatherers are listed in References Cited and Appendix B. He provided the following information (Ayres 2004):

Based on these articles (newspaper) alone, the earliest reference to pig farming is from 1882. The latest reference I have found so far is July 1895 (References are primarily about Chinese pig farms). Chinese first came to Tucson ca. 1875. I found no references to Hispanic or Euro-American hog farms in Tucson area. In 1890, Mr. Schumacker, a Tucson butcher, purchased 75 hogs from “one” of the Chinese hog farms. Note that it says “one” of the hog farms, implying there was more than one farm in 1890 (Arizona Weekly Citizen 1890b). Schumacker’s customers were primarily Hispanic and Euro-American. The number of hogs purchased is quite large, suggesting that these farms were relatively large-scale operations at that time.

There are also a couple of references to Chinese “slop” or “swill” handlers. Undoubtedly, the pig farmers were collecting waste from restaurants or other sources to feed their pigs. Also, the Chinese vegetable gardens would have generated a lot of waste in the form of overripe vegetables, melons, carrot tops, etc.

There may have been only one or two Chinese hog farms along the Santa Cruz River at any one time, but it is likely that they supplied both the Chinese demand for pork and most or all of the Hispanic and Euro-American communities as well. A piggery is a property type that is not well represented in historical-period or archaeological survey records in Arizona. Given the lack of examples of this property type it is difficult to know the range of features associated with these properties in Arizona or to provide definitive guidance on the extent of integrity needed for eligibility. To be eligible under Criterion A, the piggery would need to be associated with an important event in communal trash disposal practices in Arizona. To be eligible under Criterion C, the piggery would need to have high integrity of association, location, design, workmanship, and materials. In relationship to other piggeries, it would have to be the best example or a rare example of a once common type. Piggeries could also be contributors to a district. To be eligible under Criterion D, a piggery would need to have integrity of location, association, and materials and be able to address important research questions about waste management. The one archaeological example that was identified during research for this project was the hog farm located between Camp I and Camp II at the WWII Poston Japanese Relocation Center on the Colorado River Indian Tribes Reservation near Parker (Example 11; Figure 6-Figure 7).

Example 11.

Eligible Piggery (Criteria A and D)

Contributing property to the National Register eligible

Poston Japanese American Relocation Center (Burton et.al. 1999)

The Poston WWII Japanese American Relocation Center consists of three separate camps (Camp I, Camp II, and Camp III) located on the Colorado River Indian Tribes Reservation (Figure 6). Close to 18,000 Japanese Americans were interned at the three camps from 1942 to 1945. The hog farm was located between Camp I and Camp II and “consisted of 12 pens with feeding floors, six farrowing pens, and pastures. Facilities also included two small watchman’s houses (8 foot by 10 foot, and 10 foot by 14 foot in size), a 20 foot by 100 foot warehouse, a 30 foot by 36 foot processing house, a motor house, cold storage, an 18 ½ by 33 foot slaughter house, a latrine, a water tank, a pump house, a garbage can washing station, and a fuel tank” (Burton et al 1999:228) (Figure 7). The hogs subsisted primarily on center garbage. Today the only visible remains of the hog farm are slabs. One of the slabs has an inscription “div. of Soil 3/21/43” (Burton et al. 1999:236, 238).

The Poston hog farm is eligible as a contributing element to a National Register District that may also be eligible as a National Historic Landmark. The district is eligible under Criteria A, B, C and D.

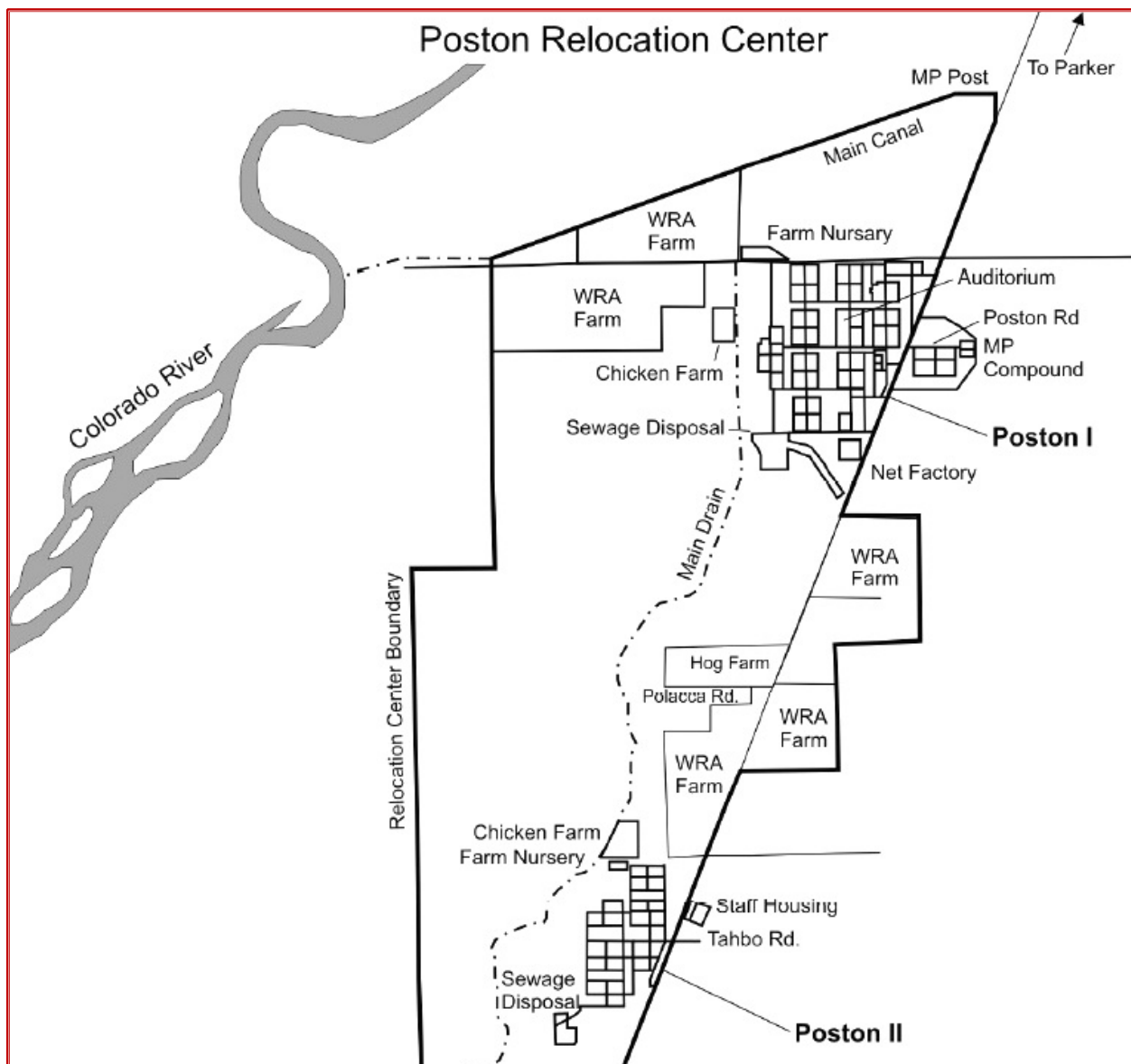


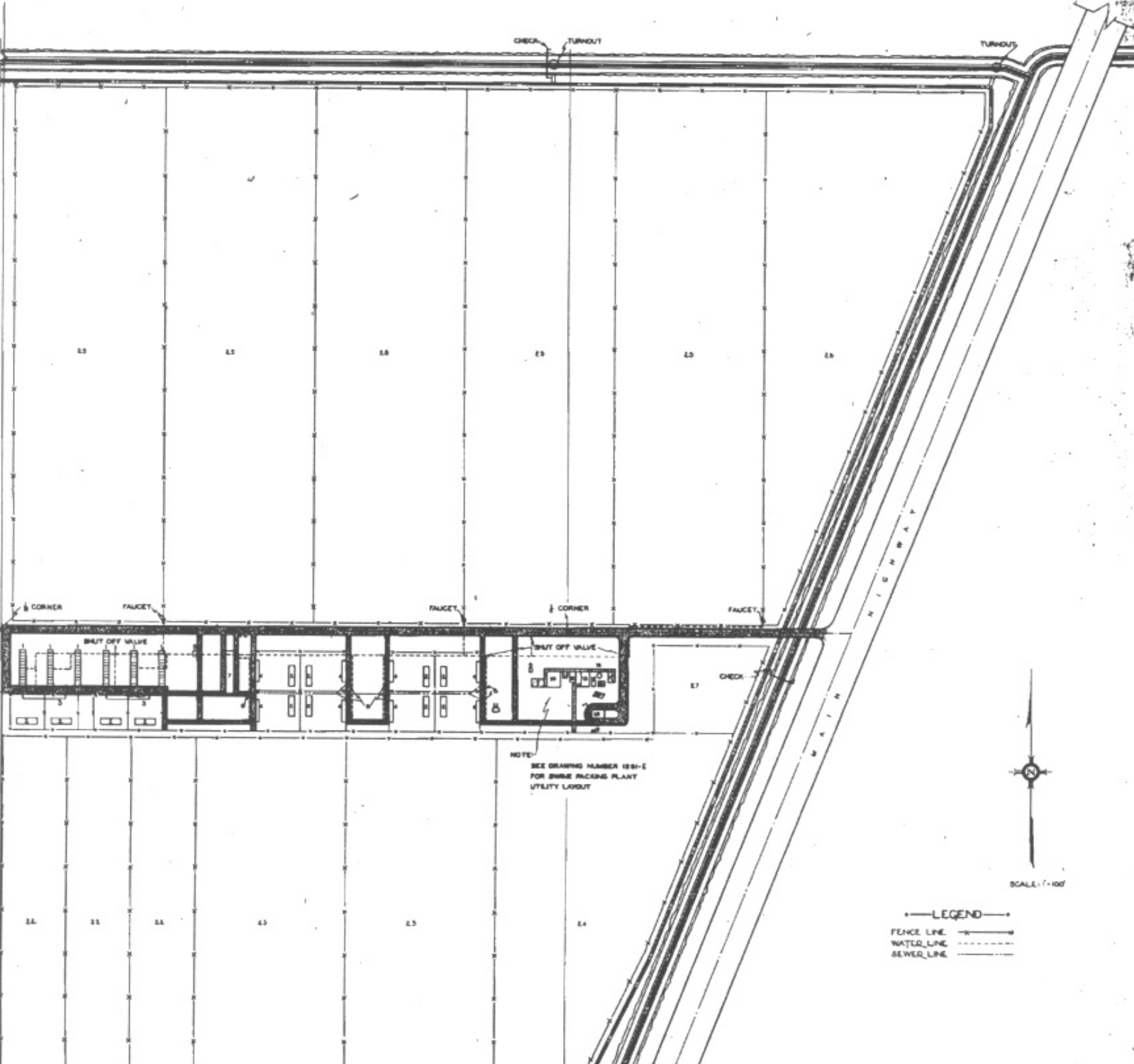
Figure 6. Plan map of Poston Relocation Center (Units I and II).

(Burton et al 1999: Figure 10.6).

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EXHIBIT "D"

HOG FARM AREA
WAR RELOCATION AUTHORITY
BILLING, WYOMING
RELEASED UNDER EXECUTIVE ORDER



NOTE:
SEE DRAWING NUMBER 1281-E
FOR SWINE PACKING PLANT
UTILITY LAYOUT



LEGEND
FENCE LINE ————
WATER LINE - - - - -
SEWER LINE

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FINAL THOUGHTS

We are hopeful that this guidance document will help to raise the awareness about, and identification of, waste disposal properties in Arizona and promote consistency in the recording of these properties. We welcome additional information and comments from cultural resource managers and researchers using this document.

Data Gaps

The most difficult aspect to developing this document was finding documentary information on historical-period trash disposal practices. When communities record their histories and accomplishments, trash disposal does not appear to be a popular topic. Waste management was left to the lowest possible agent and decisions were not often documented. As a result, there is much that is not known about waste accumulation and disposal.

Finding documentary materials becomes more difficult over time, particularly the further one explores in the historical record. Spanish Colonial period and U.S. military sites, for instance, likely disposed of waste in a regulated manner, but there is minimal archival or archaeological information related to such methods.

Trash disposal was more of an issue in urban communities, with the result that some cities and town councils maintained records of their practices. As towns grew and waste became a civic problem, newspapers and government documents would reference efforts to establish control of waste disposal or document public complaints, but these sources generally lack details about trash disposal practices and the location of dumpsites. As summarized in this document, several community dumps have been documented as archaeological sites, although many remain undocumented. In rural areas, waste disposal practices were not documented as frequently.

