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Cattle Handling Facilities: Planning, Components, and Layouts

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Cattle handling facilities are used to confine cattle safely and efficiently for close observation and to perform routine health and management procedures. Adequate facilities are an essential part of an efficient cattle operation for any producer who wants to improve marketing, cattle health, and production. A well-planned handling facility can help you save money by making easier practices such as preventive health management, pregnancy testing, implanting, controlling parasites, vaccinating, castrating, and dehorning.

The most obvious positive impact of improved cattle handling facilities would probably be on an operation's returns, including saved costs in labor. Most importantly, a good facility can prevent injury to both workers and cattle. Safe handling also minimizes stress on cattle, which can reduce their weight and ability to fight disease and cause performance problems. Stress can also cause bruising and injuries, which are quality defects.

Some aspects of cattle behavior directly affect how cattle handling facilities should be designed. They are discussed in this publication. The University of Kentucky Cooperative Extension Services also offers *Beef Cattle Corrals and Handling Facilities* (ID-13) and *The Kentucky Beef Book* (ID-108). You are encouraged to obtain these publications through the county Extension office. The Department of Biosystems and Agricultural Engineering at the University of Kentucky also offers *Corrals for Handling Beef Cattle*, a publication of Alberta Agriculture, Food, and Rural Development in Alberta, Canada, and *Modern Corral Design*, an Extension publication from Oklahoma State University. If you want more information, publications and videos on cattle behavior and handler response are available (a list of some of them is provided in this publication).

Contents

Before You Begin

Potential Economic Returns

Many smaller beef producers feel that they cannot afford to invest in handling facilities—that the return is not sufficient to justify the additional expense. But cattle handling facilities, whether they are new or an improvement on what you already have, can help improve a beef operation's profitability.

Costs can include construction of the facilities (fixed), cash interest on money borrowed for installation (variable), repair and costs of maintaining the facility from year to year (variable), and depreciation on the facility (fixed).

A producer who adds handling facilities might work the cattle more frequently, which would increase veterinary and medical costs, but a more comprehensive health program could reduce the need for remedial treatment (such as antibiotics for respiratory diseases), and thus reduce veterinary costs. The impact of improved management of the cow herd on other variable costs is not as clear.

A lot depends on the way the farmer manages the herd, but being able to administer an adequate health program for the *cow herd*, including routine vaccination and deworming, should theoretically:

- Affect the operation's calving percentage.
- Affect the calf death rate (birth to weaning).
- Decrease the breeding herd death rate.
- Increase weaning weights.

An adequate health program for *calves* should:

- Decrease the calf death rate.
- Increase the weaning rate.

Herd management can also influence returns indirectly, since calves that appear to have been mismanaged will not generally receive as high a price at auction as calves appearing to be in good condition.

Producers who are able to manage calves well may be able to realize a higher price by effectively marketing their superior calves at special sales of certified calves. These sales have become more common in recent years, with calves in these sales generally bringing a $3 to $5 per hundredweight premium over calves sold through traditional auction markets. Generally, having the ability to administer a required health program on the farm is a prerequisite to participation in these sales.

Assume that a producer with a 50-cow herd has only minimal cattle handling facilities on the farm—some structure and/or equipment for at least getting cattle up to remove calves from the herd for sale. The enterprise budget in Table 1 shows income and variable costs for the operation under these circumstances (on a per-head basis).

Now assume that this producer invests $5,000 in a cattle handling facility that includes a headgate and holding/working chute and uses them to administer a comprehensive health program to the herd (including calves prior to sale).

The budget in Table 2 illustrates how returns and variable costs might be affected. Table 2 shows that variable costs increased substantially with handling facilities due to:

- A more complete health program (veterinary and medical expenses).
- Cash interest (assuming that 80 percent of the cost of the cattle handling facility was financed at 9 percent, which represents interest paid in the first year of repayment. Interest would decline in subsequent years.)
- Fuel, repair, and maintenance requirements of new machinery and equipment.

Table 2 shows an increase in returns over variable costs of a little more than $20 per head. This is due to increase in calving percentage and weaning weights and decrease in death loss for both calves and breeding stock.

On a 50-cow herd, this increase in returns over variable costs would amount to about $1,000 in income. The producer in this example would recoup the initial $5,000 investment in about five years. (Note: This figure is not a precise estimate of how much income would increase if you constructed and used cattle handling facilities. It is based on the assumptions in the budgets in Tables 1 and 2.)

Table 3 shows that if calving percentage and weaning weights did not change, returns would actually decrease because of the cost increase associated with the new facilities. However, the potential for increased returns due to improved management is significant. For example, if calving percentage could be increased from 80 percent to 89 percent and average weaning weights could be increased by 20 pounds, returns would go up $30 per head.

Numbers used in this example are somewhat arbitrary but are based on enterprise budget estimates and appear to be reasonable. For example, it is difficult to say precisely how calv-

Table 1. Cow-calf returns and variable costs: no handling facilities.

			Amount	Unit	Price		Total
Calving Rate (live births/cow)			80.0%				
Death Rate (birth to market)			3.3%				
Cow Replacement Rate			15.0%				
Breeding Herd Death Rate			2.0%				
Expected Returns per Head							
	Number	Weight					
Steer Calf	0.384	450	172.7	lb	0.82	$	141.60
Heifer Calf	0.234	420	98.2	lb	0.75	$	73.63
Cull Cow	0.130	1100	143.0	lb	0.40	$	57.20
Total Returns						**$**	**272.44**
Variable Costs per Head							
Pasture Maintenance			2.00	acre	25.00	$	50.00
Hay			1.00	ton	65.00	$	65.00
Grain			5.00	bu	2.40	$	12.00
Salt & Mineral			75.00	lb	0.18	$	13.50
Vet & Medical			1.00	head	8.00	$	8.00
Breeding			1.00	head	12.00	$	12.00
Marketing			0.81	head	9.06	$	7.34
Maint. of Replacement Heifers			0.15	head	371.25	$	55.69
Machinery & Equip. (fuel/repair/maint.)			1.00	head	8.00	$	8.00
Other			1.00	head	0.00	$	--
Interest on Operating Capital			231.53	dollars	7.5%	$	17.36
Total Variable Costs per Head						**$**	**248.89**
Return Over Variable Costs per Head						**$**	**23.54**

Table 2. Cow-calf returns and variable costs: $5,000 handling facilities.

			Amount	Unit	Price		Total
Calving Rate (live births/cow)			85.0%				
Death Rate (birth to market)			2.5%				
Cow Replacement Rate			15.0%				
Breeding Herd Death Rate			1.0%				
Expected Returns per Head							
	Number	Weight					
Steer Calf	0.413	480	198.0	lb	0.82	$	162.36
Heifer Calf	0.263	450	118.1	lb	0.75	$	88.59
Cull Cow	0.140	1100	154.0	lb	0.40	$	61.60
Total Returns						**$**	**312.55**
Variable Costs per Head							
Pasture Maintenance			2.00	acre	25.00	$	50.00
Hay			1.00	ton	65.00	$	65.00
Grain			5.00	bu	2.40	$	12.00
Salt & Mineral			75.00	lb	0.18	$	13.50
Vet & Medical			1.00	head	15.00	$	15.00
Breeding			1.00	head	12.00	$	12.00
Marketing			0.81	head	9.06	$	7.34
Maint. of Replacement Heifers			0.15	head	371.25	$	55.69
Machinery & Equip. (fuel/repair/maint.)			1.00	head	12.00	$	12.00
Other			1.00	head	7.20	$	7.20
Interest on Operating Capital			249.73	dollars	7.5%	$	18.73
Total Variable Costs per Head						**$**	**268.46**
Return Over Variable Costs per Head						**$**	**44.10**

ing percentage will be affected by a more rigorous health program that would be possible with adequate handling facilities; however, it is reasonable to expect some improvement.

The purpose of this discussion is not to define all of the changes that will occur on an operation with the addition of handling facilities but rather to illustrate how any impact on important production variables will affect profitability. This kind of investigation is useful for giving producers at least a general idea of how much return they could reasonably expect from investing in and consistently using better handling facilities.

Remember that just installing the handling facilities does not accomplish anything. A beef operation's bottom line will be affected positively only to the extent those facilities are used to improve the cow herd's management so that higher productivity results.

If you are planning to build a new or remodel an existing cattle handling facility you need to be aware of the capital costs for different components and systems. This information on costs has been summarized in Table 4.

Choosing a Site

The location of working facilities is critical. In some cases, if two to three herds are held a mile or more apart, you may need more than one set of working facilities or a portable unit. (See *Portable Corral Facilities* in this publication.)

The most important points in selecting a site for handling facilities are:

- Easy access.
- Access to utilities (water and electricity).
- Good drainage.
- Security (including biosecurity).
- Nearness to neighbors.
- Expansion.

Easy access—Normally, a working cattle handling facility requires 1/8 to 1/2 acre of land. Trucks and stock trailers must have easy access to the facility. A circular area that is 130 to 150 feet in diameter where trucks and trailers can circle out is preferred to one in which they back out. You will need access to an all-weather road so you can get to the facility in bad weather. Ideally, handling facilities should be located along a central fence line where several fences and pastures converge so that cattle can become familiar with the facilities and not have to walk long distances to get to them. Fence lines next to the handling facilities should be stronger than standard fencing in order to withstand the additional pressure that occurs when cattle are funneled into the pens.

Access to Utilities—It is important that cattle have access to water. Cattle need it after they are worked, and you will need it to clean equipment and facilities. You will also need electricity if you:

- Work inside a building.
- Are among the many small herd owners who has an off-farm job and must work the farm at night.
- Treat sick cattle at night (this is common).
- Want or need to track cattle performance (weight gain and health) and store data.

Table 3. Change in return over variable cost per head from the addition of cattle handling facilities given varying changes in calving percentage and weaning weight.

Increase in Calving %	Increase in weaning weight (lbs/head)					
	0	10	20	30	40	50
0	($13)	($8)	($3)	$2	$7	$12
3	($2)	$3	$8	$13	$18	$24
6	$8	$13	$19	$24	$30	$35
9	$18	$24	$30	$35	$41	$47
12	$28	$34	$40	$46	$52	$58
15	$39	$45	$51	$57	$63	$69

Note: Changes are from values reported in Table 2 (i.e., calving percentage = 80%; steer weaning weight = 450 lbs; heifer weaning weight = 420 lbs; return over variable costs = $23.54/head).

Good Drainage—The site where you place the facilities must be well drained to avoid mud and sanitation problems caused by standing water. Avoid slopes of more than 5 percent to minimize problems of water pollution caused by manure runoff. The rough concrete floor in the squeeze chute area can be sloped 1 to 2 percent toward an open drainage ditch or runoff storage pond outside the fences. A washable work area is shown in Figure 1.

Table 4. Costs for different components and systems.

Item	Approximate cost range (US$)
Manual headgate	$300 - $500
Self-catch headgate	$500 - $800
Squeeze	$2,000 - $2,500
Squeeze with self-catch headgate	$2,500 - $3,000
Portable squeeze with scale and wheels	$5,000 - $5,500
Holding chute with manual headgate	$1,500 - $2,000
Holding chute with headgate and scale	$3,500 - $4,000
Portable holding and squeeze chute with manual headgate and wheels	$5,000 - $6,000
Portable holding and squeeze chute with manual headgate, scale, and wheels	$8,000 - $10,000
Hydraulic squeeze chute	$8,000 - $10,000
10-ft curved full sheeted alley section with catwalk	$1,000 - $1,500
10-ft straight full sheeted alley section with catwalk	$800 - $1,000
15- to 25-ft straight half sheeted alley	$2,000 - $3,000
Diversion alley	$1,500 - $2,000
Diversion gate	$200 - $300
Alley panels 14-gauge (4- to 16-ft panels)	$100 - $250
Alley bow	$200 - $300
Tube panels 16-gauge (8- to 16-ft panels)	$100 - $150
8-ft panel posts	$40 - $80
Sweep tubs with catwalk (16- to 30-ft long)	$2,000 - $4,000
Sweep tub panel	$250 - $300
Tub curved panel 68 in	$150 - $200
Tub straight panel 88.5 in	$200 - $250
Sweep bow gate	$500 - $750
Portable sweep tub with wheels	$2,000 - $2,500
Lever latch gate 13-gauge, frame 14-gauge (3- to 20-ft long)	$100 - $300
Chain latch gate 13-gauge, frame 14-gauge (3- to 20-ft long)	$100 - $300
Gate with 180° hinge, 16-gauge tube frame (4- to 16-ft long)	$50 - $150
Complete packages (headgate, squeeze, alleyway, sweep tub)	$7,000 - $15,000

Figure 1. Washable work area for handling facility. Adapted from Grandin, 2000.

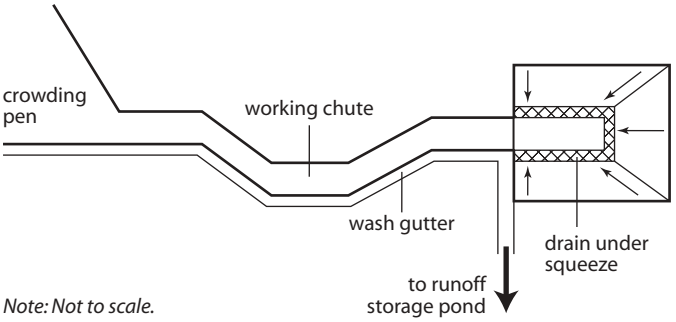
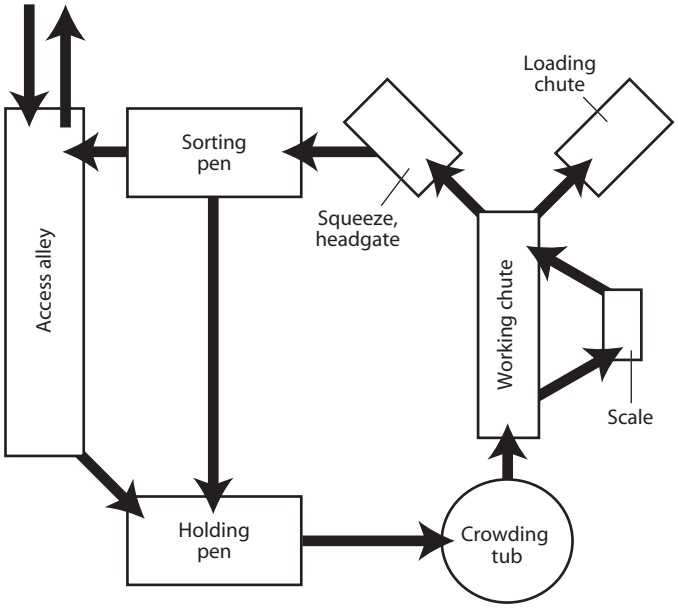


Figure 2. Cattle flow in a well designed handling facility.



Security—Locate your facility in as secure a place as possible in order to help prevent theft, vandalism, and accidental fire. Cattle handling facilities are frequently located away from the farm manager's residence. If this poses a security problem, provide only one access road. Unauthorized people are less apt to visit if there is no escape route. If possible, make access roads at remote sites visible from a public road or a neighboring residence. You also need to think about good biosecurity management—reducing the chance of infectious diseases being introduced or spread on the farm.

Nearness to Neighbors—Avoid sites that are directly next to neighbors' residences, where odor, noise, dust, and flies might be objectionable when you are using the facilities intensively.

Expansion—When planning a facility, always leave room for expansion, such as expanding the existing holding pen or adding pens.

Design Considerations

Well-planned facilities allow cattle to flow smoothly and provide handlers convenient access to them. So cattle can move easily, you need to spend some time mentally following the traffic pattern through the handling area and back to the feedlot, barn, or pasture. Spending a few minutes planning for your facility can save hours later. Try to answer the following questions:

- Are cattle flowing in only one or several directions?
- Will it be easy to pen cattle, or do I need to move gates?
- Will gates swing in the correct direction?

Cattle flow through a corral should be orderly so that sorting, weighing, and treatment will put minimum stress on animals and operators. Figure 2 shows one way to direct the cattle flow through a handling facility.

When designing a handling facility:

- Design with an eye toward safety for both animals and operator.
- Plan for economy—you do not need expensive facilities for small herds.
- Try not to oversimplify—there are minimum standards with which you need to comply in order to have a good working facility.
- Design so you can conveniently sort and handle animals. If possible, build your facility in a central location. Make cattle walk uphill slightly (at a grade of 1 to 2 percent) through the handling facility.
- Build components both strong and solid enough to hold the animals.
- Avoid dead ends, bottlenecks, and corners or projections that could bruise, injure, or cripple. If you cannot avoid them, at least cover them with padding.
- Light, both in intensity and pattern, should be kept as uniform as possible. Choose a light color that is less apt to cause shadows. The vision of cattle is sensitive to highly contrasted light and dark, which can cause balking—especially a problem when cattle see a single shadow falling across a scale, alley, or loading chute. A hole in the roof can also cause balking if the sun's rays come through it. Extend the working chute 10 to 15 feet outside the building or add a roof over the crowding pen to minimize balking, since cattle may refuse to enter a dark indoor working chute from a bright outside crowding pen—most likely to occur on a bright sunny day.
- Loading and squeeze chutes should face either north or south to minimize the effect of bright sunlight (Figure 3). Cattle tend to move better from dark areas into areas that are lit, but they will not approach blinding light (like bright sunlight). They also will not enter a dark barn.

Different layouts for small to medium herds (up to 100 head) are available at the end of this publication. Several of these layouts show facilities in tobacco barns and corners of barns and lots. Layout 14 shows a layout for a bigger herd (up to 250 head). A beef facility plan is also shown in order to give an idea of a total facility.

The University of Kentucky can provide general design assistance through its Cooperative Extension Service. Producers with specific requirements and large projects are encouraged to seek help from consulting engineers (a list with names and addresses can be provided by contacting the UK Department of Biosystems and Agricultural Engineering). A private consulting engineer can usually save enough money to offset the consulting fee and assure that the project is built to your specifications.

Figure 3. Undesirable working chute where cattle face bright sunlight.

