There are three basic systems for storing liquid manure: formed tanks, earthen basins, and lagoons. The type of storage affects the manure volume, the nutrient concentration, and ultimately, the land application rate of the manure. Each system has its own set of construction and management requirements.

SYSTEM DESCRIPTIONS

Formed tanks

Formed tanks, or pits, are used to conserve nutrients if the producer has adequate land to use the manure as crop fertilizer. Estimated nitrogen (N) losses from pits are typically about 30 percent, leaving 70 percent of the excreted N for use by the crops. Formed tanks normally contain 50 to 80 pounds of nitrogen per 1,000 gallons of manure. The concentration depends on the species, the part of the operation the tank serves (farrowing, nursery, finishing), and other management and equipment considerations. For example, swine finishing operations that use wet/dry feeders normally have 30 percent less manure volume and the manure is 30 percent more concentrated than identical operations with dry feeders and nipple waterers.

Compared with lagoons, the nutrient content of manure from formed pits is highly concentrated because little, if any, dilution water is added. Formed pits are too costly for storing dilute forms of manure that require large amounts of fresh water.

Earthen manure storage

Earthen basins are less expensive to construct than formed structures. They are lined with clay or plastic rather than concrete or steel. All earthen basins are constructed outside. Earthen basins have sloping sides rather than vertical sides. Like formed tanks, earthen basins are used with pull-plug gutters and scrapers. Although they receive no extra dilution water, they do collect some extra rain water due to their sloping sides.

Earthen basins also conserve nutrients, although nitrogen volatilization to the air and dilution water off the sidewalls slightly reduce nutrient concentrations. In Iowa, estimates of N, P_20_5, and K_20 are 32-22-20 lbs./1,000 gals. Land application rates will be higher than from formed tanks, but still low when compared to lagoons.

While earthen basins are a lower cost storage method, they are thought to be more likely to leak than concrete or steel formed pits. To be environmentally safe, earthen basins must be built correctly and managed properly. IDNR specifies construction requirements regarding factors such as soil type, excavation, and freeboard. Earthen basins must have 2 feet of freeboard.

Because compacted earth is used to seal them, extra care is necessary during agitation and pumpout to avoid eroding holes in the sides or bottom. They're also subject to burrowing rodents and should be checked frequently to prevent problems.

Lagoons

Lagoons are large earthen structures designed to partially treat manure as well as store it. Microbes digest the volatile solids, turning them into liquid and gaseous fractions. Lagoons must receive large quantities of dilution water for the microbes to thrive and grow. Therefore lagoons are typically seven to 10 times larger than formed tanks or earthen basins. Although they provide some treatment, it is not sufficient to allow discharge of the lagoon liquid.

Lagoons can be either aerobic (containing dissolved oxygen in the liquid) or anaerobic (no dissolved oxygen). Agricultural operations almost always use anaerobic lagoons (no oxygen). They are much smaller than aerobic

lagoons, they cost less, and they require less management.

Lagoon systems essentially dispose of nutrients to the air and to the lagoon floor. About 70 percent of the nitrogen from the animals is volatilized to the air, while phosphorus is settled out with solids. Unless the lagoon is vigorously agitated, the phosphorus stays on the bottom as sludge. Producers who don't have adequate land for nutrient application use lagoons to minimize the acreage needed. Lagoons also are used for flush or recharge manure handling systems because they can provide a source of relatively high quality liquid to recycle to the animal houses. These systems are used to improve air quality in buildings.

Lagoon nutrient concentrations are typically one-tenth of pit nutrient concentrations. In Iowa, lagoon estimates of N, P_20_5, and K_20 are 4-3-4 lbs./1,000 gals.

DRY MANURE STORAGE

Dry manure storage has the potential to pollute [illegible]

- Divert all outside water away from stack.
- [illegible]
- [illegible] apply it using liquid application equipment.

