NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

FENCE

CODE 382

Table 1 Construction must meet or exceed these minimum specifications:

Kind of grazing animal	Kind of Fence		Galvanized Wire (New Only)		Minimum Number of Wires	Maximum Line Posts Spacing with 2 or More Stays	Maximum Line Post Spacing With or Without Stays [7/]	Average Height of Top Wire
	Non-electric [10/]	Electric	Gage [1/]	Type				
Cattle	Barbed		12 ½	Malleable	4	30’	20’	44”
	Barbed		12 ½	Malleable	3	30’	16’	38”
	Barbed		14	High Tensile	4	30’	20’	44”
	Barbed		14	High Tensile	3	30’	16’	38”
	Smooth		12 ½	Double strand malleable	6	30’	20’	44”
	Smooth		12 ½	High Tensile [3/]	6	30’	20’	44”
	Woven (net)			Malleable [2/]		16.5’	16.5’	44”
		Smooth	12 ½	High Tensile [3/]	3	150’	75’	36”
		Smooth	12 ½	High Tensile [3/]	2 [5/]	150’	100’	36”
		Smooth	12 ½	High Tensile [3/]	1 [9/ 5/]	150’	100’	32”
	Barbed (suspension)		12 ½	Malleable or	4	100’ [4/]		44”
	Smooth (suspension)		12 ½	Double strand malleable	6	100’ [4/]		44”
Sheep	Barbed		12 ½	Malleable	7 [8/]	30’	20’	36”
	Barbed		14	High Tensile	7	30’	20’	44”
	Woven (net)			Malleable [2/]	[8/]	30’	20’	39”
		Smooth	12 ½	High Tensile [3/]	2 [5/]	150’	75’	24”
		Smooth	12 ½	High Tensile [3/]	5	150’	50’	36”
Goats	Barbed		12 ½	Malleable	7 [8/]	20’	15’	36”
	Barbed		14	High Tensile	7	30’	20’	44”
	Woven (net)			Malleable [2/]	[8/]	30’	20’	39”
		Smooth	12 ½	High Tensile [3/]	3 [5/]	150’	75’	30”
		Smooth	12 ½	High Tensile [3/]	5	150’	50’	36”
Deer/Elk	Woven (net)			Malleable [6/]		20’	20’	8’

Conservation practice specifications are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resource Conservation Service.

1/ Gage – All wire must equal or exceed 950 pounds-force (lbs.) break strength. Barbed wire, woven wire and wire netting fencing shall conform to the requirements of Federal Specification RR-F-221 for the specified types and styles of fencing. Barbed wire and woven wire shall have zinc coating of at least 0.80 ounce per square foot of wire surface or better. All wire will be of new-material.

If lab test are needed, three wire samples of the lot under consideration will be tested. The average strength of the samples shall be the basis for acceptance. Any single sample of the three tested having less than 900 (lbs.) shall disqualify the lot.

2/ At least 32" of woven (or net) wire having at least; 11 gage top and bottom strands, 14 ½ gage intermediate and stay wires with stay wires spacing 12" or less. Woven wire fences shall be topped by at least two double strand wires, with first strand 2-4 inches above top of woven wire.

3/ Electric fences will consist of at least two-wires. One or more wires will be hot, one grounded. Wire will be new, smooth 12-1/2 gauges, high tensile 135,000 to 165000 psi (recommend 160,000psi), and minimum of Type III galvanization.

4/ Twisted wire stays must be installed at not more than 15' intervals between line posts.

5/ For multi-pasture fast move rotations only. Introducing animals to electric fencing in a designated training facility is recommended. Not recommended for exterior fences.

6/ Bottom section of at least 48" woven wire, 11-gage or larger top and bottom strands, 12 ½ gage or larger intermediate and stay wires, and stay wires spaced no more than 6 inches. Top section of at least 35" woven wire and made of 11-gage or larger top and bottom strands, 14 ½ gage or larger intermediate and stay wires with stay wires spaced no more than 12 inches.

7/ Line posts must be set at significant high and low points along fence to maintain proper wire height.

8/ When cattle are grazed in addition to sheep and/or goats, the top wire will be barbed wire, with approximately a 10-inch spacing between top two wires.

9/ A minimum 2 wire (grounded to energizer) system must be used in 25-inch or less rainfall area.

10/ When splicing of wire is necessary, the "Western Union" splice will be recommended. This splice is made by overlapping the ends of each wire and wrapping each wire five times around the other wire (Exhibit 2). The use of a fence-splicing tool will facilitate this operation and result in a neat job. If sleeve is used, a crimping tool is required.

Section A

GENERAL MATERIAL AND INSTALLATION SPECIFICATIONS
APPLICABLE TO ALL PERMANENT FENCES
(See Exhibits 3, 4, & 5)

1. **Staples** – Use at least 9-gage galvanized which are at least 1 ½ inches long for soft woods (pine) and at least 1 inch long for hardwoods (cedar, oak, and bois-d-'arc). Drive staple(s) diagonally, so wire can slip, with the wood grain and at an angle, which allows staple to open. Tie wires of soft metal 12 gauge may be substituted for staples.

2. **Line Posts** - Ninety-five percent of top diameters of wooden line posts (two inches above the top wire) must be three inches or larger. Length must be sufficient to provide for the construction of at least a 42 inch-high fence to permit stapling of the top wire without splitting. Untreated or treated posts made of juniper (cedar**,** except Rocky Mountain), oak, osage orange, black locust, and redwood or, bois-d-'arc, treated pine or federal specification TT-W-571c or as indicated below.

Treatment for Pine & Oak Posts	Retention lb/ft^3
creosote coal tar	6.0
pentachloropheno	0.3
acid copper chromate	0.5
amoniacal copper arsenate	0.4
chromated copper arsenate (CCA)	0.4

Line posts must be set solidly in the ground a minimum depth of two feet in sandy soils or 18 inches in all other soils (anchor plate on steel "T" or "U" posts must be 2 or 3 inches below soil surface). In rocky soil where penetration cannot be obtained with ordinary hand tools, straddle jacks may be used

Steel assembly and post assembly may be protected with galvanization or rust-resistant paint or coating. This is mandatory in riparian or high moisture installation areas.

Wire clips or fasteners must be galvanized and similar to strength of fence wire.

Location of braces and/or end assemblies are required at all corners, gates, and at all definite angles (15 degrees or greater) in the fence. See Exhibits 6-14 for brace and end assembly specifications.

Steel "T" and "U" posts must be new, painted or galvanized and minimum of 1.25 pounds per one foot of length. Painted or galvanized 2 3/8 nominal size pipe or larger may be used for line post.

Spacing for non-electric fences between pull posts or pull post assemblies may be the lengths of spool (normally 1320') on straight pulls in flat topography. See Exhibit 9 for pull post criteria.

3. Corner, Gate and brace Posts (Pull Posts):

Wooden brace posts, untreated and/or treated wooden brace posts same specifications as line posts.

Size. Length sufficient to provide for the construction of at least a 42 inch-high fence and permit setting at least 36 inches in the ground, top diameter commercial size six inches or larger.

Alternate. Steel corner or brace posts set in concrete with a diameter of 2 and 3/8 inch nominal or better new or equivalent (weight of 7.58 pounds per linear foot) pipe or larger with brace member welded to the posts.

4. Bracing:

Required at all corners, gates and at all definite angles in the line fence. In straight sections, brace units (pull posts) shall be spaced at intervals not to exceed 1,300 feet. Wire shall be tied off at the brace units. Braces can be a four inch diameter top line post of the approved species with minimum length of 6.0 feet notched into the top one-half of the brace post and post being braced, or a diameter of 2 and 3/8 inch new or used pipe or angle iron (2”X2”X1/4”) or equivalent installed not less than three feet above ground line. A tension member composed of two complete loops of number nine gauge smooth wire, or two complete loops of number 121/2 gauge double strand barbed or smooth wire, shall extend from a point approximately six inches below the top of the brace post to ground level of the post being braced. The brace wire shall be twisted to secure the brace and provide needed rigidity. (Exhibit 2)

The standard bracing designed by the New Mexico Highway Department is an accepted alternative (See Exhibit 15).

If soil conditions prevent proper brace or line post installations, trees may be used. Fasten the wire as indicated in Exhibit 16.

Rock cribs may be used in shallow rocky areas.

5. Wire Spacing:

Where wire spacing distances may seem to conflict between the standard and specifications and the example drawings that follow the standard and specification numbers will be considered to be correct.

Section B

GENERAL MATERIAL AND INSTALLATION SPECIFICATIONS
APPLICABLE TO ALL SUSPENSION FENCES

1. Suspension Fences (Exhibit 17)

Woven wire is not acceptable for suspension fence design.

Bracing shall be required at all corners, gates, definite angles (15 degrees or greater) in the line and at prescribed spacing in straight line sections of the fence as described below.

All corner, gate, brace and pull posts shall be eight feet long with an eight-inch diameter tip and imbedded in the ground at least 31/2 feet.
Suspension fences shall not be constructed on a curve: directional changes in line shall be by definite angles properly braced.

Any straight section of fence more than one-half mile long shall have a minimum of two (2) line anchor or pull post assemblies. The pull post assemblies should be equally spaced along straight sections. It is desirable to tie off all wires at stretch panels and start with a new wire on the next ¼ mile section.

When wooden line posts are used, they shall have a minimum top diameter of four inches.

All stays should swing free of the ground to permit the fence to sway when contacted.

Any suitable fastener showing good workmanship and allowing the wire to freely contract and expand may be used to secure the wire to the post. Some examples of acceptable fasteners are small plates of 20 gauge metal cut ½ x1 inch in size and used to fasten wire to post with sixpenny nails, staple secured diagonally but not tight against the wire, etc.

Suspension fences should be constructed with approximately a two-inch sag in the wire between posts to permit maximum sway of the fence. Temperature changes that might affect this degree of sag should be considered.

Section C

GENERAL MATERIAL AND INSTALLATION SPECIFICATIONS
APPLICABLE TO PERMANENT ELECTRIC FENCES ONLY

ENERGIZERS & COMPONENTS

1. Energizers for permanent electric fencing must be:
   a. High voltage/low impedance short pulse, which can produce at least 4000 volts output with all livestock containment fences, charged (on) when under maximum anticipated load.
   b. Recommend one digital read out voltmeter to be accompanied with energizer.