Components You Will Need

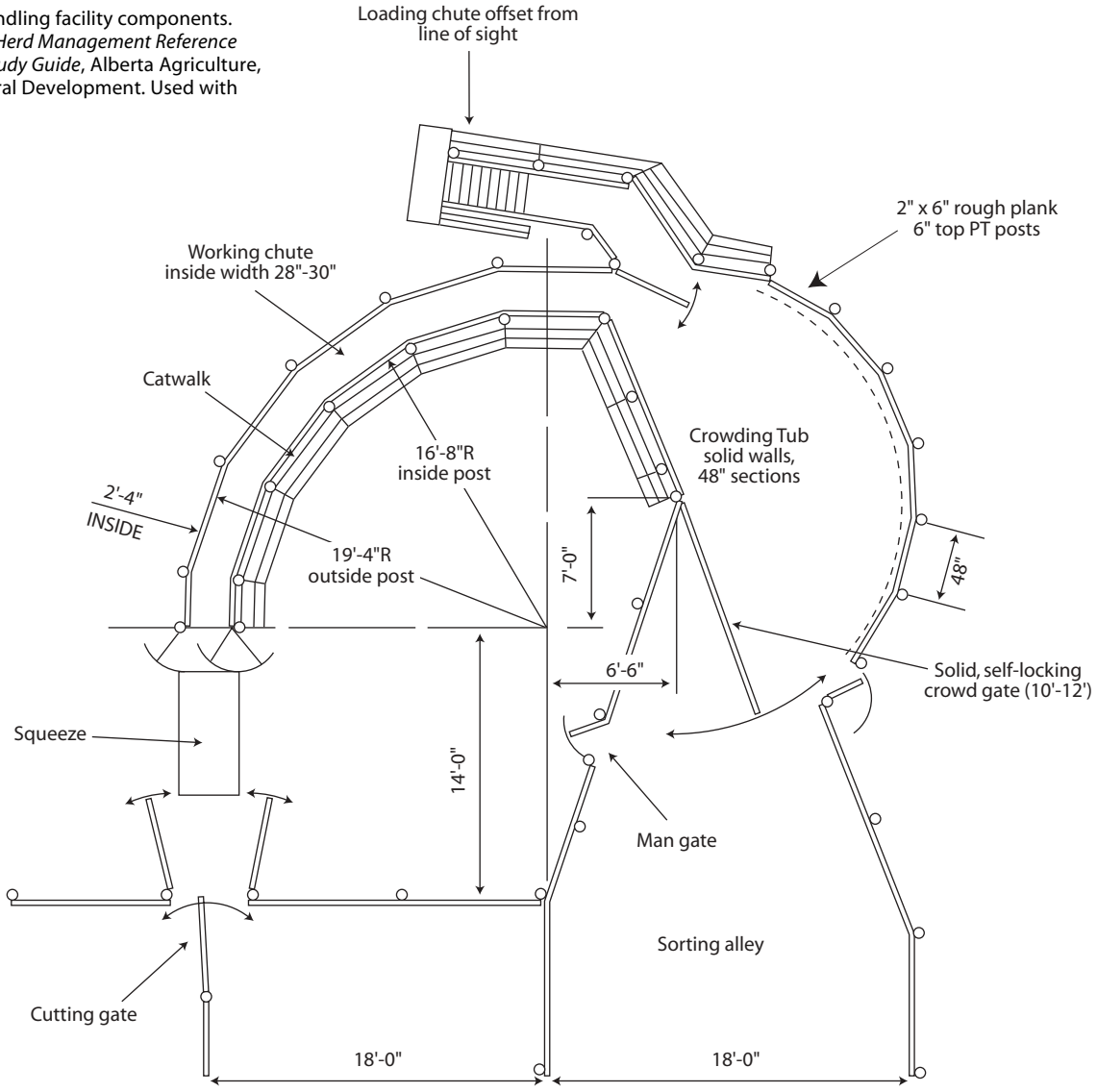
Because farms vary, all handling facilities are unique. Adequate handling facilities need not be elaborate or overly expensive, but they should be safe, work well, and allow the producer to sort, weigh, restrain, receive, and/or ship cattle as efficiently and economically as possible. Oversimplification could make your facility a headache.

Although it pays to invest in quality for critical components, each producer's needs are different. Some can build directly from plans already available, while others may need to adapt a plan to accommodate their requirements.

A complete cattle handling facility (Figure 4) consists of:

- Holding pens and gates.
- Access/sorting alley.
- Crowding pen and gate.
- Working chute.
- Headgate and holding chute/squeeze.
- Scale.
- Loading chute.

Figure 4. Handling facility components. Source: *Beef Herd Management Reference Binder and Study Guide*, Alberta Agriculture, Food and Rural Development. Used with permission.



Not every operation requires all these components. Determine the ones you need based on your particular operation, herd size, existing facilities, and available materials.

Use the following list, based on herd size, as a guide:

- 25 to 50 head: headgate, holding chute (not elaborate), small crowding pen (five to eight head), and loading chute.
- 50 to 100 head: headgate, holding chute (not elaborate), portable scale, working chute, crowding pen, loading chute, sorting alley, and one or two holding pens.
- More than 100 head: headgate, holding chute/squeeze, scale, working chute, crowding pen, loading chute, sorting alley, and two or more holding pens.

The cost of facilities will generally be a function of the size of a herd. The payback period of such an investment will depend largely on the health practices you implement.

Here are brief descriptions and construction guidelines for the various components and some important accessories:

Headgate

Health care of the herd is almost impossible without a headgate (see Figure 5). It is usually considered the facility's most important feature.

The headgate should be sturdy, safe, easy to operate, and have a quiet action. It can be either manually or hydraulically operated. We recommend a self-catching and full-opening headgate for the small operations that are typical of Kentucky. Curved stanchions may offer more control of the animal's head, but they are more likely than the straight-bar type to cause choking if animals go down.

Self-catching gates can be adjusted to accommodate animals of different sizes. Self-catching gates have vertical double doors that swing into the squeeze automatically when the animal moves. This kind of gate is intended for gentle cattle. Do not use it for wild or horned cattle or in large feedlots; head and shoulder injuries are possible if animals slam into a self-catching gate.

Figure 5. Commercial headgate.

Full-opening gates are more appropriate for a group of mixed-size cattle because they seldom need adjustment. The doors move on tracks from a closed position to an open position. Like self-catching gates, full-opening gates should not be used with big, wild cattle or in large feedlots because they are not strong enough for constant heavy use.

In large feedlots, use scissor stanchions as general-purpose headgates. They are not appropriate, however, for large bulls, which have trouble stepping out through the narrow space at the bottom of the gate. Instead, use full-opening gates for large bulls.

No matter what type of headgate you select, adjust it properly for the cattle being worked to prevent the animals or operator being injured.

Make sure that the headgate and other mechanical equipment work quietly. Loud noises frighten cattle and make them more difficult to control.

A rough concrete surface in the chute and around the headgate prevents formation of depressions and gives cattle solid footing. Smooth concrete flooring directly in front of the headgate becomes slippery when wet and should be installed with caution. To provide solid footing for the cattle:

1. Use a rough concrete surface in the holding and working chutes and around the headgate to prevent depressions from forming.
2. Score the concrete with deep parallel grooves. The grooves should not be more than an inch wide. Parallel grooves should be 1 1/2 inches apart. Installing two sets of parallel grooves in different directions creates a diamond floor pattern and provides even more confident footing. Diamond-shaped grooves should be 4 to 6 inches apart.

You can use chemically resistant epoxy material to resurface moderately damaged concrete flooring. Sand blend is often broadcast into the wet epoxy mixture to create a nonslippery surface.

Rock-covered filter fabric pads are an alternative materials for flooring.

If you use the rock-covered filter fabric pads, we suggest that you:

1. Use a geotextile filter-fabric base.
2. Cover the base with 4 to 6 inches of No. 3 or No. 4 crushed limestone rock.
3. Top the rock with 2 to 3 inches of sifted lime or dense grade (sometimes called *road mix*). This dense grade is a fine material with a maximum aggregate size of ¾ inch that improves animal comfort and reduces the chance of foot injuries. Sand tends to shift easily and does not provide as firm a footing.

Another alternative to concrete flooring is fly-ash pads. Research conducted at Ohio State University has shown that construction using these pads is an inexpensive and reliable option. Fly-ash pads are a mixture of fly-ash and lime-enriched Flue Gas Desulfurization (FGD) material, which is generated at coal-fired facilities by removing sulfur dioxide from flue gases. The Ohio State University Extension Fact Sheet AEX-332-99 gives details on installation procedure, maintenance, and economics of fly-ash pads for livestock applications.

Holding Chute

A holding chute holds or restrains cattle for treatment. It is located immediately behind a headgate and fastened to it. It can be constructed with wood or metal. Useful (though not necessary) holding chute features include:

- Adjustable width to accommodate animals of different sizes.
- Removable side panels so you can get to the animals easily.
- A floor with nonslippery surface.
- A roof over both headgate and holding chute so that cattle can be worked regardless of the weather.

Squeeze

A squeeze can be used as an alternative or addition to the holding chute. It is a holding chute with squeeze action, and its advantage is that it is less stressful for animals to be held snugly in a squeeze than to be moving about. If you have the money you will definitely want to buy a holding chute with squeeze action. It should be located immediately behind the headgate and fastened to it (Figure 6).

The squeeze action completely restrains the animal. The sides should move in and out together so the animals are not thrown off balance. The sides can be manually or hydraulically operated. Hydraulic squeezes take less effort to use and are faster, sturdier, and safer for both operator and animal. However, they can injure cattle when used by inexperienced operators. Manual squeezes are less expensive and easier to operate. Like holding chutes, squeezes can have vertical or V-shaped sides, which are useful for mixed size animals (example: cows and calves). Size specifications for a holding chute/squeeze are given in Table 5.

A power outlet near the squeeze and headgate is a must, since electric clippers, dehorners, branding irons, etc. are commonly used there.

Table 5. Specifications for cattle handling facilities.

	Recommended dimensions		
Facility component	**Up to 600 lbs**	**600 to 1,200 lbs**	**Over 1,200 lbs**
Holding pen			
Space per head (ft^2)	14	17	20
Pen fence			
Height (in)	60	60	60
Post spacing (ft)	8	8	8
Post depth in ground (in)	30	30	30
Crowding pen[1]			
Space per head (ft^2)	6	10	12
Post spacing (ft)	4 - 6	4 - 6	4 - 6
Solid wall height (in)	45	50	50 - 60
Working chute[2]			
Straight side (in)	18	22	28
Fully tapered—width at 32-in height (in)	18	22	28
Fully tapered—width at bottom (in)	15	16	18
Minimum length (ft)	20	20	20
Maximum curve angle (degrees)	15	15	15
Length for 16-foot outside radius (ft)	45	45	45
Solid wall height (in)	45	50	50 - 60
Overall height—top rail (in)	55	60	60 - 72
Chute fence			
Post spacing (ft)	6	6	6
Post depth in ground (in)	36	36	36
Holding chute/squeeze			
Height (in)	45	50	50
Width			
Straight sides (in)	18	22	28
V-shaped sides, width at bottom (in)	6 - 8	8 - 12	14 - 16
Length—with headgate (ft)	5	5 - 8	5 - 8
Loading chute			
Width (in)	26	26	26 - 30
Minimum length (ft)	12	12	12
Maximum rise (in/ft)	3.5	3.5	3.5
Radius of a curved chute (ft)	12 - 17	12 - 17	12 - 17
Spacing of 1x2-in hardwood cleats (in)	8	8	8

[1] Crowding pen: it must be of either circular shape (1/4 or 1/2 circle) or funnel shape.

[2] Working chute: it should be curved or offset (offset angle at 30° maximum).

Figure 6. Commercial squeeze and headgate.

Working Chute

The working chute leads cattle from the crowding pen to the holding chute/squeeze. Its purpose is to hold cattle in a single file so they can enter the treatment or loading area one at a time. The working chute should be at least 20 feet long, regardless of the herd size. Specific dimensions are given in Table 5. The sides of working chutes should be solid, like those of crowding pens, to prevent animals from seeing people, equipment, and other outside distractions, thus keeping them calm. To construct side panels of both working chutes and funnel-shaped crowding pens (described below), you can use wood, steel, or surplus material (such as used conveyor belting, steel grain bin panels, sheet metal, fiberglass panels, etc.). See *Using Surplus Materials* in this publication for more information.

According to the *Beef Cattle Handling and Facilities Design* publication by Temple Grandin, curved chutes (Figure 7) work better than a straight chute for three main reasons (Temple Grandin, 2000). They:

- Prevent the animal from seeing the truck, the holding chute/squeeze, or people until it is almost in the truck or chute.
- Takes advantage of the animal's natural tendency to circle around the handler, continuing to do so as the handler moves through the pen.
- Takes advantage of the natural behavior of cattle to go back where they came from when an 180-degree turn is used.

A good design principle is to make sure cattle in the crowding pen can see a minimum of two body lengths up the chute.

An alternative to a curved chute is an offset chute, which is less expensive and easier to build. With an offset chute, part of the working chute is offset to a maximum of 30 degrees so cattle are prevented from seeing the squeeze until they almost reach it.

Straight working chutes are generally not recommended.

We recommend sloped sides for working chutes, especially if the facility is used to handle both cows and calves (Figure 8). Sloped sides restrict the animal's feet and legs to a narrow path, which reduces balking and helps prevent calves from turning around.

An alternative to a chute with sloped sides is one with a narrow section at its base for leading both cows and calves to the holding chute/squeeze. Its advantage is that it is somewhat easier to construct than the sloped sidewall chute (Figure 9).

One-way gates in working chutes allow cattle to move forward in the chute but automatically prevent them from backing up. The gates must be located two body lengths behind the holding chute or squeeze. For uniform-size cattle, a chain makes a good one-way gate. If cattle are not of uniform size, use adjustable chain so you can vary the chain height.

Figure 7. A curved chute with a single animal scale at the end of the chute.

Figure 8. Working chute with sloped sides. Source: *Beef Herd Management Reference Binder and Study Guide*, Alberta Agriculture, Food and Rural Development. Used with permission.

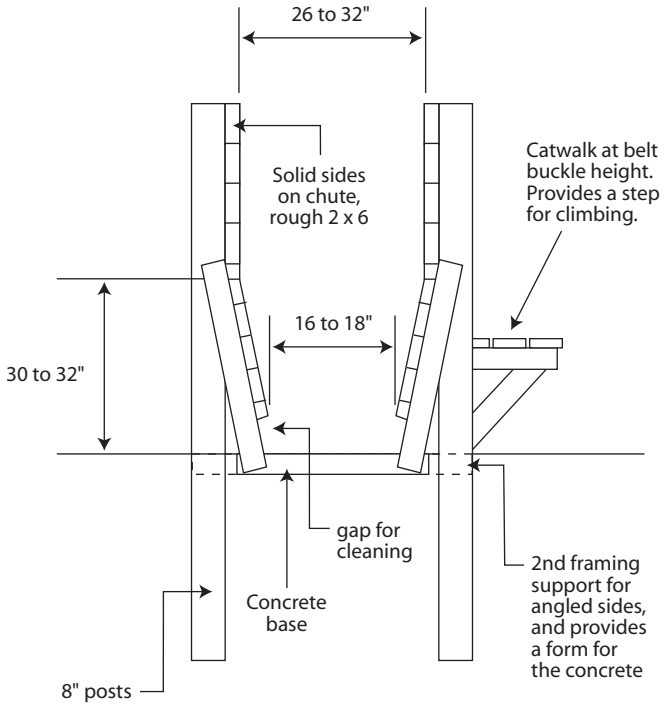
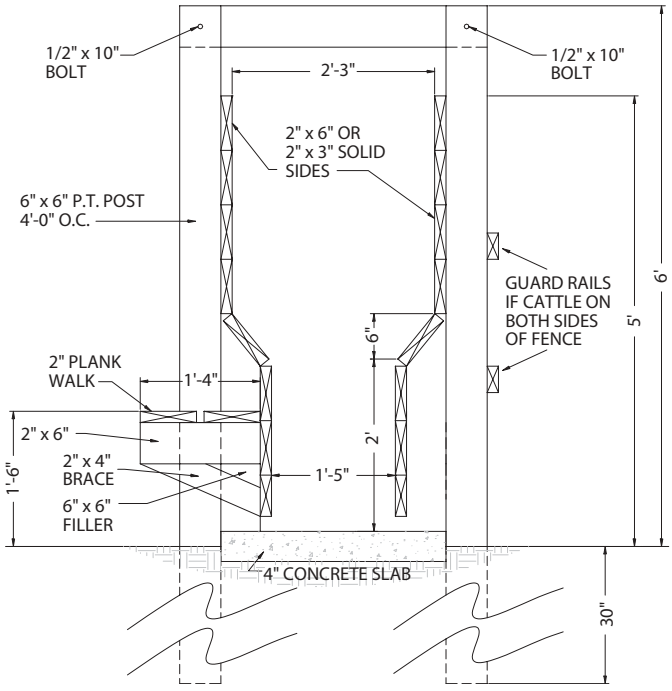


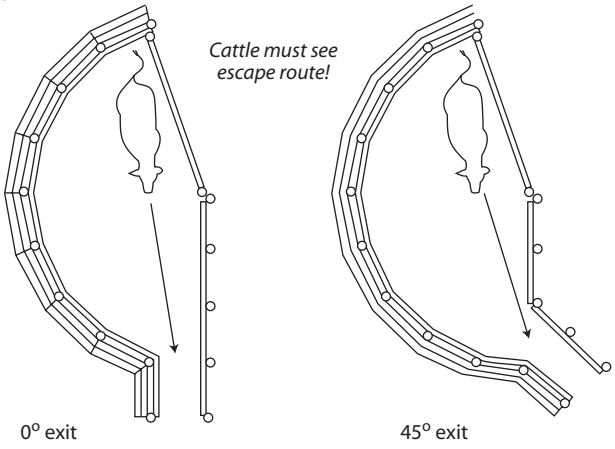
Figure 9. Alternate cross section of working chute. Source: Kentucky Building and Equipment Plans, Book No. 1— Beef, Plan No. KY.II.881-1).