MANAGEMENT REQUIREMENTS

Good management must be continuous for all storage facilities. Management of earthen basins and lagoons includes erosion control on both inside and outside walls. Establish good vegetative cover both on the outside berm and on the inside down to the waterline. Do not use deep rooted vegetation that will create macropores. Fix any small gullies that develop. Rip-rap at the waterline of lagoons is desirable. Manage pumps and agitators to avoid erode holes in the bottom or sides.

Install a depth gauge to show liquid level in the structure. It should be marked at the maximum allowable liquid elevation (where pumpout MUST occur). Read and record the level frequently and regularly. Storage structures should be checked at least once a week; once a day is better. It is especially important to record the readings if more than one person checks the liquid level. Your first indication of a leaking storage structures may be a decline in the liquid level. Regularly inspect toe drains and tile flows for any off color, odor, foaming, etc. and that pipes are open.

Freeboard should never have stored liquid. A properly maintained freeboard will prevent storage pits and lagoons from overtopping and overflowing, even during heavy rainfall events. Keep freeboards clear by pumping pits at the proper time.

Keep at least a foot of airspace between the slats and the liquid in inside pits. Additional airspace may be needed if pit ventilation is used. Use adequate agitation to minimize solids buildup. Systems using wet/dry feeders and hanging waterers may result in thicker manure, requiring additional water at pumpout time to help with agitation.

Do not pump earthen storage structures dry. Leave a small amount of liquid in the bottom to prevent the compacted soil liner from drying out and cracking.

Monitor pumping at all times. Several releases have occurred from unattended pumping equipment. Plug nearby tile intakes during pumpout. Pumps should have lockouts and safety switches to automatically shut down if pressure changes (if a pipe breaks, pressure will drop; if a plug occurs, pressure will rise). Lockouts also prevent unauthorized people from starting equipment. Keep needles, AI straws, bones, plastic gloves, and other "stuff" out of the storage basin, lagoon, or pit. They can and do interfere with pumps and valves.

STORAGE CAPACITY CALCULATIONS

You should be able to calculate the amount of manure in your storage facility whether it's square, round, or earthen. The following three equations provide simple methods to calculate it. The tables at the end of this chapter provide the same information for the specified sizes. If you have different dimensions or depths than those shown in the tables, you can interpolate between the tables.

Rectangular pits

The equation is
Gallons =
length x width x depth x 7.5
(The 7.5 converts from cubic feet to gallons.)

Example:
You have a 40 x 200 finishing pit, 9 feet deep. You are able to remove 7 feet (all but the bottom foot, plus a foot of freeboard).

Manure volume, gallons =
200 x 40 x 7 x 7. 5 = 420,000 gallons

(See Tables 1-3, storage & handling pages 7 and 8 for rectangular pit capacities.)

Round pits

The equation is
Gallons =
diameter x diameter x depth x 0.78 x 7.5
(The 7.5 converts from cubic feet to gallons.)

Example:
You have a 100-foot diameter finishing pit, 10 feet deep. You are able to remove 8 feet (all but the bottom foot, plus a foot of freeboard).

Manure volume, gallons =
100 x 100 x 8 x 0.78 x 7.5 = 468,000 gallons

(See Table 4, storage & handling page 8 for round tank capacities.)

Earthen basins

The equation for earthen basins is more complicated. We will assume that the sideslopes are 3:1. The procedure is to calculate the surface area at the waterline before pumpout, add the surface area at the waterline after pumpout, divide by 2 to get the average surface area, then multiply by the depth of manure removal.

To get the dimensions of the surface area after pumpout, take 2 times the sideslope, multiply it by the depth, and subtract it from the full top dimension. Then multiply by 7.5 to convert from cubic feet to gallons.

The equation is
Gallons =
[(top length x top width) + (top length – 6 x depth) x (top width – 6 x depth)] x
1/2 x depth x 7.5

Example:
You have an earthen basin measuring 100 x 300 feet at the waterline, and you want to pump out 10 feet.

Volume calculation:
Surface area before pumping =
100 x 300 = 30,000 sq. ft.