Other gaps in information involve survey and inventory information. A number of the property types identified in this document are not listed or only rarely identified in inventory and survey records. Open dumps, the largest of the pre-environmental regulation disposal sites, are known to have had a variety of ancillary features. There are examples of community incineration facilities, piggeries, scavenger colonies, and sorting operations from various parts of the U.S. Archival research for this project identified only a limited number of these resource types in Arizona:

- **Incinerators** are examples of a once common property type that is not well represented in inventory records. Incinerators were used at community open dumps, municipal and commercial businesses, and in residential settings. Archival records identified references to incinerators associated with large community open dumps in Tucson and Phoenix, neither of which currently exist. Only two additional incinerators are listed in SHPO inventories. These are both listed on the National Register as contributing properties to military historic districts.
- **Waste piles** are a property type frequently identified in archaeological surveys, but not easily identified in inventories because of inconsistencies in how they are recorded. Gaps in information about waste management properties could be due not only to terminology and consistency in reporting, but also because of a lack of certain property types in Arizona, or difficulties with field recognition and identification. ASM has recently published procedures for documenting isolated waste piles as IOs in specific circumstances (Arizona State Museum 2021) (see Appendix D). Regardless of their designation as sites or IOs, however, the guidance provided in this document for field documentation and evaluation for National Register eligibility should be followed.

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APPENDIX A:

Definitions

Disposables: Products and packaging used once or a few times and discarded.

Dump: A site used to dispose of solid waste without environmental controls.

Garbage: Animal and vegetable waste resulting from the handling, storage, sale, preparation, cooking, and serving of foods.

Generator: Any person(s) or facility whose acts or processes produce waste.

Landfill: Disposal sites for nonhazardous solid wastes spread in layers, compacted to the smallest practical volume, and covered by material applied at the end of each operating day.

Litter: Solid waste discarded outside the regular garbage and trash collection and disposal system.

Municipal solid waste: Domestic waste composed of everyday items that are discarded after use. These include things such as leftover food, clothing, paper products, appliances, food packaging, yard waste, paint, toys, construction debris, and more.

Open burning: Treatment of waste at an open dump by burning.

Open dump: Community accepted, uncovered site used for disposal of waste without environmental controls.

Rubbish: Solid waste, excluding food waste and ashes.

Solid waste: Non-liquid, non-soluble materials ranging from municipal garbage to industrial wastes. Solid wastes also include sewage sludge, agricultural refuse, demolition wastes, and mining residues. Technically, solid waste also refers to liquids and gases in containers.

Storage: The holding of waste for a temporary period.

Transfer point: An area where waste material is bulked for eventual removal; a break/bulk area.

Transfer station: Facility where solid waste is transferred from collection vehicles to larger trucks or rail cars for longer-distance transport.

Trash: Material considered worthless or offensive that is thrown away. Generally defined as dry waste material, but in common usage it is a synonym for garbage, rubbish, or refuse.

Treatment: Methods used to change the physical character of waste.

Waste: Unwanted materials left over from a manufacturing process. Also, refuse from places of human or animal habitation.

Waste dump: Final depository site for waste.

Waste management: The storage, transfer, and disposal of waste.

Waste pile: A non-containerized accumulation of solid waste.

Waste stream: The total flow of solid waste from homes, businesses, institutions, and manufacturing plants that is recycled, burned, or disposed of in landfills, or segments thereof, such as the "residential waste stream" or the "recyclable waste stream."

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APPENDIX B:

Timelines for Community Trash Ordinances and Trash Disposal

Much of the following information in Appendix B was compiled from Council Meeting Records and Ordinance books from larger communities. These records were made available for review at multiple municipal offices, for which we are grateful. Additionally, early county ordinance records were made available at the Arizona State Library, Archives, and Public Records in Phoenix, including the following:

- Tombstone Council Minutes, Microfilm collection
- Prescott City Ordinances, Microfilm collection
- Jerome Town Ordinances, Microfilm collection
- Casa Grande Council Minutes, Microfilm collection
- Maricopa County Records, Microfilm collection

Appendix Table B.1. Timeline for Town of Casa Grande Trash Ordinances

Date	Ordinance	Comments
1915	Ordinance 6	Provided for abatement of public nuisance.
	Ordinance 11	Prohibited the dumping of rubbish, dirt, etc. on any vacant lots within the inhabited part of town.
	Ordinance 12	Provided for impounding of stray animals.
	Council Actions	Council moved and approved that garbage be removed from town on first Monday of every month. Grant Stiles to be paid \$3.00 a day for removing garbage. Newspaper instructed to publish notice regarding gathering of garbage.
	Ordinance 19	Prohibited the stacking of hay in open and outside buildings within fire limits of town.
1916		New ordinance series established.
	Ordinance 8	Established fire limits in the city, fire regulations, and penalties for violations.
	Ordinance 11	Required abatement of public nuisance and penalties for violation.
	Ordinance 16	Required impoundment of stray animals and enacted rules for care of animals.
	Ordinance 21	Prohibited burning of trash or brush in city and established penalties.
	Ordinance 22	Established licensing tax and regulations of dogs in city.
	Ordinance 24	Regulated piling of hay in fire limits of city.
1919	Council Actions	Councilman appointed to hire a wagon or truck to take care of garbage temporarily.
	Council Actions	Matt Geib hired to haul garbage at a salary of \$30.00 per month for one month.
	Council Actions	Motion to assist Health Officer in preventing flu epidemic and Marshal ordered to carry out instructions from Health Officer.
	Council Actions	Two councilmen directed to find location of an old well in the road, fill well with trash, and cover.
1920	Ordinance 44	Required all houses in city to provide a metal can that is not less than 20 gallons in size for garbage.
	Council Actions	Salary for Garbage Collector increased to \$45.00 per/month, but must also clean up Main Street at least once a week on Friday.
	Council Actions	City Engineer directed to run levels for sewage system.
	Ordinance 53	Spitting on sidewalks prohibited.

Appendix Table B.1. Timeline for Town of Casa Grande Trash Ordinances

Date	Ordinance	Comments
	Council Actions	Tony Tonoa awarded contract at \$60.00 per/month for garbage removal.
	Council Actions	Mayor appointed two councilmen to secure a dumping ground for garbage.
1921	Ordinance 59	Amendment to allow Garbage Collector to retain all money collected.
	Council Actions	Garbage Site Committee reported a possible site and City Engineer ordered to run levels and report back.
	Ordinance 57/61	Amendment to have Garbage Collector hold office at pleasure of the council and owners of office buildings pay for the removal of garbage.
	Council Actions	C. W. Whitney appointed Garbage Collector.
	Council Actions	C. W. Whitney retained as Garbage Collector by renewal of contract.
1922	Council Actions	C. W. Whitney instructed to fill in ditches where water pipes were installed.
	Council Actions	Mayor authorized to have rubbish from Clean-up Day removed.
1923	Council Actions	J. J. Kruse given contract for 25-gallon garbage can at Auto Park at \$4.00.
	Council Actions	City Health Officer to publish notice that residences and businesses must have metal containers with covers for garbage.
	Council Actions	Health Officer instructed to obtain warrant for arrest of persons not complying with garbage ordinance.
	Ordinance 73	Discontinued digging of cesspools and provided for construction of septic tanks.
1924	Council Actions	Junior Chamber of Commerce thanked for work on "Clean-up Day".
	Council Actions	Joe Healy authorized to remove trash from school grounds.
1926	Ordinance 77	Provided for removal of weeds and refuse.
1927		Whitney elected as Garbage Collector, and Mr. Harmon appointed to see that garbage was properly removed.
	Council Actions	City purchased land for sewer lines.

Appendix Table B.2. Timeline for the Town of Clifton Trash Disposal*

Date	Comments
1883-early 1900s	The Arizona Copper Company disposed of unwanted smelter slag directly into the San Francisco River to save costs on hauling. Safford farmers brought a lawsuit against the company to end the practice.
1903	Typhus and malaria outbreaks throughout Clifton influenced propositions by community leaders for sanitation health measures. Two sanitary districts were created, each assigned with maintenance officers to ensure street cleanliness, working toilets, and collecting residential taxes. A health officer was appointed to oversee the two districts.
1909	The City of Clifton was incorporated.
1936-1938	Works Progress Administration workers paved the streets.

*Information provided in Patton (1977).

Appendix Table B.3. Timeline for City of Flagstaff Trash Ordinances

Date	Ordinance	Comments
Pre 1894	Ordinance 1	Required all filth, garbage, refuse, etc. be removed and kept from premises within town limits and removed to a place 0.5 miles from town limits and not less than 200 yards from any roads. Trash to be burned or buried. Marshal to notify violators who are given 12 hours to comply.
1895	Ordinance 10	Sec. 2: Prohibited establishment of slaughter houses or soap factories within town limits. Penalties of \$300.00 or three months in jail. Sec. 3: Ordered maintenance of privies, vaults, and drains. Sec. 9: Prohibited depositing of broken glass, filth, waste, or garbage on any public street, highway, grounds, or private premises, except such places designated by street. Marshal enforced Ordinance #1.
	Ordinance 12	Sec. 23: Supervisor of streets placed in charge of sidewalks, streets, crossings, and public places. Sec. 25: Duty of Health Officer for ordinances and regulations related to public health.
1895	Council Action	Directed the Clerk to notify the Marshal to strictly enforce the ordinances on filth and garbage.
	Ordinance 18	Established regulations to prevent the introduction and spread of contagious, loathsome, or infectious diseases in town.
1897-1899	Ordinance 24, 31, 37, 41-48, 53, 55, 58	Provided for issuance of bonds for constructing waterworks system and special election.
1899	Ordinance 62	Created a Board of Health and prescribed board duties, powers, and authorities.
1900	Ordinance 71	Established Sanitary District No. 1, which abolished and regulated nuisances therein.
1902	Ordinances 80, 82-83	Election to establish bonds for sewer.
1906	Ordinance 103	Provided for removal and suppression of filth, garbage, and refuse nuisance.
1908	Ordinance 119	Prohibited the roaming of large animals, sheep, goats, and swine in town limits.
1913	Ordinance 147	Prohibited roaming of stock.
1914	Ordinance 164	Directed the disposal of paper and trash on streets.
1916	Ordinance 187	Required the removal of weeds and other wild growth on lots (amended by Ordinance 239 in 1921)
1917	Ordinance 200	Repealed and amended Ordinance 103 (repealed by Ordinance 420)
1934	Ordinance 288	Required licensing and prohibited roaming of dogs (amended by Ordinance 315 in 1937).
	Ordinance 300	Required cleaning of premises and sidewalks
1937	Ordinance 323	Established regulations regarding handling, transportation, and storage of liquid petroleum.
	Ordinance 330	Established regulations for sanitary plumbing and house drainage.
	Ordinance 333	Addressed to collection, removal, and disposal of garbage (amended Ordinance 200).
1946	Ordinance 347	Regulated housing and general sanitation.
1951	Ordinance 376	Repealed portions of Ordinance 302 regarding plumbing and drainage.
1952	Ordinance 382	Prohibited digging in streets and alleys.
	Ordinance 389	Established regulations for collection, handling, and disposal of garbage (12-8-52).
1957	Ordinance 420	Amended Ordinance 389 regulating trash disposal.
	Ordinance 426,431	Established regulations for installation of sanitary sewer system.
1958	Ordinance 435	Established minimum requirements for life, health, and safety.
	Ordinance 446	Amended Ordinance 382 prohibiting digging in streets or alleys.
	Ordinance 447	Promoted health and safety and created Water Use and Utilization Commission.
1959	Ordinance 456	Established regulations for plumbing and house drainage.
	Ordinance 470	Prohibited car wrecking and junk yards in business zone.
1960	Ordinance 486	Amended Ordinances 389 and 420 regarding trash collection (3-22-60).
1965	Ordinance 662	Amended Ordinance 389 for red tag garbage cans (4-13-65).

Appendix Table B.3. Timeline for City of Flagstaff Trash Ordinances

Date	Ordinance	Comments
1968	Ordinance 739	Prohibited depositing of litter (12-10-68).
1970	Ordinance 768	Amended Ordinance 347 for cleaning premises (3-24-70).
1975	Proposed Ord. 944	Repealed Ordinances 389, 420, 486, and 662. Adopted Solid Waste Disposal Code. Did not pass.
1981	Ordinance 1162	Rewrote the existing Solid Waste Ordinance (7-7-81).
1982	Ordinance 1203	Established a new fee schedule for sanitary landfill (5-18-82).
	Ordinance 1223	Amended Solid Waste Ordinances 1162 and 1203. Not adopted.
1986	Ordinance 1454	Adjusted collection fee for residential rubbish can service (7-1-86).
1987	Ordinance 1490	Adjusted collection fee for residential and commercial refuse (6-16-87).
1988	Ordinance 1572	Adjusted collection fees for residential and commercial refuse (7-5-88).
1989	Ordinance 1609	Provided for operation of automated refuse collection system (2-21-89).
	Ordinance 1621	Revised residential collection, hoist and haul, and landfill fees (6-6-89).
1990	Ordinance 1662	Revised residential collection, hoist and haul, and landfill fees (6-5-90).
	Ordinance 1664	Regulated installation and operation of solid fuel burning devices in public places and residences (6-5-90).
	Proposed Ord. 1670	Amended Ordinance 1664 for solid fuel burning. Not adopted.
	Ordinance 1677	Amended City Code Title 7, Chapter 4, Preventing disposal of solid wastes from outside Coconino County at Cinder Lake Landfill and provided for application of general penalty provisions for Flagstaff City Code (10-2-90).