2. A minimum of 18 feet of galvanized steel (1/2" minimum) grounds must be installed near the Energizer. Locate ground rods in water-accumulated area and in deep soil area, preferably three 6-foot rods spaced at least 10 feet apart. If energizer terminals can accept cooper wire, cooper ground rods, copper clamp and copper wire may be used. Avoid mixing dissimilar metals to prevent electrolysis. An additional set of four 6-foot ground rods for arresting the lightning are required not closer than 65 feet from the ground rod set at the energizer. Install one additional 6-foot galvanized (1/2" minimum) ground rod for each one mile of fence, located in moist area or preferred site between end of fence and energizer. For large energizer systems (14 or more joules), use a minimum of 3 additional feet of ground rods per joule of energizer output capacity.

3. For 120 volt or 240 volt energizers install a voltage spike protector and inspect or install a ground rod at electric company's transformer pole (primary ground) and another ground rod at electrical circuit breaker box (secondary ground). Both primary and secondary grounds must have less than 10 ohms resistance.

4. A lightning arrestor or lightning choke is required (See Exhibit 18).

WIRE

1. Top wire should be about two-thirds the shoulder height of the grazing animal. Other wire(s) located below this height should be spaced so grazing animal receives facial shock. Constructed fence must not allow the animal's head to penetrate the fence without being shocked.

2. Wires attached to line post must be allowed to slip and be locked to stay post if applicable.

3. For splicing high tensile strength wire, use only the equivalent of nicropress crimping sleeves or figure eight knots. All electrical connections (both ground and positive) must use the equivalent of nicropress crimping sleeves or taps.

4. For tying end posts with high tensile strength wire use only thread through method or crimping sleeves.

5. Wire tension will be approximately 200 pounds per wire. In-line or end-post ratchet strainer devices will be installed on each wire to maintain correct tension between all brace assemblies. See Exhibit 19 for splice and tie knot illustration.

6. Fences constructed in sand, loamy sand, or shallow rocky soils are not to use all positive wire system.

7. See Exhibit 21 for example on how to install electric floodgate.

POSTS

1. **Fiberglass**. Fiberglass posts will be a composite of marble fiberglass, and polymer resins that have been treated by thermosetting (heat treatment). "T" shaped posts will be a minimum of 1x1 inch cross section with notches. One-inch fiberglass sucker rod (round) or the rectangular equivalent may be used.

2. **Wooden**. Wooden two-inch top diameter or larger posts otherwise meeting standard fence specifications or insultimber or Australian ironwood are acceptable when set in the ground 18 inches deep.

3. **"T" Steel Posts.** Posts will be one pound per foot and of sufficient length for the height of fence, with high quality commercial, black polypropylene or polyethylene plastic or porcelain ceramic insulators. Coating maybe either hot dip galvanizing or painted (Commercial Standard 184) with one or more coats of high grade, weather resistant paint or baked enamel.

4. **Corner, Gate, and Brace Assemblies (Exhibits 6 -15)**

   Gates: "Lift" or Australian" gates are acceptable. Posts on either side of these gates will be the same as standard brace posts as defined in NRCS Standard Fence Specifications (See Exhibit 20). All other gate assemblies will meet the specifications as indicated below.

   Wooden Posts. Same as Standard Fence Specifications except posts must have a minimum of 4 – inch top diameter, be set in the ground 3 feet deep, and be long enough to allow 3-4 inches above the top wire. Pull posts shall be 6 inches and set in the ground 3 feet.

   Bracing. Same as Standard Fence except the minimum 3-inch diameter brace piece, six feet long. Single Post End Brace (Slip Brace) Assembly may be used. See Exhibit 14

   Spacing: Single pull posts or pull post assemblies for electric permanent fence shall be spaced no more than ½ mile apart on undulating terrain. On flat terrain, spacing may be

increased to end of spool (normally 4000 feet). Brace assemblies ("H" braces, or single six inch wooden posts with one or more earth anchors to withstand 1100 pounds of pull) will be placed any place the fence breaks, ends or makes a 15-degree or greater bend (See Exhibits 9 & 10).

ELECTRICAL ACCESSORIES

1. Insulation used for positive charged wire(s) must be high density polyethylene or polypropylene with ultra-violet (UV) stabilizer and capable of withstanding a minimum of 10,000 volts or more current leakage.

2. All underground wire(s) installations must be insulated, moulded, high tensile strength steel 12 ½ gage or larger wire. The insulation must be high density polyethylene or polypropylene with ultra-violet (UV) stabilizer and capable of withstanding a minimum of 10,000 volts or more current leakage.

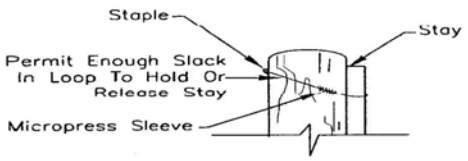
3. Insulators for steel and other conductive material posts must be high-density polyethylene or polypropylene with ultra-violet (UA) stabilizer, porcelain or other insulators, which withstands 10,000 volts or more current leakage.

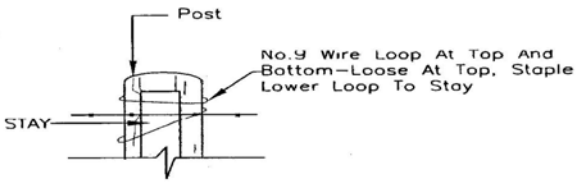
4. Insulators for end, corner, and angle braces must be high-density polyethylene or polypropylene with ultra-violet (UV) stabilizer, or porcelain. (Do not use insulated "tubing" for brace assembly (ies).)

The State Resource Conservationist must approve variations from all of the above materials and installation specification.

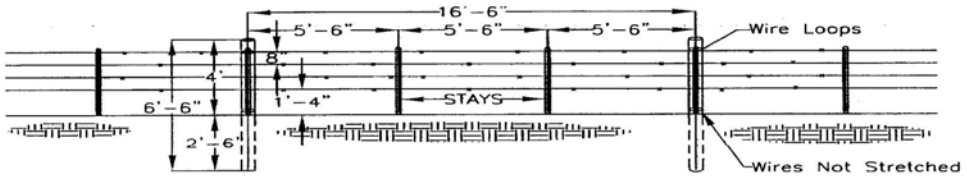
NRCS conservationist must certify variations that meet or exceed this Fencing practice Standard.

LET – DOWN FENCES
EXHIBIT 1

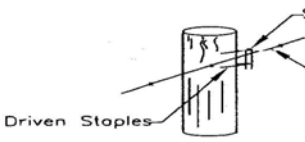




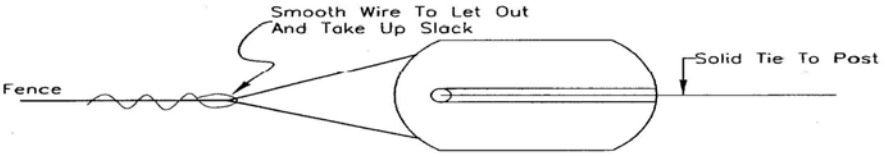
DETAIL OF FASTNER



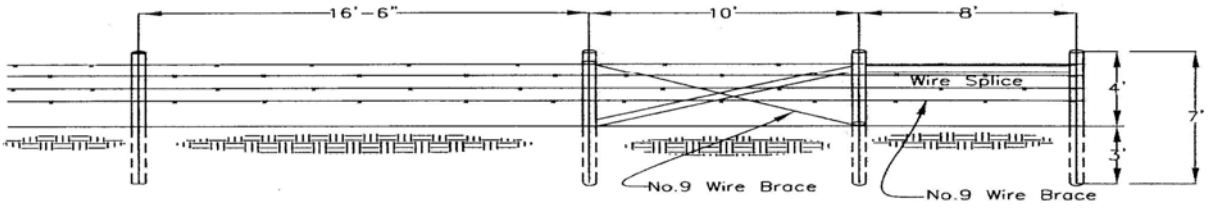
STAY LET –DOWN FENCE



DETAIL OF STAPLES



DETAIL OF STRAIN INSULATOR



NOTE:
Steel Posts May Be Used

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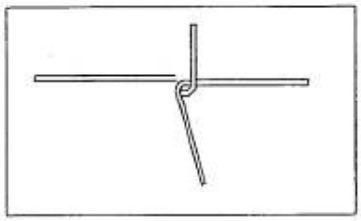
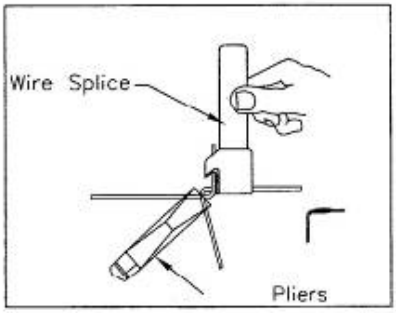
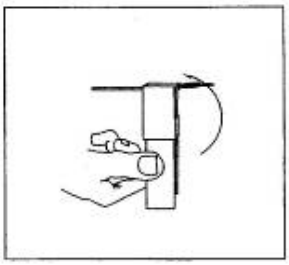
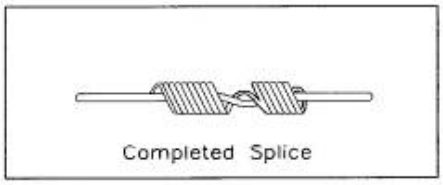
Not To Scale

