

# ***Closing Open Dumps***



## THE NATIONAL PROBLEM OF DUMPING

The National Survey of Community Solid Waste Practices, underway in the States and territories since 1966, spotlights the magnitude of the national problem of solid waste dumping.\* Conducted with the aid of the Bureau of Solid Waste Management, the Survey had identified more than 13,600 solid waste land disposal sites--and less than 5 percent of them can be considered to meet the minimum standards for sanitary landfills. Over 95 percent exhibit one or more of the following characteristics of a dump: unsightly appearance, blowing paper, dust, burning wastes, pollution of surface or groundwater, and infestation by rodents and insects.

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\*Black, R. J., A. J. Muhich, A. J. Klee, H. L. Hickman, Jr., and R. D. Vaughan. The national solid wastes survey; an interim report. U.S. Department of Health, Education, and Welfare, [1968]. 53 p.



C L O S I N G   O P E N   D U M P S

*This report (SW-61ts) was written by  
Dirk R. Brunner, S. Jackson Hubbard, Daniel J. Keller,  
and James L. Newton*

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## FOREWORD

The predominant means of solid waste disposal over the Nation today is open dumping, where a community has a piece of land, and collection trucks and individuals dump solid wastes indiscriminately. The wastes are not covered, and generally the community exercises no control over the site. The dump is a source of pollution and environmental degradation, and frequently the situation has been deteriorating over a period of years.

Communities and their States are now beginning, however, to take a close look at this unacceptable disposal practice. Many people realize that open dumping must end, and some State legislatures and city and county authorities have already outlawed the practice.

These developments have created a need for providing guidance on how to close a dump and how to dispose of solid wastes on land in an acceptable manner. This publication tells why dumps should be closed and describes the closing process.

--RICHARD D. VAUGHAN  
*Assistant Surgeon General  
Acting Commissioner  
Solid Waste Management Office*

## CLOSING OPEN DUMPS

### An Open Dump--What It Is, Why It Should Be Closed

A dump is a land disposal site where solid wastes are deposited with little or no regard for pollution controls or aesthetics. Dumps create health hazards, scenic blight, economic loss--and all in all, a spectacular demonstration of what is wrong with solid waste management in the United States. A dump may be referred to as "open," because the wastes are left uncovered, and often neither the existence nor the use of the dump are authorized and there is no supervision.

Every type of solid waste has been deposited in dumps--abandoned tires and automobiles, old furniture and kitchen appliances, industrial and commercial wastes, agricultural byproducts, trees, vegetation, demolition and construction wastes, as well as mixed household refuse. Every type of topography--ranging from flat, completely exposed areas, to steep ravines, to stream banks--has been used for this open dumping (Figure 1).

Frequently, an open dump is also a burning dump. The fire may be spontaneous. It may result from the deposit of smoldering wastes. More often, however, the fire is purposely set in an attempt to reduce volume at the dump or on the erroneous assumption that burning will destroy the food that attracts rodents and insects.

Health hazards are created by dumps through the presence of biological and chemical contaminants, which air, water, birds, insects, and rodents can carry to man and his domestic animals. A burning dump pollutes the air, most commonly in the form of highly visible clouds of particles and incompletely burned gases, or the nauseating stench of smoldering garbage (Figure 2). These air pollutants can cause human respiratory disease. They also soil buildings, clothing, and furnishings, and are a fire hazard to buildings, fields, and woodlands.

A dump can pollute both surface and groundwater. The wastes themselves, when dumped on banks of streams or lakes or in swampy areas, can pollute the water directly. A less obvious form of water pollution occurs when rain or surface water percolates down through uncovered or improperly managed dumps and carries portions of the wastes into the underlying groundwater.

A dump provides food and shelter for vermin. Extermination efforts by themselves last only a short time--and even then are not 100 percent effective. Burning the wastes may reduce food sources in a limited way, but often only the paper and plastic packaging burns, thus making the food more readily available to vermin.

There are other health threats to humans created by the existence of dumps, since typically the dumps are open to uncontrolled scavenging. Sharp fragments of glass and metal and other hazardous objects, plus pathogenic organisms, toxic chemicals, and open fires present a real danger to those roaming the dumps. The scavengers often interfere with the operation of the dump.