Blocking gates are usually placed at the entrance and exit of the working chute to keep animals from moving where you don't want them to go. The blocking gate at the entrance of the chute should be see-through so that cattle can see animals ahead. The gate should be solid at the exit or between the chute and squeeze. If the chute has a catwalk, make sure that the gate slides to either side of it so you don't block the handler's path.

Livestock will also balk if a chute appears to be dead ended. This can especially be a problem at the junction of the single-file working chute and the crowding pen (Figure 10). If you use a single chute, animals should see that they have a place to go.

Figure 10. Crowding pen design. *Source:* Beef Herd Management and Study Guide, *Alberta Agriculture, Food and Rural Development. Used with permission.*



Crowding Pen and Gate

A crowding tub or pen is used to funnel cattle into the working chute. A properly designed crowding area decreases the labor required to work cattle. Size the crowding pen or tub to handle eight to 10 cattle at a time. Size specifications are given in Table 5.

A circular crowding area with solid sides, like the one shown in Figure 11, works best, since it takes advantage of the animal's natural tendency to circle around the handler.

The gate should be solid to keep cattle from seeing through it. We recommend that the pivot post be constructed out of a 3- to 4-inch steel pipe or 8-inch wood post and embedded in 4 feet of concrete. The crowding gate needs a self-locking gate latch. If gate height is adjustable, you can compensate for diet and manure buildup in the crowding pen.

Funnel-shaped crowding pens are less expensive and easier to build than circular chutes. When properly built they can work as well as circular crowding tubs. They should be constructed with one straight side and the other side entering the chute at an angle of about 30 degrees. The large end of the funnel must be 8 to 12 feet wide.

Figure 11. Circular crowding tub.

Access Alley and Holding Pens

Access alleys are used to bring cattle to the holding pen from a barn, pen, or pasture. (Figure 12). They should be at least 10 feet wide and laid out for desirable traffic flow. The appendix includes a beef facility plan of a feedlot with an adjacent handling facility that allows for easy movement from lot to handling area. It shows a double-sorting alley in detail. *Modern Corral Design* from Oklahoma State University includes several examples of animal flow patterns for single- and double-alley corrals. This publication is available from the UK Department of Biosystems and Agricultural Engineering.

One holding pen should be enough for most small operations—large enough to handle a truckload of about 60 head. For operations of up to 250 cattle, use one holding pen to work 40 to 50 animals at a time. For larger herds, add one holding pen for each additional 250 head. A 50-head operation would require a holding pen area of between 700 and 1,000 square feet, depending on the size of cattle. Space requirements are given in Table 5. Fences of the holding pen should 5 to 6 feet high, depending on the breed, and built by setting 4- to 5-inch round wood posts 2 1/2 to 3 feet deep, 6 to 8 feet apart.

Figure 12. A 10-foot-wide access alley.

Water, feeding area, and shade must be provided in at least one of the holding pens, which is especially important when sick animals are being held in pens for a few days until they recover. At a minimum, provide 20 square feet of shed space per head for about 3 percent of the herd. For example, a facility for a 100-head herd should include 60 square feet of shade (100 x 0.03 x 20).

Scales

Scales are essential for testing performance, evaluating gains, and determining sale weights. Different types and sizes of scales are useful in various types of operations. Most scales operate well in temperatures between 0 and 100 degrees Fahrenheit. Always plan for a scale when designing a handling facility, which will make it easier and less expensive to add it later without much interference in work activity.

Scales can be selected to weigh a single animal or a group of animals. They should be capable of 0.10 percent accuracy. The best option is to locate scale(s) in the working chute or between the working chute and squeeze as shown in Figure 7.

A single-animal scale is most useful when determining rate of gain, how much weight bred cows are gaining or losing, or performance. It is also useful in selecting breeding stock. Single scales can have their own frame or cage for holding the animal. They should mount easily under any cattle squeeze, feed hopper, or custom platform. If you use a combination squeeze chute and scale, it should be heavy duty.

Portable single animal scales, recommended if you have multiple working facility locations, can either be installed in front of the headgate or placed in line with the working chute by removing one of the gate sections.

A group scale can be used for many purposes, such as weighing groups of animals, loading them out for sale, and weighing hay and feed ingredients. Like many single-animal scales, a group scale also needs a cage to hold cattle. We recommend you use a group scale near the loading chute.

Scales can have a hydraulic or electronic load cell or be mechanical. Mechanical scales are simple and durable and do not require an external power source. Hydraulic scales are quick, easy, and require no electricity, but they need to be calibrated more often. Electronic scales are fast and easy, but they require a power supply or batteries and have to be calibrated more often than either mechanical or hydraulic scales. They also have to be protected from bad weather.

If you choose a load-cell scale, it can be mounted under a conventional squeeze scale system. Look for one with cells that can be replaced by any major load cell manufacturer.

Loading Chute

Cattle can be loaded on stock trailers from either the working chute or the crowding pen. They move better, however, if moved directly from the crowding pen to the loading chute (Figure 13) rather than through a second long working chute.

If possible, locate the loading chute outside the corral and pasture to keep trucks out of feedlots and reduce the risk of disease from cattle recently bought at market. Loading chutes for semi-trailers may need to be adjusted so that they match the floor height of the vehicle being loaded.

A loading chute preferably has a curved approach, telescoping side panels, a self-aligning dock platform or bumper, and a circular crowding area. As with the crowding pen and working chute, the loading chute should also have solid sides to prevent cattle from seeing outside distractions. A catwalk on one side of the chute will allow the handler to load cattle more easily. The slope of a permanently installed cattle ramp on the loading chute should not be more than 20 degrees, and that of a portable or adjustable chute should not be more than 25 degrees. Other specifications are given in Table 5.

Gates for Sorting

Strong gates with easily operated latches are one of the most important features of a cattle-handling facility. Whenever possible, locate gates in the corners of pens or in another convenient place where it is natural for cattle to come together. Gates that are used to sort cattle and bring them into a holding pen do not need to have solid sides, but they need to be sturdy. Gates should always open in the direction of cattle flow. A swing range of at least 180 degrees is often needed in gates for corrals (Figure 14).

Figure 13. Sloped wooden loading chute without solid sides.

Figure 14. Gate for sorting and holding pen.

We recommend that the pivot post be constructed out of a 3- to 4-inch steel pipe or 6- to 8-inch wood post (as in Figure 14) that is embedded in 3 to 4 feet of concrete backfill. If you use wood, use pressure-treated posts to prevent decay. The gates themselves can be constructed out of 2-inch diameter pipes with $^5/_8$-inch sucker rods spaced 8 inches apart. A self-locking latch is recommended for all gates.

Safety Pass and Safety Gate

Safety passes should be strategically located around the facility to provide a quick escape route for handlers. A pass is two posts set so that a there is clear distance of 14 inches between them.

A safety gate should be used in facilities where only small calves are handled. It should be constructed of wood or steel. The gate should open inward toward cattle and be held in the closed position with a spring instead of a latch.

Alternative Methods

Using Surplus Materials

To save installation costs, many producers consider using materials other than wood or steel pipe when planning their cattle handling facilities. Materials such as used/recycled highway guardrails, cosmetic rejects (seconds) from fiberglass or metal manufacturers, or sections from grain bins may cost less than conventional materials but generally work best only in certain corral areas. In addition, surplus materials may not always be cost competitive with those made of wood or steel. Finally, alternative materials are often limited and available only at certain locations, while lumber or steel are generally both more plentiful and widely available.

You should weigh potential savings with alternative materials against any additional cost for hauling, assembly, and installation. Before choosing to use any surplus material, also weigh its other advantages and disadvantages, including its strength and how it would be used. Be careful if you use surplus materials to prevent injuries to both animals and people from exposed metal edges.

Used metal highway guardrails can be used for side walls in holding pens (Figure 15), tapered crowding pens, straight or offset working chutes, and loading chutes, if space (usually 4 to 6 inches) is allowed for their width.

To prevent small calves from turning around, guardrails can be placed near the bottom portion of a straight-sided working chute to form a V-shaped cross section. They do not lend themselves well to curved crowding pens or working chutes because they do not bend easily and must instead be cut in short sections with a torch or bandsaw. Exposed metal edges of guardrails are sharp and should be covered with metal flashing or wood to prevent potential injury to workers and animals.

Manufacturers of fiberglass or metal often sell full-size sheets to a secondary market at deeply discounted prices, although supply may be limited. These sheets are largely products that have near-normal structural strength and, because of non-uniform color or surface defects, minor cosmetic flaws. Such materials can be used in sorting alleys, crowding pens, and working/unloading chutes to provide a visual barrier when working cattle. If they are used with metal guardrails, attach them securely to the metal, using carriage bolts with large washers.

Figure 15. Holding pen with sidewall made from guardrail.

Galvanized metal sheets from salvaged grain storage bins can be bolted to wood posts or welded to metal posts and used for sidewalls in curved crowding pens and stacking/working chutes. Many corral layouts show a circular crowding pen with posts on a 16- to 18-foot arc. Thus, sheets from 33- or 36-foot bins may fit well into some working facilities with only slight modifications to the original layout. Individual sheets are normally either 32 or 48 inches high, so a minimum of two sheets (for 64 inches height) is needed for working cattle. The standard length for a curved sheet from a grain bin is 113 inches (center-to-center of double-bolt rows) regardless of bin diameter. In contrast to used highway guardrails, sheets from grain bins normally have only a $^1/_2$-inch deep corrugation. However, workers and animals must still be protected from sharp metal edges that are exposed by adding metal flashing at the entrance and exit of a chute where wall sheets from grain bins are used.

Portable Corral Systems

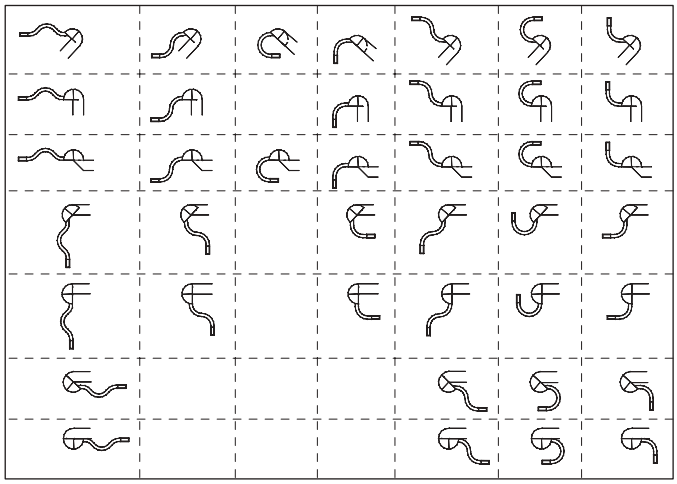
Most cattle handling systems are stationary, but portable corral systems may be a better option than a stationary facility for some operations where herds are kept in areas that may be a mile or more apart. By using panels and gates in a frame, a good working system can be put together quickly, especially for loading cattle. Portable panels come in many different gauges, tube diameters, and heights. Cheaper panels are of a light gauge and will not take abuse, so choose panels made of tubing that is 16-gauge or heavier. Panel height varies between 5 and 6 feet.

Commercial portable working chutes are usually C- or S-shaped. In order to sort cattle, you will have to add a portable tub and crowding gate to the system. The panels can then be used as the alley leading to the chute. If you add a portable squeeze, headgate, and scale, you will have a complete working system. Crowding tubs on wheels can be folded together for easy transport. Squeezes and scales can also be easily towed when supplied with wheels. Some commercial portable tubs

have a winch to lower or raise the unit. If you are working cattle of different size through the portable facility, use adjustable alley bows. They allow the width of the alley to be adjusted to match the size of the animals being worked.

Most portable crowding tubs and alleyways can be adapted to nearly any situation with the use of 45-degree and straight alley bows—left or right half circle, straight, or a combination of both. Sections can be added to create any length or configuration desired, but make sure that all widths and lengths of the various components are according the specifications listed in Table 5. Several working area combinations are shown schematically in Figure 16. However, the working area's layout is largely dictated by your preference and the way cattle are handled on your particular operation.

Figure 16. Working area combinations. *Adapted from the Beef Herd Management Reference Binder and Study Guide. Alberta Agriculture, Food and Rural Development, Alberta, Canada. Used with permission.*



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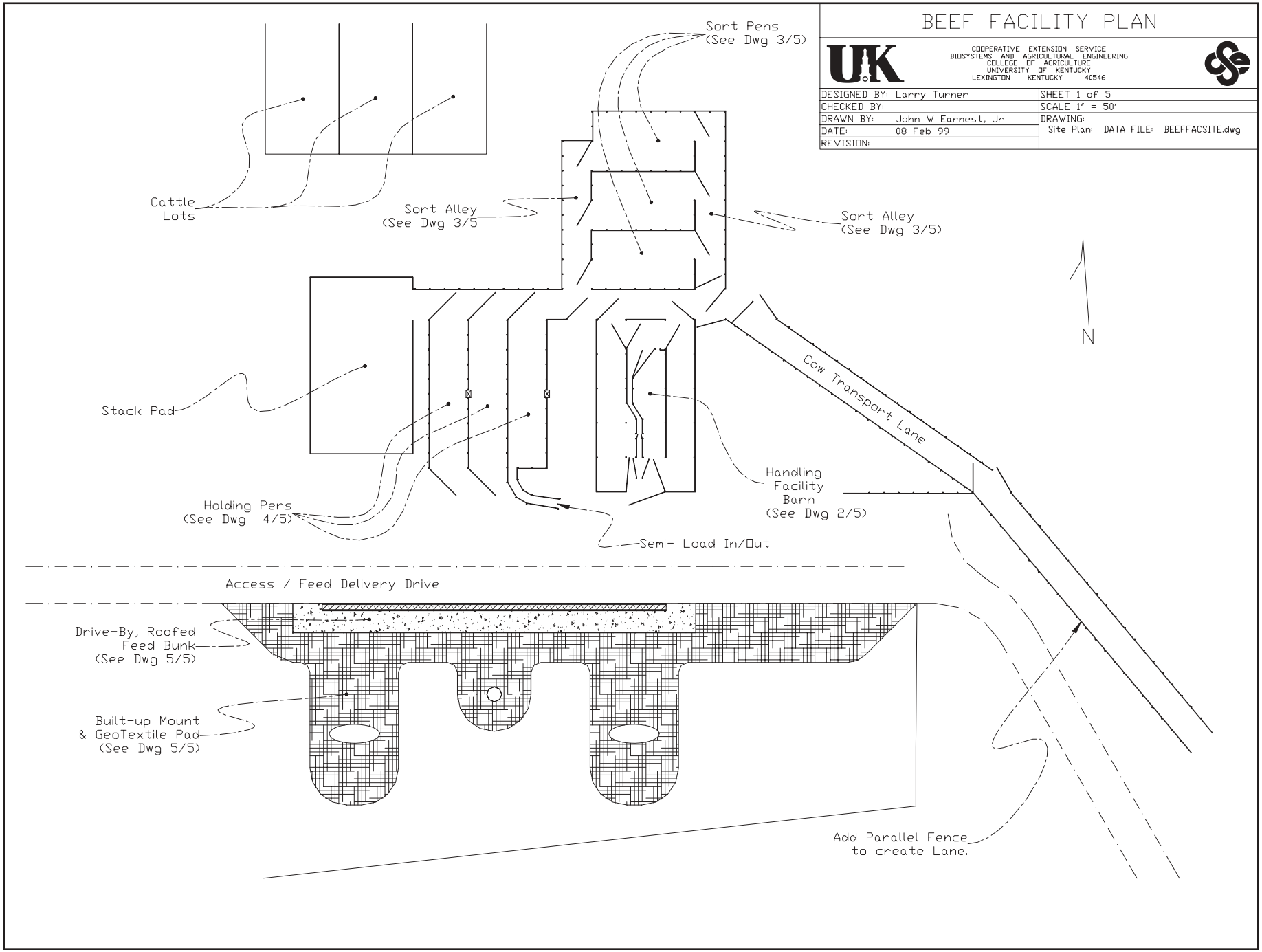
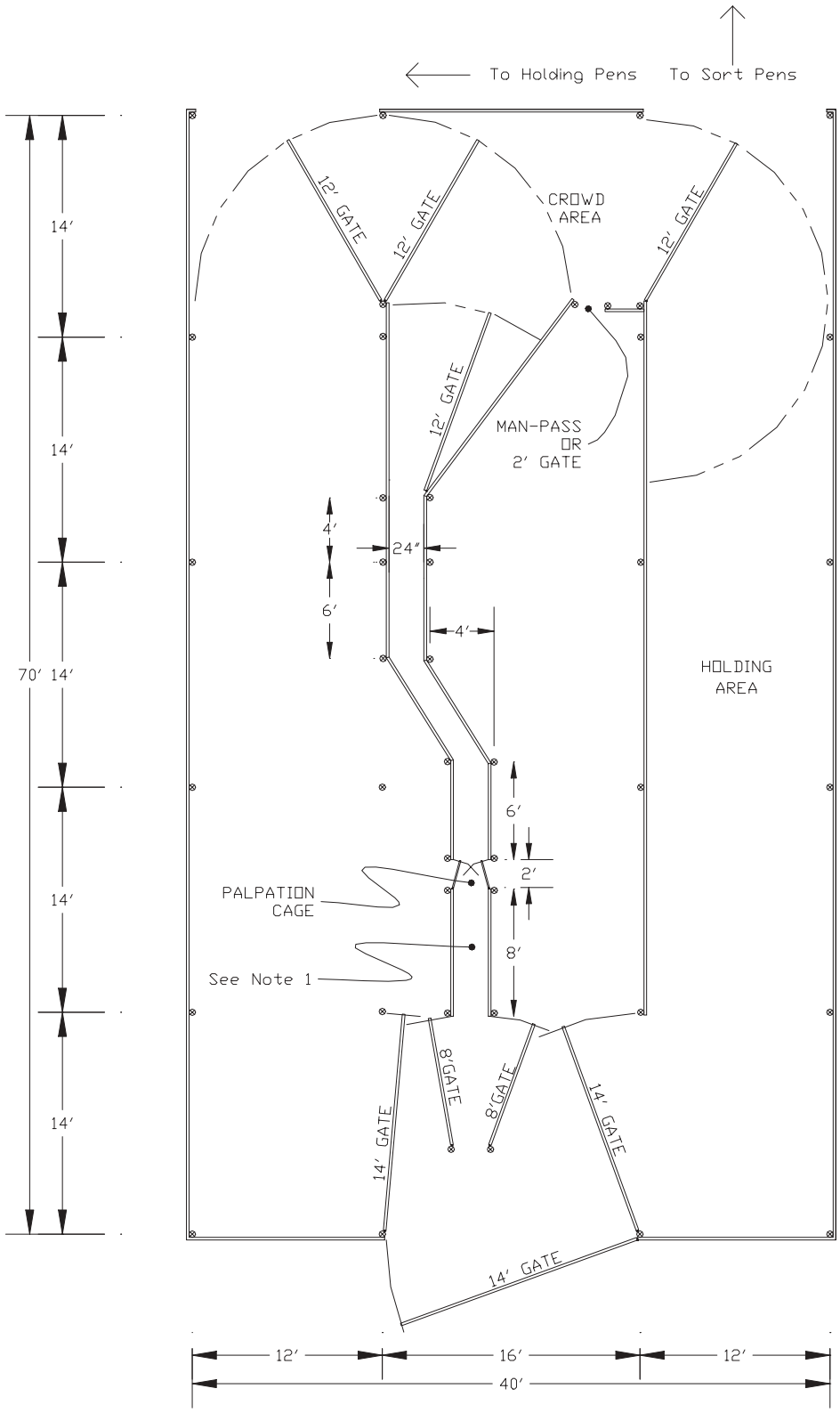
Corral Layouts


BEEF FACILITY PLAN
COOPERATIVE EXTENSION SERVICE
BIOSYSTEMS AND AGRICULTURAL ENGINEERING
COLLEGE OF AGRICULTURE
UNIVERSITY OF KENTUCKY
LEXINGTON KENTUCKY 40546
DESIGNED BY: Larry Turner
CHECKED BY:
DRAWN BY: John W Earnest, Jr
DATE: 08 Feb 99
REVISION:
SHEET 1 of 5
SCALE 1" = 50'
DRAWING:
Site Plan: DATA FILE: BEEFFACSITE.dwg
Sort Pens
(See Dwg 3/5)
Cattle
Lots
Sort Alley
(See Dwg 3/5
Sort Alley
(See Dwg 3/5)
N
Stack Pad
Cow Transport Lane
Handling
Facility
Barn
(See Dwg 2/5)
Holding Pens
(See Dwg 4/5)
Semi- Load In/Out
Access / Feed Delivery Drive
Drive-By, Roofed
Feed Bunk
(See Dwg 5/5)
Built-up Mount
& GeoTextile Pad
(See Dwg 5/5)
Add Parallel Fence
to create Lane.