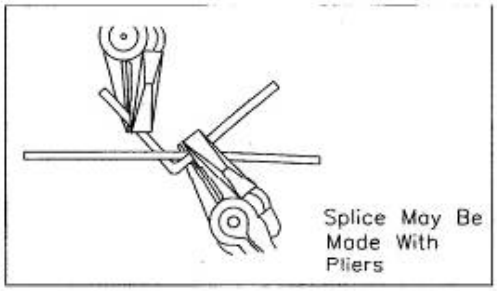
WESTERN UNION SPLICE
EXHIBIT 2



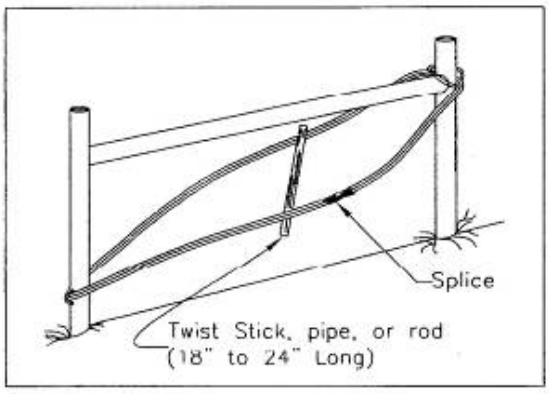


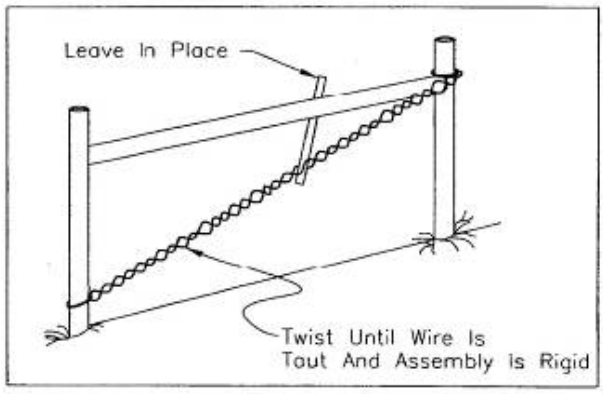






BRACE WIRE TWISTING





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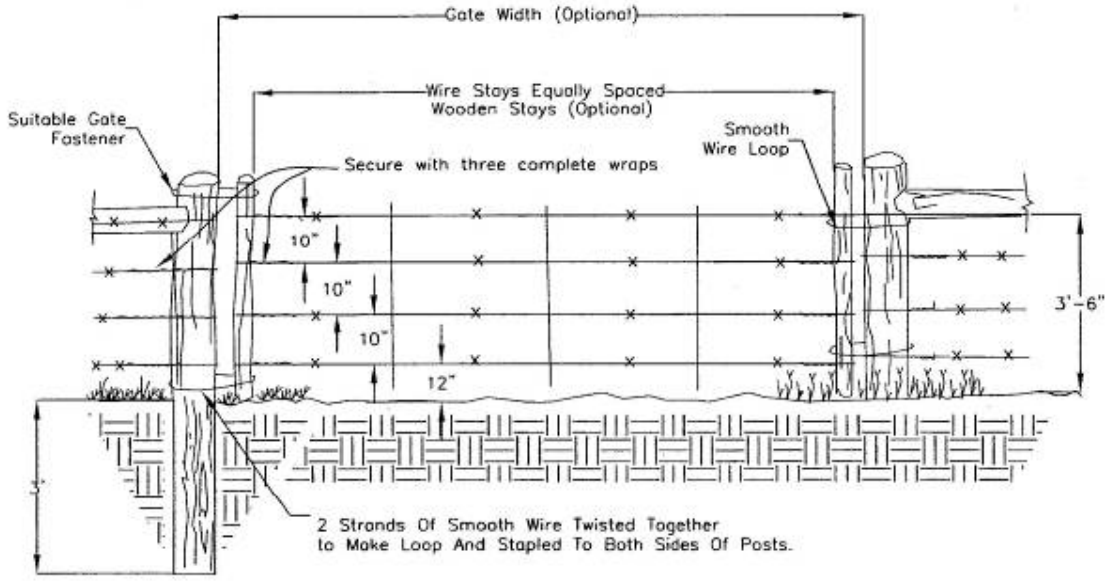
NRCS, NM

FOUR WIRE GATE
EXHIBIT 3



NOTE:
Steel Posts May Be Used

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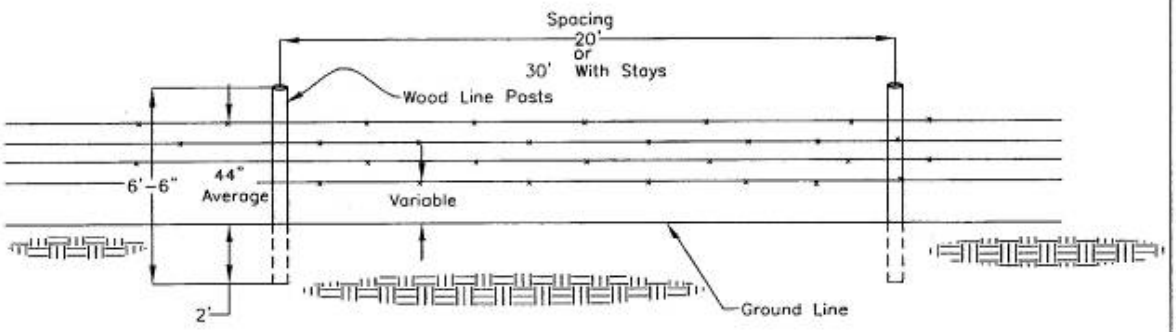
Not To Scale

STANDARD 4 WIRE FENCE
EXHIBIT 4



NOTE:
Steel Posts May Be Used

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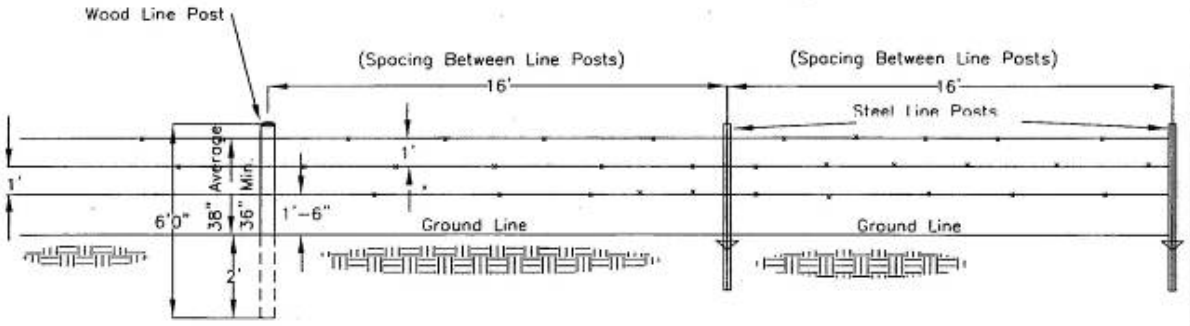
STANDARD 3 WIRE FENCE
EXHIBIT 5



NOTE:
Steel Posts May Be Used

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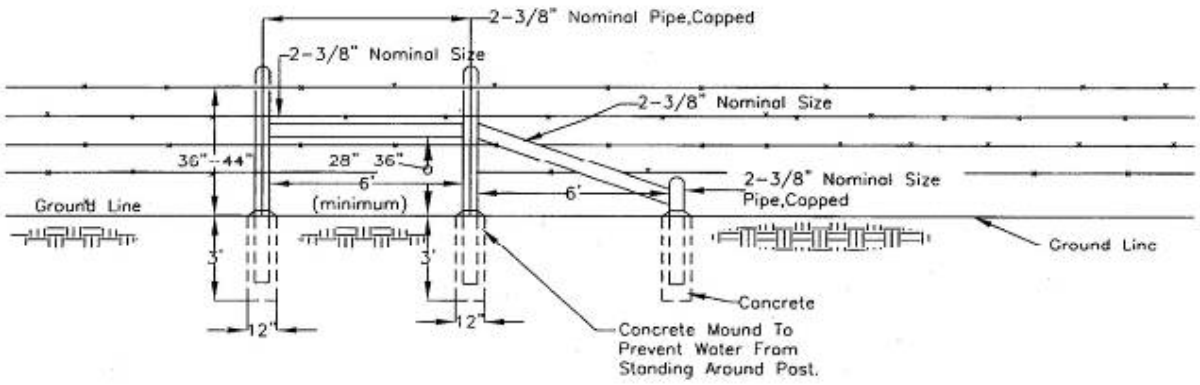
Welded Steel 3–Post Diagonal End Brace Assembly
EXHIBIT 6



DEPTH FOR DRIVEN PIPE
(Applicable Only To Sandy Loam And Finer Texture)

PIPE SIZE	DEPTH DRIVEN
2-3/8"	5'
4"	4'
5+"	3'

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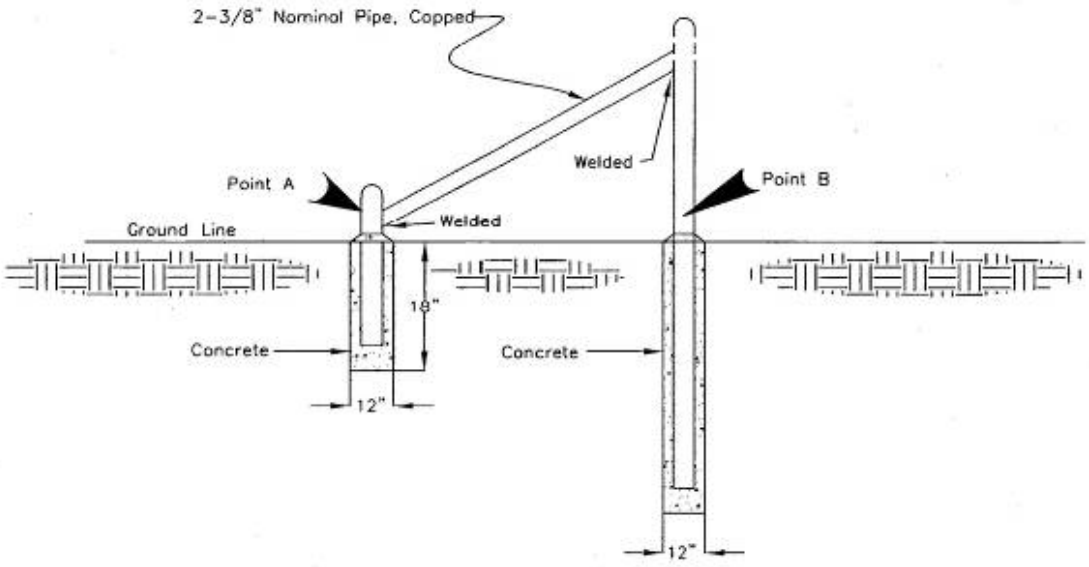
STEEL, WELDED, SINGLE POST END BRACE (Concrete Or Driven)
EXHIBIT 7



DEPTH FOR DRIVEN PIPE
(Applicable Only To Sandy Loam And Finer Texture)

PIPE SIZE	DEPTH DRIVEN
2-3/8"	5'
4"	4'
5+"	3'

Note:
Distance from point A to B to be a minimum of twice the height between the top wire and the ground surface.