Surface area after pumping =
[100 - (6 x 10)] x [300 - (6 x 10)] =
40 x 240 = 9600 sq. ft.

Average surface area =
(30,000 + 9600) x 1/2 = 19,800 sq. ft.

Volume =
19,800 x 10 X 7.5 = 1,485,000 gallons

(See Tables 5-8, storage & handling pages 9 and 10 for earthen basin capacities.)

SUMMARY OF KEY POINTS

- There are three basic types of liquid manure storage systems: formed tanks or pits – can be inside or outside buildings, round or rectangular; earthen basins — similar to formed pits but made of earth; and lagoons – constructed of earth, with much dilution water added.

- Pits and basins are designed for *storage only*. Lagoons are designed to *store* and

treat manure. Lagoon liquid is still not clean enough to release.

- Nutrient concentrations in manure are highest in formed pits, less concentrated in earthen basins, and very low in anaerobic lagoons, but all do contain nutrients.
- During construction of any earthen storage it is **EXTREMELY** important to remove any tile lines within 50 feet of the toe of the berm.
- Add plenty of dilution water to avoid overloading lagoons.
- Pits and basins are nutrient-conserving systems. Lagoons are nutrient-wasting systems.
- Properly operated lagoon nutrient concentrations are typically about one-tenth those of pits. Pit nutrients are typically 50-42-30 of N-P_2O_5-K_2O. Lagoon nutrients are typically 4-3-4.
- Outdoor formed storages are required to have at least one foot of freeboard.
- Earthen storages are required to have at least two feet of freeboard.
- The two factors for safe manure storage are good construction and good management.
- Manure volumes can be calculated from the equations at the end of the chapter.
- To convert from cubic feet to gallons, multiply by 7.5.
- Never leave operating pumps, lines, or other equipment unattended.
- Operate pumps in earthen storages carefully to avoid erosion on the sides or bottom.
- Dry manure should be stored under roof whenever possible.
- Dry manure stored outdoors should be well away from streams and waterways, on impermeable soil, and protected from upslope runoff. Releases from confinement units are prohibited by law, regardless of manure type—liquid or dry.

TABLE 1

RECTANGULAR PIT CAPACITY GALLONS — 6 FEET OF LIQUID

	WIDTH, FT.								
LENGTH, FT.	20	30	40	50	60	70	80	90	100
40	36,000	54,000	72,000	90,000	108,000	126,000	144,000	162,000	180,000
60	54,000	81,000	108,000	135,000	162,000	189,000	216,000	243,000	270,000
80	72,000	108,000	144,000	180,000	216,000	252,000	288,000	324,000	360,000
100	90,000	135,000	180,000	225,000	270,000	315,000	360,000	405,000	450,000
120	108,000	162,000	216,000	270,000	324,000	378,000	432,000	486,000	540,000
140	126,000	189,000	252,000	315,000	378,000	441,000	504,000	567,000	630,000
160	144,000	216,000	288,000	360,000	432,000	504,000	576,000	648,000	720,000
180	162,000	243,000	324,000	405,000	486,000	567,000	648,000	729,000	810,000
200	180,000	270,000	360,000	450,000	540,000	630,000	720,000	810,000	900,000
220	198,000	297,000	396,000	495,000	594,000	693,000	792,000	891,000	990,000
240	216,000	324,000	432,000	540,000	648,000	756,000	864,000	972,000	1,080,000
260	234,000	351,000	468,000	585,000	702,000	819,000	936,000	1,053,000	1,170,000
280	252,000	378,000	504,000	630,000	756,000	882,000	1,008,000	1,134,000	1,260,000
300	270,000	405,000	540,000	675,000	810,000	945,000	1,080,000	1,215,000	1,350,000
320	288,000	432,000	576,000	720,000	864,000	1,008,000	1,152,000	1,296,000	1,440,000
340	306,000	459,000	612,000	765,000	918,000	1,071,000	1,224,000	1,377,000	1,530,000
360	324,000	486,000	648,000	810,000	972,000	1,134,000	1,296,000	1,458,000	1,620,000
380	342,000	513,000	684,000	855,000	1,026,000	1,197,000	1,368,000	1,539,000	1,710,000
400	360,000	540,000	720,000	900,000	1,080,000	1,260,000	1,440,000	1,620,000	1,800,000