BEEF FACILITY PLAN

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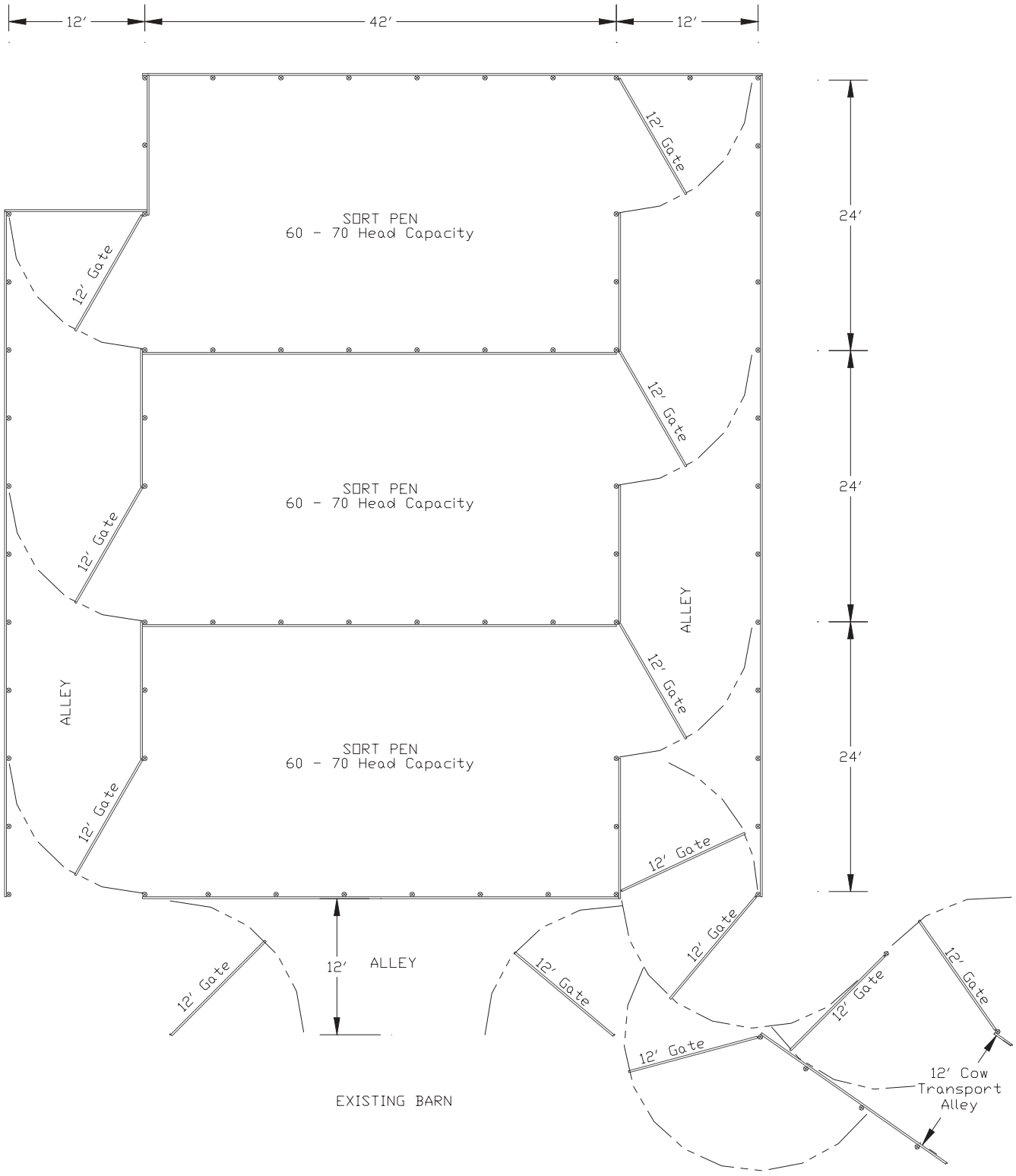
LEXINGTON KENTUCKY 40546

DESIGNED BY: Larry Turner	SHEET 2 of 5
CHECKED BY:	SCALE: NTS
DRAWN BY: John W Earnest, Jr	DRAWING: In-Barn Handling Facility
DATE: 08 Feb 99	DATA FILE: BEEFFAC2of5.dwg
REVISION:	

Note 1: See UK Plan 881-1 for Chute Detail.



BEEF FACILITY PLAN

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LEXINGTON KENTUCKY 40546

DESIGNED BY: Larry Turner	SHEET 3 of 5
CHECKED BY:	SCALE 1′ = 12′
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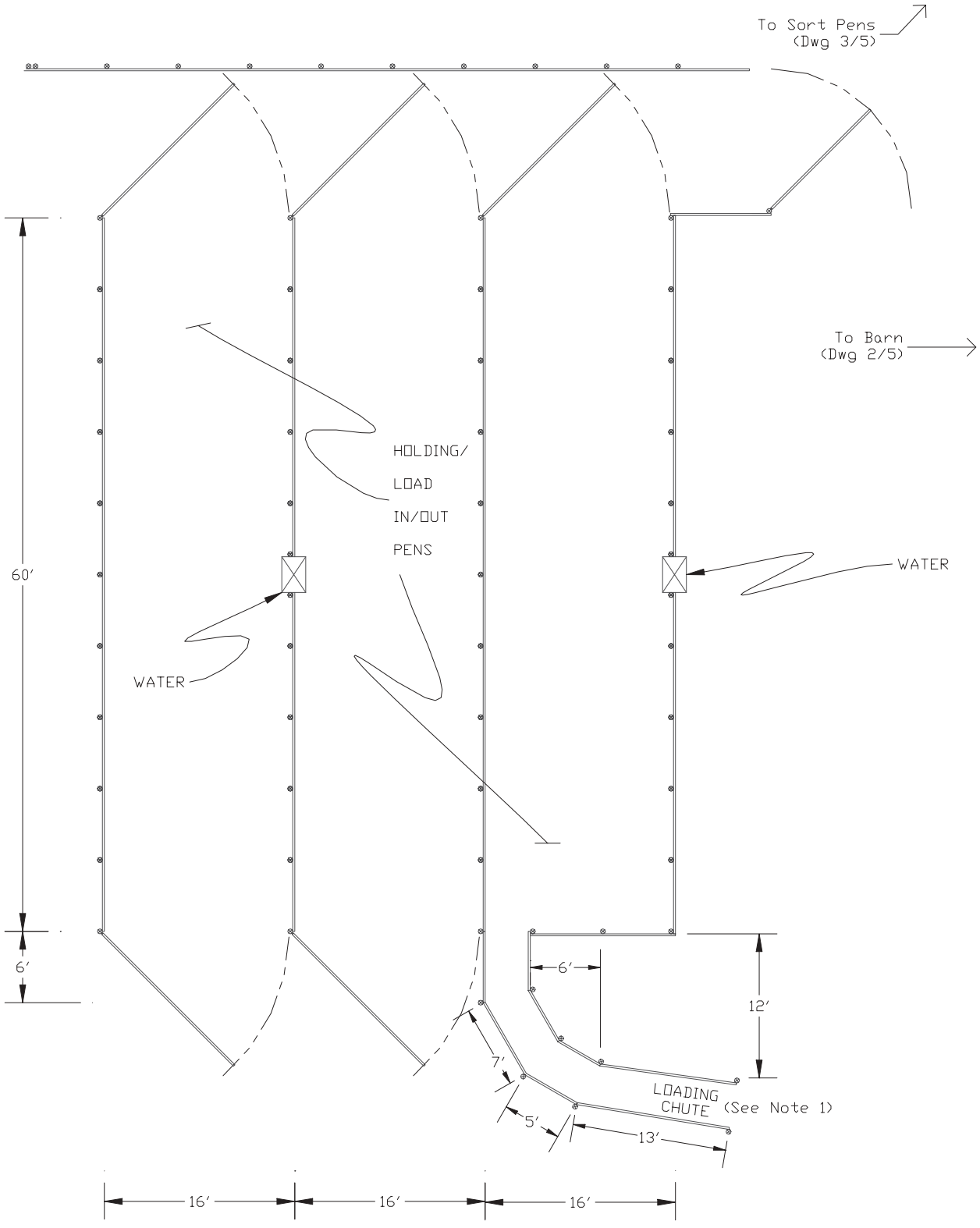
DATE: 08 Feb 99	DATA FILE: BEEFFAC3of5.dwg
REVISION:	



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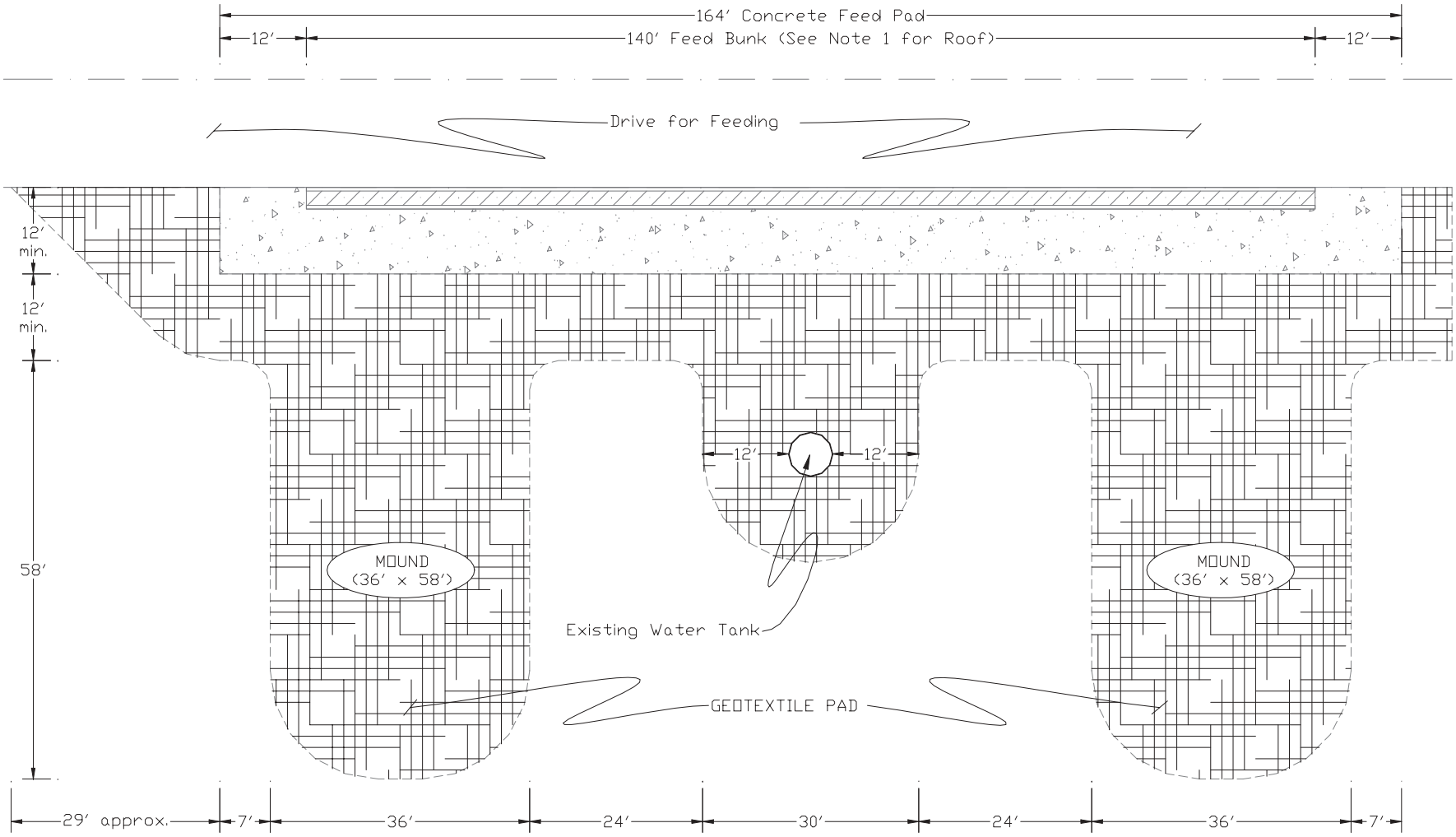
DESIGNED BY: Larry Turner	SHEET 4 of 5
CHECKED BY:	SCALE 1″ = 12′
DRAWN BY: John W Earnest, Jr	DRAWING: Holding / Load Pens
DATE: 08 Feb 99	DATA FILE: BEEFFAC4of5.dwg
REVISION:	

Note 1: See Plan USDA 5960, Loading Rmp & 6-Way Sorting Trap, for Loading Chute Details.



Note 1: See Plan USDA 6167, Silage Feed Bunks, for Roof.

Note 2: See enclosed for Mound construction details.

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DESIGNED BY: Larry Turner	SHEET 5 of 5
CHECKED BY:	SCALE 1″ = 20′
DRAWN BY: John W Earnest, Jr	DRAWING: Backgrounding Feed Pad Layout
DATE: 08 Feb 99	DATA FILE: BEEFFAC5of5.dwg
REVISION:	

WORKING FACILITY, HAY STORAGE AND SHELTER FOR 75 - 100 COWS & CALVES

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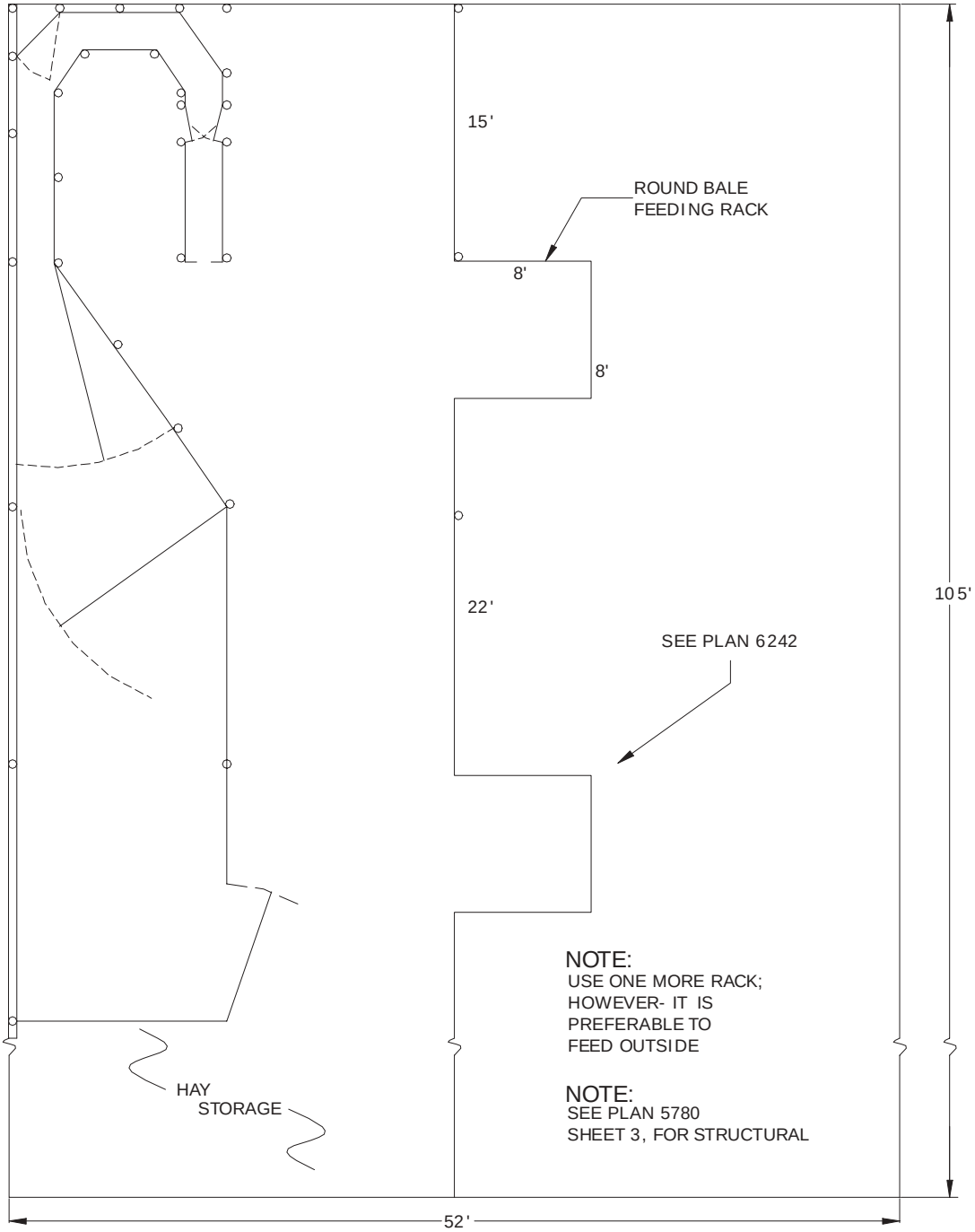