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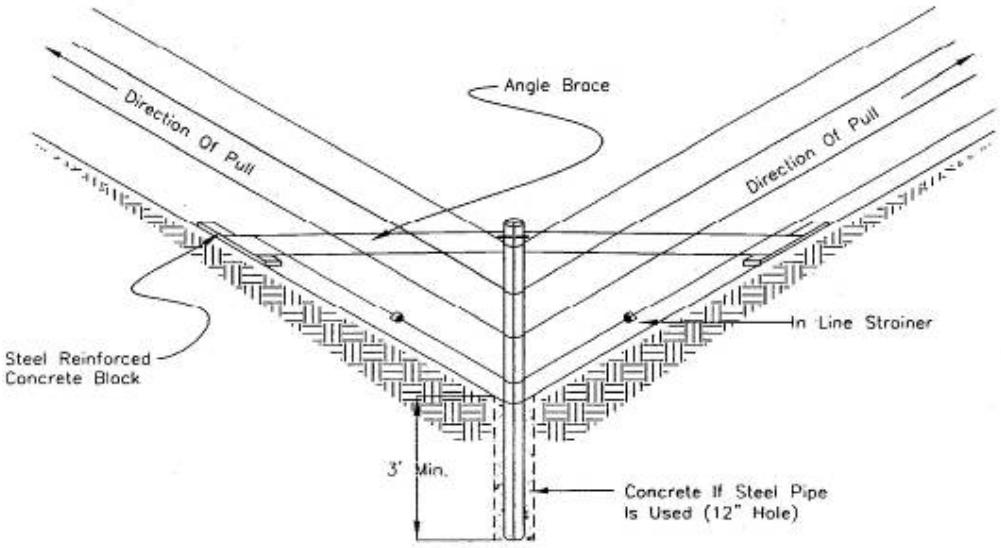
Not To Scale

STEEL, WELDED, SINGLE POST CORNER OR ANGLE BRACE ASSEMBLY
EXHIBIT 8



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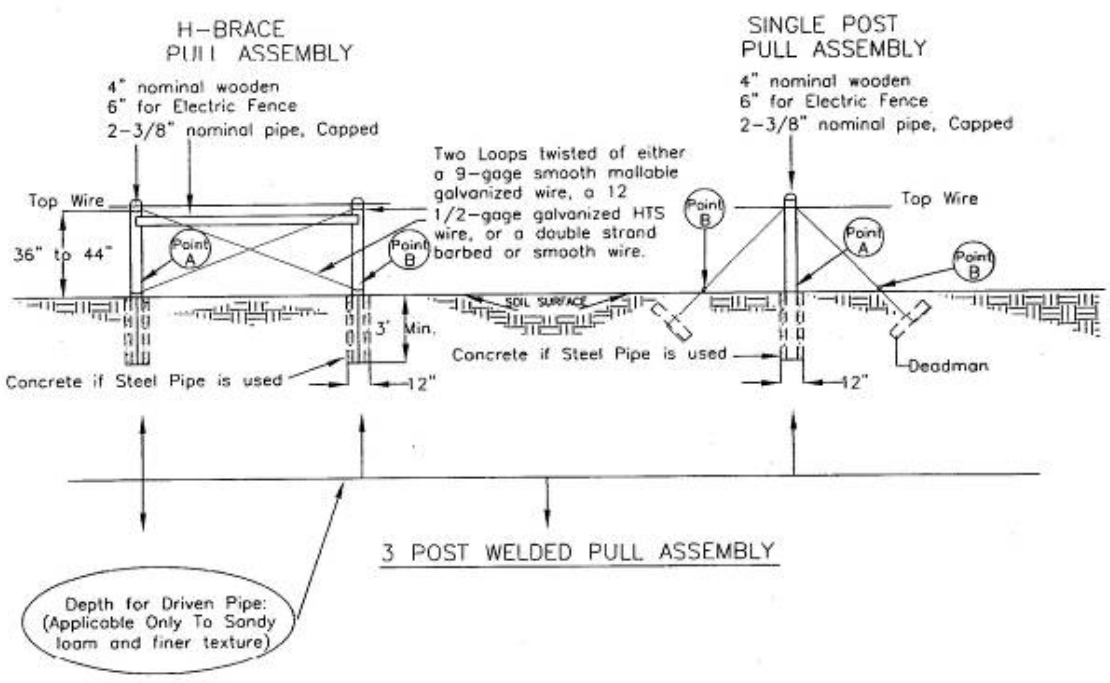
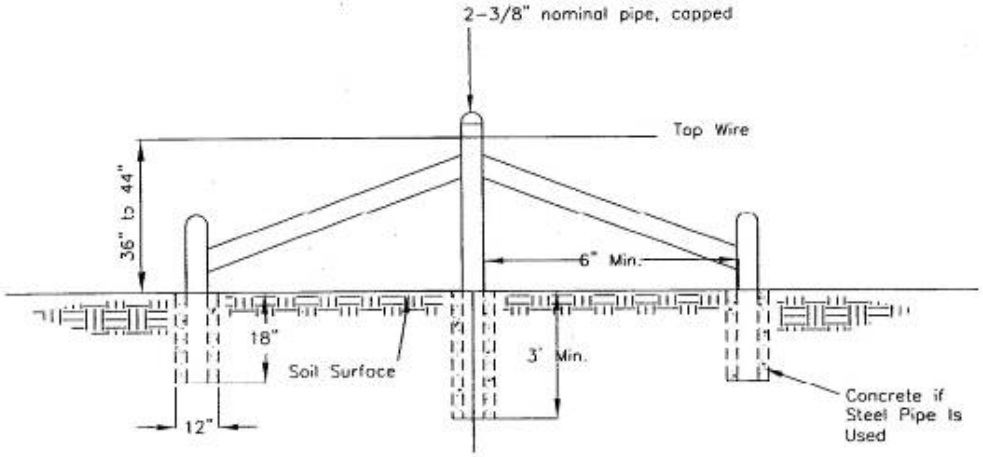
PULL ASSEMBLY
EXHIBIT 9





Pipe Size	–	Depth Driven
2 3/8 in	–	5Ft.
2 7/8–4in	–	4ft.
5+ in	–	3ft.

Note:
Distance from point A to B to be a minimum of twice the height between the top wire and the ground surface.

Steel Posts must be painted or galvanized.

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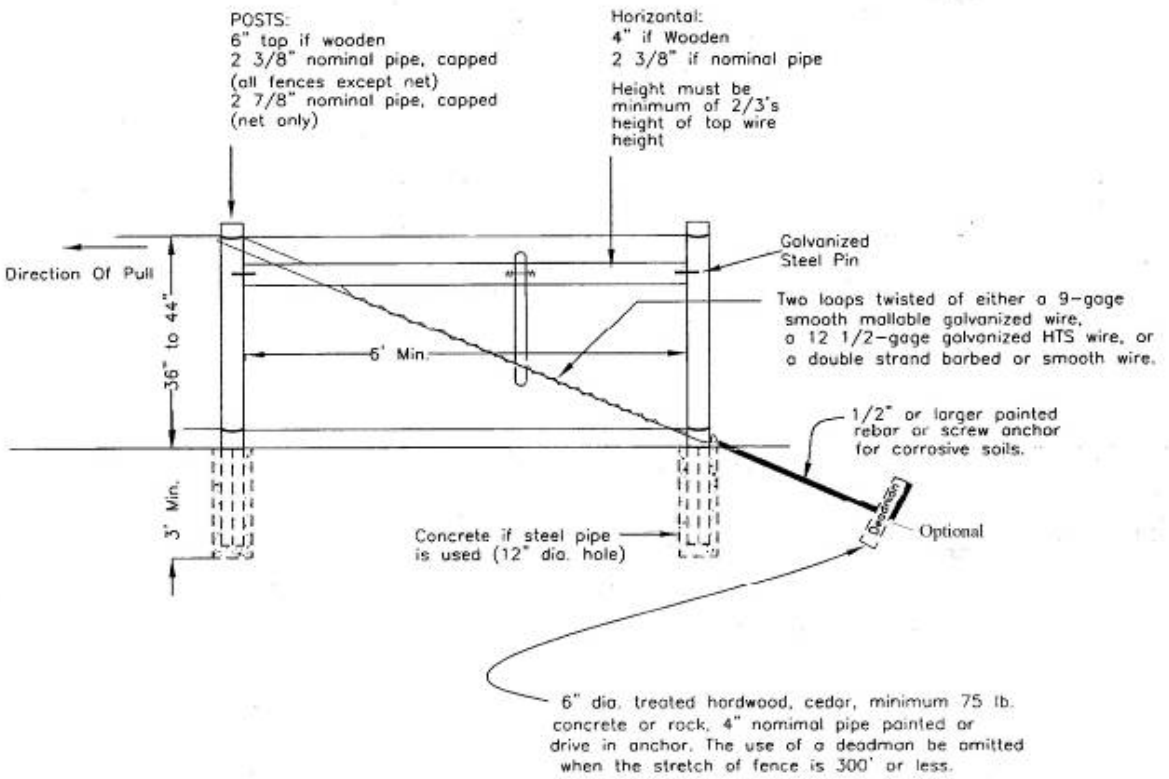
2 POST BRACE WITH DEADMAN
EXHIBIT 10



Materials: Post must be new eastern red juniper, blueberry juniper, bois-d'arc, treated pine, treated hardwood, or steel pipe. Materials shown above may be substituted using 2 3/8" steel pipe, capped, set in concrete (12" diameter hole). Pipe must be painted or galvanized.

Splices: Use western union splices, figure "8" knots or crimping sleeves for mallable wire.

Use crimping sleeves or figure "8" knot for high tensile strength wire.