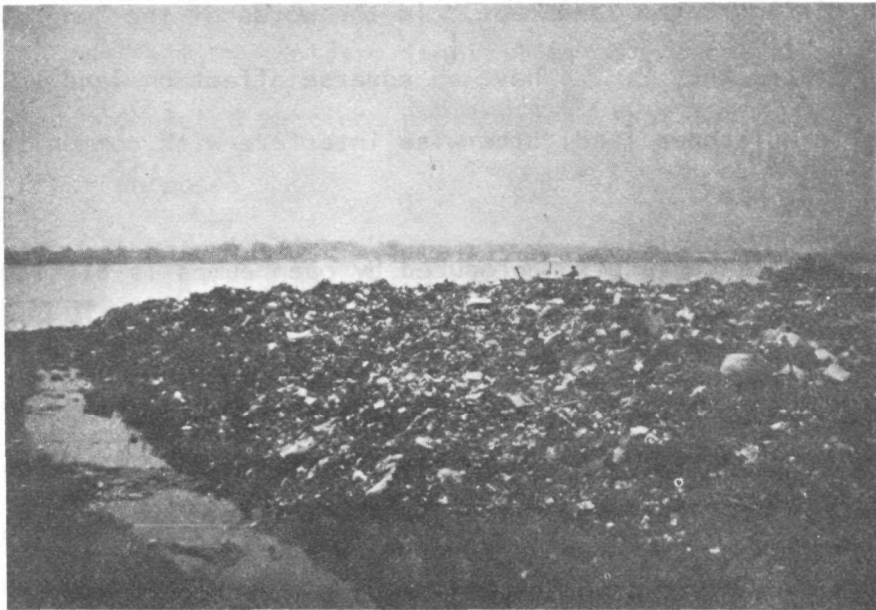


FIGURE 1. Open dumps create health hazards, scenic blight, and economic loss.



FIGURE 2. An open burning dump pollutes air, water, and land, and demonstrates spectacularly what is wrong with solid waste management throughout the Nation.



Dumps disfigure the landscape. In the words of the Congress of the United States they ". . . have an adverse effect on land values, create public nuisances [and] otherwise interfere with community life and development."<sup>1</sup>

The aesthetic degradation produced by open dumps is difficult to assess in any but abstract terms; it is, nevertheless, very real. No accurate appraisal has been made of the impact a dump has on the value of neighboring property, but one thing is clear--nobody wants one near his home. The National Survey of Community Solid Waste Practices indicates that over 60 percent of such sites are in agricultural or rural areas. Despite such typical locations, the existence of "garbage dumps" is well known. As a matter of fact, when most people think of solid waste disposal they have a dump in mind. They do so with reason, because up to 90 percent of community wastes are now deposited in dumps. This association of wastes and dumps is so well established that it is the major stumbling block to the location, construction, and operation of sanitary landfills. People have to be shown that sanitary landfills are entirely different from dumps before they will accept their use.

The economic costs of an open dump are never fully appreciated. In the long term, a dump will probably prove more expensive to a community's inhabitants than a sanitary landfill. Even without putting a price on the aesthetic blight produced by a dump, a community will pay more for maintenance, laundry, cleaning, and painting due to smoke. There is no doubt that the value of real estate nearby to dumps is seriously reduced, which reduces the community's tax base. Moreover, this

drain on the public continues until the dump is effectively and properly closed. In contrast, a sanitary landfill is more acceptable while being operated, and completed sections provide land that can be used for recreation or other purposes.

Industry is becoming increasingly aware that solid wastes must be disposed of properly. The selection of a new plant location may depend on the ability of the disposal system to accept industrial wastes without degrading the environment. Many companies would not consider open dumping acceptable because these firms know they will be the target of adverse publicity if pollution problems arise.

State legislatures are responding to the public's growing awareness of the shortcomings of open dumping and burning. Many States have already begun to outlaw these practices. The alternative to open dumping is the sanitary landfill. Present technology offers incineration and composting as methods of reducing the volume of waste that must be ultimately disposed of on the land (Appendix A).

#### How To Close A Dump

Governmental agencies, industry, citizens, and environmental effects should all be considered in developing a plan to eliminate a dump and to establish an acceptable substitute. The plan should provide for informing everyone about the need for closing the dump and the procedures that will be followed. The plan should also outline the funding arrangements necessary to carry out the operation and the anticipated use of the closed site. If the present dump location is suitable, it is often

more feasible to convert the dump into a sanitary landfill than to establish a new site.