TABLE 2

RECTANGULAR PIT CAPACITY GALLONS — 8 FEET OF LIQUID

	WIDTH, FT.								
LENGTH, FT.	20	30	40	50	60	70	80	90	100
40	48,000	72,000	96,000	120,000	144,000	168,000	192,000	216,000	240,000
60	72,000	108,000	144,000	180,000	216,000	252,000	288,000	324,000	360,000
80	96,000	144,000	192,000	240,000	288,000	336,000	384,000	432,000	480,000
100	120,000	180,000	240,000	300,000	360,000	420,000	480,000	540,000	600,000
120	144,000	216,000	288,000	360,000	432,000	504,000	576,000	648,000	720,000
140	168,000	252,000	336,000	420,000	504,000	588,000	672,000	756,000	840,000
160	192,000	288,000	384,000	480,000	576,000	672,000	768,000	864,000	960,000
180	216,000	324,000	432,000	540,000	648,000	756,000	864,000	972,000	1,080,000
200	240,000	360,000	480,000	600,000	720,000	840,000	960,000	1,080,000	1,200,000
220	264,000	396,000	528,000	660,000	792,000	924,000	1,056,000	1,188,000	1,320,000
240	288,000	432,000	576,000	720,000	864,000	1,008,000	1,152,000	1,296,000	1,440,000
260	312,000	468,000	624,000	780,000	936,000	1,092,000	1,248,000	1,404,000	1,560,000
280	336,000	504,000	672,000	840,000	1,008,000	1,176,000	1,344,000	1,512,000	1,680,000
300	360,000	540,000	720,000	900,000	1,080,000	1,260,000	1,440,000	1,620,000	1,800,000
320	384,000	576,000	768,000	960,000	1,152,000	1,344,000	1,536,000	1,728,000	1,920,000
340	408,000	612,000	816,000	1,020,000	1,224,000	1,428,000	1,632,000	1,836,000	2,040,000
360	432,000	648,000	864,000	1,080,000	1,296,000	1,512,000	1,728,000	1,944,000	2,160,000
380	456,000	684,000	912,000	1,140,000	1,368,000	1,596,000	1,824,000	2,052,000	2,280,000
400	480,000	720,000	960,000	1,200,000	1,440,000	1,680,000	1,920,000	2,160,000	2,400,000

TABLE 3

RECTANGULAR PIT CAPACITY GALLONS — 10 FEET OF LIQUID

	WIDTH, FT.								
LENGTH, FT.	20	30	40	50	60	70	80	90	100
40	60,000	90,000	120,000	150,000	180,000	210,000	240,000	270,000	300,000
60	90,000	135,000	180,000	225,000	270,000	315,000	360,000	405,000	450,000
80	120,000	180,000	240,000	300,000	360,000	420,000	480,000	540,000	600,000
100	150,000	225,000	300,000	375,000	450,000	525,000	600,000	675,000	750,000
120	180,000	270,000	360,000	450,000	540,000	630,000	720,000	810,000	900,000
140	210,000	315,000	420,000	525,000	630,000	735,000	840,000	945,000	1,050,000
160	240,000	360,000	480,000	600,000	720,000	840,000	960,000	1,080,000	1,200,000
180	270,000	405,000	540,000	675,000	810,000	945,000	1,080,000	1,215,000	1,350,000
200	300,000	450,000	600,000	750,000	900,000	1,050,000	1,200,000	1,350,000	1,500,000
220	330,000	495,000	660,000	825,000	990,000	1,155,000	1,320,000	1,485,000	1,650,000
240	360,000	540,000	720,000	900,000	1,080,000	1,260,000	1,440,000	1,620,000	1,800,000
260	390,000	585,000	780,000	975,000	1,170,000	1,365,000	1,560,000	1,755,000	1,950,000
280	420,000	630,000	840,000	1,050,000	1,260,000	1,470,000	1,680,000	1,890,000	2,100,000
300	450,000	675,000	900,000	1,125,000	1,350,000	1,575,000	1,800,000	2,025,000	2,250,000
320	480,000	720,000	960,000	1,200,000	1,440,000	1,680,000	1,920,000	2,160,000	2,400,000
340	510,000	765,000	1,020,000	1,275,000	1,530,000	1,785,000	2,040,000	2,295,000	2,550,000
360	540,000	810,000	1,080,000	1,350,000	1,620,000	1,890,000	2,160,000	2,430,000	2,700,000
380	570,000	855,000	1,140,000	1,425,000	1,710,000	1,995,000	2,280,000	2,565,000	2,850,000
400	600,000	900,000	1,200,000	1,500,000	1,800,000	2,100,000	2,400,000	2,700,000	3,000,000