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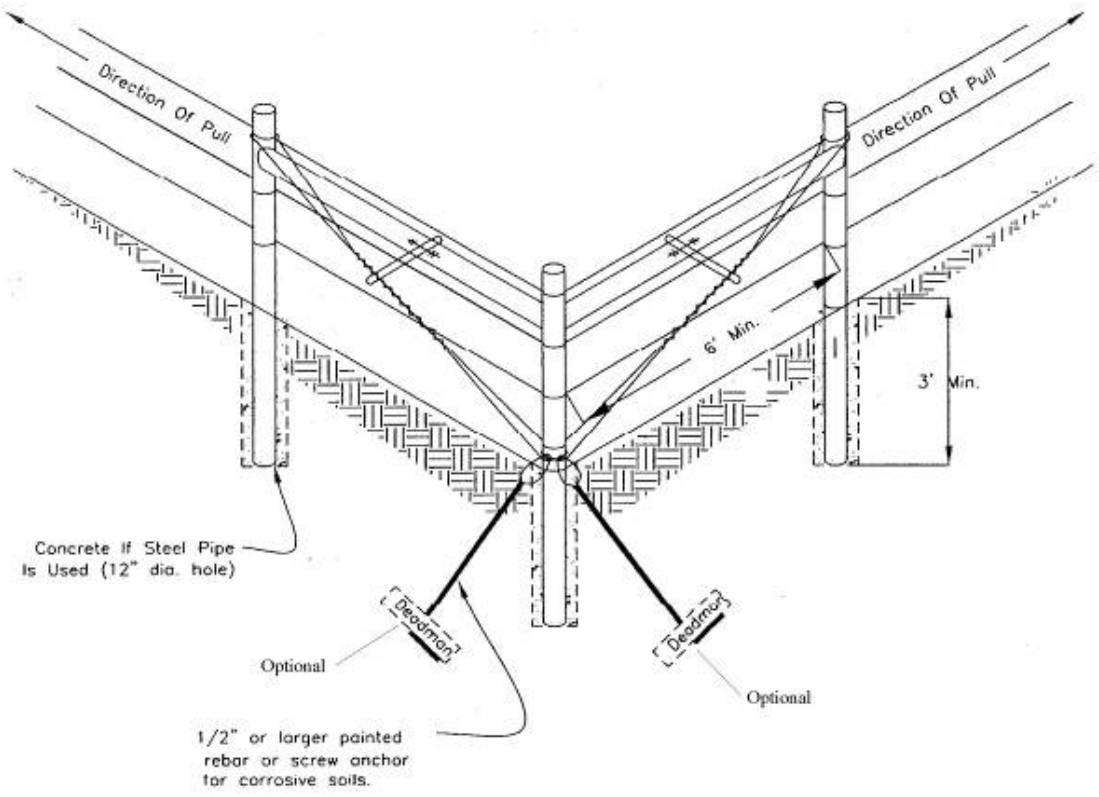
DEADMANNED 3–POST CORNER
EXHIBIT 11



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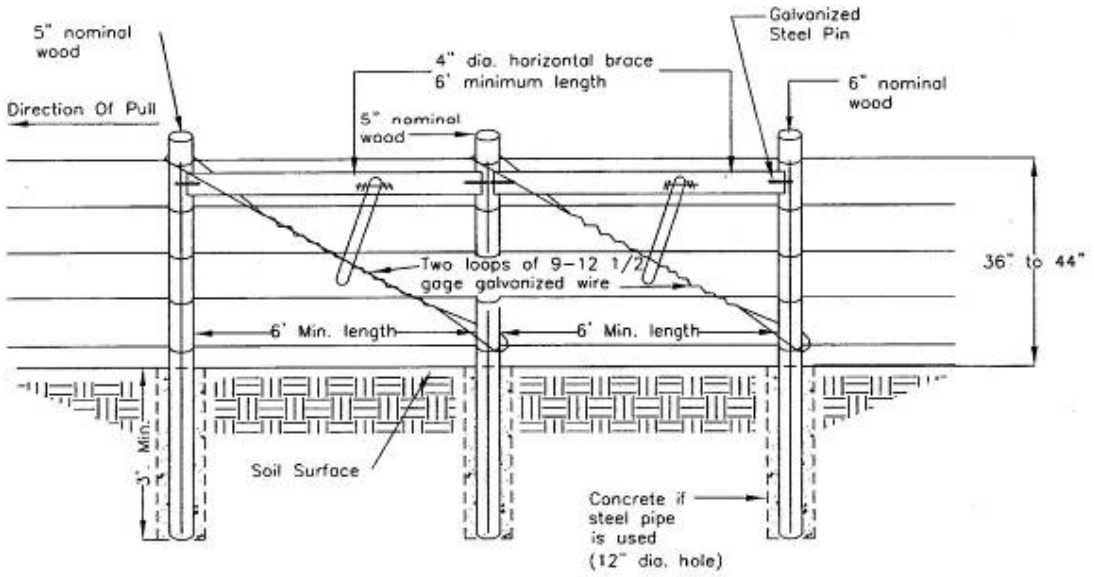
3 POST DOUBLE "H" BRACE END ASSEMBLY WITHOUT DEADMAN
EXHIBIT 12



Note: Materials shown above may be substituted using 2 3/8 in. steel pipe, capped, set in concrete (12 in. diameter hole). Pipe must be painted or galvanized.

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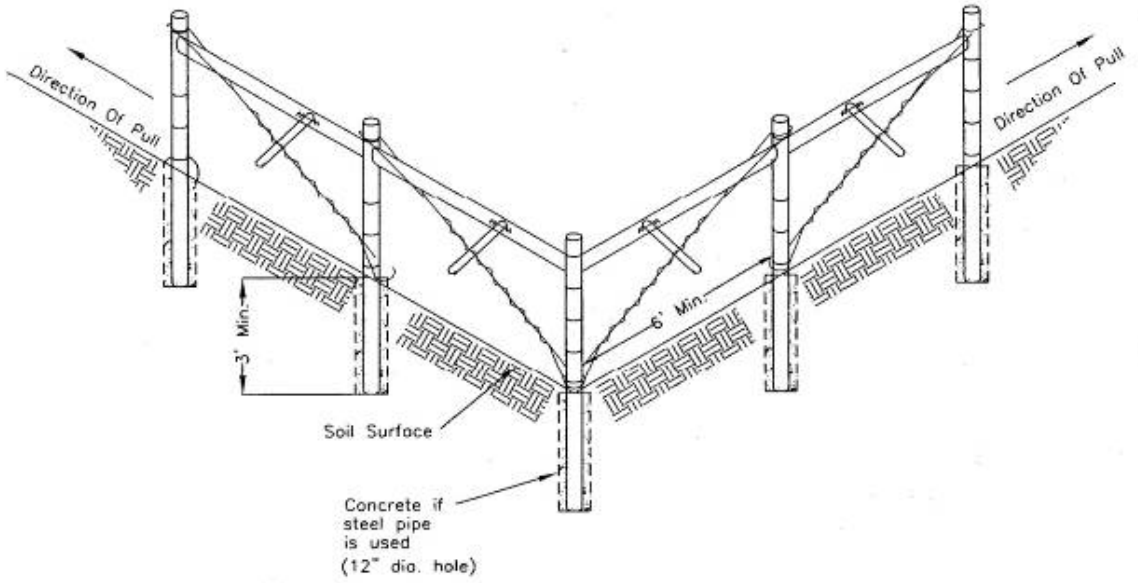
Not To Scale

5 POST, H-BRACE CORNER, WITHOUT DEADMAN
EXHIBIT 13



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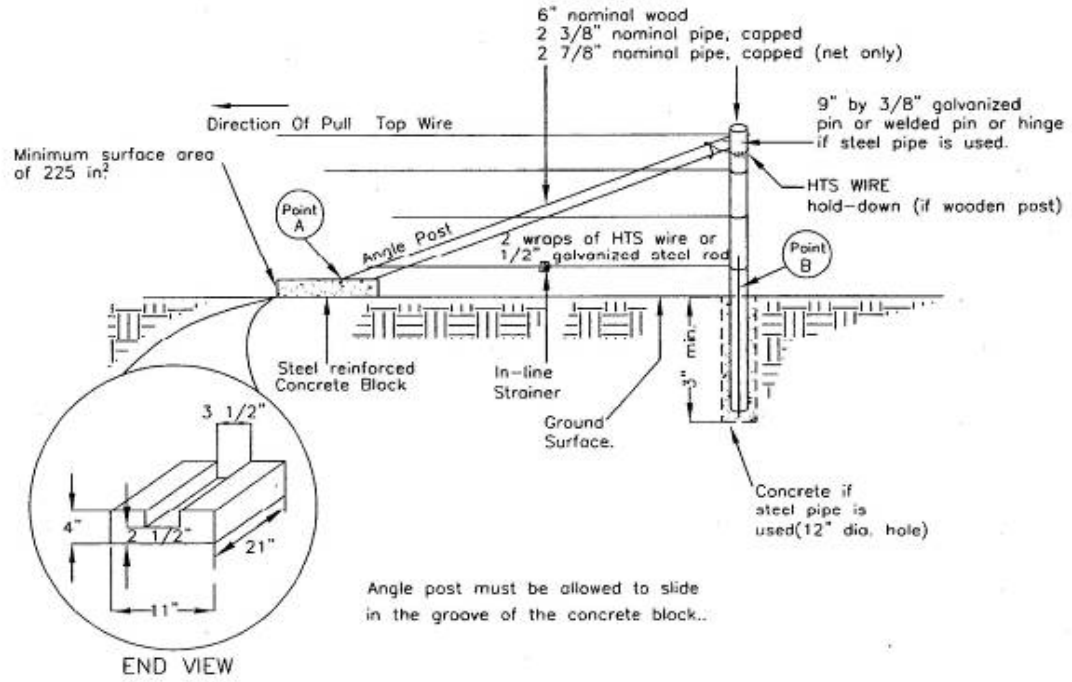
SINGLE POST END BRACE (SLIP BRACE) ASSEMBLY

EXHIBIT 14



NOTE:
Distance from point A to B must be a minimum twice the height between the top wire and the ground surface.

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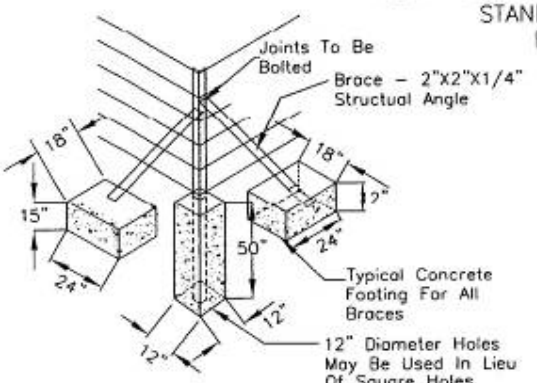
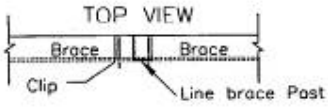
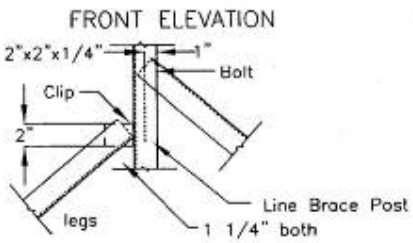
NEW MEXICO HIGHWAY DEPARTMENT
STANDARD BRACING
EXHIBIT 15