Information Dissemination. It is imperative that the public, industry, and municipal agencies be kept informed of activities pertaining to the dump closing. They are the source of the necessary funds and their cooperation is critical to a satisfactory solid waste disposal program. They should, therefore, be told:

- Why the dump is being closed
- How the job will be done
- What method of acceptable waste disposal will replace the dump
- What the costs are

A vigorous program is essential to success, and all the various techniques of information dissemination can be used to help win a favorable press.<sup>2</sup> Keeping the public informed should begin when the planning starts and continue with progress reports until the dump is closed and the new disposal method is operating successfully.

Disposal During and After Closure. A dump cannot be closed in one day. The rat extermination program alone normally requires up to 2 weeks, and extinguishing fires may take another week. Compacting and covering may take over 2 months, depending upon the size of the dump.

Open dumping must stop before rat extermination starts, and only authorized personnel should be allowed on the site during the closing operation. An approved site, with fixed and posted hours of operation, must be established for the wastes formerly disposed of at the dump.

Complete information about the new facility should be displayed at the entrance to the closed dump and advertised in news media.

The cooperation of those delivering wastes to the dump is needed to ensure success. The managements of private and municipal collectors should be told in advance of changes in disposal procedures. This information should also be available to collection crews. If individual citizens also use the dump, an intensive public information campaign should be undertaken.

Rat Extermination. Rat extermination must be given special attention when closing an active dump.<sup>3</sup> At an old open dump where the food source has been exhausted, rats and insects are unlikely to be present. Where there is a nearby food source, the old dump may still be used by rats for harborage. It is necessary, therefore, to positively establish the absence of rats. If rats are present, an extermination program must be conducted. If the dump closing operation is improperly conducted, the rat problem may be compounded.

Rats are potential carriers of numerous diseases, and if they are not killed when a dump is closed, they may pose even more of a problem than when they are at the dump. They may migrate in numbers to populated areas in search of food and harborage. At a minimum, this would cause unfavorable reaction to the dump closing and the situation would worsen if there was a rise in the incidence of rat bites.

Only trained personnel should be allowed to conduct the operation since the improper use of poisons is dangerous and may lead to lawsuits. The work is best done by a pest control specialist or by a government

rodent control expert. Assistance may be obtained from State and local health officials, pest control services, the U.S. Fish and Wildlife Service, the Bureau of Community Environmental Management, or the Bureau of Solid Waste Management, U.S. Public Health Service. More detailed information is readily available elsewhere.<sup>4-7</sup>

Extinguishing Fires. Fires at dumps may be difficult and expensive to extinguish. In some cases the burning solid waste may have to be exposed and spread out, requiring the use of heavy earthmoving equipment. The operator must work very carefully to prevent injuring himself or damaging his equipment. Spreading the waste generally allows the fire to partially burn itself out, and water can then be applied to the smoldering remains. The fire can usually be extinguished while the rat poisoning program is underway.

Covering the Dump. Immediately following the rat poisoning and fire extinguishing, the dump surface should be graded, compacted, and covered with at least 2 feet of soil. In closing large dumps, the rat extermination program should be maintained while successive sections of the dump are covered. To grade, compact, and cover most dumps, large crawler dozers will usually be necessary. Either the trench or the area method is generally used in closing the dump.

In the trench method, wastes are spread in thin layers in an excavation, compacted, and then covered with the excavated soil (Figure 3). This achieves maximum density and minimum settlement. The cover material should be compacted to keep flies in and rats out, and it should be graded to keep surface water from ponding. The bottom of the trench should be kept above the level of high groundwater.

