



K-Line Irrigation 4 Pod / 1.5 Acre Kit



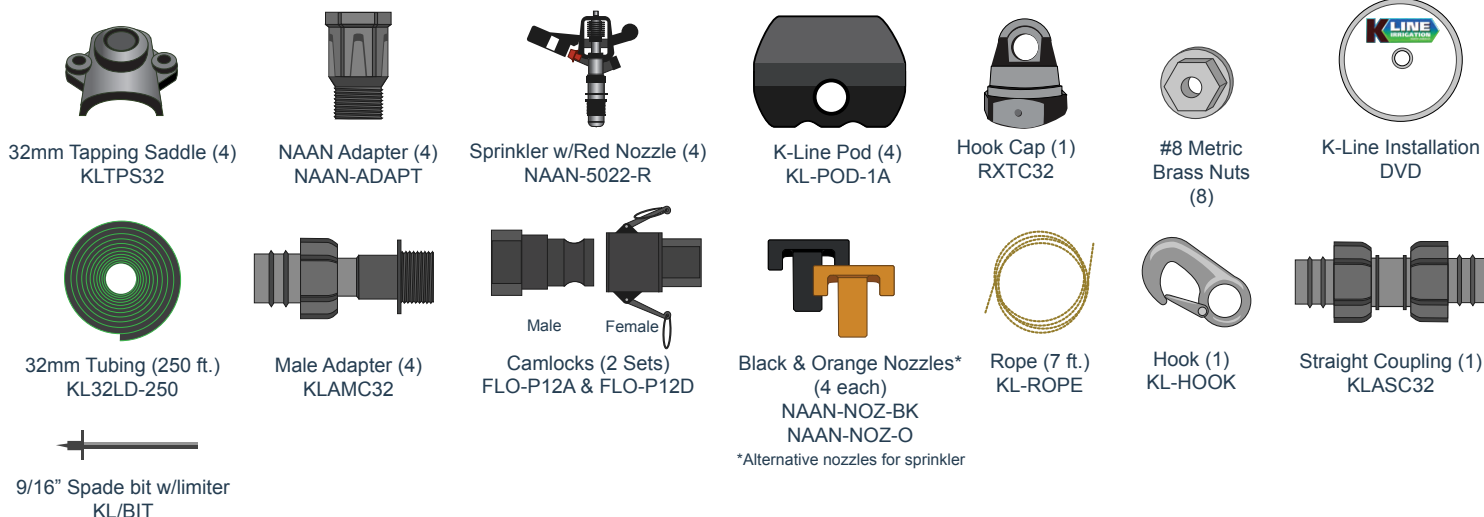
Installation and User's Manual

STEP 1: View the K-Line Installation DVD

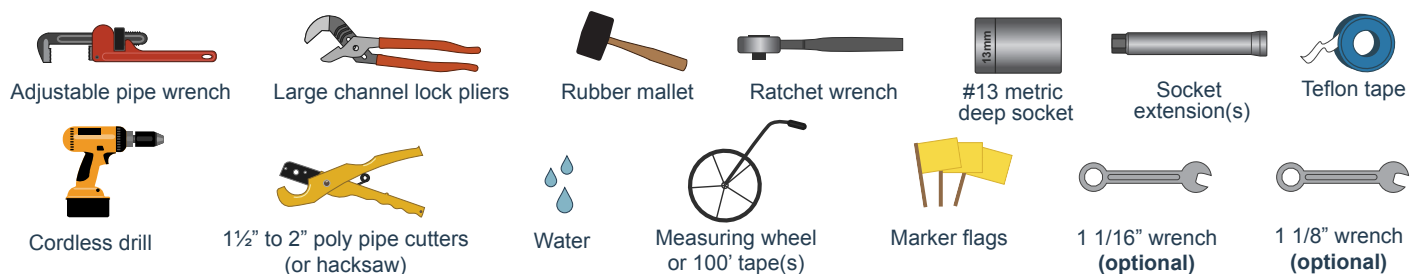
Please review the K-Line Installation DVD to become familiar with the K-Line System.