TABLE 4

ROUND PIT CAPACITY GALLONS — VARIOUS DEPTHS

	DEPTH, FT.								
DIAMETER	4	5	6	7	8	9	10	11	12
40	37,696	47,120	56,544	65,968	75,392	84,816	94,240	103,664	113,088
50	58,900	73,625	88,350	103,075	117,800	132,525	147,250	161,975	176,700
60	84,816	106,020	127,224	148,428	169,632	190,836	212,040	233,244	254,448
70	115,444	144,305	173,166	202,027	230,888	259,749	288,610	317,471	346,332
80	150,784	188,480	226,176	263,872	301,568	339,264	376,960	414,656	452,352
90	190,836	238,545	286,254	333,963	381,672	429,381	477,090	524,799	572,508
100	235,600	294,500	353,400	412,300	471,200	530,100	589,000	647,900	706,800
110	285,076	356,345	427,614	498,883	570,152	641,421	712,690	783,959	855,228
120	339,264	424,080	508,896	593,712	678,528	763,344	848,160	932,976	1,017,792
130	398,164	497,705	597,246	696,787	796,328	895,869	995,410	1,094,951	1,194,492
140	461,776	577,220	692,664	808,108	923,552	1,038,996	1,154,440	1,269,884	1,385,328
150	530,100	662,625	795,150	927,675	1,060,200	1,192,725	1,325,250	1,457,775	1,590,300
160	603,136	753,920	904,704	1,055,488	1,206,272	1,357,056	1,507,840	1,658,624	1,809,408
170	680,884	851,105	1,021,326	1,191,547	1,361,768	1,531,989	1,702,210	1,872,431	2,042,652
180	763,344	954,180	1,145,016	1,335,852	1,526,688	1,717,524	1,908,360	2,099,196	2,290,032
190	850,516	1,063,145	1,275,774	1,488,403	1,701,032	1,913,661	2,126,290	2,338,919	2,551,548
200	942,400	1,178,000	1,413,600	1,649,200	1,884,800	2,120,400	2,356,000	2,591,600	2,827,200
210	1,038,996	1,298,745	1,558,494	1,818,243	2,077,992	2,337,741	2,597,490	2,857,239	3,116,988
220	1,140,304	1,425,380	1,710,456	1,995,532	2,280,608	2,565,684	2,850,760	3,135,836	3,420,912
230	1,246,324	1,557,905	1,869,486	2,181,067	2,492,648	2,804,229	3,115,810	3,427,391	3,738,972
240	1,357,056	1,696,320	2,035,584	2,374,848	2,714,112	3,053,376	3,392,640	3,731,904	4,071,168

TABLE 5

EARTHEN BASINS CAPACITY — PUMPOUT DEPTH = 6 FEET

Assumes 3:1 sideslopes (horizontal:vertical)