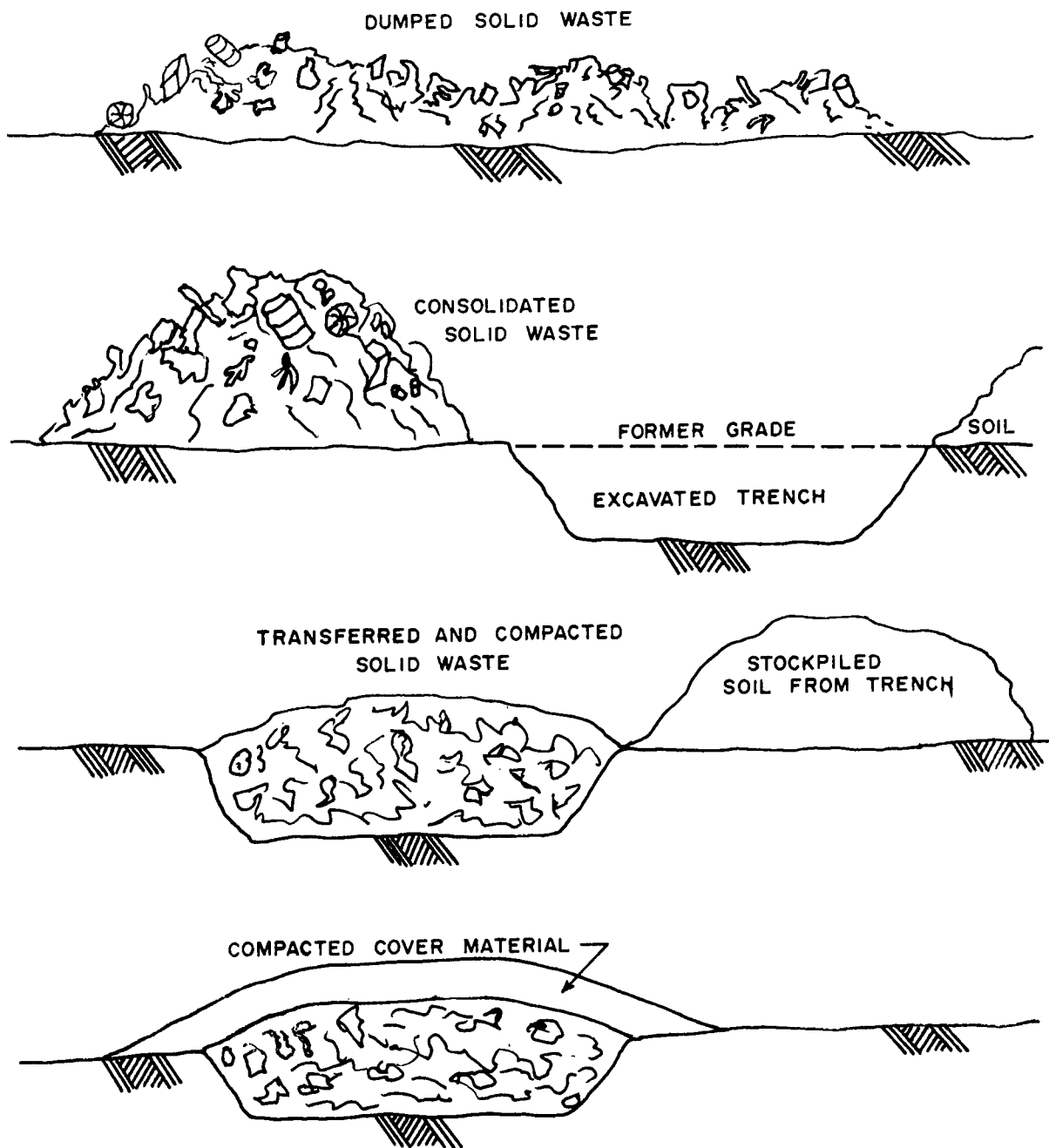


FIGURE 3. In the trench method of covering a dump, the wastes are spread in thin layers in an excavation, compacted, and then covered with the excavated soil, compacted, and graded.



The area method also involves spreading the wastes in thin layers, compacting it, and then covering it with a minimum of 2 feet of compacted soil (Figure 4). If the solid waste is spread over a large area, it must be consolidated and compacted to reduce the amount of settlement and cover material required. The cover material must be graded to avoid ponding of surface water. A modification of this method is used to close bank-type dumps (Figure 5).

Protection of Water Quality. If the dump is in a marshland or an area where the groundwater or surface waters have been contaminated, remedial action should be taken by removing the solid waste from the water or treating the water. The latter step is normally not feasible because of the difficulty in collecting and treating contaminated water. The solid waste and water can be separated by diverting the flow of water or by removing the solid waste from the watercourse. If necessary, surface streams may be relocated and the groundwater level lowered, but it is often more economical to remove the solid waste from the stream using draglines. Removal of old solid waste usually produces very unpleasant odors, so workmen may have to wear gas masks.