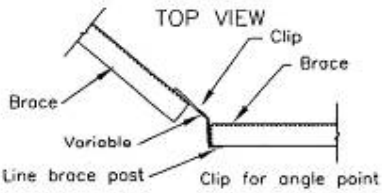


Corner Posts
With Braces– 2 1/2"x2 1/2"x 1/4"
Structual Angle

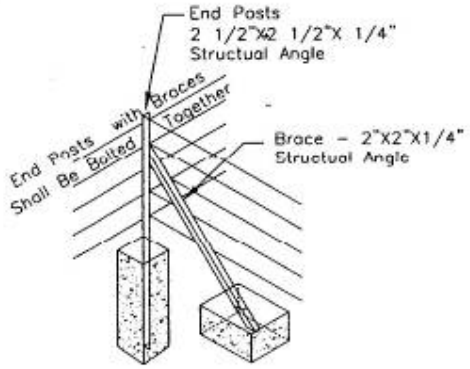
TYPICAL CORNER POST INSTALLATION



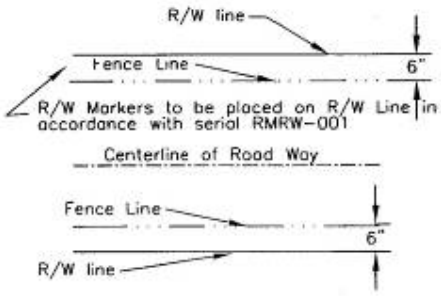




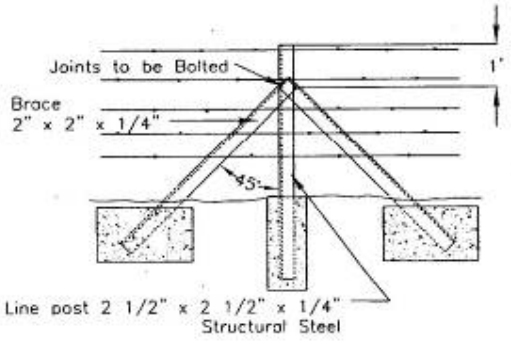
ALTERNATE BRACE ATTACHMENT DETAIL



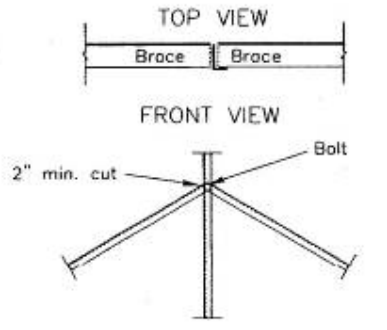
TYPICAL FENCE INTERSECTION INSTALLATION



TYPICAL PLAN VIEW ILLUSTRATING METHOD OF PLACING FENCE



TYPICAL LINE BRACE INSTALLATION



BRACE ATTACHMENT DETAIL

GENERAL NOTES

1. Holes in post braces and clip shall accomodate 1/2" Dia. Galvanized machine bolts.

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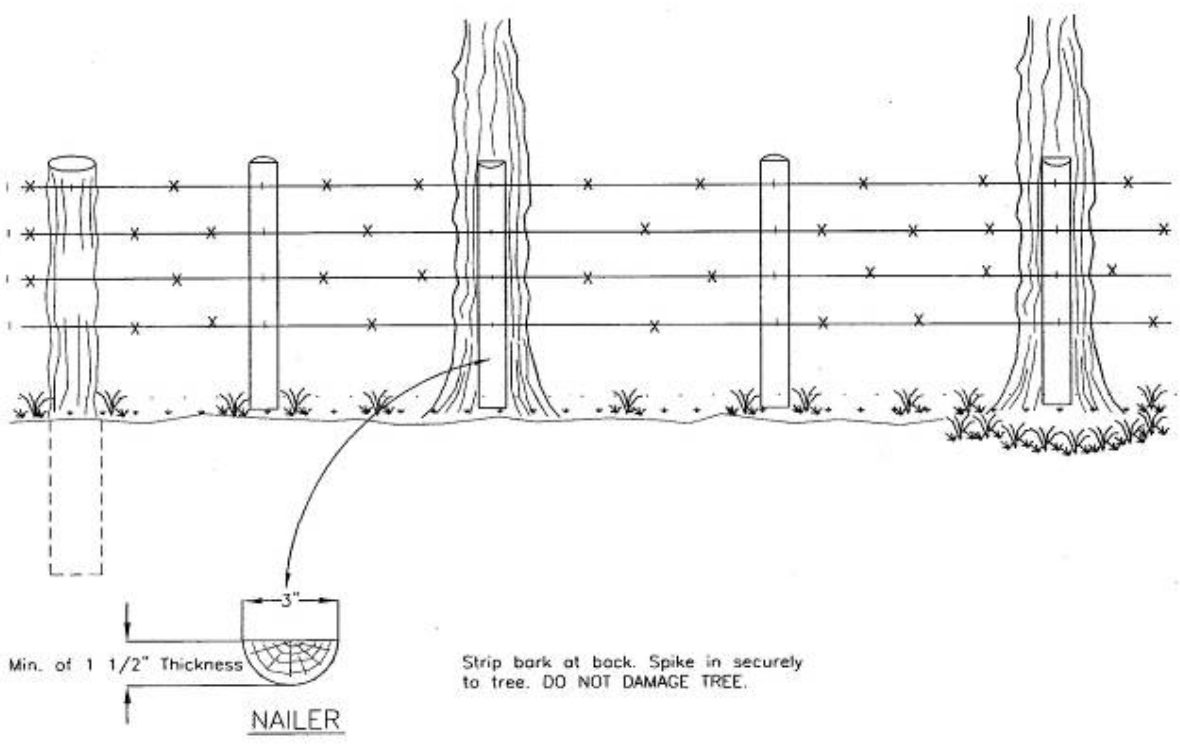
FASTENING FENCE TO TREE
EXHIBIT 16



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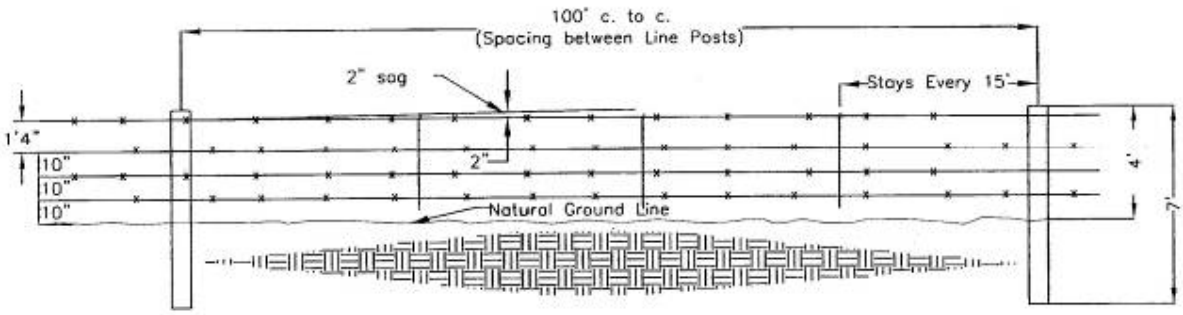
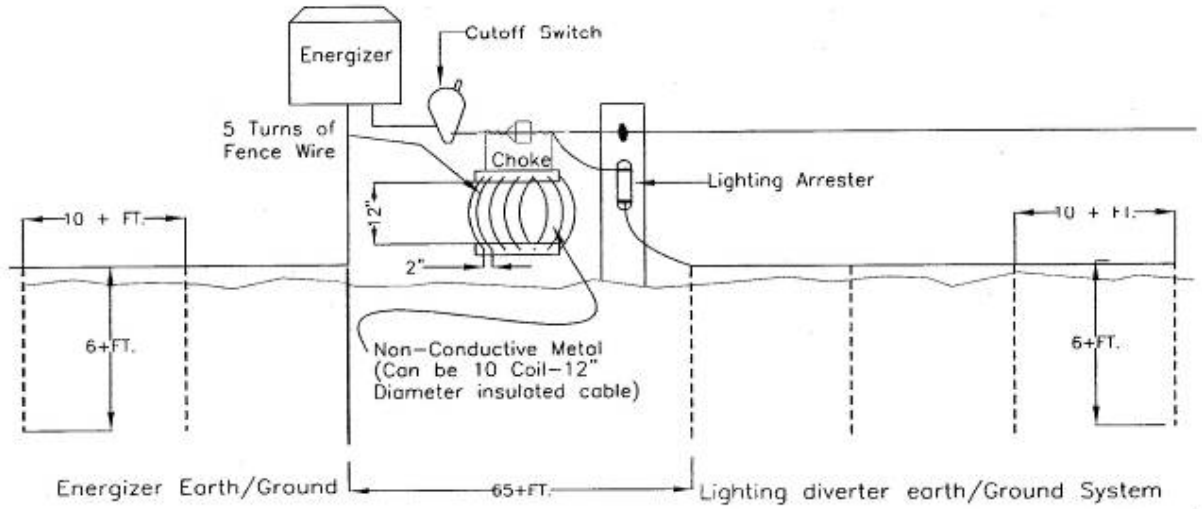
SUSPENSION – TYPE FENCE
EXHIBIT 17