	WIDTH, FT.										
LENGTH, FT.	50	75	100	125	150	175	200	225	250	275	300
50	60,660	96,660	132,660	168,660	204,660	240,660	276,660	312,660	348,660	384,660	420,660
75	96,660	160,785	224,910	289,035	353,160	417,285	481,410	545,535	609,660	673,785	737,910
100	132,660	224,910	317,160	409,410	501,660	593,910	686,160	778,410	870,660	962,910	1,055,160
125	168,660	289,035	409,410	529,785	650,160	770,535	890,910	1,011,285	1,131,660	1,252,035	1,372,410
150	204,660	353,160	501,660	650,160	798,660	947,160	1,095,660	1,244,160	1,392,660	1,541,160	1,689,660
175	240,660	417,285	593,910	770,535	947,160	1,123,785	1,300,410	1,477,035	1,653,660	1,830,285	2,006,910
200	276,660	481,410	686,160	890,910	1,095,660	1,300,410	1,505,160	1,709,910	1,914,660	2,119,410	2,324,160
225	312,660	545,535	778,410	1,011,285	1,244,160	1,477,035	1,709,910	1,942,785	2,175,660	2,408,535	2,641,410
250	348,660	609,660	870,660	1,131,660	1,392,660	1,653,660	1,914,660	2,175,660	2,436,660	2,697,660	2,958,660
275	384,660	673,785	962,910	1,252,035	1,541,160	1,830,285	2,119,410	2,408,535	2,697,660	2,986,785	3,275,910
300	420,660	737,910	1,055,160	1,372,410	1,689,660	2,006,910	2,324,160	2,641,410	2,958,660	3,275,910	3,593,160
325	456,660	802,035	1,147,410	1,492,785	1,838,160	2,183,535	2,528,910	2,874,285	3,219,660	3,565,035	3,910,410
350	492,660	866,160	1,239,660	1,613,160	1,986,660	2,360,160	2,733,660	3,107,160	3,480,660	3,854,160	4,227,660
375	528,660	930,285	1,331,910	1,733,535	2,135,160	2,536,785	2,938,410	3,340,030	3,741,660	4,143,285	4,544,910
400	564,660	994,410	1,424,160	1,853,910	2,283,660	2,713,410	3,143,160	3,572,910	4,002,660	4,432,410	4,862,160
425	600,660	1,058,535	1,516,410	1,974,285	2,432,160	2,890,035	3,347,910	3,805,785	4,263,660	4,721,535	5,179,410
450	636,660	1,122,660	1,608,660	2,094,660	2,580,660	3,066,660	3,552,660	4,038,660	4,524,660	5,010,660	5,496,660
475	672,660	1,186,785	1,700,910	2,215,035	2,729,160	3,243,285	3,757,410	4,271,535	4,785,660	5,299,785	5,813,910
500	708,660	1,250,910	1,793,160	2,335,410	2,877,660	3,419,910	3,962,160	4,504,410	5,046,660	5,588,910	6,131,160

TABLE 6

EARTHEN BASINS CAPACITY — PUMPOUT DEPTH = 8 FEET

Assumes 3:1 sideslopes (horizontal:vertical)