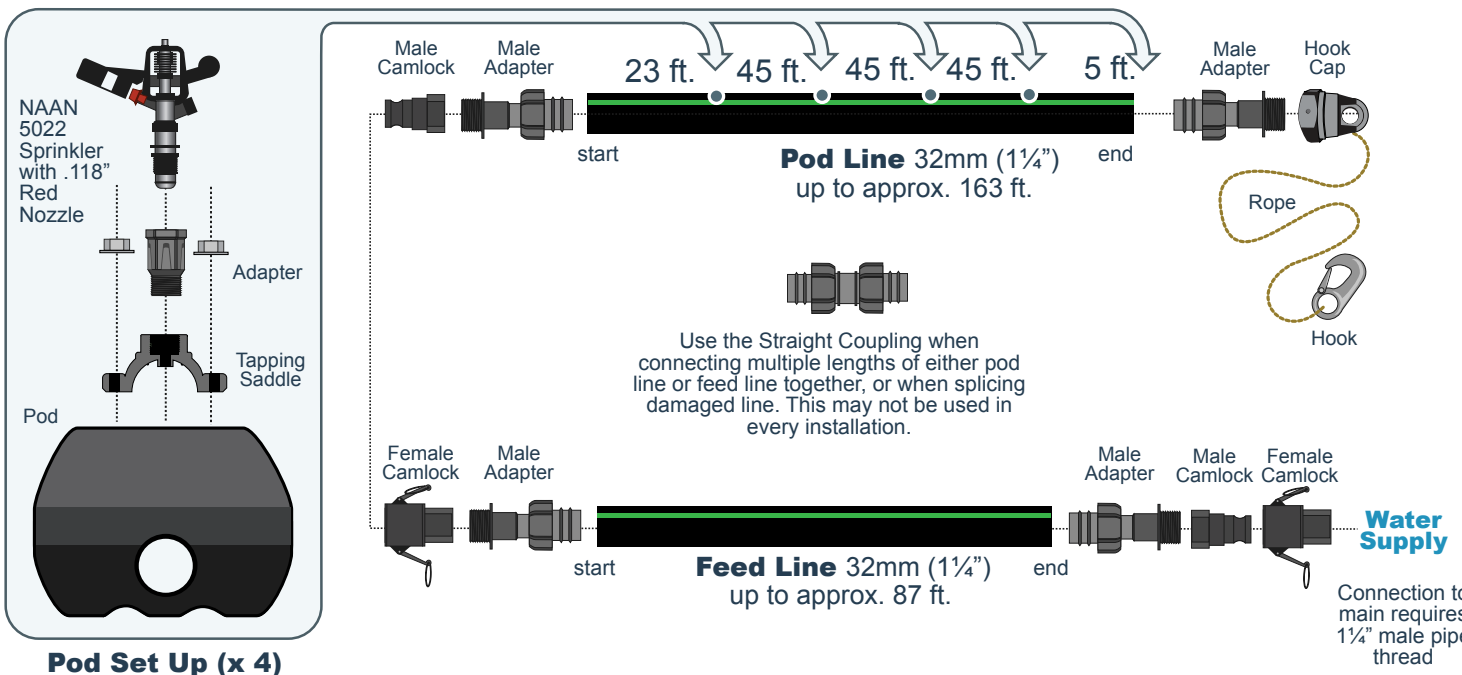
STEP 2: Identify System Components



STEP 3: Tools Required for Installation

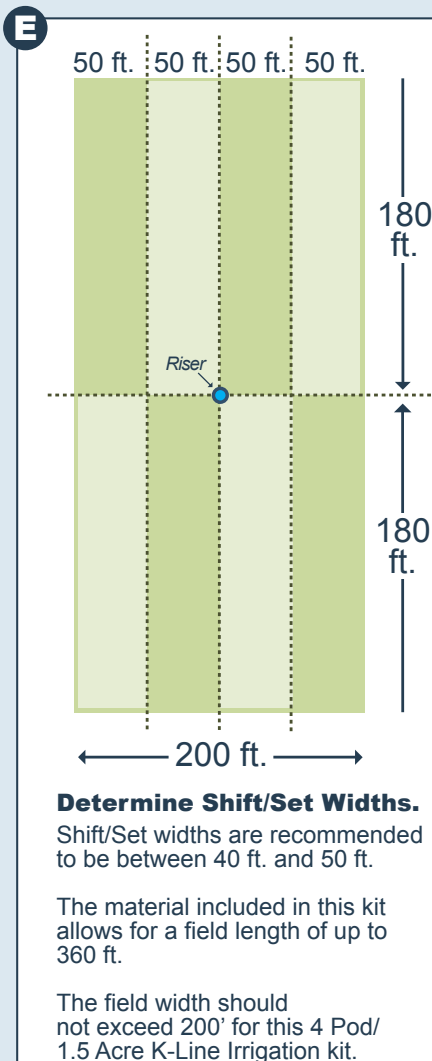
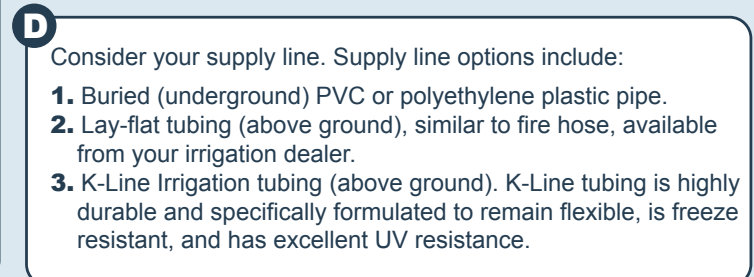
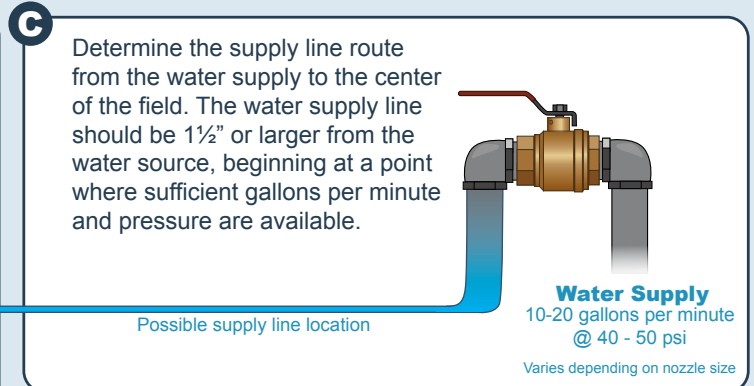
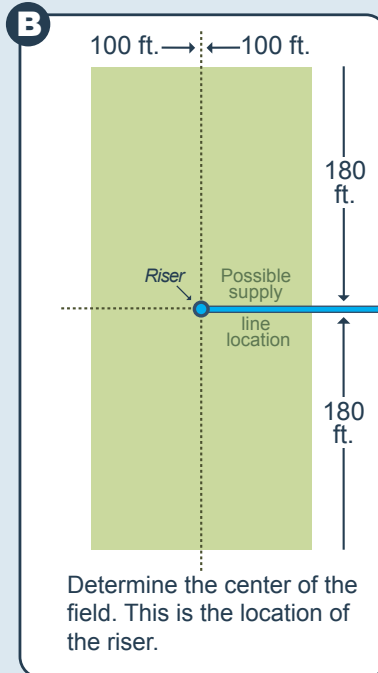
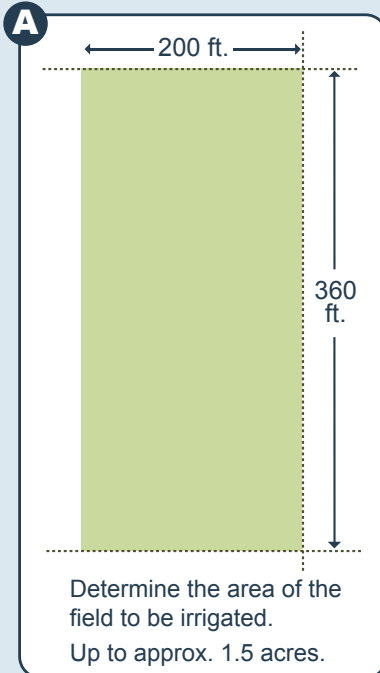


STEP 4: K-Line System Overview



STEP 5: Plan your 4 Pod / 1.5 Acre System Layout *

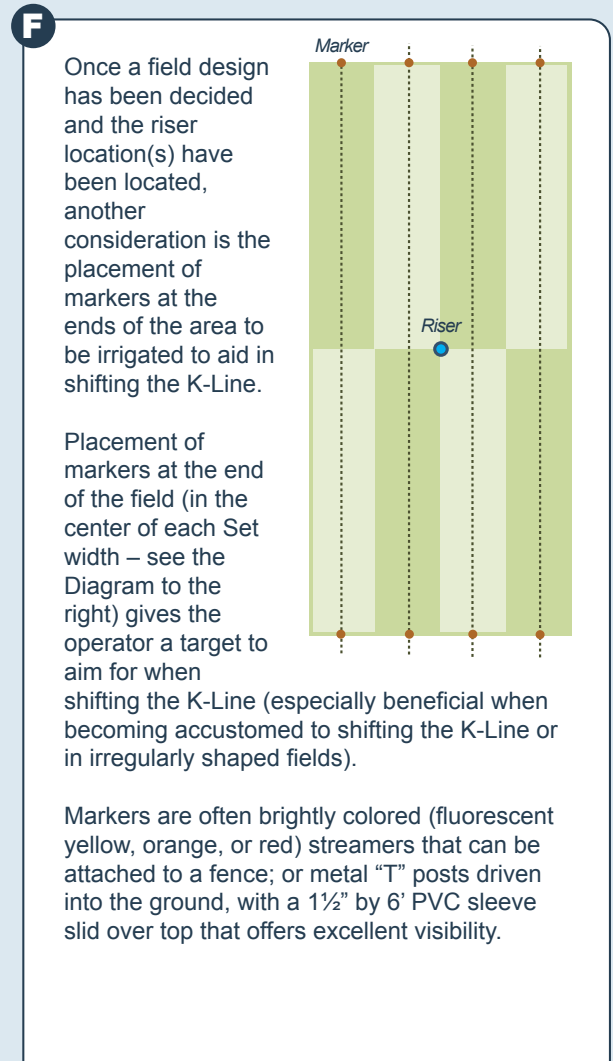
Field shapes and dimensions may not match this ideal layout. K-Line's signature flexibility allows for adaptation to other field dimensions. See the additional "Sample Designs" at the end of this manual. Also, see "K-Line Layout Design Process" on page 11 for ideas about customizing your design.



K-Line's great flexibility of design allows for numerous options in laying out a field. K-Line is adaptable in its ability to have more than one riser location. Sprinkler/pod lines can be curved to adjust to field shapes, obstacles, or terrain. Sprinkler nozzles are easily changed for adjusting application rates. Shifting more than once per day allows a larger area to be covered quickly. Extended irrigation sets can apply that long, slow rain that fills the soil profile and encourages a stronger, deeper and more efficient, and resilient, root system.

Rotational grazers have found an invaluable tool in K-Line Irrigation, especially in combination with the K-Line Portable Stock Tank, see the included "K-Line and Rotational/Intensive Grazing" brochure for more information.

The "K-Line Layout Design Process" included at the top of page 11 will help explain the general design process in designing a K-Line Layout. We have included many examples in our "Sample Designs" that are included in this kit to help identify irrigation opportunities for your situation. Call K-Line Irrigation at (866) 665-5463 with questions.



* If you are combining 2 kits, please follow steps 5 through 7 as outlined on pages 10 and 11.