Appendix Table B.4. Timeline for the Town of Florence Trash Ordinances*

Date	Ordinances	Comments
		No council meeting records available before 1920.
1958	Ordinance 594	Required owners, occupants of buildings, structures, or grounds within town limits to provide specified size containers with lids for household trash. Unlawful to dump trash on streets or premises in town. Corporate entities must maintain outhouses, privies, toilets, sinks, etc. in sanitary condition and must remove rubbish and trash from streets, alleyways, lots, and buildings. Established penalties for violations and authorized the Marshal to enforce the ordinance.
1973	Council meeting	Attorney McCarville read abatement order from State Health Director concerning the burning of garbage at dump north of town (2-1-73).
	Council meeting	Discussion of lack of grant funding for solid waste disposal and landfill garbage disposal on National Guard property (9-6-73).
	Council meeting	Planned to take care of the landfill problem for about 50 years with a \$10.00 annual lease from the National Guard. Required a fire truck at the site and fencing of about three acres at a time. Mr. Conkle will take care of fill for next year.

Appendix Table B.4. Timeline for the Town of Florence Trash Ordinances*

Date	Ordinances	Comments
1977	Council meeting	Cease and Desist order for operation of the landfill for solid waste received by Mayor on 2-28-77. Pinal County Supervisor Karam gave town permission to use county landfill west of Florence as long as necessary. United Materials considered setting up landfill operations off Attaway Road for a fee.
	Ordinance 11	Garbage and Trash Collection Regulations document and declaration of emergency, amending Chapter 10 Health & Sanitation of Town Code. Established penalties, repealed earlier ordinances. Established fees per unit and collection monthly rather than quarterly. Enforced by Health Officer. Prohibited burning, dumping, incinerating, and collecting of garbage or rubbish in town without a permit, and deposition on streets, alleys, irrigation canals, or waterways. Established town disposal sites (7-7-77).
1979	Council meeting	Council discussed and voted to charge property owners for annual garbage and trash fees even if service not used.
1981	Ordinance 31	Amended Garbage and Trash Collection to change fee structure.
1985	Ordinance 76	Amended Garbage and Trash Collection and declared an emergency. Chapter 10 repealed and replaced by Resolution 229 (12-16-85).

* Information courtesy of staff at the City of Florence.

Appendix Table B.5. Timeline for City of Jerome Trash Ordinances

Date	Ordinance	Comments
1899	Ordinance 1	Created Health Officer.
	Ordinance 2	Prohibited deposition of filth on streets and sidewalks.
1908	Ordinance 44	Required receptacles be placed for pickup near street alley.
1925	Ordinance 127	Revised, consolidated and amended sanitation laws. Created Office of Sanitation Inspector. Mayor and Council can proclaim "Clean-up Day." Designated frequency of garbage collection.

Appendix Table B.6. Timeline for Payson-Area Trash Disposal*

Date	Comments
1974	Star Valley sanitary landfill opened (March 1).
	Ponderosa and Star Valley dumps closed because of federal requirements banning open pit dumps. Pine and Christopher Creek closed and then reopened (March 31).
	Strawberry residents dumped refuse along Fossil Creek instead of at the transfer station in Pine (June 13).
	Forest Service closed Washington Park Dump (June 13).
	Payson Dump closed (June 28).
	Closing date for all open dumps on federal lands (July 1).
	Pine and Christopher Creek open dumps closed under federal order (July 2).
	Transfer station (Pine-Strawberry Transfer Station) in operation at old Pine dump, where trash was hauled to Star Valley Landfill (July 2)..
	Gila County made plans for landfill in Pine (July 2).
	Placed a transfer station between Christopher Creek and Kohl's Ranch (July 2).
Landfills went into operation at Gisela, Tonto Basin, and Pinto Creek (July 2).	

* Information courtesy of volunteers of the *Payson Round Up*, who helped recover archival issues of the newsletter for reference in the table (all issues reviewed from 1974). Pat Stein collected the information (personal communication, 2004-2005)

Appendix Table B.7. Timeline for City of Phoenix Trash Ordinances

Date	Charter/ Ordinances	Comments
1881		Incorporated Phoenix as a municipality.
1881		Prohibited deposition of filth on streets and sidewalks.
1883		Established Public Health Officer.
1885	City Charter	Common Council given power to compel owners to keep vacant lots clean. Marshal's duties expanded to include keeping streets, alleys, lanes and commons clean and unobstructed.
1910	Ordinance 60	Created Health Department and Board of Health. Enacted regulations regarding infectious diseases and disposal of clothing and bedding of infected persons beyond city limits.
	Ordinance 100 (rev.)	Disposal of garbage on streets, alleys, and lots made a misdemeanor.
	Ordinance 292 (rev. 1899)	Required placement of refuse in containers in designated areas to be removed by City Scavenger.
	Ordinance 99	Chapter III designated two classes of garbage, specified types of containers for each garbage type to be removed by City Garbage Collector.
1951	City Charter Sec. 27 (rev.)	Established authority for collection and disposal of solid waste, and duties and powers of Public Health Director. Forbade dumping. Regulated development and operation of facilities. Prohibited burning except in an incinerator authorized by city and county. Regulated hauling and collection.

Appendix Table B.8. Timeline for City of Prescott Trash Ordinances

Date	Ordinance	Comments
1883	Ordinance 2	Stipulated owner/occupant of premises must remove rock, hay, garbage, etc., at own expense within three days. Prohibited deposition of ash in wooden containers.
1925	Ordinance 129	Revised, consolidated, and amended sanitation laws. Created Office of Sanitation Inspector. Mayor and Council can proclaim "Clean-up Day." Designated frequency of garbage collection.

Appendix Table B.9. Timeline for Town of Tombstone Trash Ordinances

Date	Ordinance	Comments
1879		Tombstone incorporated as a village.
1881		Tombstone incorporated as a city.
1881	Ordinance 12	Forbade open sewer ditches.
1882	Ordinance 13	Established Head of Health position.

Appendix Table B.10. Timeline for City of Tucson Trash Ordinances¹

Date	Ordinance	Comments
1872	Ordinance 8	Decreed that owners/occupants must keep lot, alley, and street clean. Refuse placed in pits, collected by Marshal every Saturday.
1877	Ordinance 1 (rev.)	Mandated that vacant lots be kept clean and privies be purified.
1878	Ordinance 9 (rev.)	Directed owner to keep property and street clean. Prohibited dumping on lots. Designated rubbish to be dumped in arroyos and privies purified monthly.
1882	Ordinance 36	Established Board of Health.
1890 ²		Wing Toy and Ah Sing hog ranch (Arizona Daily Star 1882). Wing Toy and Ah Sing sell hog ranch to Chan Tin Wo (Arizona Weekly Citizen 1882). Chinese swill gatherers (Arizona Weekly Citizen 1884). Ah Been hog ranch (Arizona Weekly Citizen 1890a). Mr. Schmacker, Tucson butcher, purchased 75 hogs from one of the Chinese hog farms (Arizona Weekly Citizen 1890b). Ah Din hog ranch (Arizona Weekly Citizen 1890c). Arrest of slop haulers (Arizona Weekly Citizen 1890d). Sue Kee, former merchant on Congress, now has a hog farm on the Santa Cruz River (Arizona Weekly Citizen 1895).
1908	Ordinance 285	Regulated disposal of bedding, clothing, etc., from people w/infectious diseases.
1909	Ordinance 302 Ordinance 303	Required metal trash receptacles with lids. Prohibited garbage transport between 7:00 am and 12:00 pm.
1910	Ordinance 328	Required barns and coops to be located 20 feet from dwelling. Decreed that manure be removed once a week.
1915	Ordinance 438	Replaced earlier ordinances. Specified type of garbage containers, prohibited litter in streets, lots, and vacant structures, and the use of trash as lot fill material. Prohibited salvage of material from city dump.
1926		Called for Bond election to install incinerator and improve city garbage-disposal plant. Repealed and consolidated prior ordinances.

¹ For detailed information on trash disposal history and timelines for Tucson, see Diehl et.al. 1997: Table 2.1.

² Articles noted here may allude to the possibility that piggeries were in operation in and around Tucson.

Appendix Table B.11. Timeline for Town of Willcox Trash Ordinances

Date	Ordinance	Comments
	Council Action	Supervisor of Streets ordered to ensure that all dead animals and offensive substances of all kinds and classes are removed from streets and squares.
	Ordinance 4, Sec. 7	Prohibited disposition of refuse, garbage, waste paper, or natural debris on streets, alleys, public grounds, or vacant lots, except at a time and place provided by regulation. Made violations a misdemeanor punishable by a fine of not more than \$300 or not more than 60 days in jail or both.
1915	Ordinance 13	Established Board of Health. Section 25: Prohibited the gathering, accumulation, storage, exposure, or transport of bone refuse, garbage, or other offensive material through the streets or public places without a permit from Board of Health. Banned throwing of ash offal, dirt, waste paper, garbage, rubbish, or offensive material in streets, alleys, or public places. Section 26: Prohibited swill, brine, animal urine, offensive matter, liquid, or other filth to run into or upon the street. Section 27: Banned runoff of vault, privy, cistern, cesspool, or sink onto ground or street. Section 28: Prohibited disposition of offal, ashes, meat, fish, or garbage into a vault, sink, privy or cesspool.

Appendix Table B.12. Timeline for the Town of Yuma Trash Disposal*

Date	Comments
1963	A delegation from Civic Beautification Blue Ribbon Committee urged Yuma City Council to enforce the clean-up ordinance. Mayor Allt stated, "We would like people to respond to the appeal to clean-up the city voluntarily rather than using force to obtain the clean-up." Plumbing Code Revisions replaced the 1958 code and the building inspector given authority to refuse approval of any sewer line installed over a septic tank.
1968	Chamber maids pleaded: "Surely Somebody in Yuma Has Some Trash for Clean-up": a special clean-up trash campaign. The area visited by the special city refuse trucks to aid in the special clean-up campaign is the center sections of the city bounded by 8th and 16th Streets and East Main Canal and Arizona Avenue.
1969	War is declared on litter at beginning of Johnny Horizon Days. The nine-day campaign began with about 1,000 Yuma residents taking to the roads and recreational areas to pick up what others left behind. The Bureau of Land Management sponsored this event nationally.
	New sewage treatment plant costing over \$4 million will end dumping in the Colorado River (4-5-70).
	New sewage treatment plant became operational 'on stream' for testing (8-20-70).
1970	Mechanized trash runs began. Prongs on the front of the lift boom of a trash truck slip into carriers on the side of trash bins. Hydraulic controls and lifting mechanisms hoist the six cubic-yard trash bin off the ground. The lifting mechanism tips the trash bin just before the final dump (11-70).
1970	Yuma resident stated new plan stinks. Armon Curtis lived about 0.66 miles from the new sewage treatment plant and complained of the stench. He stated that at times, members of his family have been sickened by the smell (12-70).
	James Clevenger said the primary source of odor from the plant is from the intake line, the flocculation tank and the primary clarifier. The smell was due to hydrogen sulfide, which is usually non-toxic, but can be toxic in high concentrations with a lack of oxygen. "Every plant on start-up has operating problems that have to be worked out," Clevenger said. "Modifications are being made by the manufacturer who is paying for the labor and the equipment."
1971	The sanitary landfill at 22 nd Avenue and the Colorado River closed on June 6. The city began using a sanitary landfill south of Highway 95 at County 16th Street and Avenue D.
1974	The city concluded a study of trash collection methods. The city had been experimenting with various trash programs to determine ways to save money. Administrator Clevinger said, "We realize we would have people objecting, but we have to go through these traumas sometimes to determine costs."
1974	City realized cost savings with new garbage trucks. Available figures from surveys indicate that the new Shu-Pak Truck used to collect garbage stuffed plastic bags was substantially cheaper than the old system. Costs cut by two-thirds according to an analysis report on the garbage collection.

* Information courtesy of City of Yuma (2003).

APPENDIX C:
Arizona's Municipal Solid Waste Landfills
(Closed and Active)

Closed Landfills

http://legacy.azdeq.gov/environ/waste/solid/closed_test.html

Active Landfills

<http://legacy.azdeq.gov/environ/waste/solid/active.html>

The following information was acquired from the
Arizona Department of Environmental Quality (2016a,b and 2019).
Please note that information in the tables may not be consistently available or complete.