The solid waste removed from the water should not be allowed to create new problems. Since most marshes are underlaid by a blanket or a layer of relatively impervious silt, it is often feasible to construct an impervious berm around the perimeter of the new site. The berm should be keyed to the underlying impervious silt layer and constructed higher than the outside water level. Another device is to build a mat to serve as an operating platform for a dragline as well as the foundation for

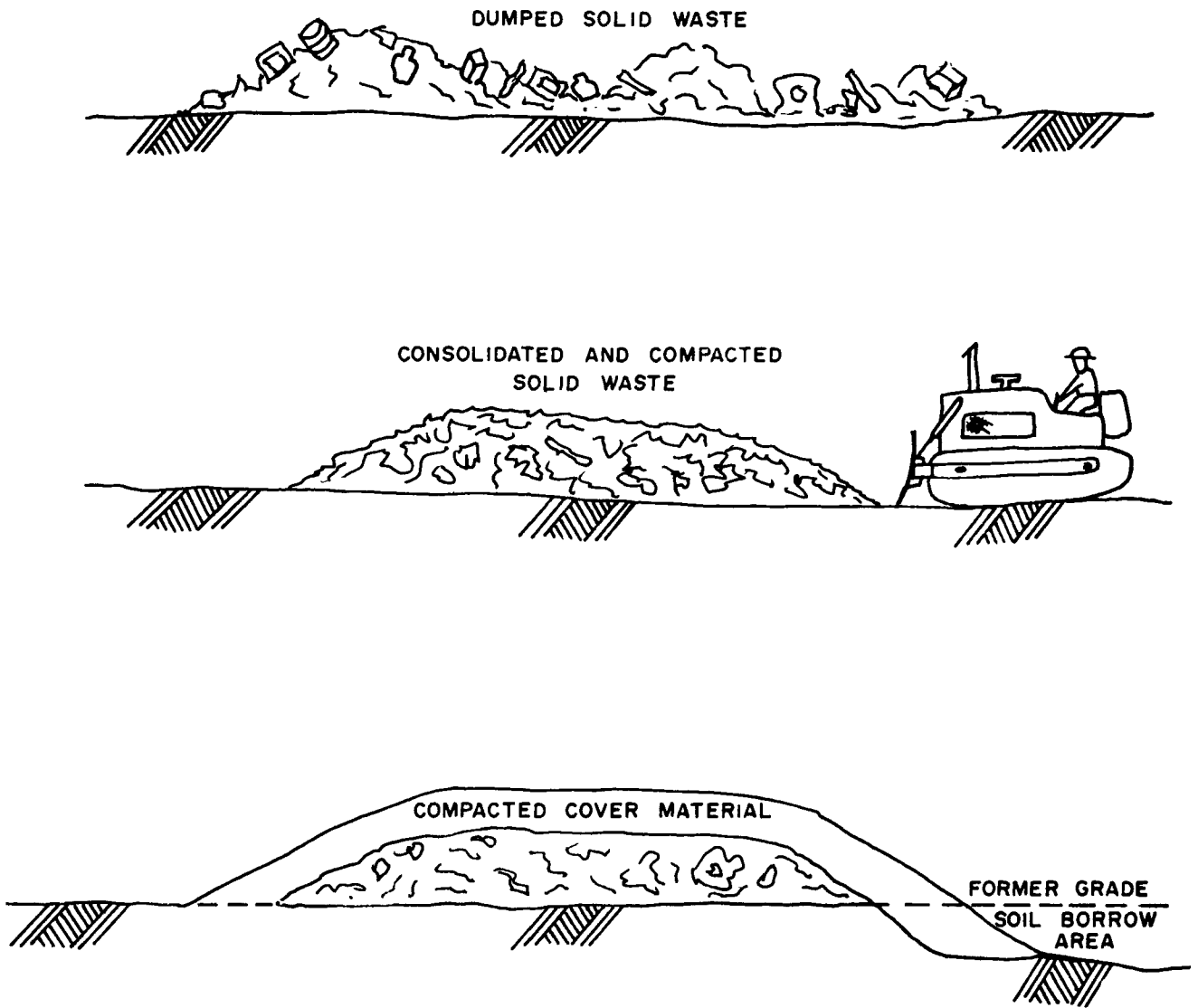


FIGURE 4. In the area method of covering a dump, wastes are spread in thin layers, compacted, and covered with a minimum of 2 feet of compacted soil.