STEP 6: 4 Pod / 1.5 Acre Layout of the Pod Line

A Measuring pod placement

Roll out a measuring tape and place 5 markers/flags, starting at 23 feet and then at 45 foot intervals.

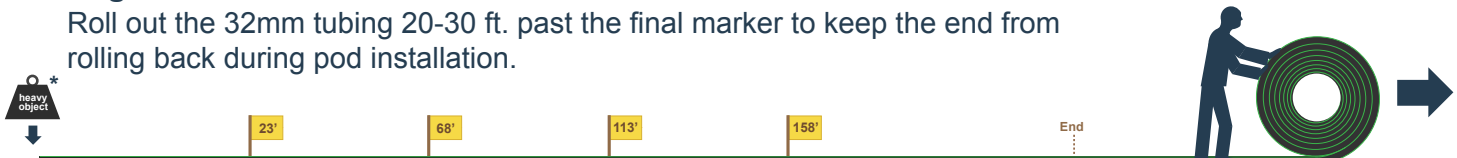


Note: Sprinkler/pod spacing is determined by field length and may differ if your area to be irrigated is less than 440'. For the K-Line 4 Pod/1.5 Acre Irrigation Kit, K-Line recommends spacing up to 45'. Dealer engineered K-Line layouts are usually between 40' and 50'.

If you need assistance, call your dealer or K-Line Irrigation at (866) 665-5463.

B Rolling out the Pod Line

Roll out the 32mm tubing 20-30 ft. past the final marker to keep the end from rolling back during pod installation.

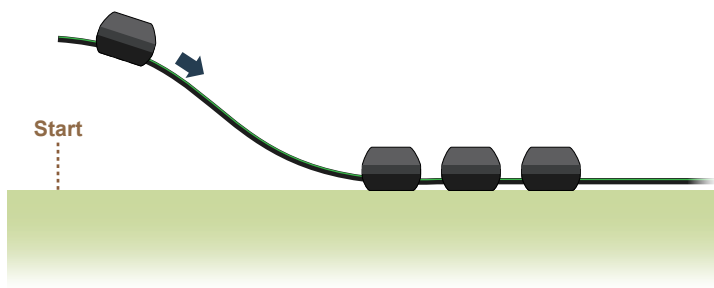


DO NOT ALLOW IT TO TWIST! The single green line should face up for the entire length of the tubing. **Do not make the end cut until the pods have all been installed.**

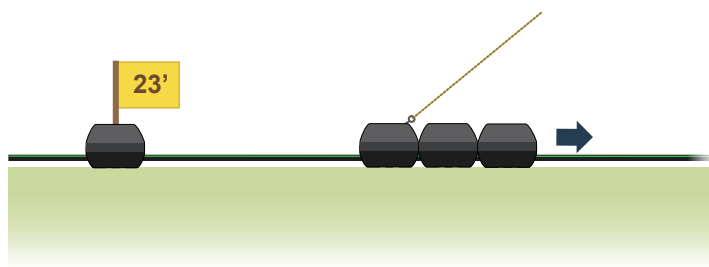
***Hint:** It helps to put a heavy object on the ends of the K-Line Tubing when rolling it out to keep the tubing in place and prevent it from rolling up behind you. The tubing will relax once rolled out and allowed to sit in the sun.

STEP 7: Placing the pods

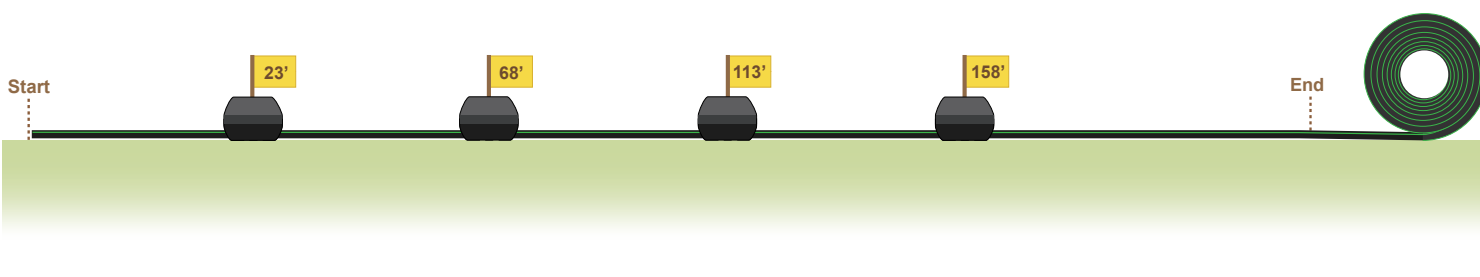
A Slide the 4 pods onto the K-Line tubing.



B Use the Tow Rope and Hook to pull all 4 pods to the first marker. Unhook a pod, leaving it at the marker.

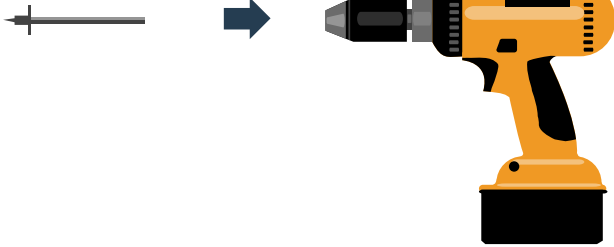


C Continue on to the remaining markers, leaving a pod at each.

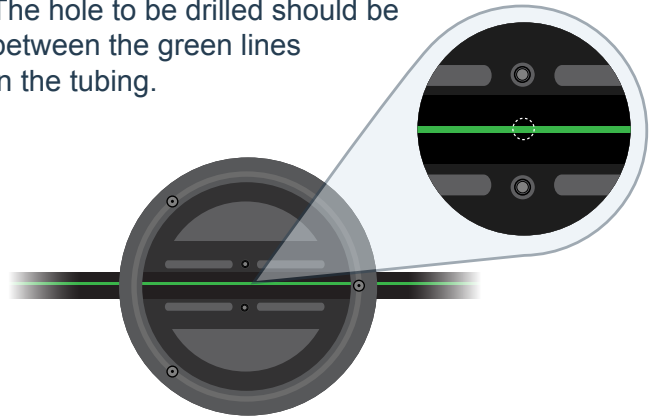


STEP 8: Tapping Saddle Installation

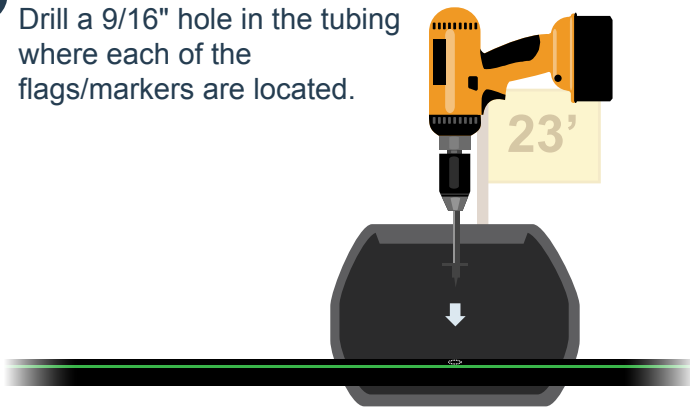
- A** Install the included K-Line spade drill bit w/limiter into a cordless drill.



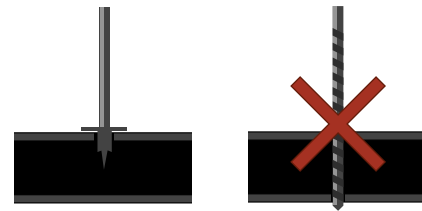
- B** The hole to be drilled should be between the green lines in the tubing.



- C** Drill a 9/16" hole in the tubing where each of the flags/markers are located.