Closed Solid Waste Facilities

Appendix Table C.1. Apache County	
<p>Apache County Facility Operator: Apache County PO Box 428, St. Johns, AZ 85936</p> <p>Location:</p>	<p>Chambers Operator: Apache County PO Box 428, St. Johns, AZ 85936</p> <p>Location: <i>South of I-40 at Chambers, southeast at dirt road 0.4 miles</i></p>
<p>City of St. Johns Facility Operator: City of St. Johns - 520-337-2031 PO Box 455, St. Johns, AZ 85936</p> <p>Location: <i>3.3 miles north of Cleveland St. on 2nd St. west</i></p>	<p>Concho Operator: Apache County PO Box 428, St. Johns, AZ 85936</p> <p>Location: <i>4.3 miles south of AZ 180 on AZ 61, 0.5 miles</i></p>
<p>Greer Operator: Apache County PO Box 428, St. Johns, AZ 85936</p> <p>Location:</p>	<p>Navajo Operator: Apache County PO Box 428, St. Johns, AZ 85936</p> <p>Location: <i>South of I-40 at Navajo exit cross rail road right</i></p>
<p>Nutrioso Operator:</p> <p>Location:</p>	<p>Round Valley Operator: Apache County - 520-337-4364 PO Box 428, St. Johns, AZ 85936</p> <p>Location: <i>6 miles south of Eager on US 666</i></p>
<p>Sanders Operator: Apache County PO Box 428, St. Johns, AZ 85936</p> <p>Location:</p>	<p>Vernon Operator: Apache County PO Box 428, St. Johns, AZ 85936</p> <p>Location:</p>

Appendix Table C.2. Cochise County

<p>Benson Transfer Station Operator: Benson County - 602-588-2095 980 N. Madison, Benson, AZ 85602 Location:</p>	<p>Bisbee Operator: Location:</p>
<p>Bowie Operator: Cochise County Drawer AJ, Bisbee, AZ 85603 Location: <i>0.8 miles north of Main St. on Central Ave.</i></p>	<p>City of Benson Facility Operator: City of Benson - 520-586-2245 425 10th St., Douglas, AZ 85607 Location: <i>0.3 miles north of I-10 on Ocotillo Rd., east, 0.5 mile to site</i></p>
<p>City of Douglas Facility Operator: City of Douglas PO Box 2223, Benson, AZ 85602 Location: <i>0.3 miles west of Pan American Rd. on 9th street 0.5 miles</i></p>	<p>City of Tombstone Facility Operator: City of Tombstone - 520-457-3415 PO BOX 339, Tombstone, AZ 85638 Location: <i>0.2 miles east of US 80 on Middle March Rd.</i></p>
<p>Cochise County Facility Operator: Cochise County Drawer AJ, Bisbee, AZ 85603 Location:</p>	<p>Courtland Operator: Cochise County Drawer AJ, Bisbee, AZ 85603 Location: <i>On Courtland Rd.</i></p>
<p>Double Adobe Operator: Cochise County Drawer AJ, Bisbee, AZ 85603 Location: <i>1.75 miles of Prince Rd. on west side of Kings Highway</i></p>	<p>Dragoon Operator: Cochise County Drawer AJ, Bisbee, AZ 85603 Location: <i>3 miles east of I-10 on Dragoon Rd., 1.5 miles north of Johnson</i></p>
<p>Ft. Huachuca Operator: USAG Ft. Huachuca - 520-533-3120 ext. 5215 ATTN:AT25-I5-B, Ft. Huachuca, AZ 85613-6000 Location: <i>Ft. Huachuca south range of installation</i></p>	<p>Naco Operator: Cochise County Drawer AJ, Bisbee, AZ 85603 Location: <i>0.7 miles north and west of 6th St. on D St.</i></p>
<p>Pearce Operator: Cochise County Drawer AJ, Bisbee, AZ 85603 Location:</p>	<p>San Simon Operator: Cochise County Drawer AJ, Bisbee, AZ 85603 Location: <i>At San Simon exit I-10 west 0.75 miles to site</i></p>
<p>Sierra Vista Operator: Location:</p>	<p>Split Rock Ranch Transfer Station Operator: Location:</p>
<p>St. David Operator: Cochise County Drawer AJ, Bisbee, AZ 85603 Location: <i>1.5 miles north of US 80 on Sibyl Rd.</i></p>	<p>Sun Sites Operator: Cochise County Drawer AJ, Bisbee, AZ 85603 Location:</p>
<p>Sunizona Operator: Cochise County Drawer AJ, Bisbee, AZ 85603 Location:</p>	<p>Sunizona Transfer Station Operator: Location:</p>

Appendix Table C.3. Coconino County

<p>Ashurst Lake Operator: Coconino County Highway Department, Flagstaff, AZ 86001</p> <p>Location: <i>1.1 miles on road to Ashurst Lake 0.25 miles north</i></p>	<p>B.B Bonner Co. Operator: B.B. Bonner Company PO Box 99, Flagstaff, AZ 86001</p> <p>Location: <i>Between Industrial Dr. and the Santa Fe Railroad Track</i></p>
<p>City of Page Facility (old) Operator: City of Page PO Box HH, Page, AZ 86040</p> <p>Location: <i>East on AZ 98 0.3 miles from Junction with AZ 98 south 0.5 miles</i></p>	<p>Clint's Well Operator: Coconino County Highway Department, Flagstaff, AZ 86001</p> <p>Location: <i>1 mile west of AZ 486 on west side of road</i></p>
<p>Forest Lake Operator: Coconino County Highway Department, Flagstaff, AZ 86001</p> <p>Location: <i>In Forest Lakes, 2 miles north of AZ 260 Canyon Dr.</i></p>	<p>Marble Canyon Operator: Marble Canyon Lodge PO Box 2094, Marble Canyon, AZ 86001</p> <p>Location: <i>0.4 miles southwest of US 89 on road behind airport. 7 miles west of AZ 486 on Mormon Lake Rd. west 0.9 miles west of I-17 on Willard Springs Rd.</i></p>
<p>Morman Lake Operator: Coconino County Highway Department, Flagstaff, AZ 86001</p> <p>Location:</p>	<p>Mund's Park Operator: Coconino County Highway Department, Flagstaff, AZ 86001</p> <p>Location:</p>
<p>NPS/Lees Ferry Operator: NPS-Glenn Canyon Area 337 N. Navajo Dr., Page, AZ 86040</p> <p>Location: <i>4 miles west of US 89A on Lees Ferry Rd.</i></p>	<p>Ponderosa Paper Operator:</p> <p>Location:</p>
<p>Town of Fredonia Operator: Town of Fredonia - 520-643-7241 PO Box 217, Fredonia, AZ 86022</p> <p>Location: <i>1.5 miles east US 89A on end of Pratt St.</i></p>	<p>Tusayan Operator: Coconino County Highway Department, Flagstaff, AZ 86001</p> <p>Location: <i>2.4 miles east of AZ 64 on north side of Ten-X-Road 1.3 miles south of I-40 on Woody Mountain Rd</i></p>
<p>Woody Lake Operator: City of Flagstaff 120 N. Beaver, Flagstaff, AZ 86001</p> <p>Location:</p>	

Appendix Table C.4. Gila County

<p>BHP/Miami Unit Asbestos Operator: BHP Copper, Pinto Valley - 520-473-6200 PO Box 100, Miami, AZ 85539</p> <p>Location: <i>Hwy 60</i></p>	<p>BSA/Camp Geronimo Operator: Boy Scouts of America</p> <p>Location: <i>0.5 miles southeast of the camp entrance</i></p>
<p>Christopher Lake Operator: Gila County 1400 E. Ash St., Globe, AZ 85501</p> <p>Location: <i>1.5 miles east of Kohl's Ranch on AZ 260, 0.5 miles south</i></p>	<p>Gisela Operator: Gila County 1400 E. Ash St., Globe, AZ 85501</p> <p>Location: <i>5 miles east of AZ 87 at Gisela</i></p>
<p>Payson Operator: Gila County 1400 E. Ash St., Globe, AZ 85501</p> <p>Location: <i>1.6 miles south of AZ 260 on AZ 87, 0.75 east</i></p>	<p>Pine Operator: Gila County 1400 E. Ash St., Globe, AZ 85501</p> <p>Location: <i>2 miles south of Pine on AZ 87, 0.1 miles north of highway</i></p>
<p>Roosevelt Operator: Solid Waste Dept. - 520-425-8501 1400 E. Ash St., Globe, AZ 85501</p> <p>Location: <i>Roosevelt, AZ</i></p>	<p>Star Valley Operator: Solid Waste Dept. - 520-425-8501 1400 E. Ash St., Globe, AZ 85501</p> <p>Location: <i>Tonto National Forest</i></p>
<p>Tonto Basin Facility Operator: Solid Waste Dept. - 520-425-8501 1400 E. Ash St., Globe, AZ 85501</p> <p>Location: <i>Tonto Basin</i></p>	<p>Town of Hayden Facility Operator: Town of Hayden 520 Velasco Ave. Hayden, AZ 85235</p> <p>Location: <i>On AZ 177, 0.3 miles north of milepost 139, 0.6 miles. Adjacent to southeast edge of Country Club</i></p>
<p>Town of Hayden #2 Operator: Town of Hayden 520 Velasco Ave. Hayden, AZ 85235</p> <p>Location:</p>	<p>Town of Miami Facility Operator: Town of Miami - 520-473-4403 500 Sullivan St., Miami, AZ 85539</p> <p>Location: <i>0.5 miles west of Miami on US 60, 0.6 miles south to site</i></p>
<p>Young Operator: Solid Waste Dept. - 520-425-8501 1400 E. Ash St., Globe, AZ 85501</p> <p>Location: <i>Tonto National Forest</i></p>	

Appendix Table C.5. Graham County

<p>Artesia Operator: Graham County - 520-428-1962 826 Main St., Safford, AZ 85546</p> <p>Location:</p>	<p>Eden Operator: Graham County - 520-428-1962 826 Main St., Safford, AZ 85546</p> <p>Location: <i>1.8 miles east of US 70 on Eden Springs Road</i></p>
<p>Ft. Thomas Operator: Graham County - 520-428-1962 826 Main St., Safford, AZ 85546</p> <p>Location: <i>1.7 miles south of Ft. Thomas on US 70 west, 0.8 miles to site</i></p>	<p>San Jose Operator: Graham County - 520-428-1962 826 Main St., Safford, AZ 85546</p> <p>Location: <i>0.3 miles north of US 70 at San Jose east, 0.2 miles to site</i></p>
<p>Town of Pima Operator: Town of Pima 110 W. Center, Pima, AZ 85543</p> <p>Location: <i>1.5 miles south of US 70 on Main St. 1 mile west</i></p>	<p>Town of Thatcher Operator: Town of Thatcher 230 College Ave., Thatcher, AZ 85552</p> <p>Location: <i>At Thatcher 1 mile west of US 70</i></p>

Appendix Table C.6. Greenlee County

<p>Franklin Operator: Greenlee County PO Box 908, Clifton, AZ 85533</p> <p>Location: <i>0.5 miles south of Franklin on US 70, 0.25 miles west</i></p>	<p>Sheldon Operator: Greenlee County - 520-865-4762 PO Box 908, Clifton, AZ 85533</p> <p>Location: <i>9 miles northwest of Duncan, 0.25 miles east of SR 75 at milepost 388.5</i></p>
<p>South County Operator: Greenlee County - 520-865-4762 PO Box 908, Clifton, AZ 85533</p> <p>Location: <i>6 miles northwest of Duncan 0.25 miles east of SR 75 at milepost 385.2</i></p>	<p>Town of Duncan Facility Operator: Town of Duncan PO Box 916, Duncan, AZ 85534</p> <p>Location: <i>In Duncan 0.5 miles west of US 70 on 4th St.</i></p>
<p>York Valley Operator: Greenlee County - 520-865-4762 PO Box 908, Clifton, AZ 85533</p> <p>Location: <i>14 miles northwest of Duncan 1 mile east of SR 75 at milepost 394.3</i></p>	