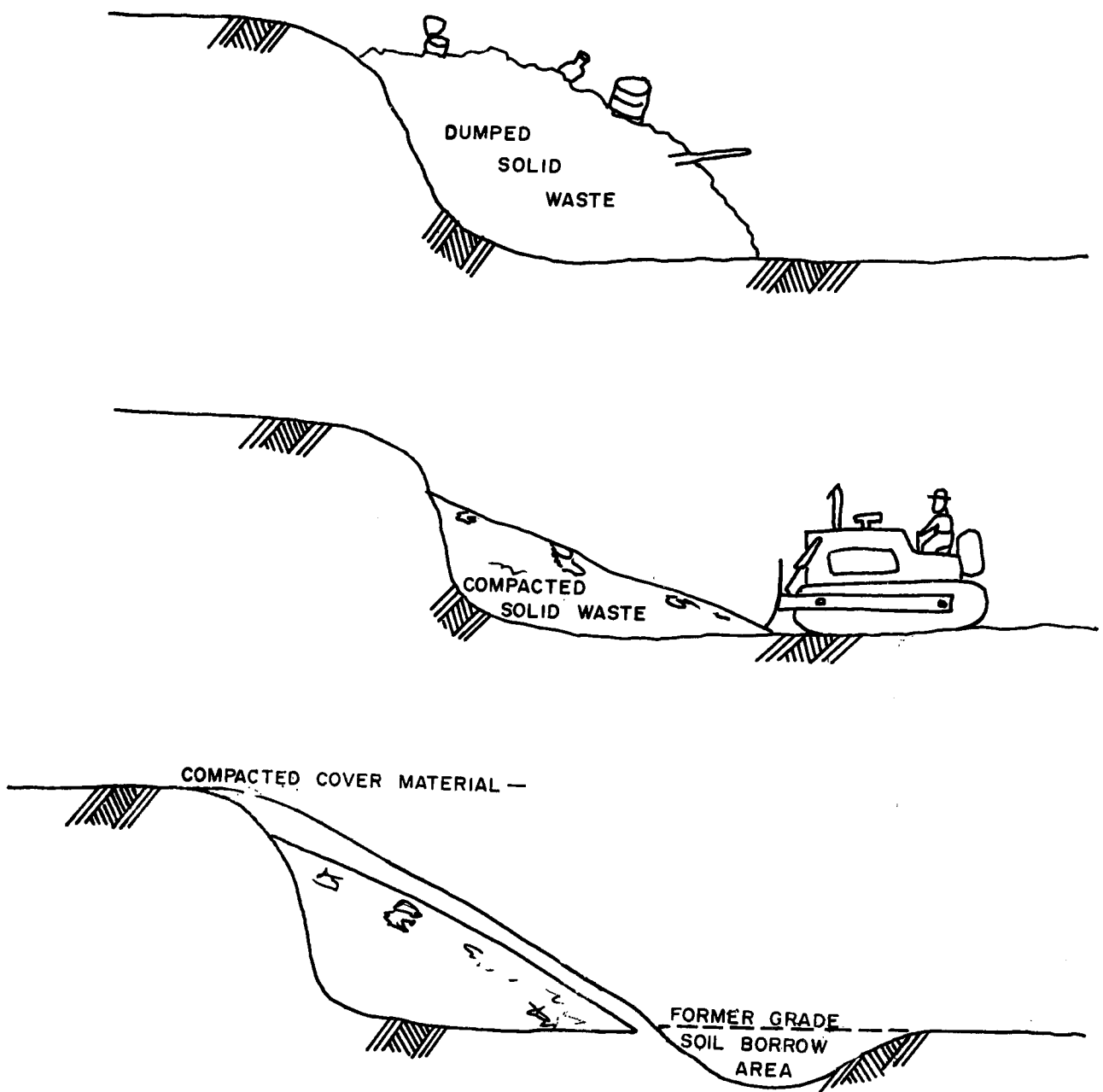


FIGURE 5. A modified area method is used to close bank-type dumps.

the excavated solid waste that will finally be covered with soil (Figure 6). Relatively inert materials such as rocks, soil, broken concrete, or demolition debris may be used for this purpose.