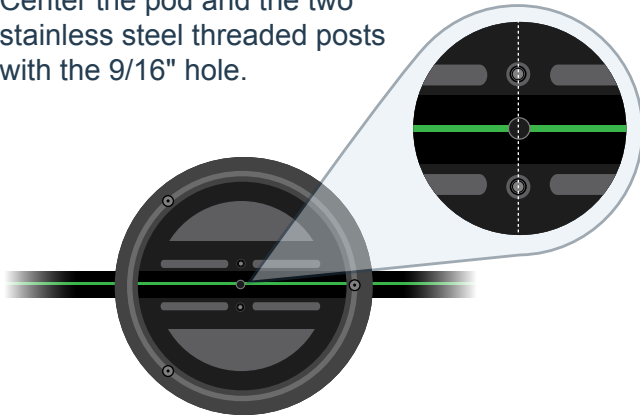


- D** **Caution: Do not use a 3rd party drill bit.** The K-Line Bit has a limiter welded onto it to prevent the bit from being inserted too deeply and puncturing the opposite tubing wall.

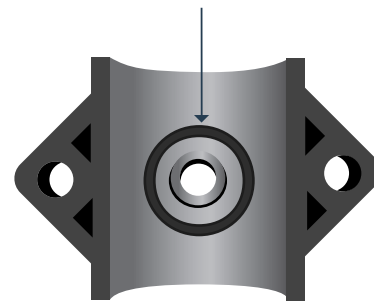


After drilling, remove the tubing chaff from each hole.

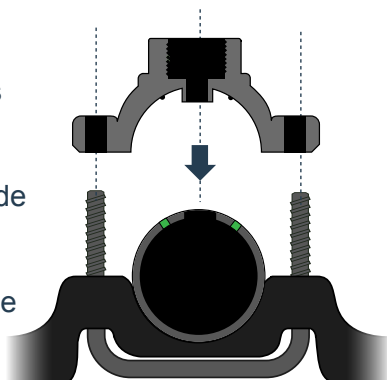
- E** Center the pod and the two stainless steel threaded posts with the 9/16" hole.



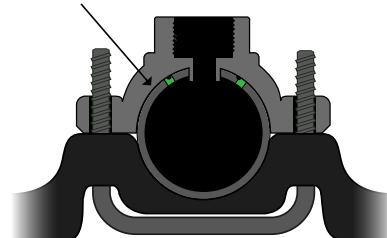
- F** Make sure that the rubber O-ring is in the groove on the underside of the K-Line Tapping Saddle.



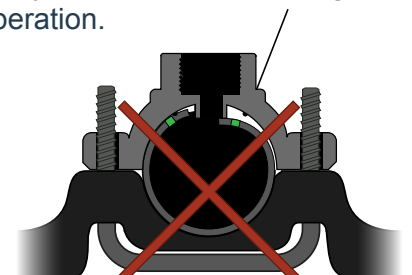
- G** Push the K-Line tapping saddle down over the threaded posts and be certain that the nipple on the underside of the tapping saddle is inserted into the 9/16" hole.



The K-Line tapping saddle should sit snugly over the tubing without a gap.



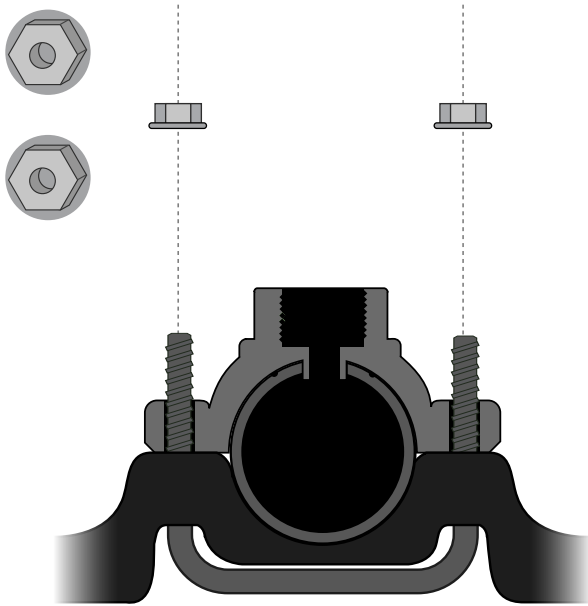
A gap might indicate that you are pinching the tubing on either side of the hole causing water to spray out into the pod during operation.



STEP 8: Tapping Saddle Installation (continued)

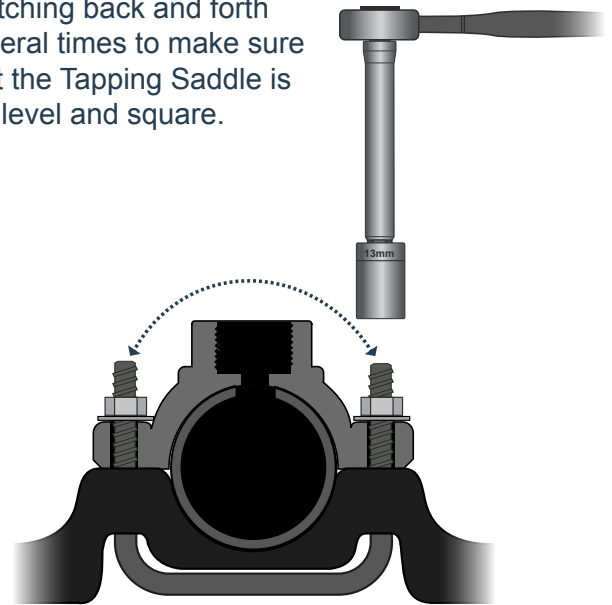
H

Hand tighten a #8 metric brass nut onto each post.



I

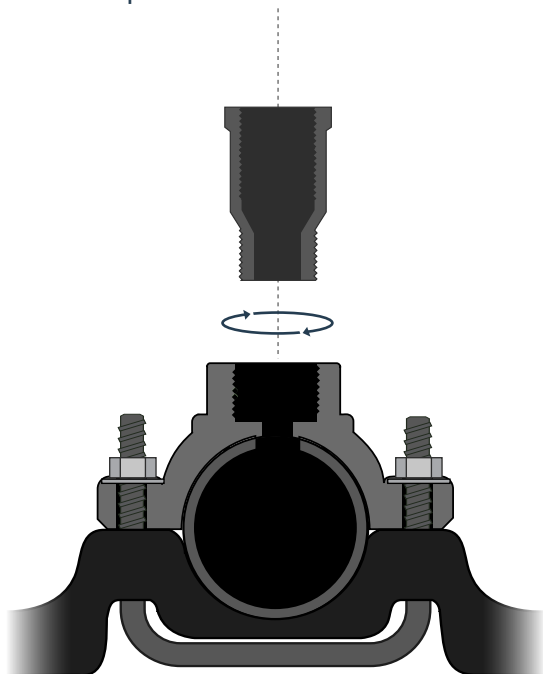
With a 13mm socket (with 8" or longer extension) and ratchet, alternate tightening the #8 metric nuts by switching back and forth several times to make sure that the Tapping Saddle is set level and square.



STEP 9: NAAN Sprinkler Installation

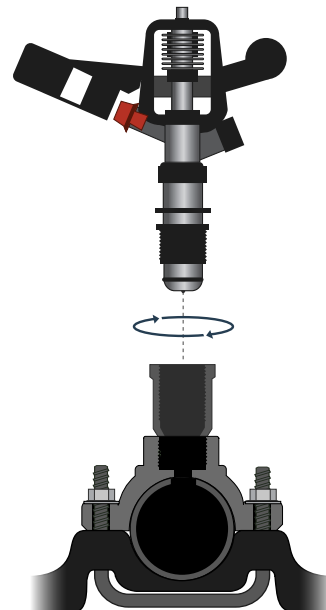
A

Hand start the NAAN adaptor into the K-Line tapping saddle (careful not to cross thread), then finish tightening with an adjustable wrench or channel lock pliers.