ELECTRIC FENCE
EXHIBIT 18



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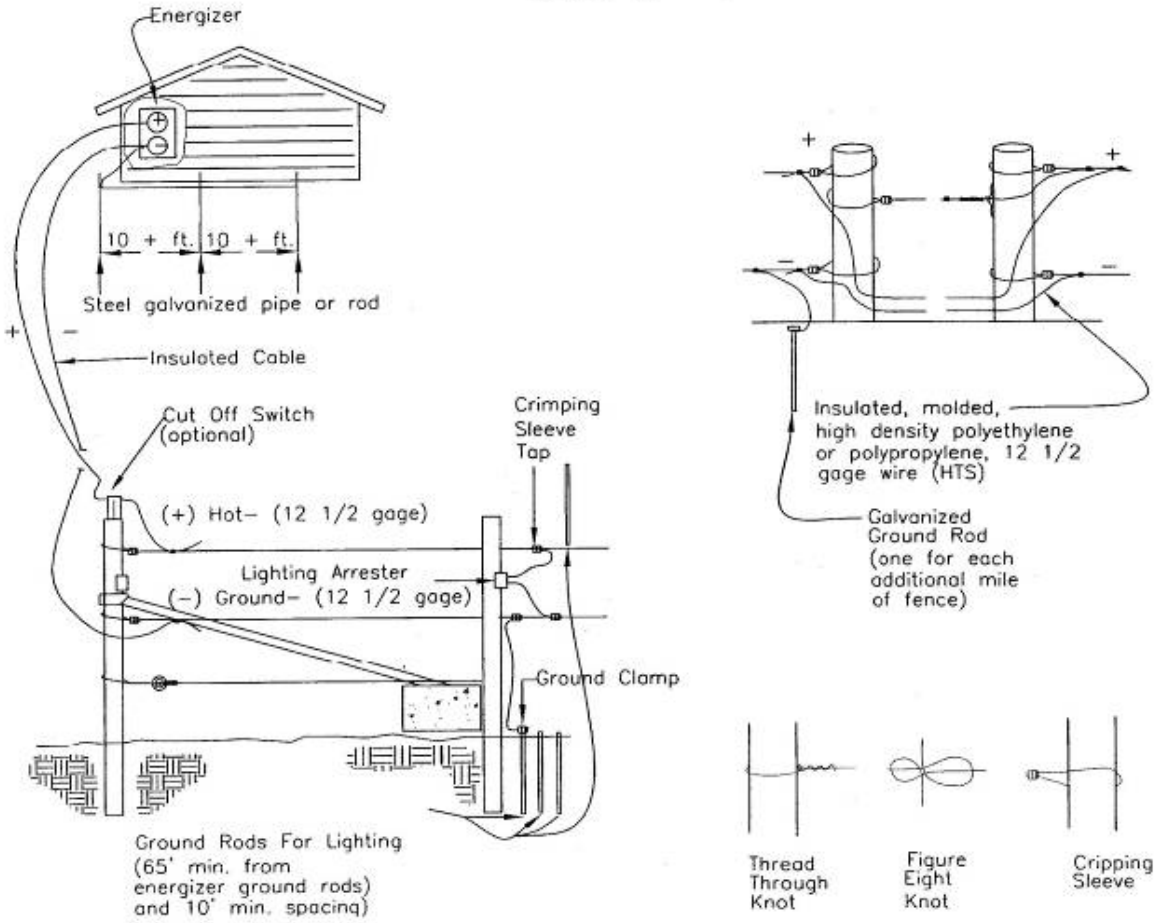
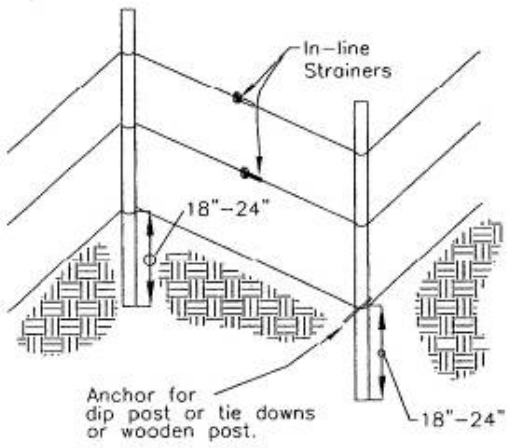
Not To Scale

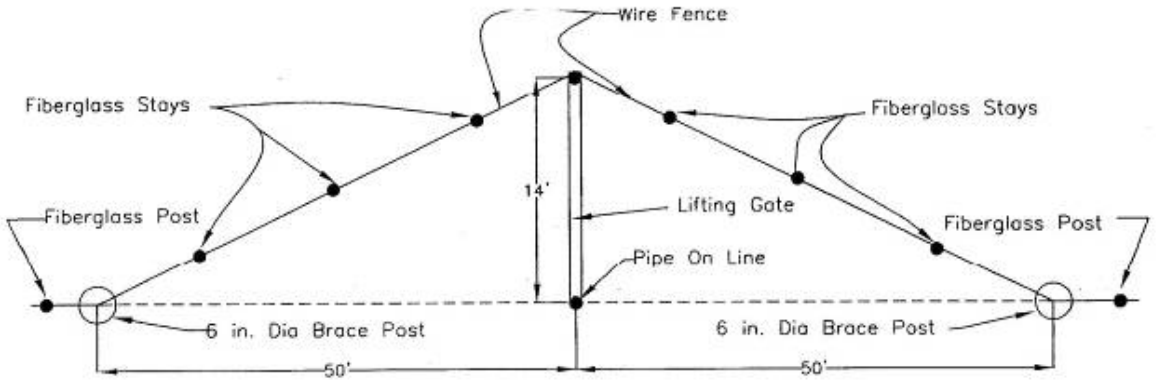
TYPICAL INSTALLATION OF A LOW-IMPEDENCE ELECTRIC
FENCE ENERGIZER AND GROUNDING SYSTEM
EXHIBIT 19



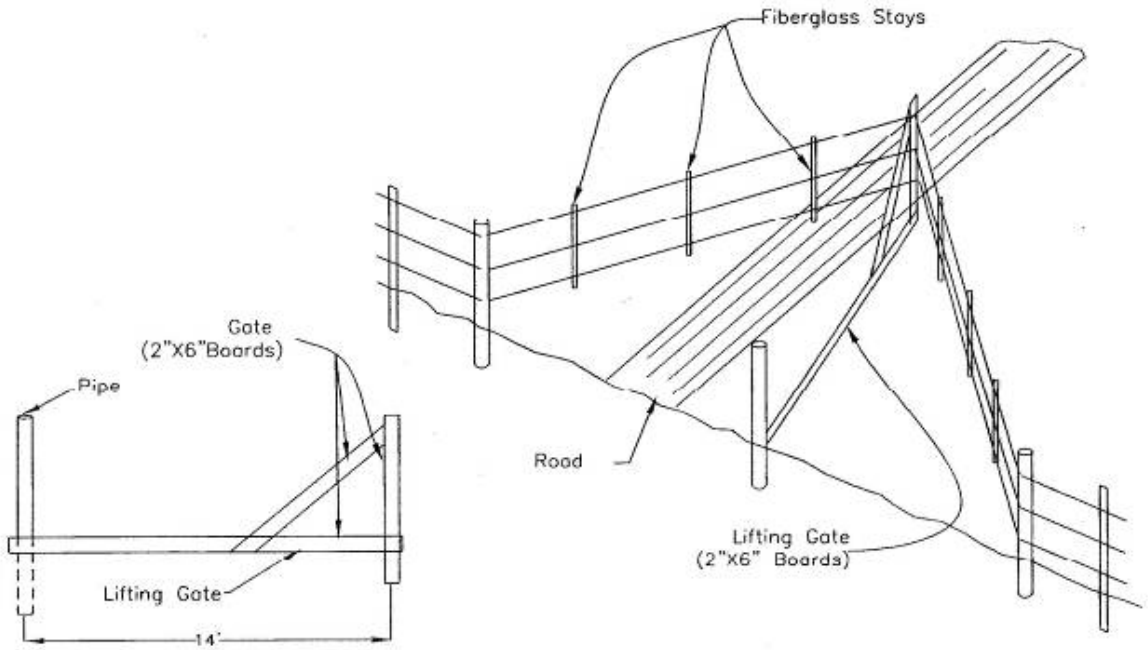
Methods of Tying HTS Wire

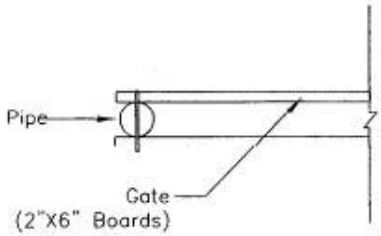


"LIFT " OR "AUSTRAILIAN" GATE
(FOR USE WITH PERMANENT POWER FENCE)
EXHIBIT 20



PLAN VIEW





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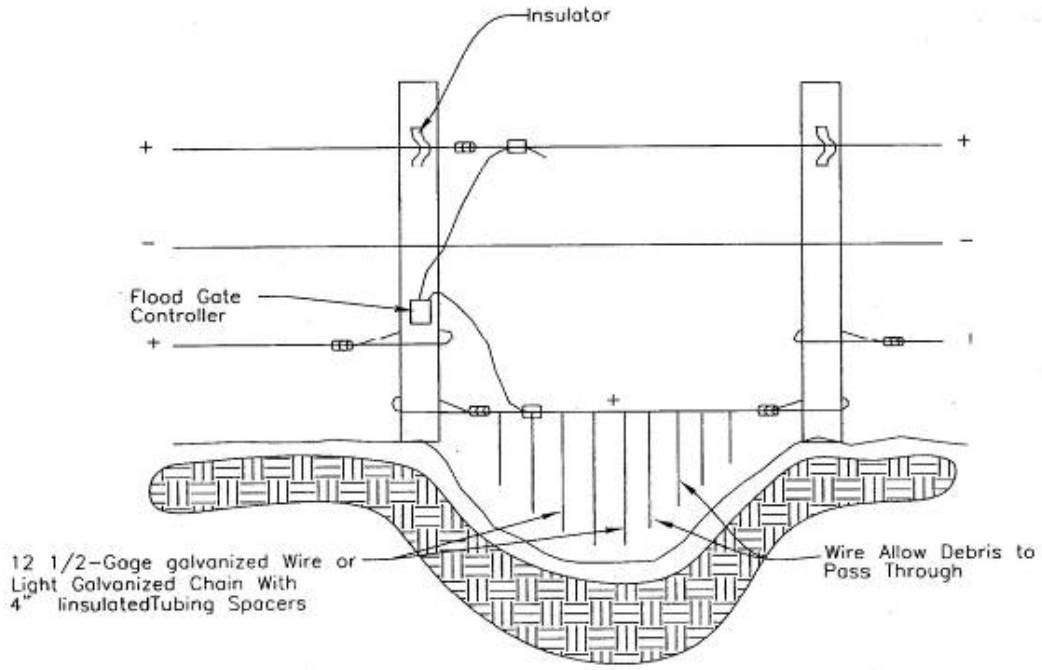
ELECTRIC FLOOD GATE
EXHIBIT 21