Cover Material. Cover material should be selected according to its ability to perform the following functions: (1) limit the access of vermin to the solid waste; (2) control moisture entering the fill; (3) control the movement of gas from the decomposing waste; (4) provide a pleasing appearance and control blowing paper; (5) support vegetation.

Not all soil types perform these functions equally well (Table 1). While the soil is usually selected from the types available nearby, consideration needs to be given to its suitability before using it as cover material.

The depth of the cover material depends on the use planned for the closed dump, as well as the soil type. Usually 2 feet of earth is sufficient, and it should be compacted and graded. Proper grading is important since it prevents excessive soil erosion and ponding. Ponding tends to infiltrate and saturate the fill, resulting in water pollution.

To further reduce erosion, the area should be seeded with grass or other vegetation. Two feet of soil is usually sufficient for grass, but more is necessary for shrubs and trees. If the dump is along a lake front or the edge of a stream, riprap is often required to prevent water from eroding the edge of the cover material.

Ultimate Use of Closed Dump. A closed dump need not remain an unused parcel of wasteland. The site may have been changed from a ravine or gully to a relatively flat area. It is no longer unsightly since

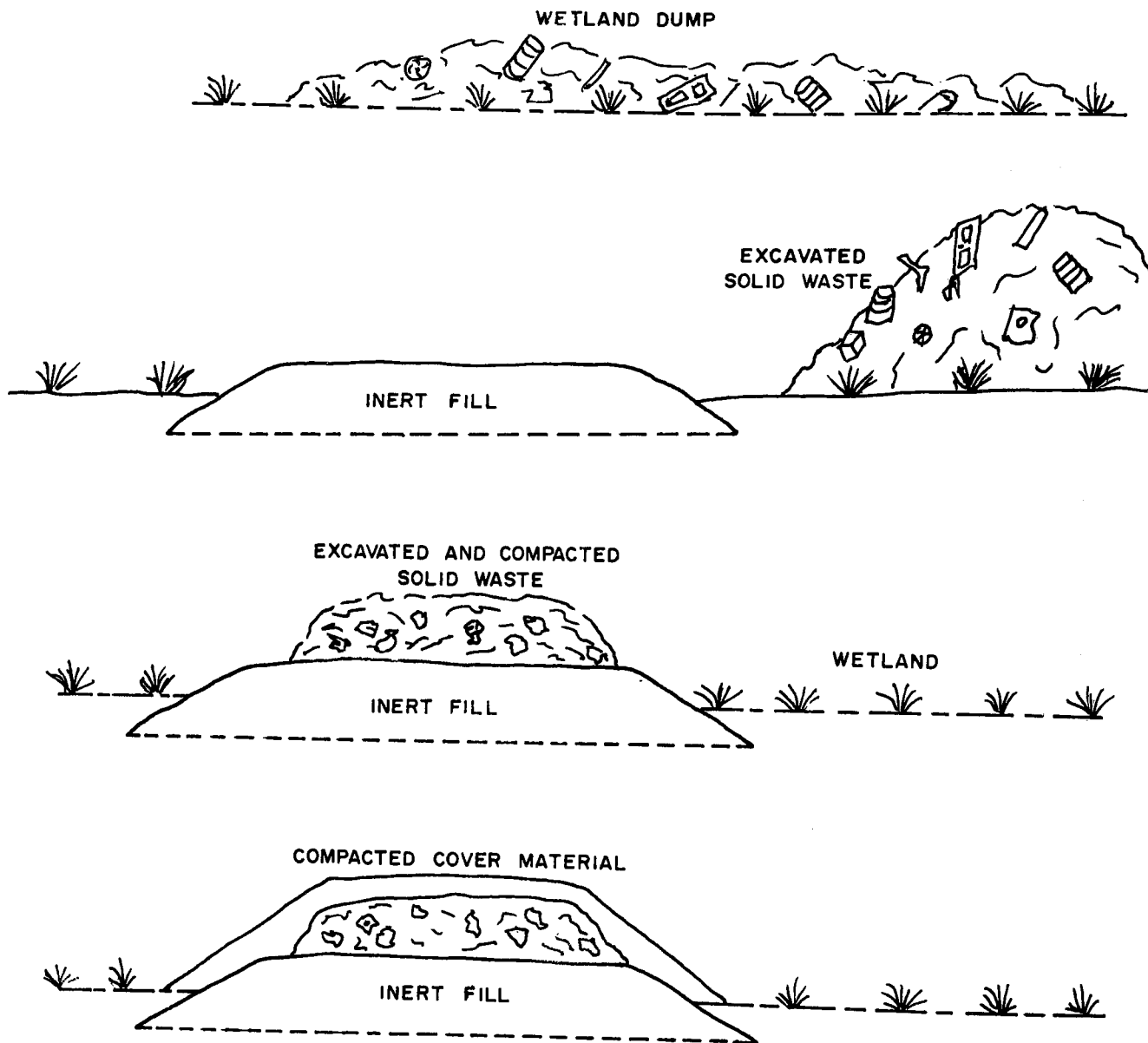


FIGURE 6. To properly close a wetland dump so that water quality will not be impaired, it will often be necessary to elevate the waste deposit above the general water level.

TABLE 1

## COVER MATERIAL SUITABILITY OF GENERAL SOIL TYPES

Function	General soil type					
	Clean gravel	Clayey-silty gravel	Clean sand	Clayey-silty sand	Silt	Clay
Prevent rodents from burrowing or tunneling	G	F-G	G	P	P	P
Keep flies from emerging	P	F	P	G	G	E*
Minimize moisture entering fill	P	F-G	P	G-E	G-E	E*
Minimize landfill gas venting through cover	P	F-G	P	G-E	G-E	E*
Provide pleasing appearance and control blowing paper	E	E	E	E	E	E
Support vegetation	P	G	P-F	E	G-E	F-G
Be permeable for venting decomposition gas <sup>†</sup>	E	P	G	P	P	P

E, excellent; G, good; F, fair; P, poor.

\*Except when cracks extend through the entire cover.

<sup>†</sup>Only if well drained.



it is covered with soil and with grass and other vegetation. It is almost inevitable that a high amount of uneven settlement will occur and recognition of this fact should influence the ultimate use of the site.