B

Hand start the NAAN 5022 sprinkler (careful not to cross thread), then finish tightening with a 13/16" open ended wrench or channel lock pliers.



Repeat Steps 8 and 9 for each pod in the line.

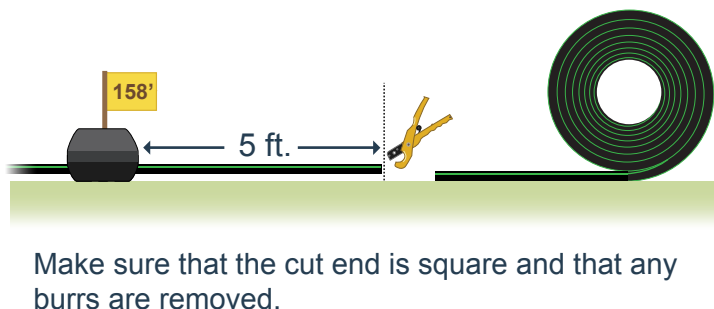
STEP 10: K-Line Fittings Installation on the Lines

A Attach the Male Adapter and Male Camlock to the Start of the **Pod Line**, as follows:

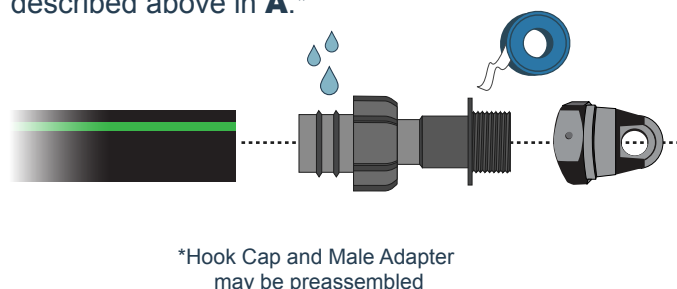
- 1 Assemble the Male Adapter and Male Camlock together, using Teflon tape on the threads to seal the connection, and tighten with a pipe wrench and channel locks.*
- 2 Moisten the barbed end of the Male Adapter with water. Drive the Male Adapter and Male Camlock into the K-Line Tubing with a rubber mallet ensuring that the collar is back against the neck of the Male Adapter.
- 3 Hand tighten the collar of the Male Adapter onto the tubing, then finish by using a combination of pipe wrenches and channel locks to securely tighten the collar. This causes the barbs to bite into the interior and exterior of the K-Line tubing for a strong connection.

*Camlock and Male Adapter may be preassembled

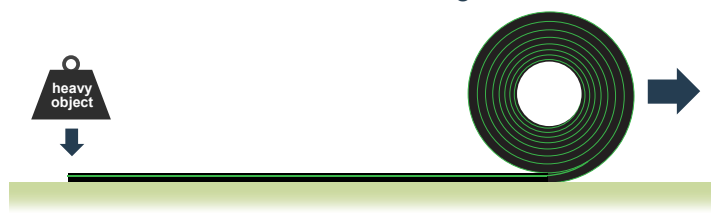
B At the end of the **Pod Line** (5 ft. BEYOND THE LAST POD), use 1½" to 2" poly pipe cutters or a hack saw to cut the K-Line Tubing.



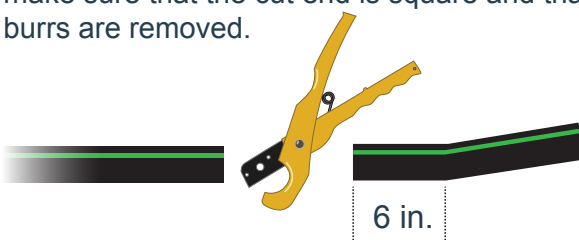
C Attach the Hook Cap to the Male Adapter using Teflon tape on the threads, tighten securely, and connect to the **Pod Line** following the directions described above in A.*



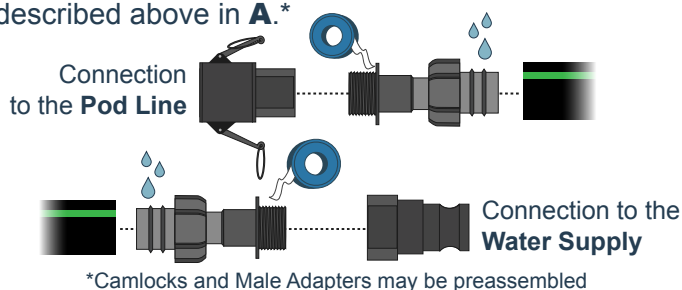
D Roll out the remainder of the 32mm tubing, this will be the **Feed Line**. It should be approximately 87' if your area to be irrigated is 200' wide. If your area to be irrigated is less than 200', then the **Feed Line** should be at least long enough to run from the riser in the center of the field to the edge of the field.



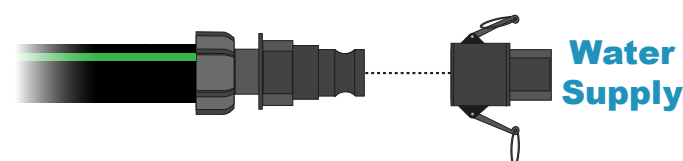
E At the end of the desired length of Feed Line, cut the K-Line Tubing. There may be a kink in the 32mm tubing from when the tubing was wound for shipping, make a square cut 6" prior to the kink or make sure that the cut end is square and that any burrs are removed.



F Attach one Female Camlock and one Male Camlock to two Male Adapters using Teflon tape on the threads, tighten securely. Connect one set to EACH END of the **Feed Line** following the directions described above in A.*



G Attach the Male Camlock to the Water Supply Line using the supplied Female Camlock.



This completes the K-Line installation.

K-Line Shifting

Please also refer to the K-Line Installation DVD to learn how to shift the K-Line System.