CATTLE CORRAL LAYOUT 1a

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PRINCETON, KENTUCKY 42445

REVISED: CONVERTED TO AutoCAD 2000 J. ASH 4/10/2001		
DESIGNED BY: LARRY W. TURNER	SHEET 1 of 2	SCALE 1" = 10'
DRAWN BY: JAMES ASH	SHEET	1a
DATE:		
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WORKING FACILITY DETAIL

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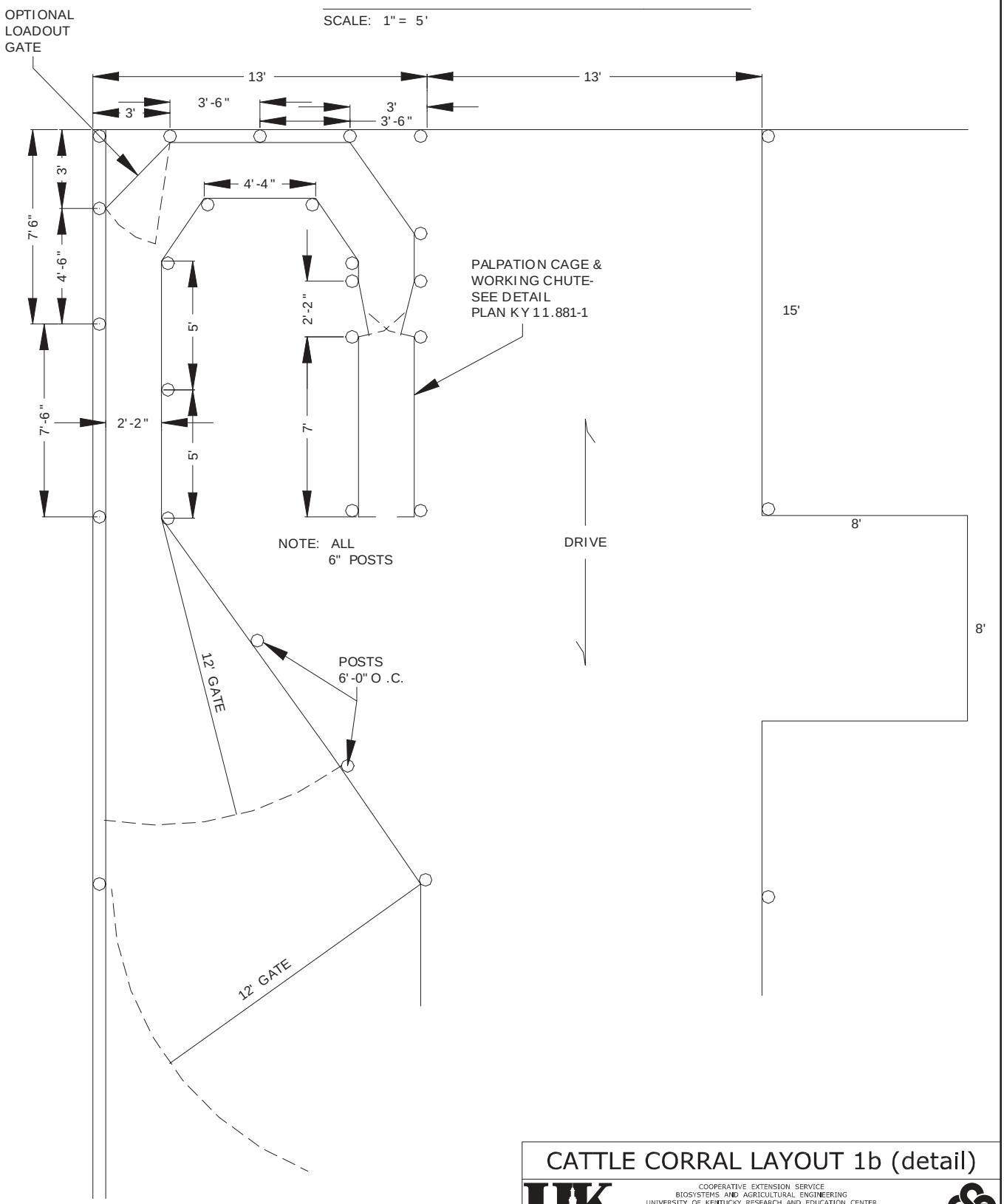

CATTLE CORRAL LAYOUT 1b (detail)

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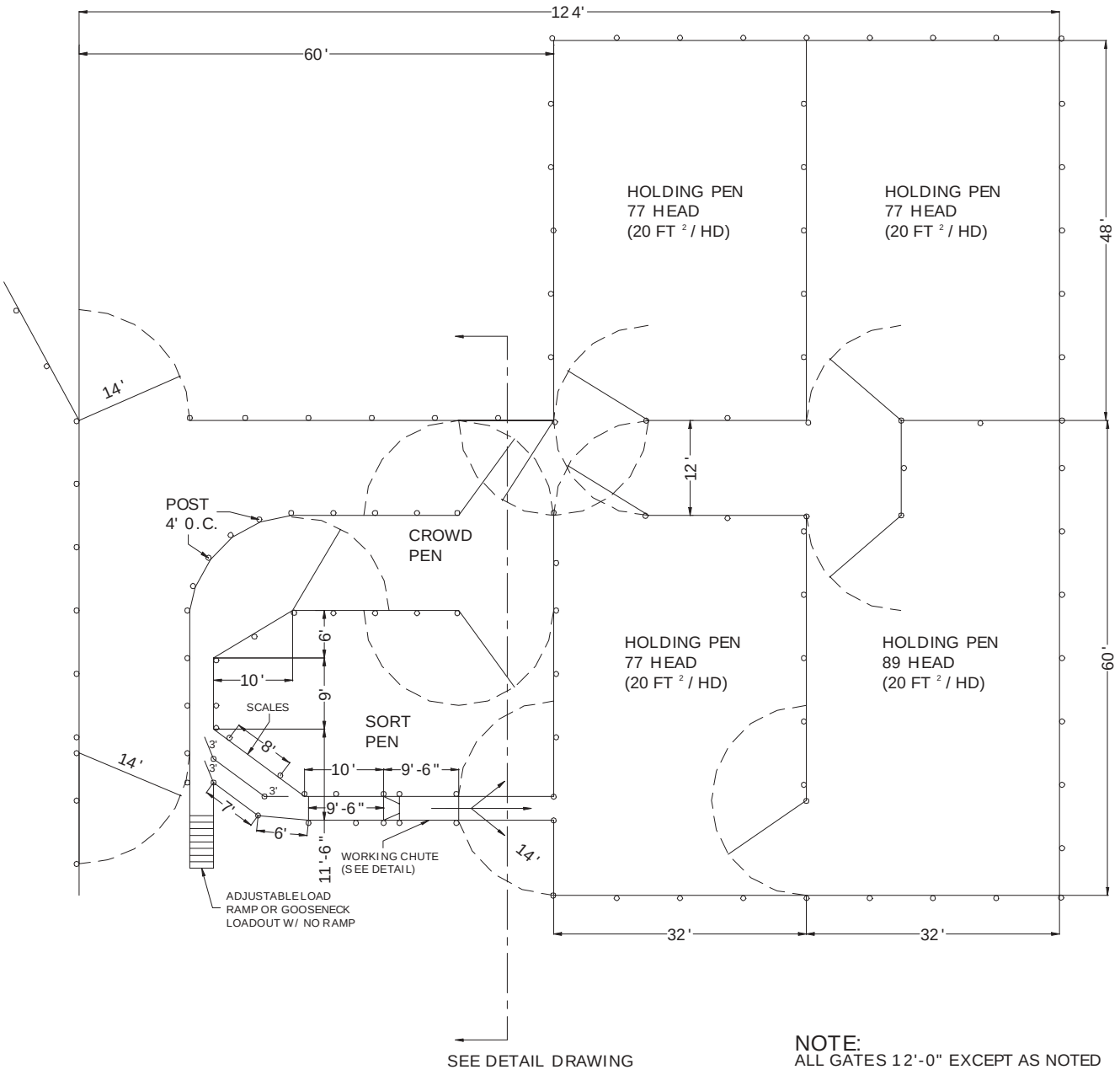

NOTE:
ALL GATES 12'-0" EXCEPT AS NOTED

CATTLE CORRAL LAYOUT 2a

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PRINCETON, KENTUCKY 42445

REVISED: CONVERTED TO AutoCAD 2000 J. ASH 4/10/2001		KY.11.
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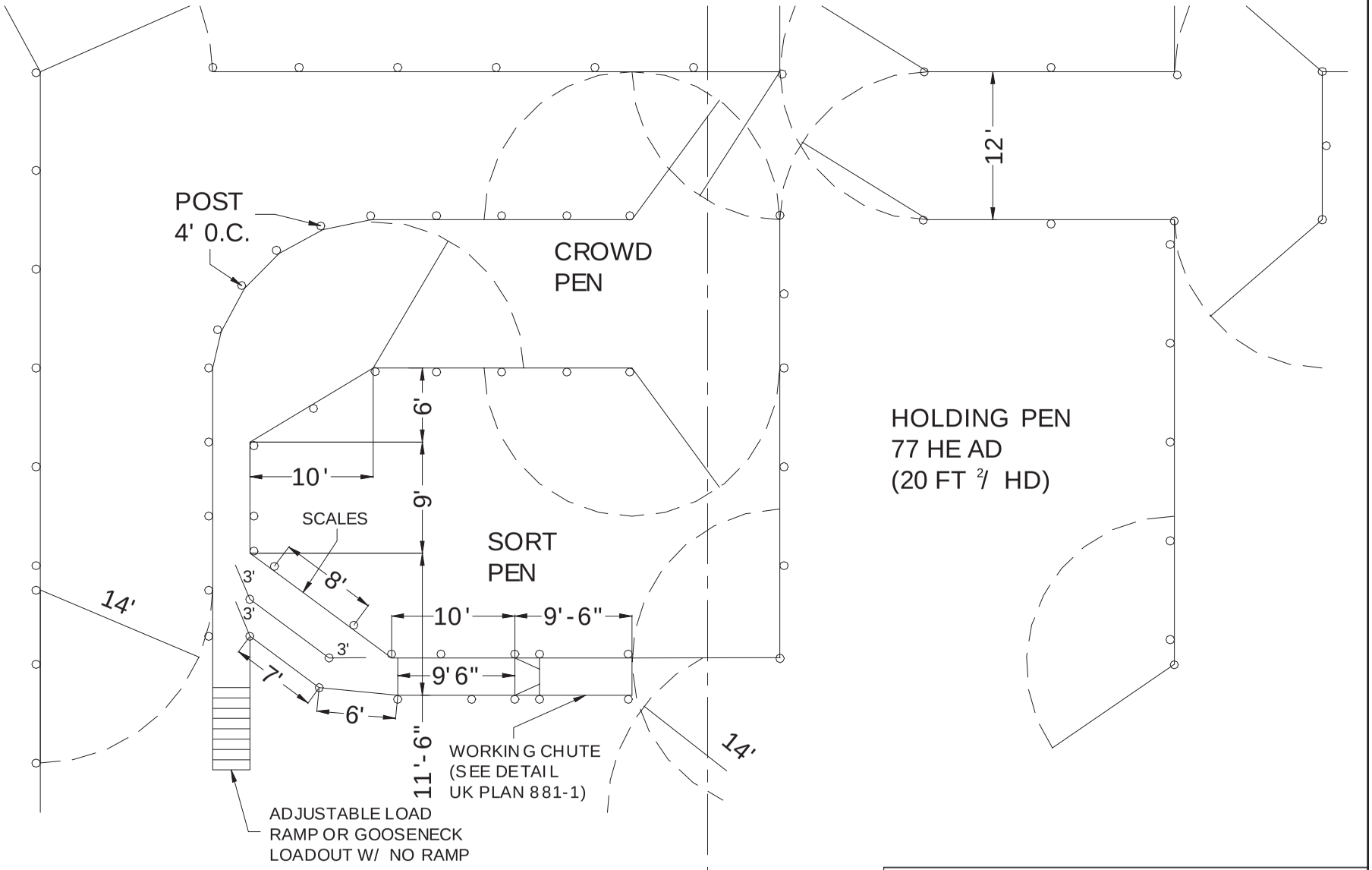

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CATTLE CORRAL LAYOUT 2b (detail)

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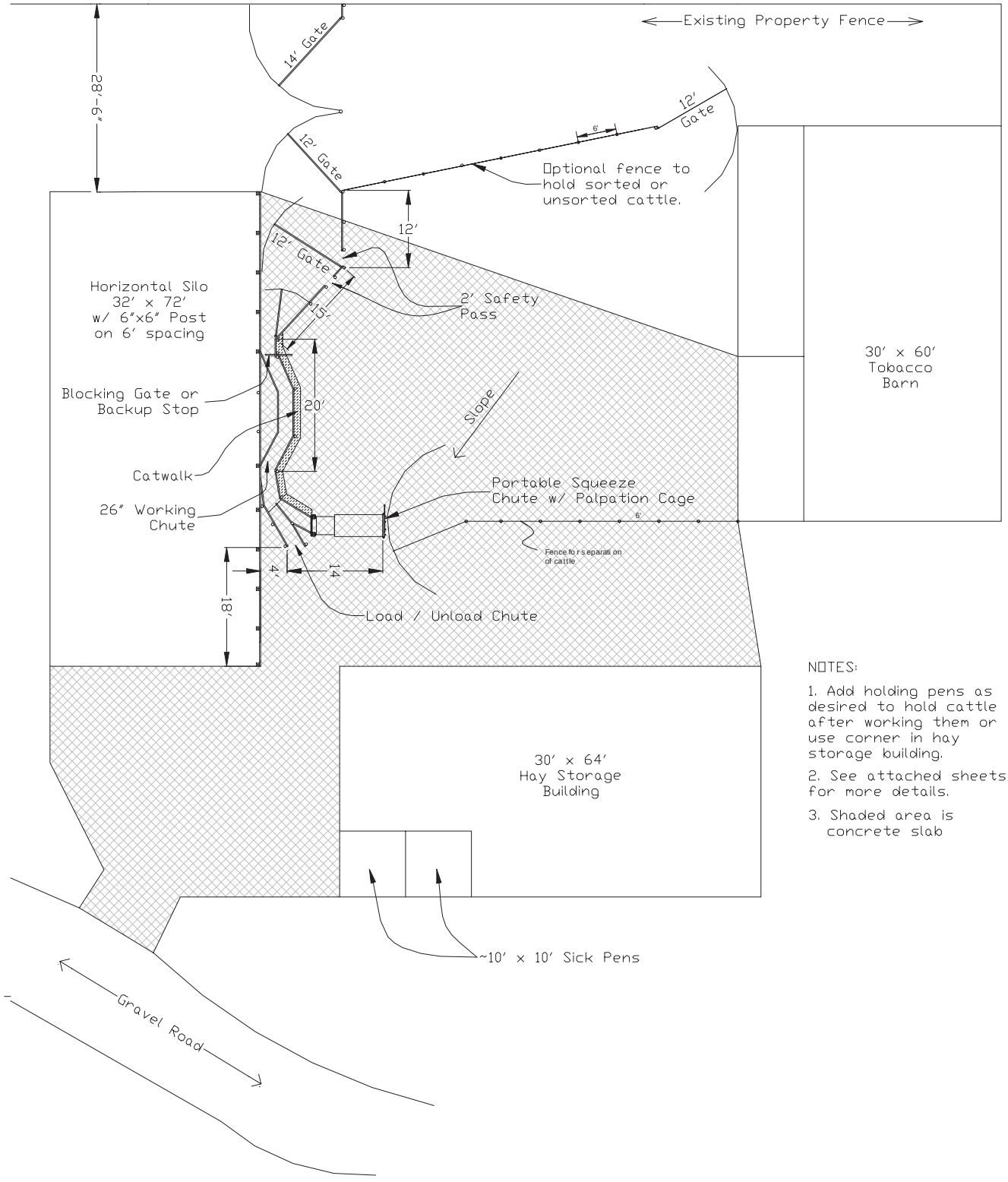

NOTES:

1. Add holding pens as desired to hold cattle after working them or use corner in hay storage building.
2. See attached sheets for more details.
3. Shaded area is concrete slab