	WIDTH, FT.										
LENGTH, FT.	50	75	100	125	150	175	200	225	250	275	300
50	75,120	114,120	153,120	192,120	231,120	270,120	309,120	348,120	387,120	426,120	465,120
75	114,120	190,620	267,120	343,620	420,120	496,620	573,120	649,620	726,120	802,620	879,120
100	153,120	267,120	381,120	495,120	609,120	723,120	837,120	951,120	1,065,120	1,179,120	1,293,120
125	192,120	343,620	495,120	646,620	798,120	949,620	1,101,120	1,252,620	1,404,120	1,555,620	1,707,120
150	231,120	420,120	609,120	798,120	987,120	1,176,120	1,365,120	1,554,120	1,743,120	1,932,120	2,121,120
175	270,120	496,620	723,120	949,620	1,176,120	1,402,620	1,629,120	1,855,620	2,082,120	2,308,620	2,535,120
200	309,120	573,120	837,120	1,101,120	1,365,120	1,629,120	1,893,120	2,157,120	2,421,120	2,685,120	2,949,120
225	348,120	649,620	951,120	1,252,620	1,554,120	1,855,620	2,157,120	2,458,620	2,760,120	3,061,620	3,363,120
250	387,120	726,120	1,065,120	1,404,120	1,743,120	2,082,120	2,421,120	2,760,120	3,099,120	3,438,120	3,777,120
275	426,120	802,620	1,179,120	1,555,620	1,932,120	2,308,620	2,685,120	3,061,620	3,438,120	3,814,620	4,191,120
300	465,120	879,120	1,293,120	1,707,120	2,121,120	2,535,120	2,949,120	3,363,120	3,777,120	4,191,120	4,605,120
325	504,120	955,620	1,407,120	1,858,620	2,310,120	2,761,620	3,213,120	3,664,620	4,116,120	4,567,620	5,019,120
350	543,120	1,032,120	1,521,120	2,010,120	2,499,120	2,988,120	3,477,120	3,966,120	4,455,120	4,944,120	5,433,120
375	582,120	1,108,620	1,635,120	2,161,620	2,688,120	3,214,620	3,741,120	4,267,620	4,794,120	5,320,620	5,847,120
400	621,120	1,185,120	1,749,120	2,313,120	2,877,120	3,441,120	4,005,120	4,569,120	5,133,120	5,697,120	6,261,120
425	660,120	1,261,620	1,863,120	2,464,620	3,066,120	3,667,620	4,269,120	4,870,620	5,472,120	6,073,620	6,675,120
450	699,120	1,338,120	1,977,120	2,616,120	3,255,120	3,894,120	4,533,120	5,172,120	5,811,120	6,450,120	7,089,120
475	738,120	1,414,620	2,091,120	2,767,620	3,444,120	4,120,620	4,797,120	5,473,620	6,150,120	6,826,620	7,503,120

TABLE 7

EARTHEN BASINS CAPACITY GALLONS — PUMPOUT DEPTH = 10 FEET

Assumes 3:1 sideslopes (horizontal:vertical)

	WIDTH, FT.										
LENGTH, FT.	50	75	100	125	150	175	200	225	250	275	300
50	97,500	135,000	172,500	210,000	247,500	285,000	322,500	360,000	397,500	435,000	472,500
75	135,000	219,375	303,750	388,125	472,500	556,875	641,250	725,625	810,000	894,375	978,750
100	172,500	303,750	435,000	566,250	697,500	828,750	960,000	1,091,250	1,222,500	1,353,750	1,485,000
125	210,000	388,125	566,250	744,375	922,500	1,100,620	1,278,750	1,456,870	1,635,000	1,813,125	1,991,250
150	247,500	472,500	697,500	922,500	1,147,500	1,372,500	1,597,500	1,822,500	2,047,500	2,272,500	2,497,500
175	285,000	556,875	828,750	1,100,620	1,372,500	1,644,370	1,916,250	2,188,120	2,460,000	2,731,875	3,003,750
200	322,500	641,250	960,000	1,278,750	1,597,500	1,916,250	2,235,000	2,553,750	2,872,500	3,191,250	3,510,000
225	360,000	725,625	1,091,250	1,456,870	1,822,500	2,188,120	2,553,750	2,919,370	3,285,000	3,650,625	4,016,250
250	397,500	810,000	1,222,500	1,635,000	2,047,500	2,460,000	2,872,500	3,285,000	3,697,500	4,110,000	4,522,500
275	435,000	894,375	1,353,750	1,813,120	2,272,500	2,731,870	3,191,250	3,650,620	4,110,000	4,569,375	5,028,750
300	472,500	978,750	1,485,000	1,991,250	2,497,500	3,003,750	3,510,000	4,016,250	4,522,500	5,028,750	5,535,000
325	510,000	1,063,125	1,616,250	2,169,370	2,722,500	3,275,620	3,828,750	4,381,870	4,935,000	5,488,125	6,041,250
350	547,500	1,147,500	1,747,500	2,347,500	2,947,500	3,547,500	4,147,500	4,747,500	5,347,500	5,947,500	6,547,500
375	585,000	1,231,875	1,878,750	2,525,620	3,172,500	3,819,370	4,466,250	5,113,120	5,760,000	6,406,875	7,053,750
400	622,500	1,316,250	2,010,000	2,703,750	3,397,500	4,091,250	4,785,000	5,478,750	6,172,500	,866,250	7,560,000
425	660,000	1,400,625	2,141,250	2,881,870	3,622,500	4,363,120	5,103,750	5,844,370	6,585,000	7,325,625	8,066,250
450	697,500	1,485,000	2,272,500	3,060,000	3,847,500	4,635,000	5,422,500	6,210,000	6,997,500	7,785,000	8,572,500