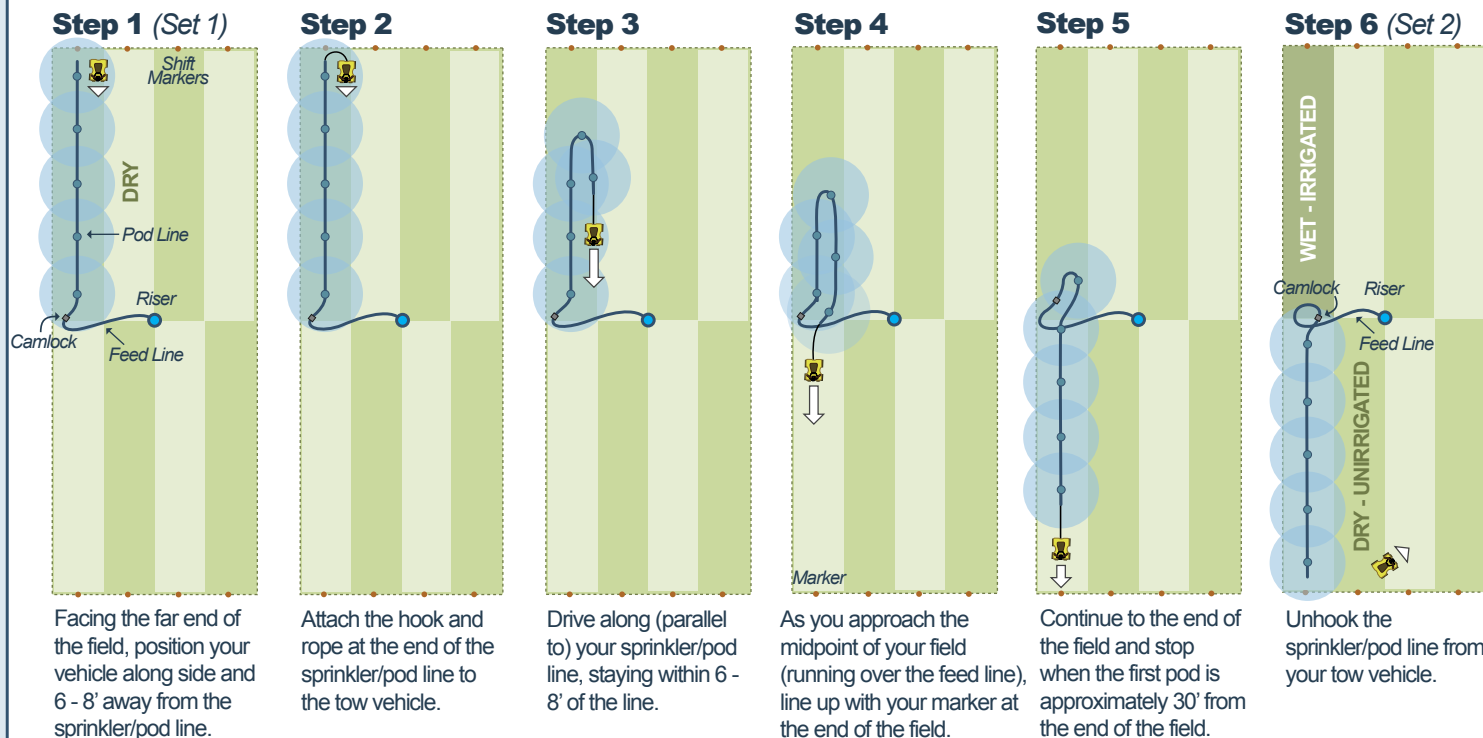
Shifting from Set 1 to Set 2

You can shift K-Line Irrigation with an ATV, heavy duty lawn tractor, golf cart, Gator, or similar tow vehicle. The preferred method of movement is while the sprinklers are in operation. This saves shifting time and the water pressure in the K-Line tubing helps prevent kinking.

The two most important practices to follow when shifting:

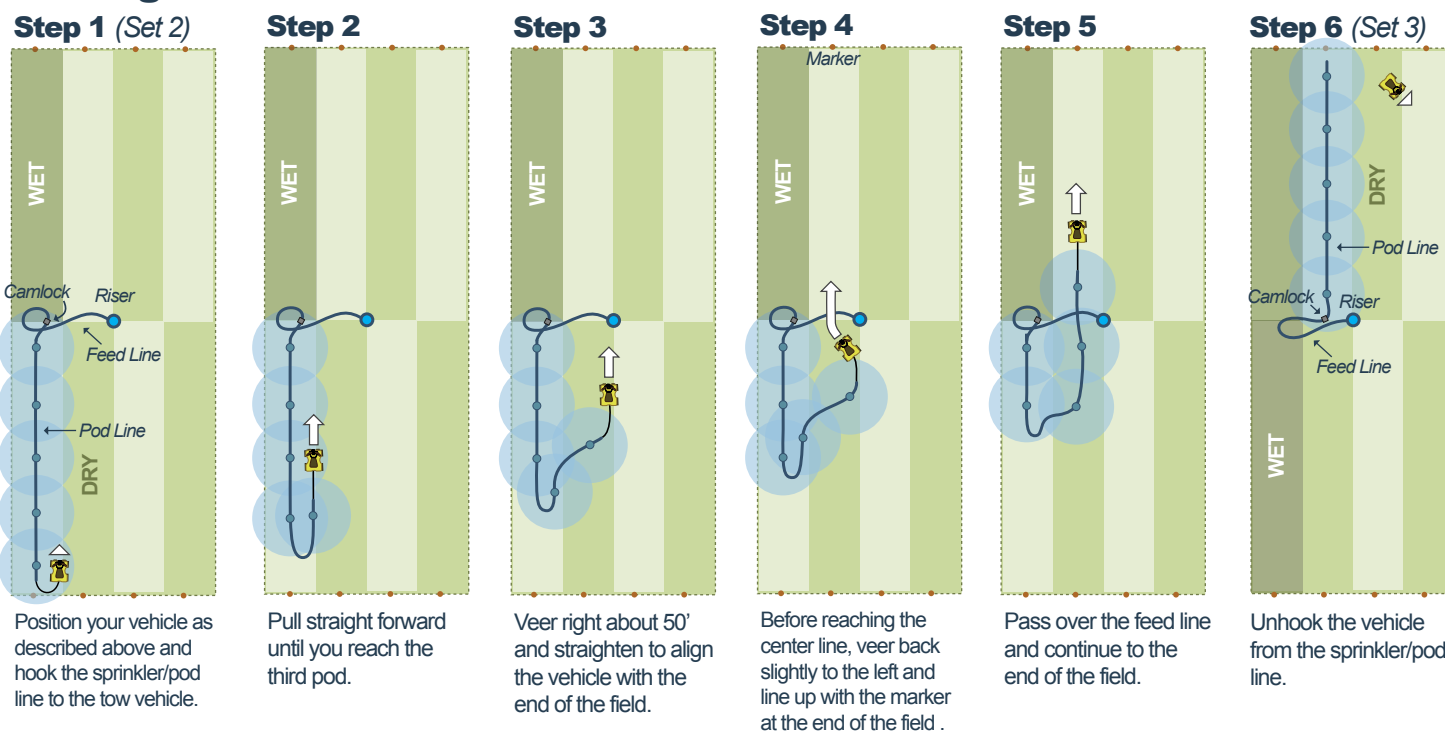
1. **ALWAYS Shift on the "dry" side.** Always begin the shifting procedure on the dry (unirrigated) side of the K-Line. The "dry" (unirrigated) side of a K-Line is the side next to the section(s) of the field that have not been irrigated. This is opposed to the "wet" (irrigated) sections or "Sets" which have been irrigated previously. This will prevent "double loops" in the Feed Line and reduce chances that the tubing will get kinked. Please refer to the illustrations below and note that the "wet" (irrigated) and "dry" (unirrigated) Sets have been labeled.

2. **When connecting to the K-Line,** always face towards mid-field and position the tow vehicle 6 - 8' from, and parallel to, the K-Line.



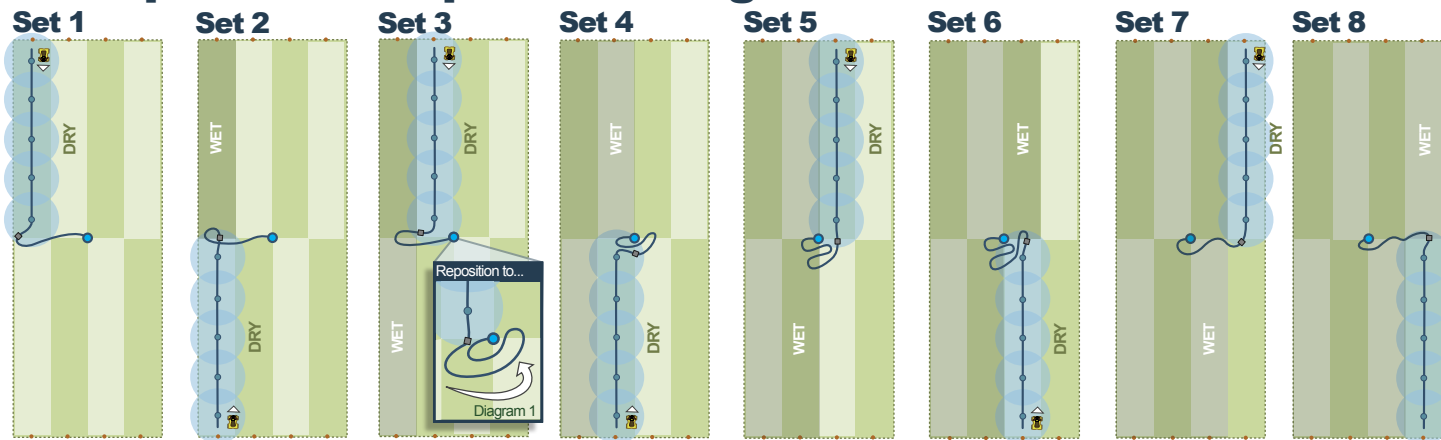
Shifting from Set 2 to Set 3

The following steps show how to move the K-Line 50' over to the right for the next set.