Appendix Table C.7. La Paz County

<p>Arizona State Parks/Alamo State Parks Operator: AZ State Parks 800 West Washington #145, Phoenix, AZ 85007</p> <p>Location: <i>With the Alamo State Parks</i></p>	<p>Bouse Operator: La Paz County Route Z Box 706 Highway 95, Parker, AZ 85344</p> <p>Location: <i>Highway 72 to Bouse. Go 1 mile west on Plomosa turn west</i></p>
<p>Cienega Springs Operator: Yuma County 2703 Avenue B, Yuma, AZ 85364</p> <p>Location: <i>1 mile east of AZ 95 on Cienega Springs Rd.</i></p>	<p>Ehrenberg Operator: La Paz County Route Z Box 706 Highway 95, Parker, AZ 85344</p> <p>Location: <i>I-10 west to Ehrenberg exit at Cibola Rd. site over 2 miles</i></p>
<p>Quartzsite Operator: La Paz County - 520-667-3326 PO Box BP, Parker, AZ 85344</p> <p>Location: <i>2.5 miles north of I-10 on the west side of AZ 95</i></p>	<p>Salome Operator: La Paz County PO Box BP, Parker, AZ 85344</p> <p>Location: <i>0.3 miles north of US 60 on Center St. 2.4 miles</i></p>
<p>Southwest Tire Recycling Operator: Southwest Tire Recycling - 520-669-6424 PO Box 2217, Poston, AZ 85271</p> <p>Location: <i>5 miles north of McVay Rd. on Highway 72, 1 mile past milepost 40</i></p>	<p>Vicksburg Operator: La Paz County Route Z Box 706 Highway 95, Parker, AZ 85344</p> <p>Location: <i>0.4 miles north of Vicksburg Junction then 0.3 miles west</i></p>
<p>Wenden Operator: La Paz County Route Z Box 706 Highway 95, Parker, AZ 85344</p> <p>Location: <i>1.8 miles east of post office on US 60 1.5 miles out</i></p>	

Appendix Table C.8. Maricopa County

<p>23rd Ave. Landfill Operator: City of Phoenix Public Works - 602-534-3333 3060 S. 27th Ave., Phoenix, AZ 85009</p> <p>Location: <i>23rd Ave. and Lower Buckeye</i></p>	<p>7th Street Landfill Operator:</p> <p>Location: <i>Promiscuous dump at 7th St. and the Salt River</i></p>
<p>99TH Ave New River Ranch Operator:</p> <p>Location:</p>	<p>ASU NO. 1 Operator: AZ State University Tempe, AZ 85287</p> <p>Location: <i>Along west side of Scottsdale Rd. south of the Salt River</i></p>
<p>ASU NO. 2 Operator: AZ State University Tempe, AZ 85287</p> <p>Location: <i>Along east side of Scottsdale Rd. south of the Salt River</i></p>	<p>Aguila Operator: Maricopa County 3325 W. Durango, Phoenix, AZ 85009</p> <p>Location: <i>3.1 miles west of Aquila on the south side of US 60</i></p>
<p>Allied Concrete Operator: Allied Concrete 2405 N. Center, Mesa, AZ 85201</p> <p>Location: <i>The southeast corner of Lehi Rd. and Center St.</i></p>	<p>Ameron Operator: Ameron Pipe Division PO Box 2050, Phoenix, AZ 85036</p> <p>Location: <i>West of 12th street south of Watkins in Phoenix</i></p>
<p>Arizona Sand & Rock Operator: Arizona Sand & Rock PO Box 20067, Phoenix, AZ 85036</p> <p>Location: <i>Agua Fria River and Grand Ave.</i></p>	<p>Avondale Operator: Maricopa County 3325 W. Durango, Phoenix, AZ 85009</p> <p>Location: <i>North side of Intersection of US 80 and Agua Fria</i></p>
<p>Beardsley Operator: City of Phoenix Public Works - 602-534-3333 3060 S. 27th Ave., Phoenix, AZ 85009</p> <p>Location: <i>Between Central Ave. and 7th St south of Beardsley Rd.</i></p>	<p>Boothill Operator:</p> <p>Location:</p>
<p>Buckeye Operator: Town of Buckeye 715 Monroe, Phoenix, AZ 85326</p> <p>Location: <i>At Miller Rd. and Gila River</i></p>	<p>Butterfield/Billing Account for Tempe Operator: City of Tempe PO Box 5002, Tempe, AZ 85281</p> <p>Location:</p>
<p>Chandler Int. #1 Interim</p> <p>Location: <i>Southeast intersection of Frye and Dobson Rd.</i></p>	<p>Chandler Int. #2 Interim</p> <p>Location: <i>South side of Queen Creek Rd. 1 mile east of Val Vista Dr.</i></p>
<p>Chandler Int. #3 Interim Operator:</p> <p>Location: <i>Mile north of German Rd. mile east of Gilbert Rd.</i></p>	<p>City of Mesa Facility Operator: City of Mesa 55 N. Center St., AZ 85211</p> <p>Location: <i>Northeast corner of Center St. and Lehi Rd.</i></p>
<p>City of Phoenix 19th Ave. Operator: City of Phoenix 251 W. Washington, Phoenix, AZ 85004</p> <p>Location: <i>1 mile south of I-17 on east side of 19th Ave.</i></p>	<p>City of Phoenix 22nd Ave. Operator: City of Phoenix 251 W. Washington, Phoenix, AZ 85004</p> <p>Location: <i>22nd Ave. and Lower Buckeye Rd.</i></p>

Appendix Table C.8. Maricopa County

<p>City of Phoenix 91st Ave. Operator: City of Phoenix 251 W. Washington, Phoenix, AZ 85004</p> <p>Location: <i>West side of 91st. Ave.</i></p>	<p>City of Tempe Facility Operator: City of Tempe 31 E. 5th St., AZ 85281</p> <p>Location: <i>South side of Salt River on Hayden Dr.</i></p>
<p>Deer Valley Operator: City of Phoenix Public Works - 602-534-3333 3060 S. 27th Ave., Phoenix, AZ 85009</p> <p>Location: <i>19th Ave. and South of Greenway</i></p>	<p>Del Rio Operator: City of Phoenix Public Works - 602-534-3333 3060 S. 27th Ave., Phoenix, AZ 85009</p> <p>Location: <i>Between 7th and 16th St. north of Elwood Rd.</i></p>
<p>Design Master Homes Facility Operator: Design Master Homes 8808 N. 106th Ln., Peoria, AZ 85345</p> <p>Location: <i>115th Ave 0.5 miles south on Olive</i></p>	<p>El Mirage Operator: Ken Boyce 11141 N. 115th Ave., El Mirage, AZ 85335</p> <p>Location: <i>South side of AZ 93 and Agua Fria River</i></p>
<p>Estes Operator: City of Phoenix 251 W. Washington, Phoenix, AZ 85004</p> <p>Location: <i>East side of 40th St. south of the Salt River</i></p>	<p>General Motors Proving Grounds Operator: General Motors - 602-827-5239 13303 S. Ellsworth Rd., Mesa, AZ 85208</p> <p>Location: <i>Elliot Rd. east to Sossman Rd. south to Warner go east</i></p>
<p>Gila Bend Operator: Maricopa County - 602-506-8726 2901 W. Durango, Phoenix, AZ 85009</p> <p>Location: <i>3 miles north of Gila Bend on Old US 80</i></p>	<p>Goodyear - Sump #1 Operator:</p> <p>Location: <i>1 mile north of McDowell Rd.</i></p>
<p>H & H Materials Operator: H & H Material 2362 W. Kathleen Rd., Phoenix, AZ 85023</p> <p>Location: <i>West side of Cave Creek Wash north of Tierra Buena</i></p>	<p>Hassayampa Operator: Maricopa County - 602-506-8726 2901 W. Durango, Phoenix, AZ 85009</p> <p>Location: <i>Salome Rd. west to Junction of Wickenburg and Ward Rd.</i></p>
<p>Hickman's Egg Ranch Operator: Hickman's Egg Ranch 7403 N. 91st Ave., Glendale, AZ 85305</p> <p>Location: <i>0.5 miles south of Glendale Ave. on 99th Ave.</i></p>	<p>Juice of Life Operator: Mike Neils 5837 S. 36th St., Phoenix, AZ 85034</p> <p>Location: <i>5837 S. 36th St.</i></p>
<p>Kachina Ready Mix First Street Operator: Kachina Ready Mix 1976 E. Pima St. Tempe Az 85281</p> <p>Location: <i>Northeast corner of 1st St. and Clark Dr.</i></p>	<p>Laylor Materials Operator: Laylor Materials PO Box 41662, Phoenix, AZ 85080</p> <p>Location: <i>Northeast corner of 16th St. and Beardsley</i></p>
<p>Morristown Operator: Maricopa County 3325 W. Durango, Phoenix, AZ 85009</p> <p>Location: <i>1 mile south of US 60 off Morristown overpass</i></p>	<p>New River Operator: Maricopa County - 602-506-8726 2901 W. Durango, Phoenix, AZ 85009</p> <p>Location: <i>4.3 miles west of I-17 on east Lake Pleasant Rd.</i></p>
<p>Northwest Regional Operator: Maricopa County</p> <p>Location:</p>	<p>Old Town Dump Operator: Location: <i>Dysart Rd. to RID Canal north of Thomas mile east</i></p>
<p>Orangewood</p> <p>Location: <i>Northeast corner of Orangewood and 107th Ave.</i></p>	<p>Perry Lane Methane</p> <p>Location: <i>Northeast corner of 1st St. and Perry Lane</i></p>

Appendix Table C.8. Maricopa County

<p>Perryville Operator: Maricopa County 3325 W. Durango St., Phoenix, AZ 85009</p> <p>Location: <i>Yuma Rd. east of Luke Air Force Auxiliary Field</i></p>	<p>RRCA (old Tempe) Operator: Raymond Edwards 1976 E. Pima St. Tempe AZ 85281</p> <p>Location: <i>61.3 miles north of Apache Blvd. on Hayden Rd.</i></p>
<p>Rainbow Enterprises Operator: Rainbow Enterprises 19052 N. 54th Ave., Glendale, AZ 85308</p> <p>Location: <i>.25 miles north of Union Hills Rd. on 54th Dr.</i></p>	<p>Rainbow Valley Operator: Maricopa County 3325 W. Durango St., Phoenix, AZ 85009</p> <p>Location: <i>5.5 miles from AZ 85 west to Airport Rd. south of Arlington</i></p>
<p>Reed Construction Operator: Reed Construction Co 4637 S. Whitton, Phoenix, AZ 85031</p> <p>Location: <i>West side of 67th Ave. on Salt River</i></p>	<p>Salt River/Pima Tribe / Tri-City Operator: Salt River Pima Tribe Route 1 Box 216, Scottsdale, AZ 85256</p> <p>Location: <i>1 mile north of Mc Dowell on the Beeline Highway, AZ 87</i></p>
<p>Satorise (earthworks) Operator: Pete Satoris 2833 N. River Stage, Phoenix, AZ 85004</p> <p>Location: <i>1.5 miles east of I-17 on end of Greenway Rd.</i></p>	<p>Spreckles Sugar Operator: Spreckles Sugar PO Box 68, Mendola, CA 93640</p> <p>Location: <i>Southwest corner of Riggs and McQueen Rds.</i></p>
<p>Terra Quest Operator: Terra Quest LTD - 602-831-9364 4541 E. Quartz Mountain, Paradise Valley, AZ 85253</p> <p>Location: <i>1.5 mile south of Baseline east side Priest Ave. Avenidos Del Yaqui</i></p>	<p>Tolleson Operator: City of Tolleson 9555 W. Van Buren. Tolleson, AZ 85253</p> <p>Location: <i>91st Ave. and Salt River</i></p>
<p>Tri City (old) Operator: Salt River Pima Tribe Route 1 Box 216, Scottsdale, AZ 85256</p> <p>Location: <i>North bank Salt River, west of Country Club Rd.</i></p>	<p>Tri City/Billing for Gilbert Operator: Town of Gilbert</p> <p>Location:</p>
<p>Tri City/Billing for Scottsdale Operator: City of Scottsdale</p> <p>Location:</p>	<p>Turf Paradise Operator: Turf Paradise 19th Ave. and Bell Rd., Phoenix, AZ 85023</p> <p>Location: <i>19th Ave. and Bell Rd.</i></p>
<p>UFI Operator: Universe Financial 2930 E. Camelback, Phoenix, AZ 85016</p> <p>Location: <i>Southeast corner of 123rd. Ave. and Bell Rd.</i></p>	<p>Val Vista</p> <p>Location: <i>Southeast corner of Ray Rd. and Val Vista Dr.</i></p>
<p>Wayne Oxygen Operator: Wayne Oxygen Co. 2615 S. 40th St., Phoenix, AZ 85034</p> <p>Location: <i>2615 S. 40th St.</i></p>	<p>Wickenburg Billing for Maricopa County Operator: Maricopa Solid Waste Department 2901 W. Durango, Phoenix, AZ 85009</p> <p>Location:</p>
<p>William Roer Operator: William Roer Route 1 Box 230, Laveen, AZ</p> <p>Location: <i>75th Ave., n. of Southern Ave.(south of Salt River)</i></p>	<p>Williams Air Force Base Operator: US Air Force</p> <p>Location: <i>Southwest corner of Williams Air Force Base</i></p>