CATTLE CORRAL LAYOUT 3

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PRINCETON KENTUCKY 42445

DESIGNED BY: S G McNeill	SHEET 1	SCALE 1" = 20'
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DRAWN BY: J W Earnest Jr.	Overall Corral Site	
DATE: 05 Jun 2000	REVISION: 5/01/2001 J. ASH	
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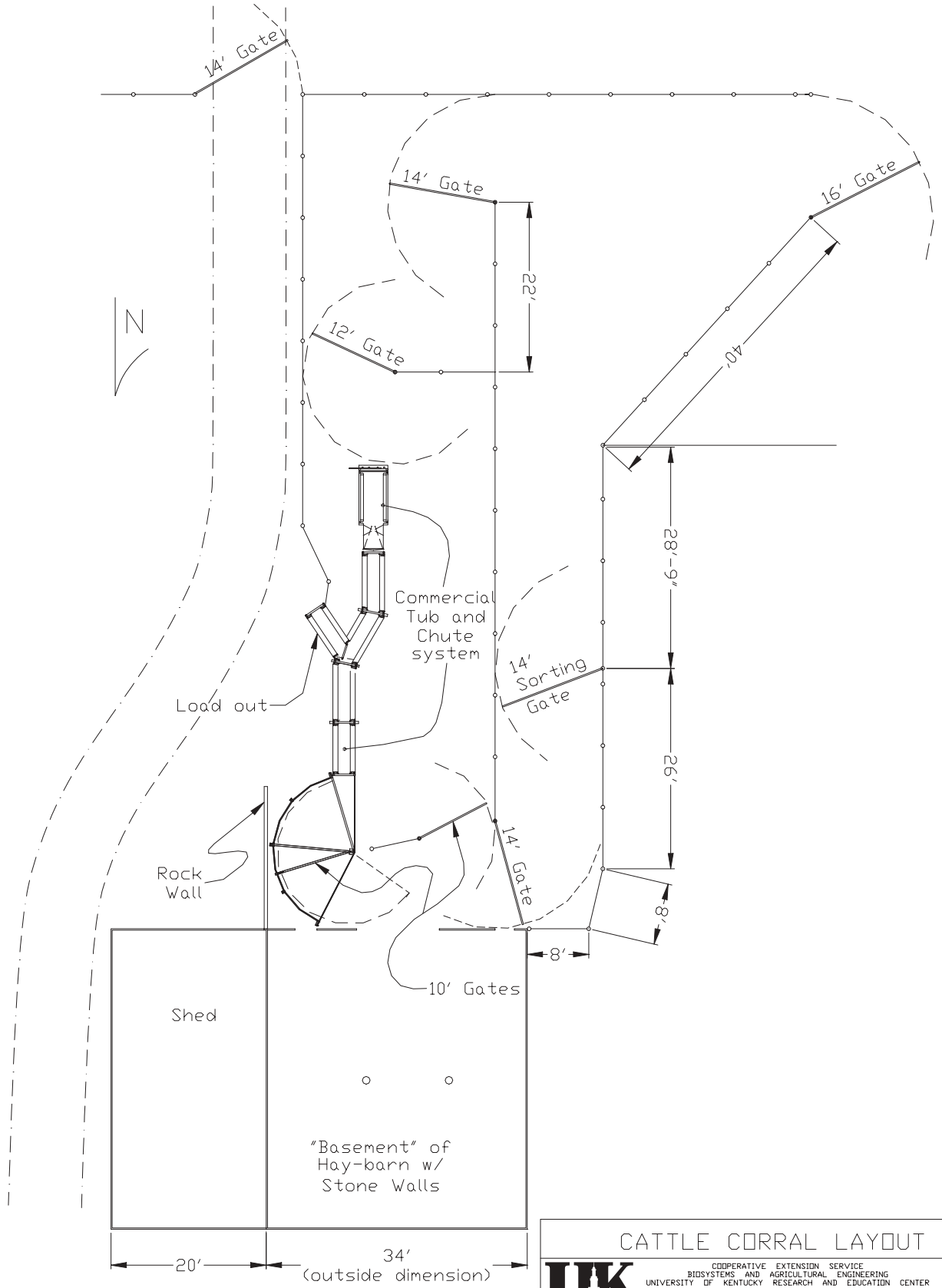

CATTLE CORRAL LAYOUT 4

COOPERATIVE EXTENSION SERVICE
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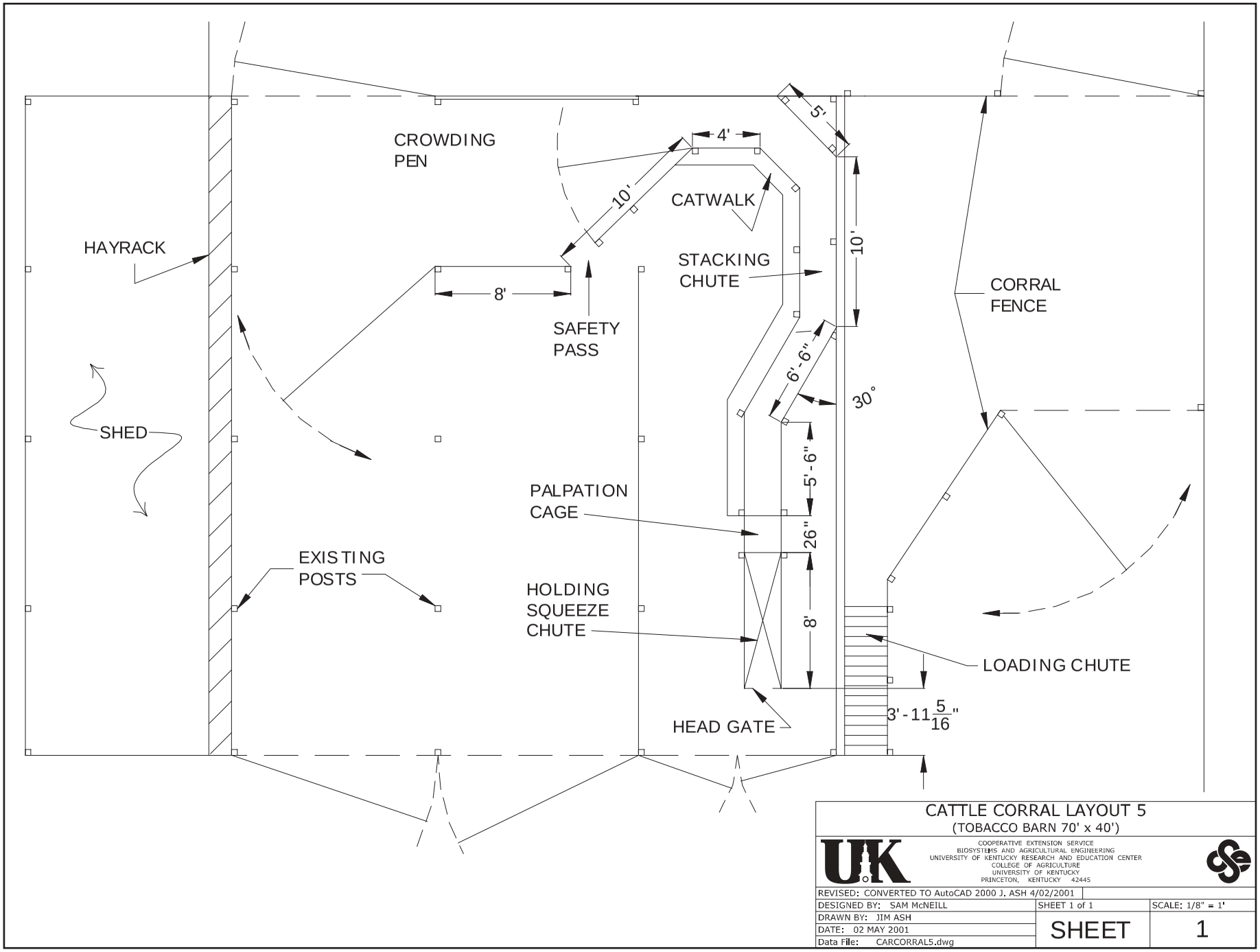
UNIVERSITY OF KENTUCKY RESEARCH AND EDUCATION CENTER
COLLEGE OF AGRICULTURE
UNIVERSITY OF KENTUCKY
PRINCETON KENTUCKY 42445

DESIGNED BY: S.G. McNeill		SCALE 1" = 20'
CHECKED BY:		SHEET 1
DRAWN BY: J.W. Earnest, Jr		
DATE: 01 May 00	REVISION: 4/02/2001 J. ASH	
Data File: CATCORRAL4.dwg		



CATTLE CORRAL LAYOUT 5
(TOBACCO BARN 70' x 40')

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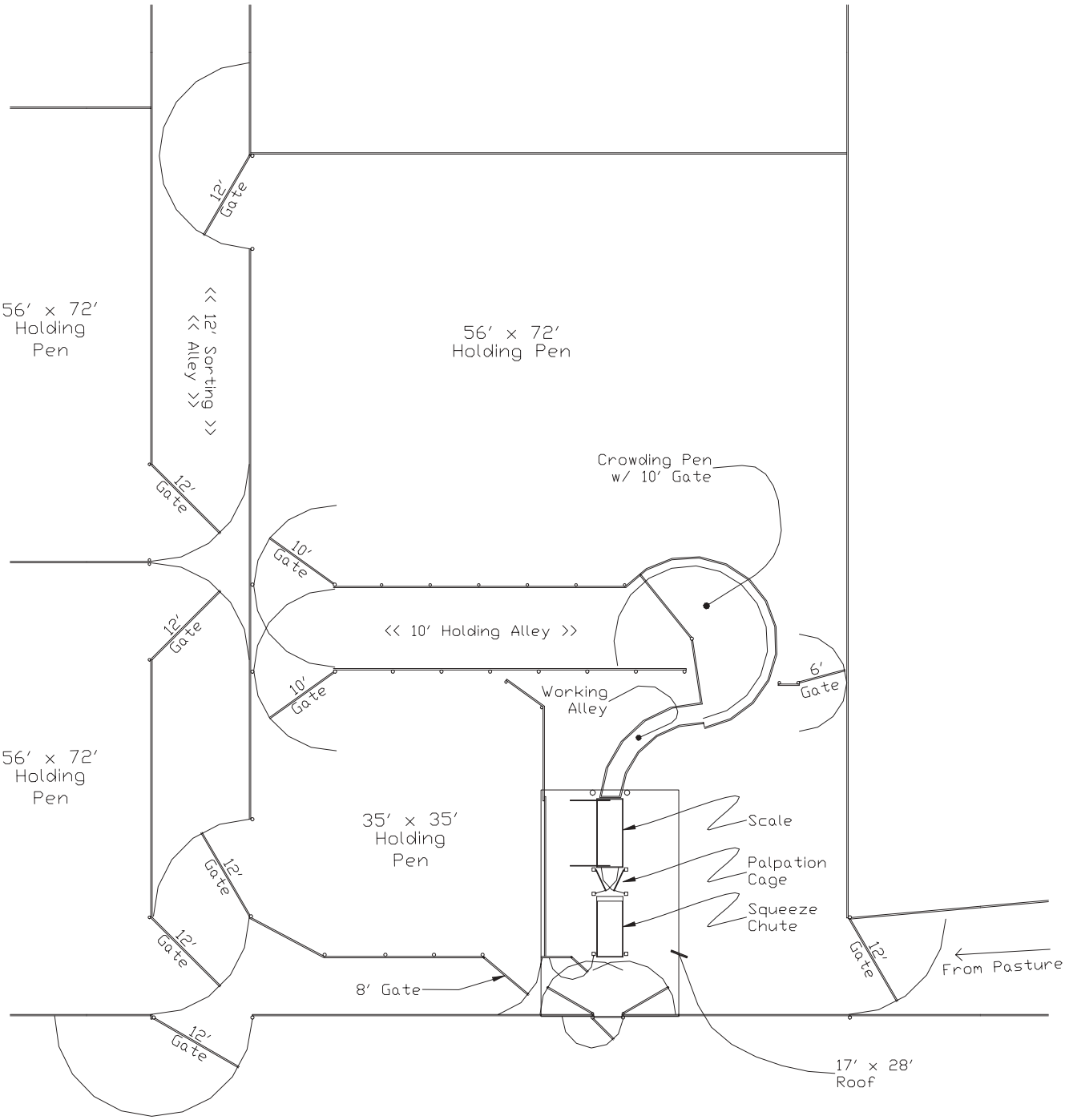
COLLEGE OF AGRICULTURE
UNIVERSITY OF KENTUCKY
PRINCETON, KENTUCKY 42445

REVISED: CONVERTED TO AutoCAD 2000 J. ASH 4/02/2001		
DESIGNED BY: SAM McNEILL	SHEET 1 of 1	SCALE: 1/8" = 1'
DRAWN BY: JIM ASH	SHEET	1
DATE: 02 MAY 2001		
Data File: CARCORRAL5.dwg		



CATTLE CORRAL LAYOUT 6

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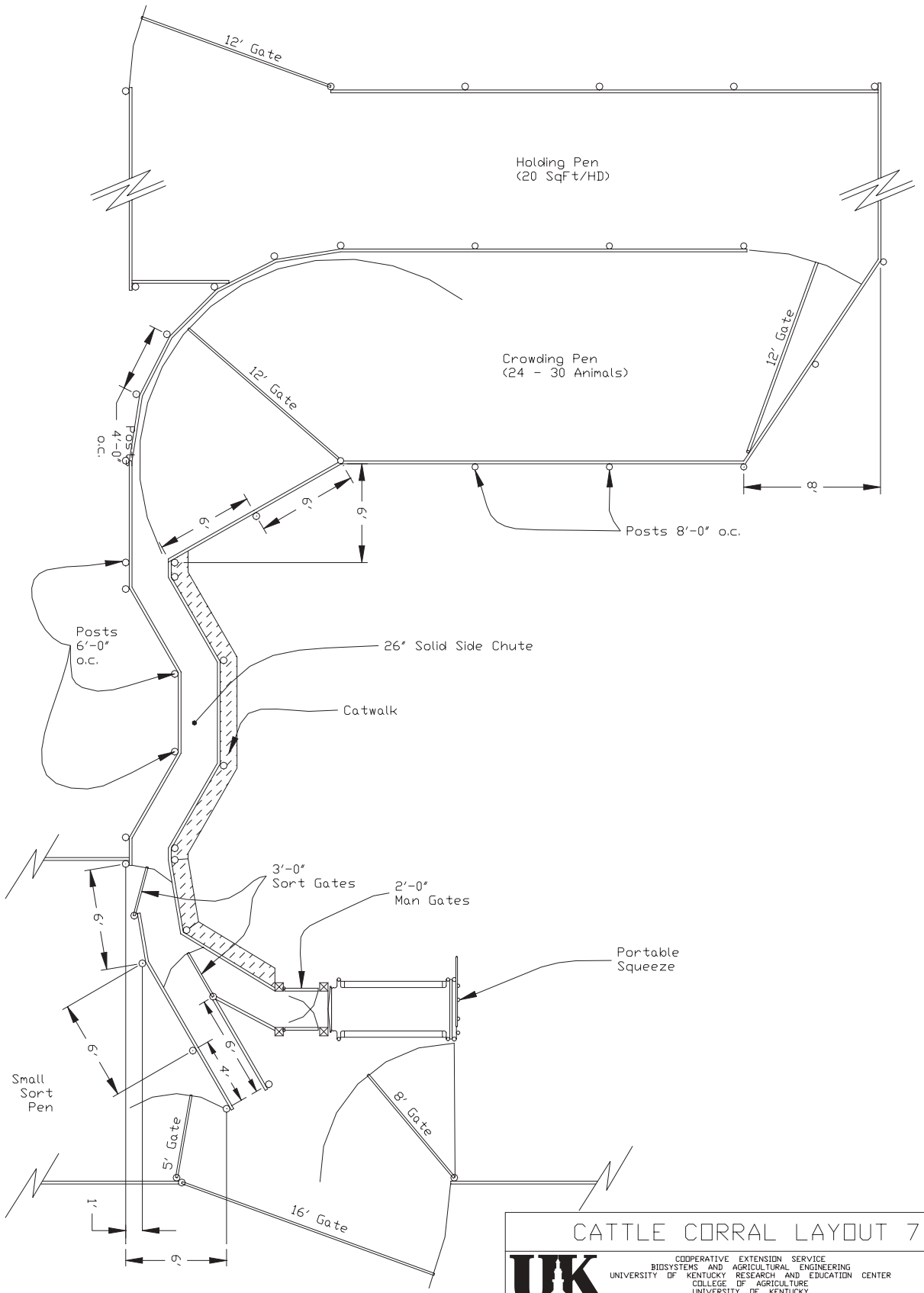
UNIVERSITY OF KENTUCKY RESEARCH AND EDUCATION CENTER
COLLEGE OF AGRICULTURE
UNIVERSITY OF KENTUCKY
PRINCETON KENTUCKY 42445