Follow the steps above to shift the line to irrigate all the sections of the field.

Example of a Complete Shifting Schedule



This is an example of the Sets and order of shifts to completely irrigate a field. For other field shapes and sizes please consult your K-Line dealer.

Repositioning the Feed Line

You will need to reposition the Feed Line at least once (sometimes more often) as you shift from Set to Set. In this Shifting Schedule, after the 2nd shift, where the K-Line is positioned to irrigate Set 3, the operator must manually take hold of the Feed Line at the point of the loop furthest from the riser. Then, as shown in **Diagram 1**, the operator must pull the Feed Line loop to a point about 15-20' to the right of the riser at mid-field.

The operator may also need to reposition the Feed Line if they see that the first sprinkler/pod closest to the riser or mid-field is out of alignment with the other pods.

In this Shifting Schedule, this is most likely to occur after shifting the K-Line to the Set 7 position. In this situation, just pull the Feed Line (near the cam lock connection) to reposition the sprinkler/pod and Feed Line. Once the operator becomes familiar with the shifting procedure, the need to reposition (as in Set 7) will be less often.

K-Line Shifting Hints

To keep the final sprinkler (pod closest to the tow vehicle during shifting) from spraying the operator during shifting, use a clothes pin to prevent sprinkler movement, or a coffee can (or similar) over the sprinkler to redirect the spray. Remove after the K-Line has been shifted.

Always position the tow vehicle 6 - 8' from the K-Line to be shifted on the dry (unirrigated) side of the K-Line - SEE page 8-9. This will prevent "double loops" in the Feed Line and reduce chances that the tubing will get kinked. Mark the ends of the field with large different colored markers or flags to help position your lines properly

The first sprinkler/pod may be out of line with the rest of the sprinklers/pods if you have not positioned the last pod (the sprinkler/pod furthest from mid-field) approximately 30' from the edge of the field; OR if the Feed Line needs to be repositioned (as after moving the K-Line to the Set 3 or Set 7 positions - see above, Repositioning the Feed Line, for more details).

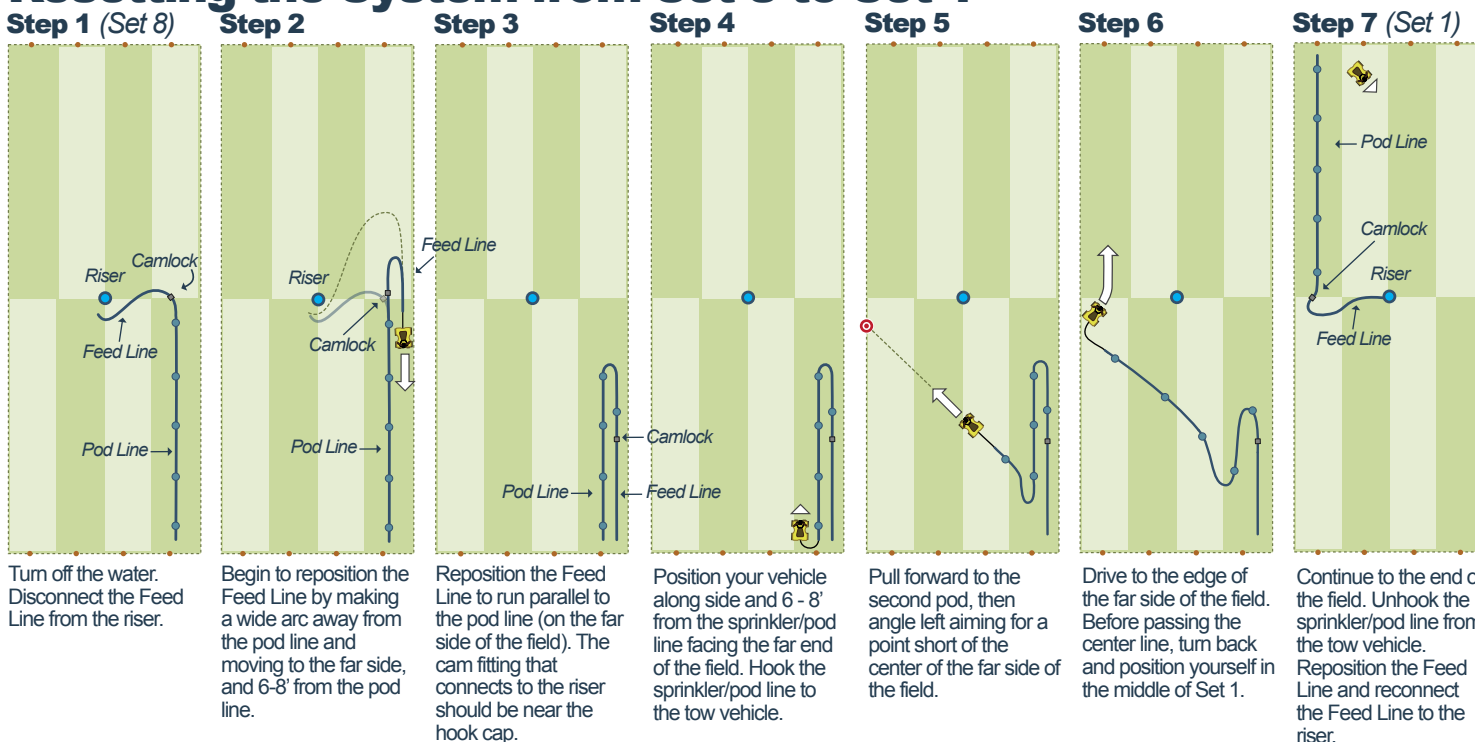
Shifting K-Line in hot weather without water running through the tubing increases the chance of kinking. EITHER shift the line while irrigating, OR shift (without water running) in the early morning or early evening when the tubing is cool.

Winterization / Harvest

Unhook the Feed Line and K-Line from the riser and shift it to the side of the field for storage or during harvest. Setting the K-Line on an incline, and the action of shifting the K-Line itself, will remove most of the water from the K-Line. K-Line tubing will also stretch slightly to withstand some freezing. Open all riser and drain valves to drain the system and cover any open risers or tubing ends (cam dust caps and plugs are available) to prevent small animals from nesting inside.

If a significant amount of grass is allowed to grow up and entangle the K-Line (i.e., from fall through to late spring when you begin irrigating again) then be sure to manually loosen the pods from the grip of the forage before shifting the K-Line.

Resetting the System from Set 8 to Set 1



Combining 2 K-Line Kits: Steps 5 through 7

STEP 5: Plan your 8 Pod / 4.5 Acre System Layout

Field shapes and dimensions may not match this ideal layout. K-Line's signature flexibility allows for adaptation to other field dimensions. See the additional "Sample Designs" included at the end of this manual.

A

Determine the area of the field to be irrigated.
Up to approx. 4.5 acres.

B

Determine the center of the field. This is the location of the riser.

C

Determine the supply line route from the water supply to the center of the field. The water supply line should be at least 2" or larger from the water source, beginning at a point where sufficient gallons per minute and pressure are available.

Water Supply
19-39 gallons per minute
@ 40 - 50 psi
Varies depending on nozzle size

D

Consider your supply line. Supply line options include:

1. Buried (underground) PVC or polyethylene plastic pipe.
2. Lay-flat tubing (above ground), similar to fire hose, available from your irrigation dealer.
3. K-Line Irrigation tubing (above ground). K-Line tubing is highly durable and specifically formulated to remain flexible, is freeze resistant, and has excellent UV resistance.

E

Determine Shift/Set Widths. Shift / Set widths are recommended to be between 40 ft. and 50 ft.

The material included in two kits allows for a field length of up to 800 ft.