Appendix Table C.9. Mohave County

<p>Anteres Operator: Mohave County 119 E. Andy Devine Ave. #C, Kingman, AZ 86402</p> <p>Location: <i>0.8 miles north of old US 66 on road to Pearce Ferry</i></p>	<p>Chloride Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>1 mile south of Chloride on 2nd St.</i></p>
<p>Colorado City Facility Operator: Colorado City - 520-875-5646 PO Box 70, Colorado City, AZ 86021</p> <p>Location: <i>0.5 miles east of Central Ave. on Mohave Ave.</i></p>	<p>Daniel's Wastewater Dolan Operator: Daniel's Septic Pumping - 520-754-3483 PO Box 1483, Bullhead City, AZ 86430</p> <p>Location: <i>Northeast of Bullhead City, 2 miles north of AZ</i></p>
<p>Springs Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>685 miles east of US 93 1 mile north</i></p>	<p>Hackberry Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>0.25 miles south of US 66 on road to Wickieup</i></p>
<p>Hualapi Mountain Park Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>12 miles S of old US 66 on Park Rd., 8 miles south</i></p>	<p>Kingman Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>1 mile east of old US 66 on Airport Rd.</i></p>
<p>Littlefield Operator: Mohave County Public Works - 520-757-0910 3675 E. Devine Ave. #C, Kingman, AZ 86402</p> <p>Location: <i>2 miles northeast of Littlefield</i></p>	<p>Meadview Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>7 miles south of Meadview on Pierce Ferry Highway</i></p>
<p>Oatman Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>1 mile south of Oatman</i></p>	<p>Peach Springs Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>2 miles south of Peach Springs on Reservation</i></p>
<p>Sacramento #1 Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>8.4 miles W of US 93 on AZ 68, 5 miles northwest</i></p>	<p>Sacramento #2 Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>1.3 miles west of US 93 on AZ 68 on Tooman Rd.</i></p>
<p>Silver Creek Operator: Mohave County Public Works - 520-757-0910 3675 E. Devine Ave. #C, Kingman, AZ 86402</p> <p>Location: <i>Silver Creek Rd., app. 2 miles west of Bullhead City</i></p>	<p>Temple Bar Operator: National Park Service</p> <p>Location: <i>.7 miles south of ranger station</i></p>
<p>Topcock Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>2 miles north of Topcock on AZ 95</i></p>	<p>Transwestern Pipeline Operator: Transwestern Pipeline 6381 N. Main St., Roswell, NM 88201</p> <p>Location: <i>1 mile north of I-40 35 miles east of Kingman</i></p>

Appendix Table C.9. Mohave County

<p>Truxton Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>1.5 miles southeast of Truxton</i></p>	<p>Wikieup Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>.5 miles north of Airport on Chicken Springs Rd.</i></p>
<p>Willow Beach Operator: National Park Service 3104 Department of Interior, Washington, DC 20240</p> <p>Location: <i>At Willow Beach in Lake Mead National Park</i></p>	<p>Willow Valley Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>18m N of Topcock on AZ 95, 4 miles on Willow</i></p>
<p>Yucca Operator: Mohave County 119 E. Andy Devine Ave., Kingman, AZ 86402</p> <p>Location: <i>1 mile south of Yucca</i></p>	

Appendix Table C.10. Navajo County

<p>City of Holbrook Facility Operator: City of Holbrook PO Box 970, Holbrook, AZ 86402</p> <p>Location:</p>	<p>Heber/Overgaard Operator: Waste Controls of Northern Arizona</p> <p>Location: <i>2.1 miles east of AZ 260, 1 mile north</i></p>
<p>Joseph City Operator: Navajo County Governmental Center, Holbrook, AZ 86025</p> <p>Location: <i>1.5 miles southeast of old US 66 on Richards Ave.</i></p>	<p>Pinetop/Lakeside Operator: Waste Controls of Northern Arizona</p> <p>Location: <i>1.1 miles south of Pine Lake Rd. on White Mountain Rd.</i></p>
<p>Show Low Operator: City of Show Low 200 W. Cooley, Show Low, AZ 85901</p> <p>Location: <i>3 miles east of Show Low on US 60</i></p>	<p>Taylor Operator: Town of Taylor PO Box 249, Taylor, AZ 85939</p> <p>Location: <i>2.5 miles south of Taylor on AZ 77, 0.25 miles east</i></p>
<p>Winslow South Operator: Town of Winslow 21 Williamson Ave., Winslow, AZ 86407</p> <p>Location:</p>	

Appendix Table C.11. Pima County

<p>29th St. Landfill Operator: City of Tucson PO Box 27210, Tucson, AZ 85726</p> <p>Location: <i>29th St. (Silverlake Rd.) and Santa Cruz River</i></p>	<p>A Mountain Operator: City of Tucson PO Box 27210, Tucson, AZ 85726</p> <p>Location: <i>Mission Rd. at base of "A" Mountain</i></p>
<p>Broadway #1 Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>South of Broadway Rd. between Kolb and Pantano</i></p>	<p>Broadway #2 Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>North of Broadway Rd. between Kolb and Pantano</i></p>
<p>Cactus Operator: City of Tucson</p> <p>Location: <i>Allen Rd. between Tucson Blvd. and Cactus Rd.</i></p>	<p>Catalina Operator: Pima County Solid Waste - 520-740-6650 201 N. Stone Ave. 6th Fl, Tucson, AZ 85701</p> <p>Location: <i>14425 N. Oracle Rd.</i></p>
<p>Columbus #1 Operator: City of Tucson PO Box 27210, Tucson, AZ 85726</p> <p>Location: <i>North end of Columbus Dr. on east end</i></p>	<p>Columbus #2 Operator: City of Tucson PO Box 27210, Tucson, AZ 85726</p> <p>Location: <i>North end of Columbus Dr. on east end</i></p>
<p>Congress Operator:</p> <p>Location: <i>East of Nearmont along west side of Santa Cruz</i></p>	<p>Cortaro Road Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>South of the Cortaro Road Bridge on east side</i></p>
<p>Cottonwood Operator: Barnett & Deyoe - 602-623-2662 701 W. Silverlake Rd., Tucson, AZ 85713</p> <p>Location: <i>3000 S. Cottonwood Ln.</i></p>	<p>Davis Monthan Operator: Davis-Monthan Air Force Base Tucson, AZ 85713</p> <p>Location: <i>Southwest of Davis-Monthan Runway</i></p>
<p>El Camino Del Cerro Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>0.5 miles west of I-10 on El Camino Del Cerro Rd.</i></p>	<p>Esperanza Operator: Duval Mining Corp. Z 4715 E. Fort Lowell Rd., Tucson, AZ 85712</p> <p>Location: <i>South of Tucson on Duval Mine Property</i></p>
<p>Granite Construction Operator:</p> <p>Location:</p>	<p>Harrison Operator: City of Tucson - 520-791-3175 4004 S. Park Ave., Tucson, AZ 85726</p> <p>Location:</p>
<p>Harrison Rd. #2 Operator: Pima County - 520-791-3175 130 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>0.5 miles north of Irvington Rd. on Harrison east</i></p>	<p>Jail Annex (Silverbell) Operator:</p> <p>Location:</p>
<p>La Canada</p> <p>Location: <i>1 mile south of Helmet Peak Rd.</i></p>	<p>La Cholla #1 Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>East side of La Cholla Rd., south of Rillito River</i></p>

Appendix Table C.11. Pima County

<p>Linda Landfill Operator:</p> <p>Location: <i>North of Alameda and east of Santa Cruz</i></p>	<p>Marana Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>1.5 miles west of I-10 on Tangerine Rd south side</i></p>
<p>Mission Landfill Operator:</p> <p>Location:</p>	<p>Nearmont Operator:</p> <p>Location: <i>Nearmont St. and Melwood</i></p>
<p>Old Nogales Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>East of I-19 on Hughes access road.</i></p>	<p>Organ Pipe Monument Operator: National Park Service 3104 Department of Interior, Washington, DC 20240</p> <p>Location: <i>Organ Pipe Monument, 1 mile south of Visitor Center</i></p>
<p>Pima County Facility Operator: City of Tucson PO Box 27210, Tucson, AZ 85726</p> <p>Location: <i>0.25 miles west of freeway north of Grant Rd.</i></p>	<p>Pima County - La Cholla #2 Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>West side of La Cholla Rd. south Rillito River</i></p>
<p>Rita Road Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location:</p>	<p>Ryan Field Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>12 miles west of Tucson on AZ 86 north of 86</i></p>
<p>Ryland Operator: City of Tucson PO Box 27210, Tucson, AZ 85726</p> <p>Location: <i>West end of 40th St. and Santa Cruz River</i></p>	<p>Saguaro Monument Operator: National Park Service 3104 Department of Interior, Washington, DC 20240</p> <p>Location: <i>1 mile southeast of Visitor Center</i></p>
<p>Sahuarita #1 Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>0.5 miles east of Sahuarita</i></p>	<p>Sasabe Operator:</p> <p>Location: <i>Presumido Peak Quadrant: 0.5 miles north of US-Mexico border</i></p>
<p>Silverbell (old) Operator:</p> <p>Location: <i>Silverbell Peak covered by mine tailings</i></p>	<p>St. Mary's Operator: City of Tucson PO Box 27210, Tucson, AZ 85726</p> <p>Location: <i>Southwest corner of St. Mary's Rd. and Grande</i></p>
<p>Tumamoc Operator: City of Tucson PO Box 27210, Tucson, AZ 85726</p> <p>Location: <i>Directly west of Tumamoc Hill on 22nd St.</i></p>	<p>Walnut Operator: City of Tucson PO Box 27210, Tucson, AZ 85726</p> <p>Location: <i>North end of Alvernon and Rillito Wash</i></p>
<p>Why Operator: Pima County 131 W. Congress, Tucson, AZ 85701</p> <p>Location: <i>0.5 miles north of Why on AZ 85</i></p>	<p>Wilmot Rd. Operator: City of Tucson PO Box 27210, Tucson, AZ 85726</p> <p>Location: <i>1 mile south of I-10 on Wilmont Rd</i></p>

Appendix Table C.12. Pinal County

<p>Central Arizona College Operator: Signal Peak Campus Woodruff at Overfield Rd., Coolidge, AZ 85228</p> <p>Location: <i>On Signal Peak Campus</i></p>	<p>Coolidge #1 Operator: City of Coolidge PO Box 398, Coolidge, AZ 85228</p> <p>Location: <i>0.6 miles north of AZ 287 on Nafiger Rd.</i></p>
<p>Coolidge #2 Operator: City of Coolidge PO Box 398, Coolidge, AZ 85228</p> <p>Location: <i>1 mile north of AZ 287 on Christenson Rd.</i></p>	<p>Florence Operator: City of Florence 133 N. Main St., Florence, AZ 85232</p> <p>Location: <i>On US 80,89 0.35 miles south of milepost 138</i></p>
<p>Florence State Prison Operator: AZ Department of Corrections 1601 W. Jefferson, Phoenix, AZ 85007</p> <p>Location: <i>0.25 miles southeast of prison</i></p>	<p>Florence State Prison #1 Operator: AZ Department of Corrections 1601 W. Jefferson, Phoenix, AZ 85007</p> <p>Location: <i>5.7 miles east of Prison off Division Dam Rd.</i></p>
<p>Kearney Operator: Town of Kearny PO Box 338, Kearny, AZ 85237</p> <p>Location: <i>1 mile west of Kearney on AZ 177</i></p>	<p>Kelvin/Riverside Operator: Pinal County PO Box 727, Florence, AZ 85232</p> <p>Location: <i>1.3 miles south of AZ 177 on Mineral Creek Rd.</i></p>
<p>Maricopa #1 Operator: Pinal County PO Box 727, Florence, AZ 85232</p> <p>Location: <i>0.8 m east of Maricopa Rd., north side of Casa Grande</i></p>	<p>Maricopa #2 Operator: Pinal County PO Box 727, Florence, AZ 85232</p> <p>Location: <i>3 miles north of Maricopa on Maricopa Rd.</i></p>
<p>Oracle Operator: Pinal County PO Box 727, Florence, AZ 85232</p> <p>Location: <i>0.5m east of AZ 77, north side of Valley Wash</i></p>	<p>Picacho Operator: Pinal County - 520-868-6680 PO Box 1747, Florence, AZ 85232</p> <p>Location: <i>0.5 miles south of I-10 on Picacho Blvd., east to site on East Shay Rd. (0.5 miles)</i></p>
<p>Randolph La Palma Operator: Pinal County - 520-868-6680 PO Box 727, Florence, AZ 85232</p> <p>Location: <i>2 miles south of Randolph on AZ 87</i></p>	<p>San Manuel Operator: Magma Copper Co. PO Box M, San Manuel, AZ 85631</p> <p>Location: <i>Mc Nab Pkwy, through town to dead end, left 0.4 miles</i></p>
<p>San Manuel Townsite Operator: BHP Copper Inc. - San Manuel - 520-385-3469 PO Box M, San Manuel, AZ 85631</p> <p>Location: <i>Mc Nab Pkwy, through town to dead end, left 0.4 miles</i></p>	<p>Stanfield Operator: Pinal County - 520-868-6680 PO Box 1747, Florence, AZ 85232</p> <p>Location: <i>1.2 miles west of Maricopa Rd. on AZ 84</i></p>
<p>Superior Operator: Pinal County - 520-868-6680 PO Box 1747, Florence, AZ 85232</p> <p>Location: <i>2.1 miles. south of US 60 on Mary Dr.</i></p>	<p>Town of Mammoth Operator:</p> <p>Location: <i>Off Hwy 77 on N end of town</i></p>