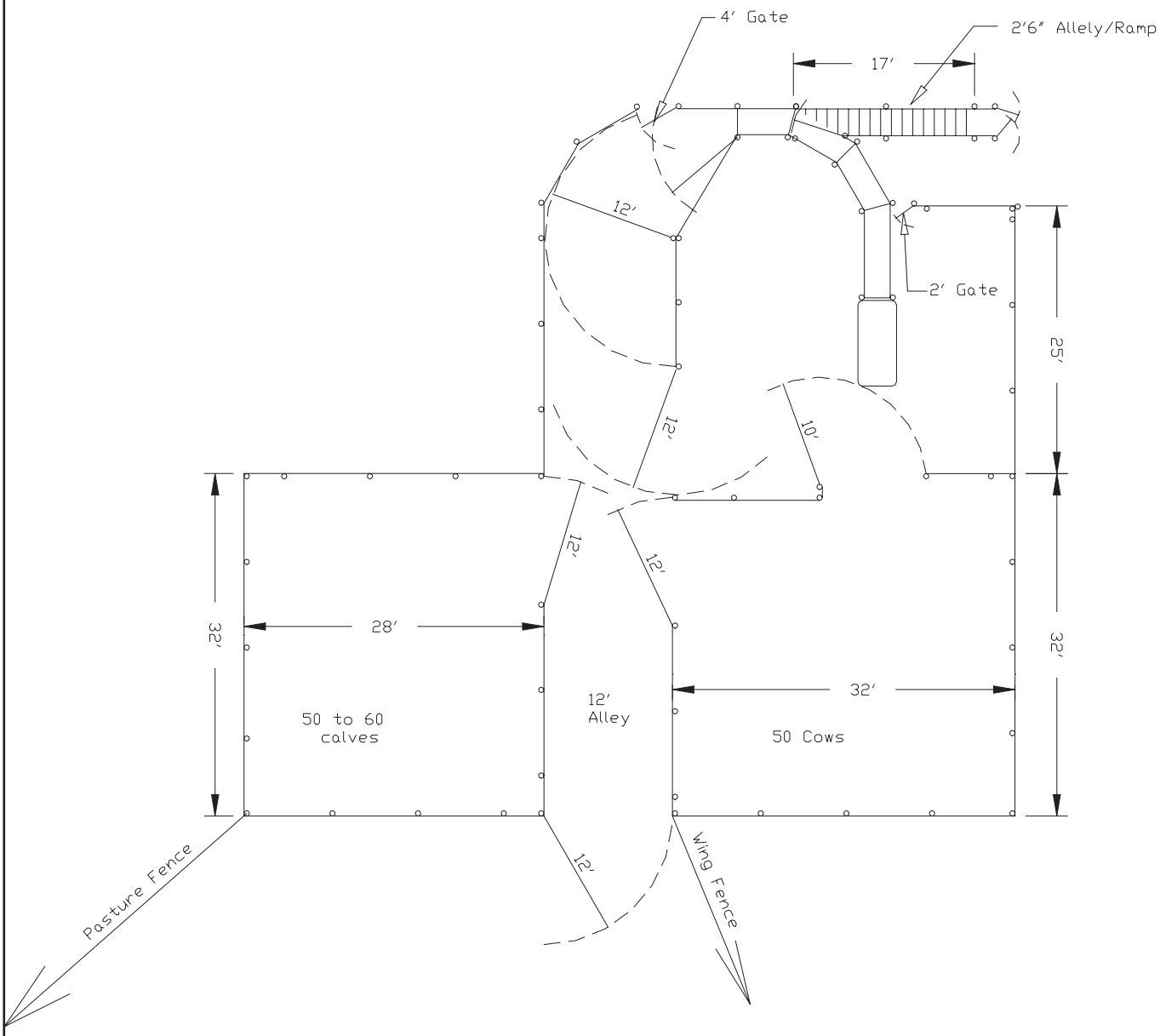
DESIGNED BY:	SHEET 1 of 1	SCALE 1′ = 20′
CHECKED BY:	DRAWING:	
DRAWN BY:		
DATE: REVISION:		
Data File: CATCORRAL6.dwg		



CATTLE CORRAL LAYOUT 7

COOPERATIVE EXTENSION SERVICE
BIOSYSTEMS AND AGRICULTURAL ENGINEERING
UNIVERSITY OF KENTUCKY RESEARCH AND EDUCATION CENTER
COLLEGE OF AGRICULTURE
UNIVERSITY OF KENTUCKY
PRINCETON KENTUCKY 42445

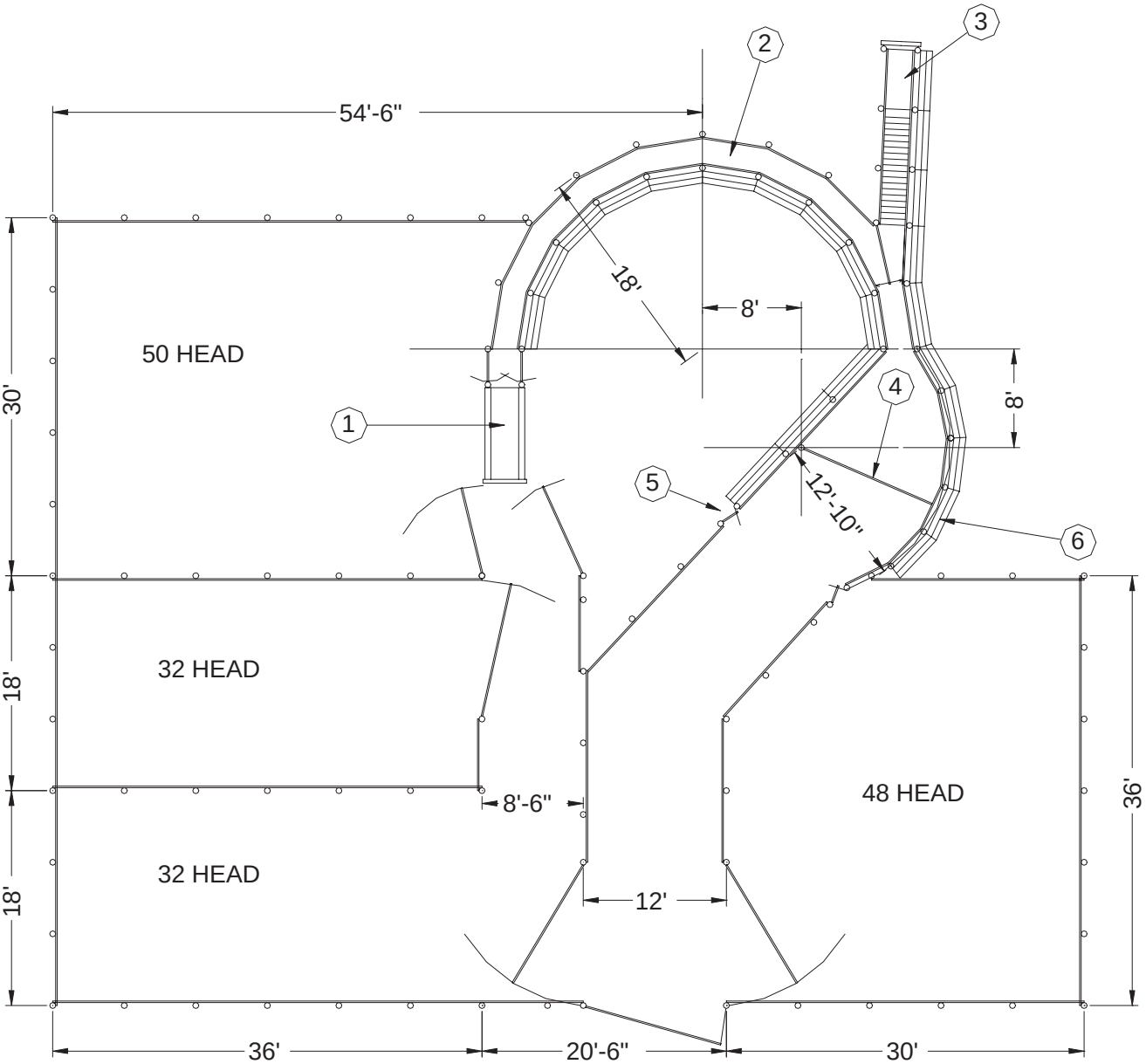
DESIGNED BY:	SHEET # of #	SCALE 1" = 8'
CHECKED BY:	DRAWING:	
DRAWN BY:		
DATE: REVISION:		
Data File: CATCORRAL7.dwg		



CATTLE CORRAL LAYOUT 8

COOPERATIVE EXTENSION SERVICE
BIOSYSTEMS AND AGRICULTURAL ENGINEERING DEPARTMENT
UNIVERSITY OF KENTUCKY RESEARCH AND EDUCATION CENTER
COLLEGE OF AGRICULTURE
UNIVERSITY OF KENTUCKY
AND
UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING
PRINCETON KENTUCKY 42445

DESIGN: S. McNeill	01Oct96	SECTIONAL CORRAL
DRAWN: J. Earnest	01Oct96	Ref.: CES/UK–USDA Plans No. 6049 & 6229 Modified
PROJECT ENGR:		
DATA FILE: CATCORRAL8.dwg		
REVISIONS: CHANGED LOCATION OF CHUTE DRAWN BY: J. ASH	02 MAY 2001	SCALE: 1" = 14' DRAWING 1 OF 1



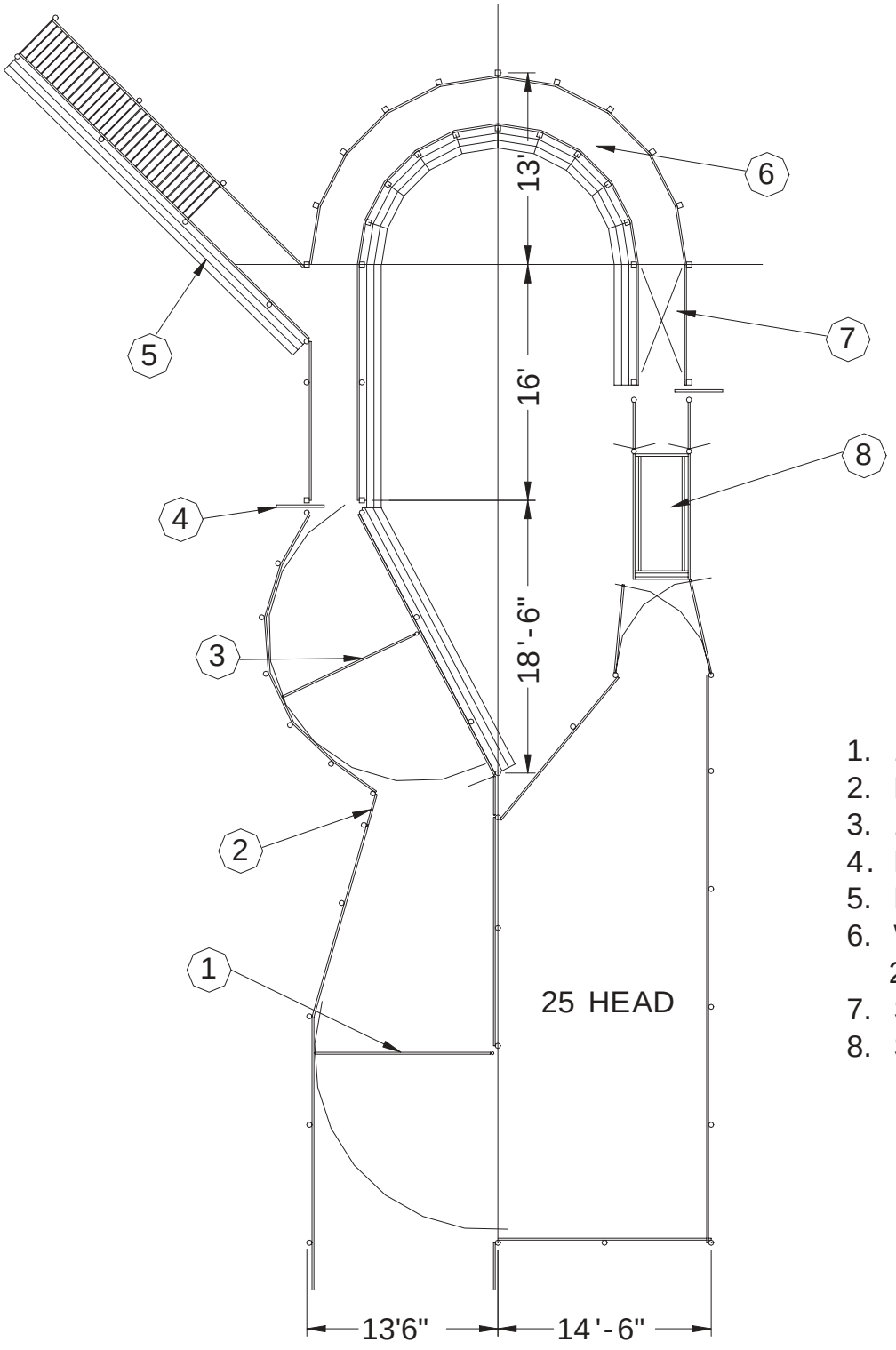
1. SQUEEZE
2. WORKING CHUTE
3. LOADING CHUTE
4. 12 ' CROWDING GATE
5. MAN GATE
6. CATWALK

CATTLE CORRAL LAYOUT 9

UK

COOPERATIVE EXTENSION SERVICE
BIOSYSTEMS AND AGRICULTURAL ENGINEERING
UNIVERSITY OF KENTUCKY RESEARCH AND EDUCATION CENTER
COLLEGE OF AGRICULTURE
UNIVERSITY OF KENTUCKY

DESIGNED BY: USDA PLAN 6229	SHEET 1 of 1	SCALE 1/16" = 1'
CHECKED BY:	DRAWING:	
DRAWN BY: TO AutoCAD FILE BY: J. ASH		
DATE: 07 MAY 2001 | REVISION: TO AutoCAD		
Data File: CATCORRAL9.dwg		

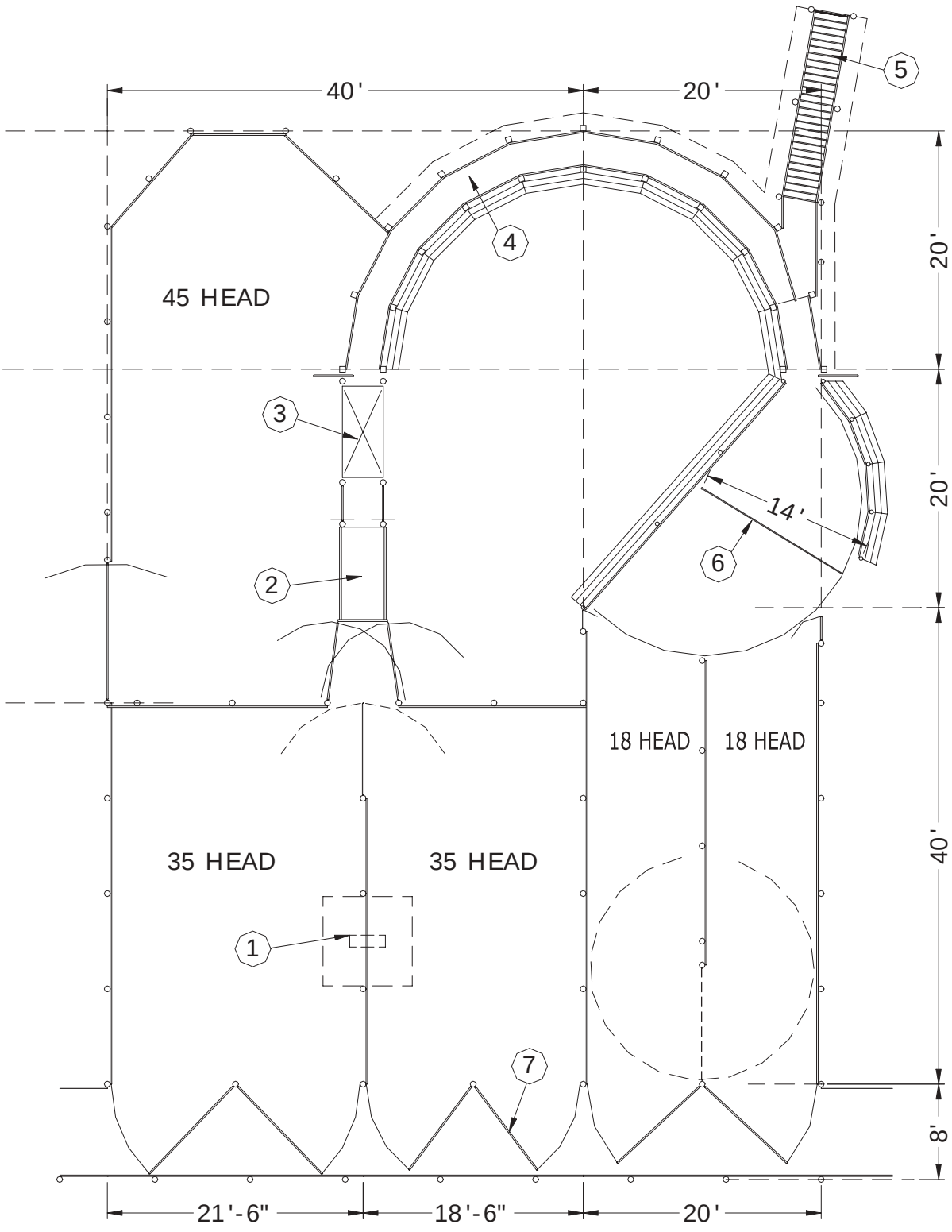


1. 12' GATE
2. MAN GATE
3. 10' CROWD GATE
4. BLOCKING GATE
5. LOADING CHUTE
6. WORKING CHUTE
   28" TO 32"
7. SCALE
8. SQUEEZE

CATTLE CORRAL LAYOUT 10

UK COOPERATIVE EXTENSION SERVICE
BIOSYSTEMS AND AGRICULTURAL ENGINEERING
UNIVERSITY OF KENTUCKY RESEARCH AND EDUCATION CENTER
COLLEGE OF AGRICULTURE
UNIVERSITY OF KENTUCKY

DESIGNED BY:	SHEET 1 of 1	SCALE 1/16" = 1'
CHECKED BY:	SASKATCHEWAN S186 ADAPTED FROM CORRALS FOR HANDLING BEEF CATTLE WITH PERMISSION OF ALBERTA AGRICUTURE, FOOD AND RURAL DEVELOPMENT	
DRAWN BY: TO AutoCAD FILE BY: J. ASH		
DATE: 07 MAY 2001 | REVISION:TO AutoCAD		
Data File: CATCORRAL10.dwg		



1. OPTIONAL WATERER FOR OVERNIGHT
2. SQUEEZE
3. SCALE
4. WORKING CHUTE WITH CATWALK
5. LOADI NG CHUTE
6. 14' CROWDING PEN
7. 9' TO 10' GATES