TABLE 8

EARTHEN BASINS CAPACITY GALLONS — PUMPOUT DEPTH = 12 FEET

Assumes 3:1 sideslopes (horizontal:vertical)

	WIDTH, FT.										
LENGTH, FT.	50	75	100	125	150	175	200	225	250	275	300
50	134,280	165,780	197,280	228,780	260,280	291,780	323,280	354,780	386,280	417,780	449,280
75	165,780	253,530	341,280	429,030	516,780	604,530	692,280	780,030	867,780	955,530	1,043,280
100	197,280	341,280	485,280	629,280	773,280	917,280	1,061,280	1,205,280	1,349,280	1,493,280	1,637,280
125	228,780	429,030	629,280	829,530	1,029,780	1,230,030	1,430,280	1,630,530	1,830,780	2,031,030	2,231,280
150	260,280	516,780	773,280	1,029,780	1,286,280	1,542,780	1,799,280	2,055,780	2,312,280	2,568,780	2,825,280
175	291,780	604,530	917,280	1,230,030	1,542,780	1,855,530	2,168,280	2,481,030	2,793,780	3,106,530	3,419,280
200	323,280	692,280	1,061,280	1,430,280	1,799,280	2,168,280	2,537,280	2,906,280	3,275,280	3,644,280	4,013,280
225	354,780	780,030	1,205,280	1,630,530	2,055,780	2,481,030	2,906,280	3,331,530	3,756,780	4,182,030	4,607,280
250	386,280	867,780	1,349,280	1,830,780	2,312,280	2,793,780	3,275,280	3,756,780	4,238,280	4,719,780	5,201,280
275	417,780	955,530	1,493,280	2,031,030	2,568,780	3,106,530	3,644,280	4,182,030	4,719,780	5,257,530	5,795,280
300	449,280	1,043,280	1,637,280	2,231,280	2,825,280	3,419,280	4,013,280	4,607,280	5,201,280	5,795,280	6,389,280
325	480,780	1,131,030	1,781,280	2,431,530	3,081,780	3,732,030	4,382,280	5,032,530	5,682,780	6,333,030	6,983,280
350	512,280	1,218,780	1,925,280	2,631,780	3,338,280	4,044,780	4,751,280	5,457,780	6,164,280	6,870,780	7,577,280
375	543,780	1,306,530	2,069,280	2,832,030	3,594,780	4,357,530	5,120,280	5,883,030	6,645,780	7,408,530	8,171,280
400	575,280	1,394,280	2,213,280	3,032,280	3,851,280	4,670,280	5,489,280	6,308,280	7,127,280	7,946,280	8,765,280
425	606,780	1,482,030	2,357,280	3,232,530	4,107,780	4,983,030	5,858,280	6,733,530	7,608,780	8,484,030	9,359,280
450	638,280	1,569,780	2,501,280	3,432,780	4,364,280	5,295,780	6,227,280	7,158,780	8,090,280	9,021,780	9,953,280
475	669,780	1,657,530	2,645,280	3,633,030	4,620,780	5,608,530	6,596,280	7,584,030	8,571,780	9,559,530	10,547,280