Appendix Table C.13. Santa Cruz County

<p>Kino Springs Operator: Yerba Buena Utilities One Xavier Way, Nogales, AZ 85621</p> <p>Location: <i>3.5 miles south of AZ 82 on Kino Springs Rd.</i></p>	<p>Nogales Operator: City of Nogales 1018 Glenn Ave., Nogales, AZ 85621</p> <p>Location: <i>0.5 miles east of US 89, north 0.5 miles on Bankyard</i></p>
<p>Tubac Operator: Santa Cruz County - 520-761-7800 2150 N. Congress site, Nogales, AZ 85621</p> <p>Location: <i>West of I-19 at exit 40, 0.7 miles north</i></p>	

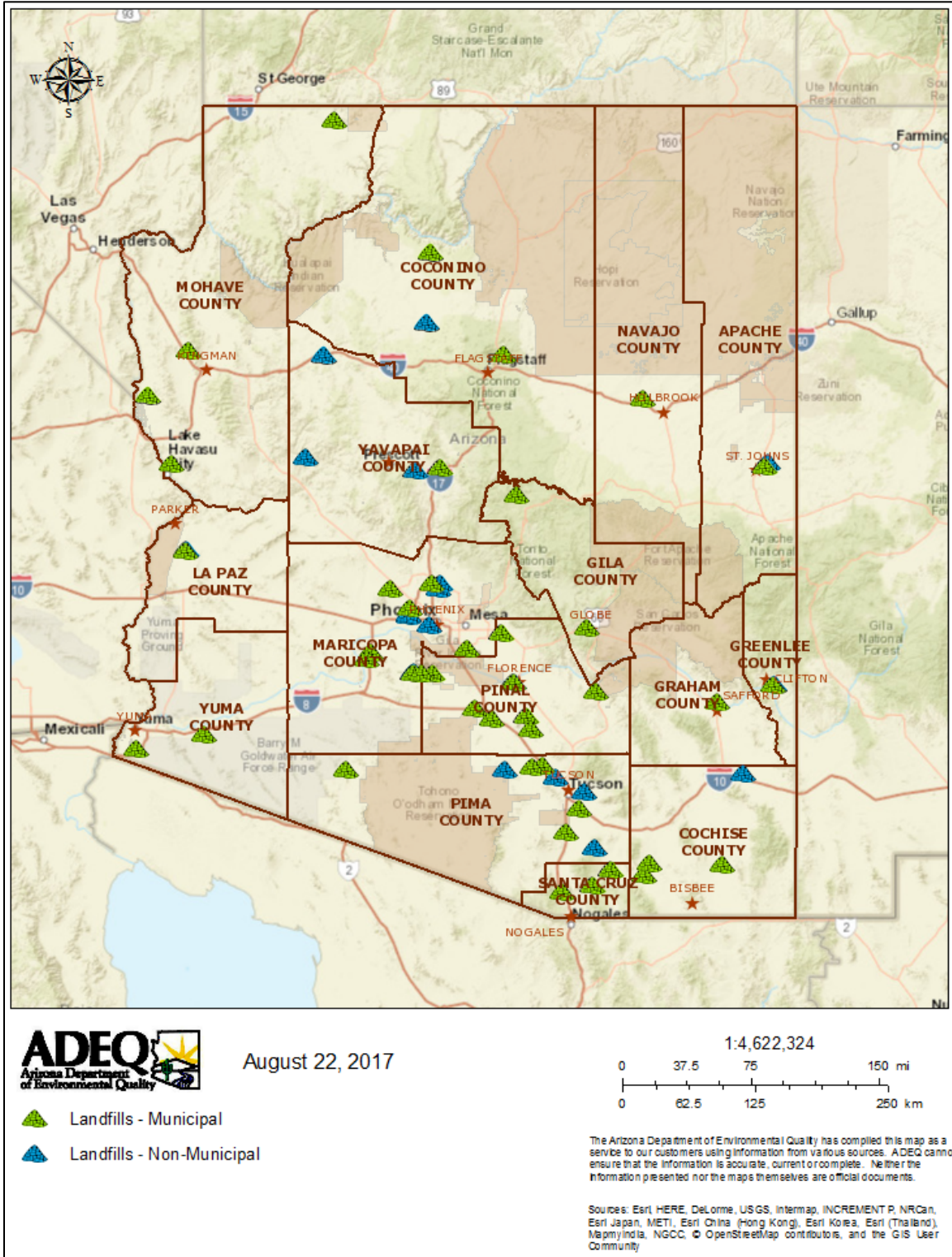
Appendix Table C.14. Yavapai County

<p>Ash Fork Operator: Yavapai County - 520-771-3088 255 E. Gurley, Prescott, AZ 86301</p> <p>Location: <i>0.5 miles north of I-40 on road just west of Dunbar Stone Co.</i></p>	<p>Bagdad Operator: Yavapai County - 520-771-3088 255 E. Gurley, Prescott, AZ 86301</p> <p>Location: <i>0.8 miles east of the high school, left at mine entrance</i></p>
<p>Chemical Nelson Plan Landfill Operator: Chemical Lime Company - 602-941-1291 7272 E. Indian School Rd. #350, Scottsdale, AZ 85251</p> <p>Location: <i>Inside Nelson Plant of Chemical Lime Co., 0.60 miles</i></p>	<p>Congress Operator: Yavapai County 255 E. Gurley, Prescott, AZ 86305</p> <p>Location: <i>.1 mile north of milepost 271 on west side of US 93</i></p>
<p>Cottonwood Operator: Yavapai County 255 E. Gurley, Prescott, AZ 86305</p> <p>Location: <i>893.2 miles west of 89A at end of Mingus Ave.</i></p>	<p>Hillside Operator: Yavapai County 255 E. Gurley, Prescott, AZ 86305</p> <p>Location: <i>North side of AZ 96 at hillside</i></p>
<p>Magma McCabe Operator: BHP Copper Inc. - 520-575-5600 7400 N. Oracle Rd. #200, Tucson, AZ 85704</p> <p>Location: <i>3.5 miles southwest of Humboldt on Iron King Rd.</i></p>	<p>Mayer Operator: Yavapai County 255 E. Gurley, Prescott, AZ 86305</p> <p>Location: <i>Turn on Main St. then left behind Black Canyon</i></p>
<p>Sedona Operator: Yavapai County 255 E. Gurley, Prescott, AZ 86305</p> <p>Location: <i>9.6 miles south of AZ 179 on US 89A, 0.8 miles west</i></p>	<p>Seligman Operator: Yavapai County - 520-771-3088 255 E. Gurley, Prescott, AZ 86301</p> <p>Location: <i>0.5m west of Seligman Exit off I-40; 1.1 miles north</i></p>
<p>Skull Valley Operator: Yavapai County 255 E. Gurley, Prescott, AZ 86305</p> <p>Location: <i>4 miles southeast of I-10 at Aztec Interchange</i></p>	

Appendix Table C.15. Yuma County

<p>Aztec Operator: Location: <i>4 miles south of I-10 at Aztec Interchange</i></p>	<p>Dateland Operator: Yuma County 2703 Avenue B, Yuma, AZ 85364 Location: <i>2.8 miles north of I-18 (Exit 67), 2 miles west</i></p>
<p>Dome Operator: Yuma County 2703 Avenue B, Yuma, AZ 85364 Location:</p>	<p>Martinez Lake Operator: BLM 2400 Valley Bank Center, Phoenix, AZ 85073 Location: <i>1 mile northeast of Fisher's Landing (north end of airstrip)</i></p>
<p>North Gila Valley Operator: Yuma County 2703 Avenue B, Yuma, AZ 85364 Location: <i>Ave. 7 east and County 5th St., 1.25 miles east on County 5th St. across canal</i></p>	<p>Roll Operator: Yuma County - 520-329-2307 2703 Avenue B, Yuma, AZ 85364 Location: <i>6 miles north of US 80 on I-8 exit 38 east</i></p>
<p>San Luis Operator: Yuma County 2703 Avenue B, Yuma, AZ 85364 Location: <i>2.75 miles east of AZ 95 on County and 23rd St.</i></p>	<p>Wellton Operator: Yuma County 2703 Avenue B, Yuma, AZ 85364 Location: <i>2.8 miles north of Wellton Ave.</i></p>

Active Municipal Solid Waste Facilities



Appendix Figure C.1. Map of Arizona, showing active landfills across the state (<http://gisweb.azdeq.gov/arcgis/emaps/?topic=landfills>).

Appendix Table C.16. Active Landfills in Arizona

County	Active Landfill
Apache	<p>Apache County Regional Landfill – Blue Hills Owner: Apache County (928.333.1628) Operator: Apache County PO Box 428, St. Johns, AZ 85936 Location: <i>2.5 miles northeast of St. Johns on US 191</i></p>
Cochise	<p>Cochise County Western Regional Landfill Owner: Cochise County Operator: Cochise County (520.803.3770) 2595 N. Sagebrush Road, Huachuca City Location: <i>0.5 miles north of SR 82 and 4 miles east of SR 90</i></p>
	<p>Huachuca City Owner: Town of Huachuca City Operator: Town of Huachuca City (520.456.1928) 600 Skyline Drive, Huachuca City Location: <i>1 mile east of Highway 90 on Skyline Ave. 3 miles north to site.</i></p>
Coconino	<p>Cinder Lake Landfill Owner: City of Flagstaff Operator: City of Flagstaff - 928-213-2125 Highway Department, Flagstaff, AZ 86001 Location: <i>12 miles north of Flagstaff, 1 mile east of Hwy 89</i></p>
	<p>South Rim Landfill, Grand Canyon National Park Owner: National Park Service, US Dept of Interior Operator: National Park Service, US Dept of Interior - 928-213-2125 Location: <i>2 miles north of South Rim Grand Canyon National Park, entrance off SR-64</i></p>
Gila	<p>Buckhead Mesa Landfill Owner: US Dept of Agriculture Operator: Gila County - 928-476-3350 1321 E. Buckhead Mesa Landfill Rd, Payson Location: <i>North of Payson, Hwy 87, at milepost 263, 1 mile east to site</i></p>
	<p>Russell Gulch Landfill Owner: Gila County Operator: Gila County - 928-425-7470 5891 E. Hope Lane Location: <i>1.5 miles south of SR 60 and SR 80 intersection at end of Russel Gulch Rd.</i></p>
Graham	<p>Graham County Regional Landfill - 928-432-4286 Owner: City of Safford Operator: City of Safford - 928-432-4286 3600 North Safford Landfill Rd, Safford Location: <i>3 miles north of the intersection of S. 8th Ave. and Hwy 70</i></p>
Greenlee	<p>Loma Linda Landfill Owner: Greenlee County Board of Supervisors Operator: Greenlee County Roads & Public Works - 928-865-4762 1271 Skyline View Rd, Clifton Location: <i>3 miles southeast of Clifton, 2 miles east of Hwy 191 (milepost 157.5)</i></p>