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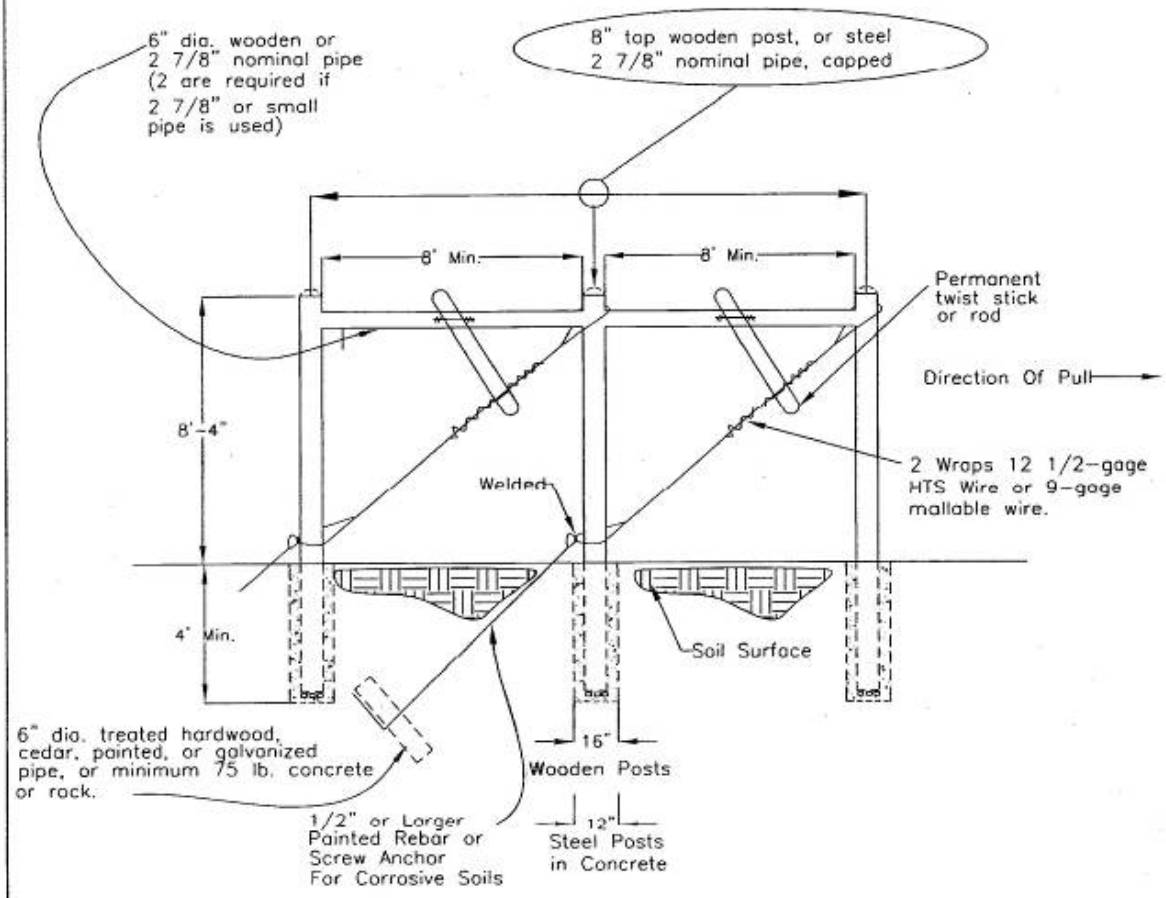
END BRACE ASSEMBLY DEER MANAGEMENT FENCE
EXHIBIT 22



DEADMAN IS OPTIONAL EXCEPT WHERE SURFACE LAYER OF SOIL IS MORE THAN 20 INCHES IN DEPTH OF LOAMY FINE SAND OR COARSER.

STEEL POSTS MUST BE PAINTED OR GALVANIZED.

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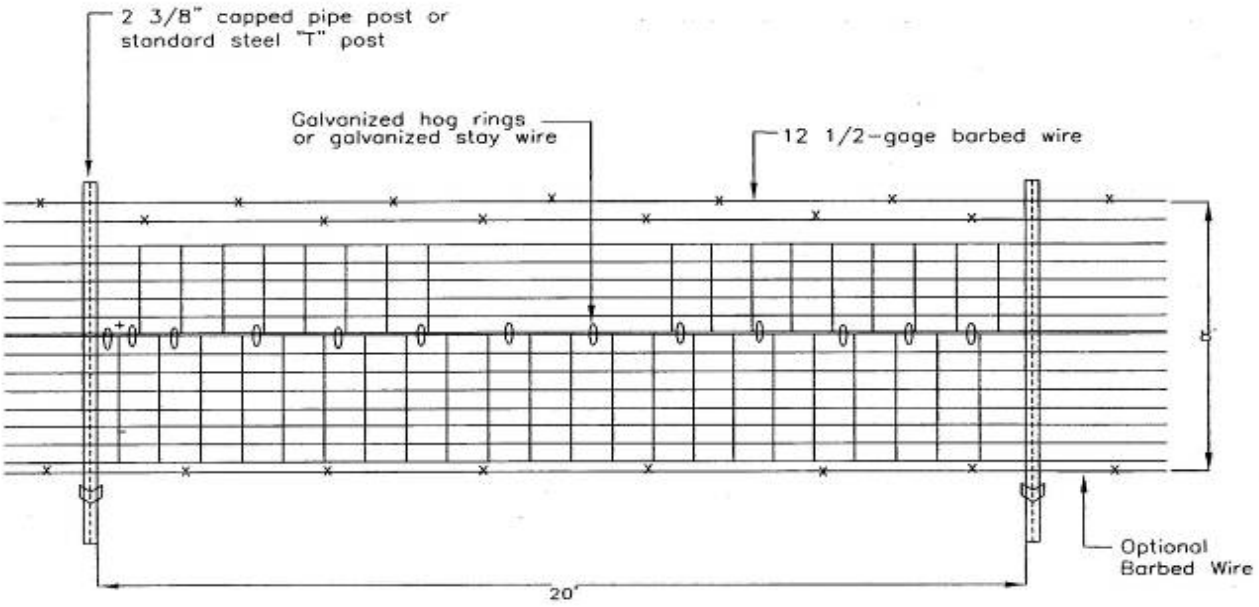
GENERAL INSTALLATION SPECIFICATIONS FOR DEER MANAGEMENT FENCE
EXHIBIT 23



Note:
If standard steel "T" Posts are used
Install 2 3/8" pipe post (capped) or
6" top wooden post every 150'
(Wooden stays may be placed
between line post as needed.
Steel posts must be pointed or galvanized.

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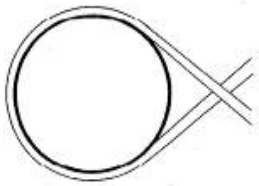
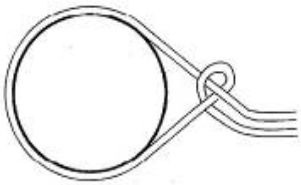
TIE KNOTS
EXHIBIT 24

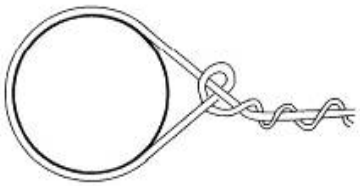
Step 1



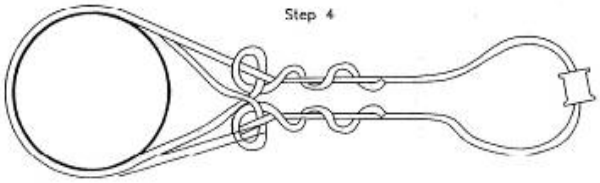
Step 2



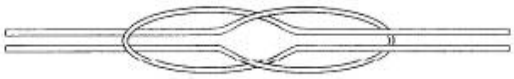
Step 3



Step 4



When tying-off a ground wire around a strainer post we suggest you follow steps 1, 2 & 3. If you are tying-off a Hot Wire, simply go through steps 1, 2 & 3 Then string a Insulator on the tie wire, go back around the strainer post and and follow steps 1, 2 & 3 again as illustrated in step 4. Tie Off fence wire around the insulator by following steps 1, 2 & 3.



SQUARE KNOT USED TO SPLICE WIRE TOGETHER

PDR
Not To Scale

Buck and Pole Fence

Construction Notes: Upright posts shall be 7' long x 5"-8" in diameter. Rails shall be 3"-5" in diameter, 12' long, and 12" apart. Back rail shall be 3"-5" in diameter, and placed between every other pair of bucks. Secure rails with spikes long enough to ensure 3" nail penetration into the post.

Figure 1

A-Frame Pattern consists of one sheet of ¾" plywood with 2"x4" layout boards. Posts are placed on the boards, overlapping each other, and then the notches are cut.

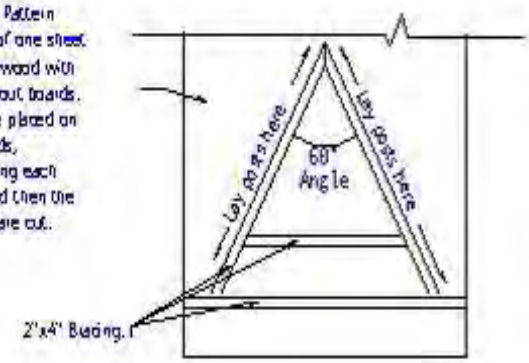


Figure 2

Notch both posts to a depth of 1/3 the diameter of the post, at the point at which they cross. Posts shall fit together snugly

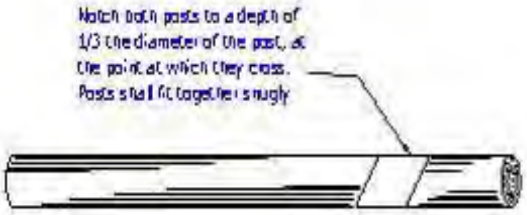
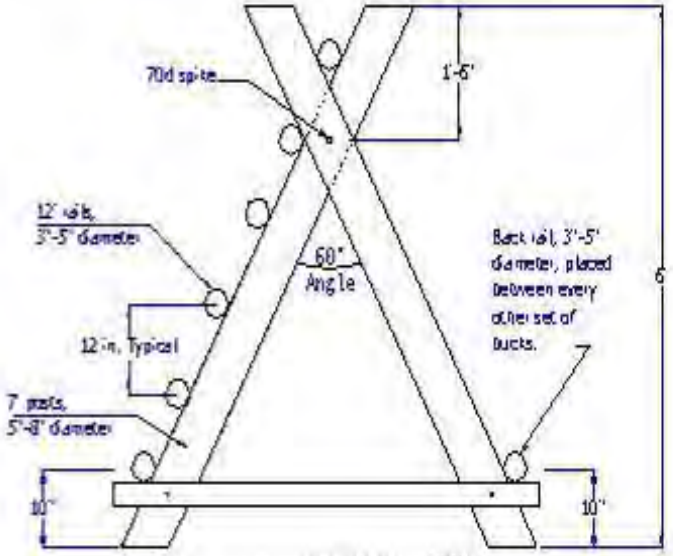


Figure 3



Bottom cross piece shall be 6 ft. long, 2"-3" diameter, 8" off of ground. Spike to posts with 60D spikes.

Figure 4

Construction Notes: For sliding gate, fasten 6' x 2"-3" holding poles to rails on adjacent bucks. Slide 12' long poles in between rails and holding poles. The gate poles can easily be slid out and removed for access.