CATTLE CORRAL LAYOUT 11

UK

COOPERATIVE EXTENSION SERVICE
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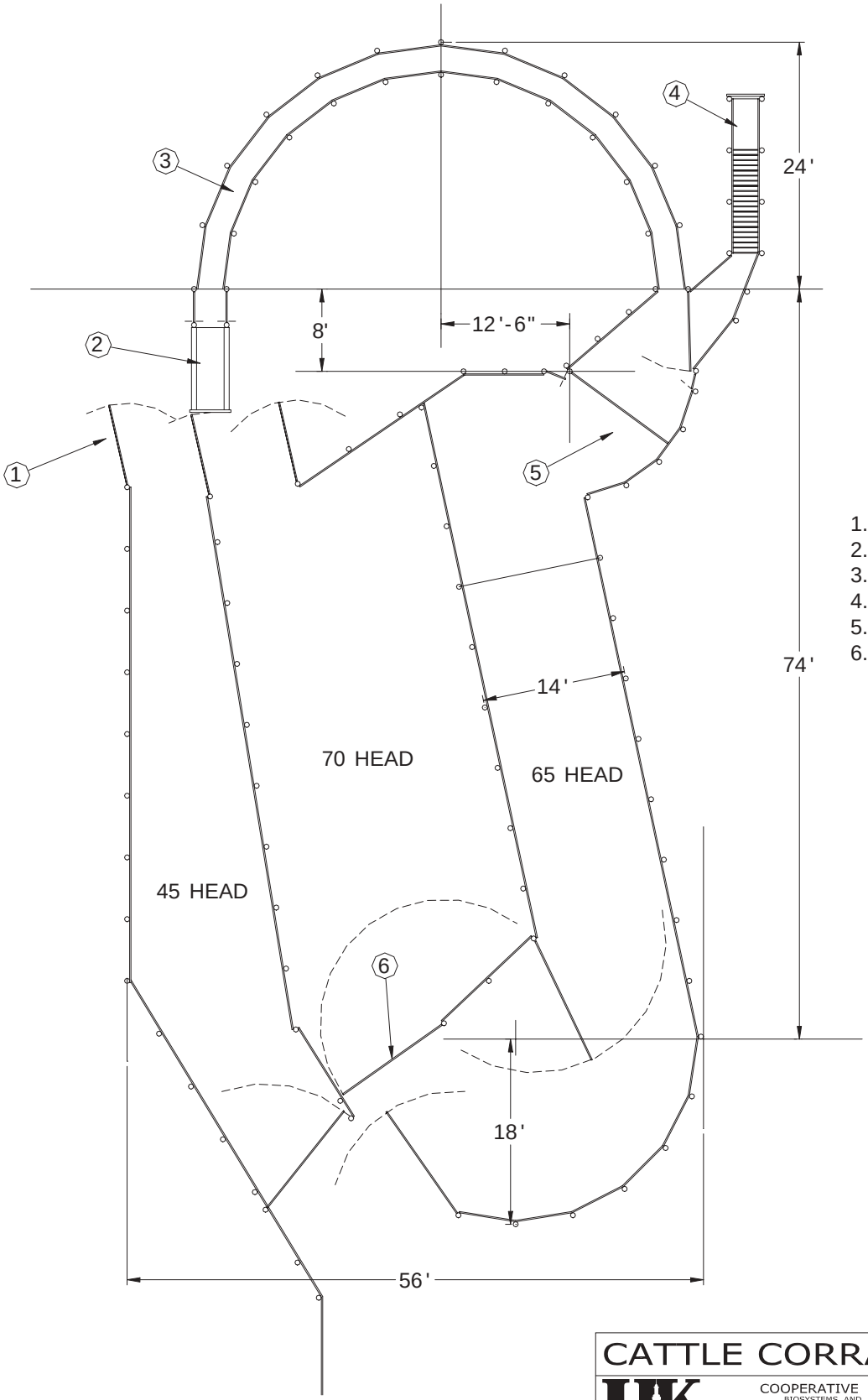
DESIGNED BY:SEE NOTE	SHEET 1 of 1	SCALE 1/16" = 1'
CHECKED BY:	SASKATCHEWAN S185	
DRAWN BY: TO AutoCAD FILE BY: J. ASH	ADAPTED FROM CORRALS FOR HANDLING BEEF CATTLE WITH PERMISSION OF ALBERTA AGRICULTURAL, FOOD AND RURAL DEVELOPMENT	
DATE: 07 MAY 2001 REVISION:TO AutoCAD		
Data File: CATCORRAL11.dwg		



1. 8' GATES
2. SQUEEZE
3. WORKING CHUTE
4. LOADING CHUTE
5. 12 'CROWDING PEN
6. 12 ' GATES

CATTLE CORRAL LAYOUT 12

UK COOPERATIVE EXTENSION SERVICE
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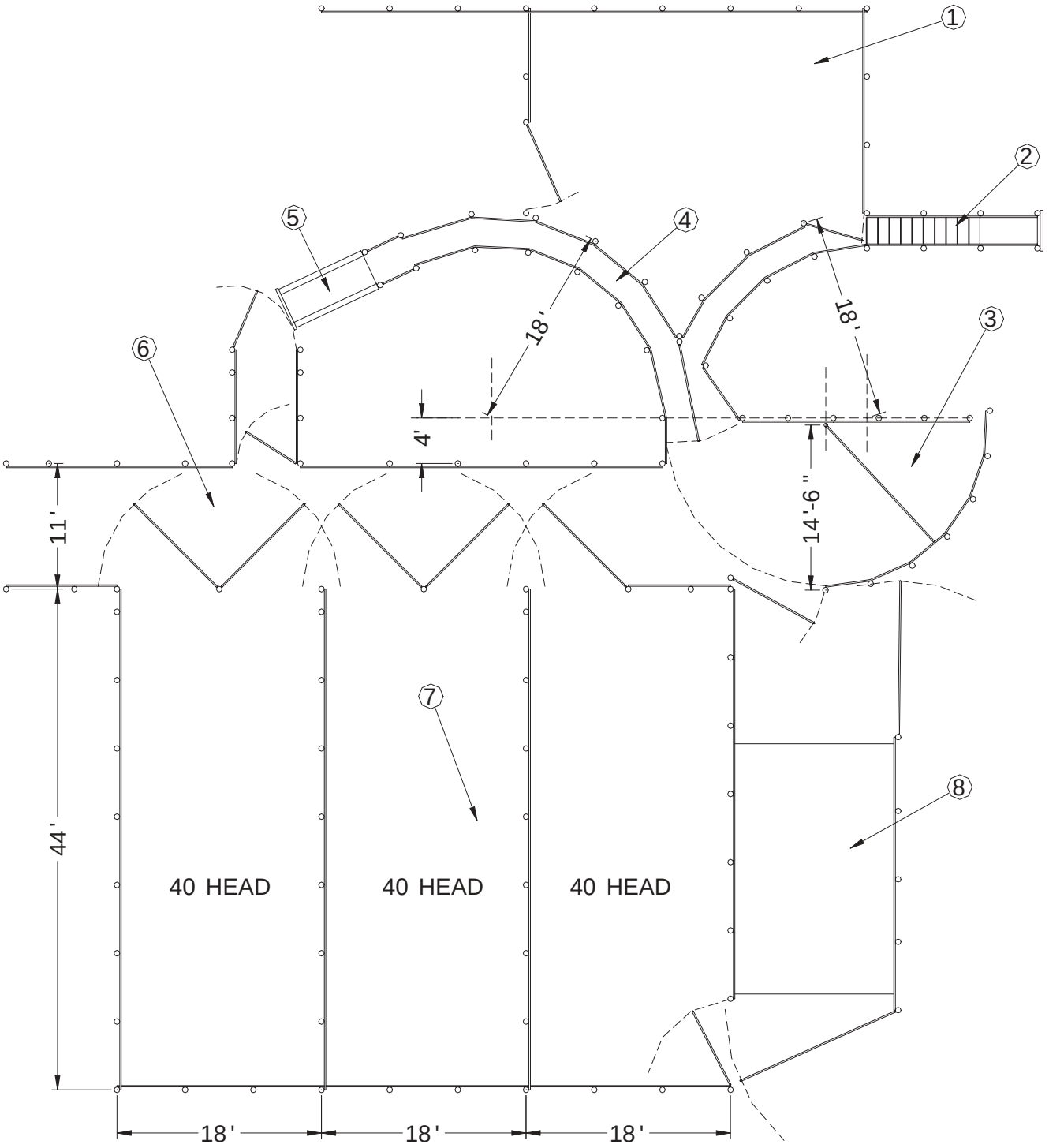
COLLEGE OF AGRICULTURE
UNIVERSITY OF KENTUCKY

DESIGNED BY: SEE NOTE	SHEET 1 of 1	SCALE 1/16" = 1'
CHECKED BY:	T JONES PLAN	
DRAWN BY: TO AutoCAD FILE BY: J. ASH	ADAPTED FROM CORRALS FOR HANDLING BEEF CATTLE WITH PERMISSION OF ALBERTA AGRICULTURAL, FOOD AND RURAL DEVELOPMENT	
DATE: 07 MAY 2001 REVISION: TO AutoCAD		
Data File: CATCORRAL12.dwg		



1. SHIP IN PEN
2. LOADING CHUTE
3. 14' CROWDING GATE
4. WORKING CHUTE
5. SQUEEZE
6. GATHERING ALLEY
7. HOLDING PENS
8. 14' X 22 ' SCALE

CATTLE CORRAL LAYOUT 13

UK

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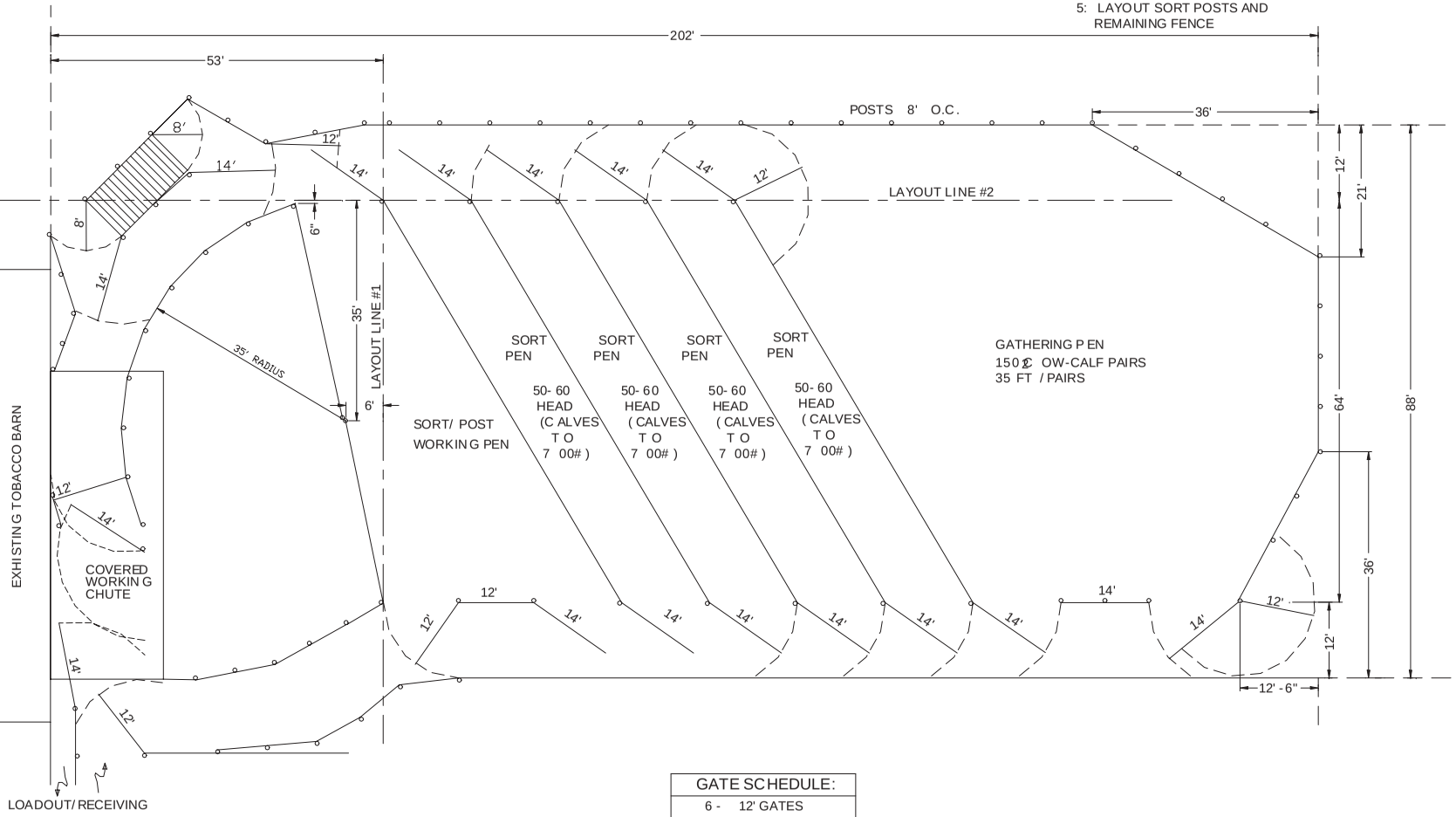
UNIVERSITY OF KENTUCKY

DESIGNED BY:	SHEET 1 of 1	SCALE 1/16" = 1'
CHECKED BY:	DOUBLE CIRCLE CORRAL	
DRAWN BY: TO AutoCAD FILE BY: J. ASH	ADAPTED FROM CORRALS FOR HANDLING BEEF CATTLE WITH PERMISSION OF ALBERTA AGRICULTURAL, FOOD AND RURAL DEVELOPMENT	
DATE: 07 MAY 2001 REVISION:TO AutoCAD		
Data File: CATCORRAL13.dwg		

LAYOUT INSTRUCTIONS
1: POSITION LAYOUT LINE # 1
53' FROM BARN
2: SET LAYOUT LINE # 2 68'
FROM LOADOUT END OF PARLOR
3: POSITION 35' RADIUS CENTER
4: LAYOUT CURVED ALLEY
5: LAYOUT SORT POSTS AND
REMAINING FENCE



GATE SCHEDULE:
6 - 12' GATES
12 - 14 ' GATES
2 - 8' GAT ES

SCALE: 1" = 30'

CATTLE CORRAL LAYOUT 14

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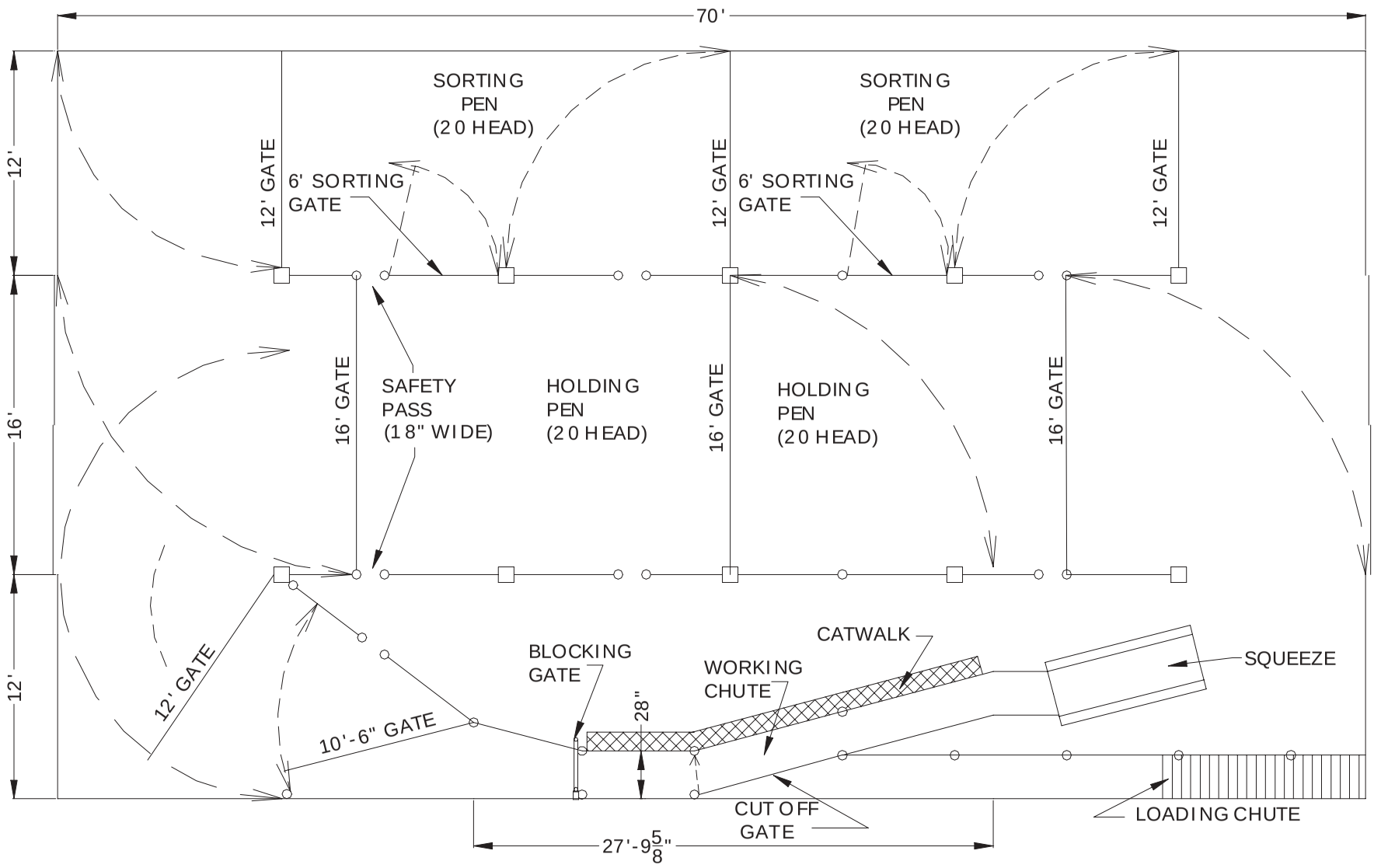
UNIVERSITY OF KENTUCKY

DESIGNED BY: L. TURNER	SHEET 1 of 1	SCALE 1" = 30'
CHECKED BY:	DRAWING:	
DRAWN BY: TO AutoCAD FILE BY: J. ASH	MODIFIED: 05/10/2001 ADDED TWO SORT PENS	
DATE: 07 MAY 2001 REVISION: TO AutoCAD		
Data File: CATCORRAL14.dwg		



CATTLE CORRAL LAYOUT 15

(TOBACCO BARN 70' x 40')

COOPERATIVE EXTENSION SERVICE
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UNIVERSITY OF KENTUCKY
PRINCETON, KENTUCKY 42445

REVISED: CONVERTED TO AutoCAD 2000 J. ASH 4/02/2001		
DESIGNED BY: JOSE BICUDO	SHEET 1 of 1	SCALE: 1/8" = 1'
DRAWN BY: JIM ASH	SHEET	1
DATE: 02 MAY 2001		
Data File: CARCORRAL15.dwg		