Appendix Table C.16. Active Landfills in Arizona

County	Active Landfill
La Paz	<p>La Paz County Regional Landfill - 928-916-1256 Owner: La Paz County Operator: Allied Waste Systems of Arizona, LLC - 26999 Highway 95, Parker Location: <i>3.5 miles south of Hwy 72 on Hwy 95, east on Landfill Rd.</i></p>
Maricopa	<p>Butterfield Station Facility Owner: Waste Management of Arizona, Inc. Operator: Waste Management of Arizona, Inc. - 602-437-3165 40404 So. 99th Ave., Mobile Location: <i>91st Ave., north of SR-238</i></p>
	<p>City of Glendale Municipal Solid Waste Landfill Owner: City of Glendale Operator: City of Glendale Municipal - 623-930-2191 11480 W. Glendale Ave., Glendale Location: <i>1 mile east of El Mirage Rd., on Glendale Ave.</i></p>
	<p>Northwest Regional Landfill Owner: Waste Management of Arizona, Inc. Operator: Waste Management of Arizona, Inc. - 623-584-6065 19401 W. Deer Valley Rd., Surprise Location: <i>Southeast of the intersection of 195 Ave. and Deer Valley Rd.</i></p>
	<p>Sierra Estrella Landfill, Inc. Owner: Waste Management of Arizona, Inc. Operator: Waste Management of Arizona, Inc. - 602-437-3165 22087 N. Ralston Rd., Maricopa Location: <i>South of SR 238, on N. Ralston Rd.</i></p>
	<p>Southwest Regional Municipal Solid Waste LF Owner: Buckeye Pollution Control Corp. Operator: Allied Waste Industries of Arizona, Inc. - 623-393-0085 24427 SR-85, Buckeye Location: <i>15 miles south of I-10</i></p>
Mohave	<p>Arizona Strip Community Landfill Owner: Towns of Colorado City & Fredonia Operator: Arizona Strip Landfill Corp. - 928-875-2646 Location: <i>Hwy 389, 9 miles southeast of Colorado City</i></p>
	<p>Cerbat Municipal Solid Waste Landfill Owner: County of Mohave Operator: Gambi Disposal, Inc. - 928-565-2777 7300 Mineral Park Rd., Golden Valley Location: <i>12 miles north of Kingman on Mineral Park Rd., east of Hwy 93</i></p>
	<p>Lake Havasu City Landfill Owner: BLM and Lake Havasu City Operator: Allied Waste Industries - 928-855-441 3251 E. Chenoweth Dr, Lake Havasu City Location: <i>5 miles north of Lake Havasu City and 2.5 miles east of SR 95</i></p>

Appendix Table C.16. Active Landfills in Arizona

County	Active Landfill
Mohave	<p>Mohave Valley Landfill Owner: Mohave County Operator: Mesa Disposal, Inc. - 928-758-0000 3999 East El Rodeo Rd., Fort Mohave Location: <i>6 miles northeast of the intersection of Hwy 95 and El Rodeo Rd.</i></p>
Navajo	<p>Painted Desert Regional Owner: Pen-Rob, Inc, dba Painted Desert Landfill Operator: Waste Management of Arizona, Inc. - 928-288-3605 9001 North Porter Ave., Joseph City Location: <i>I-40, Exit 274, 7 miles north</i></p>
Pima	<p>Ajo Municipal Solid Waste Landfill Owner: Pima County Operator: Tucson Recycling & Waste Services - 520-623-7300 2000 North Ajo Well No. 1 Rd., Ajo Location: <i>1 mile east of the intersection of Hwy 85 and W. Rasmussen Rd.</i></p>
	<p>Los Reales Landfill Owner: City of Tucson Operator: City of Tucson - 520-791-4183 5300 E. Los Reales Rd., Tucson Location: <i>South of Los Reales Rd. on Swan Rd., south on Craycroft off I-10</i></p>
	<p>Marana Regional Landfill Owner: Waste Management of Arizona, Inc. Operator: Waste Management of Arizona, Inc. - 800-963-4776 14508 West Avra Valley Rd, Marana Location: <i>I-10, Exit 242, go 9 miles west on W. Avra Valley Rd.</i></p>
	<p>Sahuarita Landfill Owner: Pima County Operator: Tucson Recycling & Waste Services - 520-623-7300 16605 S. La Canada Dr., Sahuarita Location: <i>2 miles southwest of I-19, Exit 75</i></p>
Pinal	<p>Apache Junction Landfill Owner: Apache Junction Landfill Corp. Operator: Apache Junction Landfill Corp. - 480-982-7003 4050 South Tomahawk Rd., Apache Jct Location: <i>2.5 miles south of Hwy 60, Exit 197</i></p>
	<p>Cactus Landfill Owner: Cactus Waste Systems, LLC Operator: Cactus Waste Systems, LLC - 480-797-0140 22481 East Deep Well Ranch Rd., Florence Location: <i>15 miles south of Florence and 8 miles west of SR-79</i></p>
	<p>Casa Grande Landfill Owner: City of Casa Grande Operator: City of Casa Grande - 520-421-8628 5200 S. Chuichu Rd., Casa Grande Location: <i>Northwest corner of I-8 and Chuichu Rd.</i></p>
	<p>City of Eloy Landfill Owner: City of Eloy Operator: City of Eloy - 520-466-3366 305 So. Toltec Hwy, Eloy Location: <i>Northeast corner of S. Toltec Hwy and W. Alsdorf Rd.</i></p>

Appendix Table C.16. Active Landfills in Arizona

County	Active Landfill
Pinal	<p>Dudleyville Municipal Solid Waste Landfill Owner: Waste Management of Arizona, Inc. Operator: Waste Management of Arizona, Inc. - 520-356-6181 8195 N. Hwy 77 Location: <i>3 miles south of Winkelman</i></p>
	<p>Ironwood Municipal Solid Waste Landfill Owner: Waste Management of Arizona, Inc. Operator: Waste Management of Arizona, Inc. - 520-868-8778 12720 E. Hwy 287, Florence Location: <i>2.5 miles east of Adamsville Rd. and Hwy 287</i></p>
Santa Cruz	<p>Rio Rico Sanitary Landfill Owner: Rio Rico Properties, Inc. Operator: Santa Cruz County - 520-761-7892 1500 West Frontage Rd., Rio Rico Location: <i>1 mile north of the Peck Canyon interchange on the west side of I-19</i></p>
	<p>Sonoita-Elgin Landfill Owner: US Dept of Interior, BLM Operator: Santa Cruz County - 520-455-0409 2857 Hwy 83, Sonoita Location: <i>Hwy 83 and Lower Elgin Rd., 2.5 miles east of Hwy 83 and 82 interchange</i></p>
	<p>Town of Patagonia Landfill Owner: Town of Patagonia Operator: Town of Patagonia - 520-394-2229 McKeown Ave., Patagonia Location: <i>2 miles northwest of Patagonia off Hwy 82</i></p>
Yavapai	<p>Gray Wolf Regional Landfill Owner: Waste Management of Arizona, Inc. Operator: Waste Management of Arizona, Inc. - 928-634-2002 23355 East Hwy 169, Dewey Location: <i>3 miles west of I-17</i></p>
Yuma	<p>Copper Mountain Landfill Owner: Copper Mountain Landfill, Inc. Operator: Copper Mountain Landfill Acquisition, Inc. - 928-785-3797 34853 East County 12th St., Wellton Location: <i>3 miles southwest of I-8, Exit 37</i></p>
	<p>South Yuma County Landfill Owner: South Yuma County Landfill Operator: South Yuma County Landfill - 928-782-1015 19536 S. Avenue 1 E, Yuma Location: <i>2 miles east on W. County 15 St., and 3 miles south on S. Avenue 1 E</i></p>
	<p>Yuma Proving Ground Solid Waste Facility Owner: Dept of U.S. Army Operator: Dept of U.S. Army Location: <i>25 miles east of Yuma on Hwy 95 within Yuma Proving Ground</i></p>

APPENDIX D:

SHPO GUIDANCE AND FREQUENTLY ASKED QUESTIONS CONCERNING DOCUMENTATION OF HISTORICAL WASTE PILES

This guidance is a State Historic Preservation Office (SHPO) supplement to the Arizona State Museum (ASM) *Policy and Procedures Regarding Historical-Period Waste Piles* (approved February 21, 2021) which was developed by ASM in collaboration with SHPO and the Historical Archaeology Advisory Committee (HAAC) for projects occurring on state, county, or municipal land. The policy statement itself can be downloaded from the following site: <https://statemuseum.arizona.edu/crm/document/historical-waste-piles>:

“Due to the increasing number of historical-period archaeological sites, archaeologists spend significant amounts of time recording mass-produced, historical-period artifacts. Therefore, in specific circumstances, a historical-period waste pile composed of mass-produced, historical-period artifacts may be recorded as an Isolated Occurrence (IO). In such cases, neither the assignment of an ASM site number nor the submission of a site card is required.”

SHPO Guidance

Implementation of ASM’s policy regarding the documentation of historical waste piles as isolated features (isolated occurrence [IO]) requires that researchers have a knowledge of relevant historical contexts, and assess the significance of the waste pile before deciding to treat it as an IO. As noted in SHPO’s Survey Report Standards, the eligibility of IOs are reviewed on a case-by-case basis. Although most IOs are ineligible for inclusion in the Arizona or National Registers of Historic Places (ARHP/NRHP), this may not always be the case. All IOs must be evaluated for their significance and ARHP/NRHP eligibility.

FAQs

If there are additional questions not addressed in this FAQ, please review relevant sections in this latest revision of *Down in the Dumps* and/or contact SHPO.

Q. Can ASM’s policy be applied to projects involving federal or private land?

A. SHPO recommends the policy should be universally applied on federal lands if it conforms to an existing agency programmatic agreement and/or the agency guidance manuals and handbooks. Yes, it should be used for projects involving private land. If there is a combination of federal and private land, be consistent with the land managing agency’s decision.

Q. Is this policy retroactive?

A. No. All existing site numbers will be retained by the ASM and AZSITE.

Q. Is there a difference between a waste pile and a trash scatter or an open dump?

A. Yes; the guidance follows the definitions presented in this revision of *Down in the Dumps*. Open dumps and trash scatters should be recorded as archaeological sites (provided they meet ASM’s site criteria).

Q. My survey includes a trash scatter previously recorded as an archaeological site. How do I treat it now? Does the site’s eligibility status affect how it is treated?

A. SHPO and ASM recommend that the site number be retained and it should continue to be treated as a site. No, the eligibility status of a previously recorded site should not be considered. It should be treated as an archaeological site if it already has a site number, regardless.

Q. The historical waste pile in my project area is likely associated with a historical road. How do I document the historical waste pile?

A. The significance of the historical waste pile must be assessed in the appropriate context (regardless of whether the road is abandoned or in-use). If archival research suggests an association with the road, then the documented waste pile should be evaluated as a contributing or non-contributing component of the road. In other words, the waste pile would be documented as a feature of the site (abandoned road) or historical in-use structure, and not as a separate IO.

Please bear in mind, however, that waste piles may also be associated with local homesteads, farms, and ranches. Indeed, the road in question may also have a more direct association with a larger property resource, particularly a ranch encompassing multiple sections of land (in which case, the nearby waste pile and road would be documented as a feature and structure of the larger property resource). Again, archival research is imperative for identifying possible associations with nearby structures and/or larger property resources. If the archival research *cannot* definitively indicate an association with an adjacent historical road or possible larger property resource, then the waste pile would be documented as an IO.

Q. There is a historical waste pile in the vicinity of a historical structure (for example, a windmill or fence line); how do I document the waste pile?

A. Sufficient background research (e.g., use of historical maps, photographs, primary and secondary resources) should first be conducted to assess whether the structures are part of a larger homestead, ranching facility, etc. If research suggests no association with a larger property and no association with the structure, then historical waste pile can be recorded as an IO.

Q. There is a historical waste pile associated with one feature. Can I document this as an IO?

Q. We have encountered a multicomponent site consisting of a historical waste pile and a prehistoric lithic scatter. How do I document this?

A. Any historical waste pile associated with a *historical* feature should be documented as a site.

If the waste pile is identified in a prehistoric site (with or without features), SHPO preference is to address each component separately. SHPO is of the opinion that multicomponent sites should be limited in definition, such as a site consisting of a Paleolithic or Archaic period component and a later Formative period component, not one that contains both prehistoric and historical materials that are clearly temporally discrete. As such, in this example, the lithic scatter would be recorded as a site and the historical waste pile would be recorded as an IO.

Whereas ASM's current policy is to record a prehistoric lithic scatter and historical waste pile as a multicomponent site under one site number, SHPO recommends that each component be evaluated separately. Thus, prehistoric component is/is not recommended eligible for inclusion in the ARHP/NRHP, and the historic component is/is not recommended eligible for inclusion in the ARHP/NRHP. Do not state that one component does or does not contribute to the eligibility of the other.

That being said, for projects that *only* involve an Arizona Antiquities Act permit, follow ASM protocol and obtain one site number; however, the evaluation of each component must be made independent of one another.

Q. The historical waste pile in my survey area includes at least two discrete dumping areas that appear to be temporally distinct. Do I document the waste pile as an IO or a site?

Q. There are multiple historical waste piles in the survey area, each separated by about 100 meters or less. Should I document them collectively as a single site, or as 3 separate IOs?

A. Field documentation of waste piles in the survey area (including an inventory of artifacts), coupled with information collected from a review of pertinent archival resources, should determine the manner in which they are documented. For example, if the documented waste piles share a general temporal range of deposition (e.g., 1930s–1950s) and are in close vicinity to one another, they likely share an association with one or more nearby residences, camps, or a larger ranch. As such, they should be documented as a site. If, however, there is a sizeable temporal disparity between documented waste piles (regardless of distance), then an argument can certainly be made that they are individually distinct, and would therefore be documented as IOs. Regardless of the manner of documentation (site or IO), the archaeologist must still provide a summary of these findings, as well as an assessment and evaluation of significance.

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