In general, it is not advisable to construct buildings over a closed dump because it makes a poor foundation. Furthermore, gas from the decomposing waste may accumulate in explosive concentrations in or beneath buildings constructed on or adjacent to the fill. Playgrounds, golf courses, and similar recreational facilities do not normally have to support appreciable concentrated loads, and converted dumps are often used for these purposes, but they still require careful planning. Maintenance costs may be greater for recreational areas constructed on dumps than on natural ground because of excessive and irregular settling and possible cracking of the cover material.

The main objective of solid waste management should be the safe and economic disposal of solid wastes, and the use of a completed site should not conflict with this objective.

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## APPENDIX A

### AVAILABLE METHODS OF DISPOSAL

A sanitary landfill can be designed and operated so that solid wastes can be disposed on land under conditions that control odor, rodents, insects, and air and water pollution.<sup>1</sup> In a sanitary landfill, solid waste is spread in thin layers, compacted to the smallest practical volume, and covered with earth every day of operation in a manner that safeguards against environmental pollution. No burning is permitted. When the site is completed, it can become a community asset--a green area or a recreation facility, for example. Proper planning before filling actually begins can mean maximum use of the completed site.

Communities with limited space for sanitary landfilling should consider processing to achieve volume reduction. Incineration is a controlled combustion process used to reduce the volume of solid waste.<sup>2</sup> When properly designed, constructed, and operated, an incinerator can substantially reduce the volume and weight of a community's solid wastes without damaging the environment. Certain wastes are not processed through a conventional incinerator because they are too large, would not burn sufficiently in the normal process time, or might damage or interfere with the incinerator mechanism. These wastes, plus the residue from conventional incineration, still require disposal on land in a sanitary manner.

Composting is another alternative and involves processing of wastes for reuse as a soil conditioner.<sup>3</sup> Although the economics of this process

in the United States have not been favorable, composting combined with separation for recycling of certain noncompostable components of solid waste may provide a useful waste treatment method. The net cost to the community depends on the availability of markets for the compost and for the separated paper, metals, glass, and other salvaged materials. Nonsalable residues of the process must still be disposed of in a sanitary manner.

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