The field width should not exceed 250' for this 8 Pod / 4.5 Acre K-Line Irrigation kit.

K-Line's adaptability is increased when 2 Kits are combined. The example layout in this Manual allows 2 Kits to be combined to irrigate a 4.5 acre area, but K-Line's almost limitless flexibility allows you an even greater range of options – from irrigating larger areas with a single 8 sprinkler/pod K-Line, to making two K-Lines of different lengths to irrigate several different sized areas.

The key to K-Line's success is the maneuverability of the sprinkler/pod line, allowing the K-Line to irrigate areas with trees, buildings, ponds, streams, and hilly or irregular shapes to become productive and profitable grasslands. Shifting markers (discussed further on Page 3, Step 5F) allow the operator to become accustomed to shifting and placement of the K-Line from Set to Set.

Follow the "**K-Line Layout Design Process**" on page 11, Step 6B to better understand how to develop K-Line layouts for your irrigation opportunities. Our "**Sample Designs**" literature gives many example layouts that may help you identify irrigation opportunities of your own. Call K-Line Irrigation at (866) 665-5463 with questions.

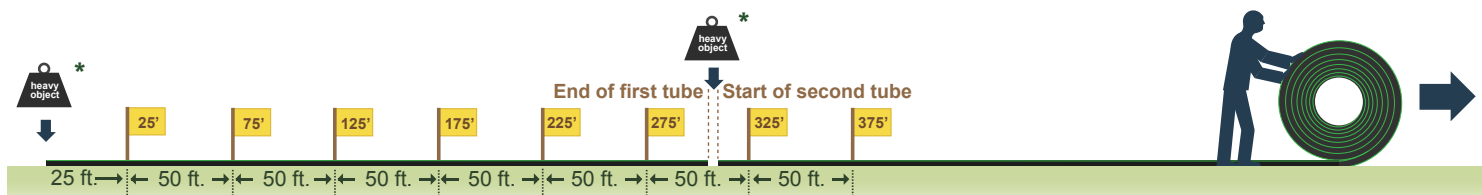
STEP 6: 8 Pod / 4.5 Acre Layout of the Pod Line

A Measuring pod placement and rolling out the Pod Line

Roll out a measuring tape and place 8 markers/flags, starting at 25 feet then at 50 foot intervals.

Roll out 1 full 32mm roll of tubing for approximately 250 ft. (if the end is kinked, follow the instructions on page 7, step 10E to cut a square end).

Continue the line by rolling out the next roll of tubing 20-30 ft. past the final marker to keep the end from rolling back during pod installation.



DO NOT ALLOW IT TO TWIST! The single green line should face up for the entire length of the tubing.
Do not make the end cut until the pods have all been installed.

***Hint:** It helps to put a heavy object on the ends of the K-Line Tubing when rolling it out to keep the tubing in place and prevent it from rolling up behind you. The tubing will relax once rolled out and allowed to sit in the sun.

STEP 6: 8 Pod / 4.5 Acre Layout of the Pod Line (continued)

B

K-Line Layout Design Process

K-Line recognizes that most areas to be irrigated will differ from the 250' by 800' dimensions used in this Layout illustration. The process represented in this Installation Manual will guide you through your own application.

In general you will have 5' of tubing past the final pod, an even spacing between the pods in the line, and prior to the first pod, half or slightly more of the distance between pods.

Using our sample layout dimensions of 800' long by 250' wide, you will GENERALLY use these steps, when determining the distance between the pods:

1. Take the length of the field and divide by 2 ($800' / 2 = 400'$);
2. Subtract 10 – to account for overspray at the end of the line and to give room to maneuver the tow vehicle ($400' - 10' = 390'$).

NOTE: Try to always leave at least 30' between the final pod and the edge of the area to be irrigated.

3. Divide the remaining length by 50' ($390' / 50 = 7.8$), always round up ($7.8 \rightarrow 8$), this is the number of pods that you need to use in your K-Line (8 pods).

4. Take the remaining length found in step 2 (390') and divide by the number of pods that you calculated in step 3 (8 pods) to get the spacing between pods ($390' / 8 \text{ pods} = 48.75'$ between pods).

NOTE: Almost always round a decimal down ($48.75' \rightarrow 48'$) and do not exceed a 50' spacing between pods.

5. The length of tubing from the first pod of the Pod Line and the beginning of the K-Line tubing should be $\frac{1}{2}$ of the distance between pods ($48' \times \frac{1}{2} = 24'$), rounded up. In our 4.5 acre Layout we have 26' because we had extra tubing that could either be added to the Feed Line or the Pod Line and we choose to add it to the Pod Line. It is better to have more tubing than to not have enough tubing.

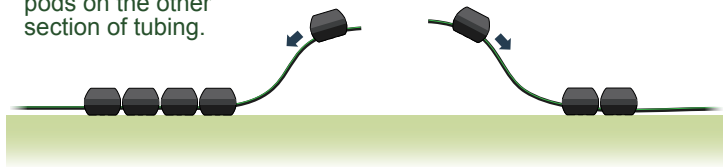
This is how we designed this 8 Pod / 4.5 Acre Layout and you can use this process to develop your own Layout.

NOTE: You will need a length of K-Line tubing for a Feed Line that is $\frac{1}{2}$ (or slightly less) the width (250') of the area to be irrigated ($250' \times \frac{1}{2} = 125' - 10'$).

STEP 7: Placing the pods

A

At the break between the two rolls of tubing, slide the 8 pods onto the K-Line tubing. 5 pods on the side with 250 feet of tubing, 3 pods on the other section of tubing.



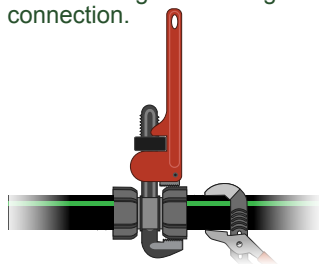
D

Wet and insert the unattached end of the Straight Coupling into the other section of tubing and place your foot (and weight) on the tubing to hold the tubing in place. On the already connected Straight Coupling/tubing side, place the channel locks directly behind the attached collar. Use a rubber mallet to strike the channel locks to drive the Straight Coupling securely into the unattached tubing.



E

Hand tighten the collar of the Straight Coupling onto the tubing, then finish by using a combination of pipe wrenches and channel locks to securely tighten the collar. This causes the barbs to bite into the interior and exterior of the K-Line tubing for a strong connection.



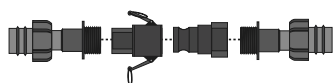
When connecting 2 lengths of tubing, be sure to keep the green lines on the tubing facing up.

B

Be sure that the tubing ends are square. Moisten the end of the Straight Coupling with water and drive the Straight Coupling into the K-Line Tubing with a rubber mallet.

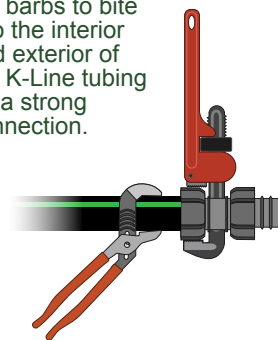


The "extra set" of Camlocks from combining 2 K-Line Kits can be used in place of a Straight Coupling. See step 10A on page 7 for installation of both Camlocks.



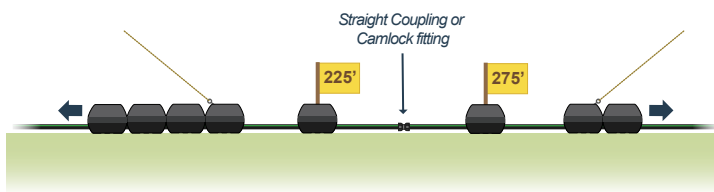
C

Hand tighten the collar of the Straight Coupling onto the tubing, then finish by using a combination of pipe wrenches and channel locks to securely tighten the collar. This causes the barbs to bite into the interior and exterior of the K-Line tubing for a strong connection.



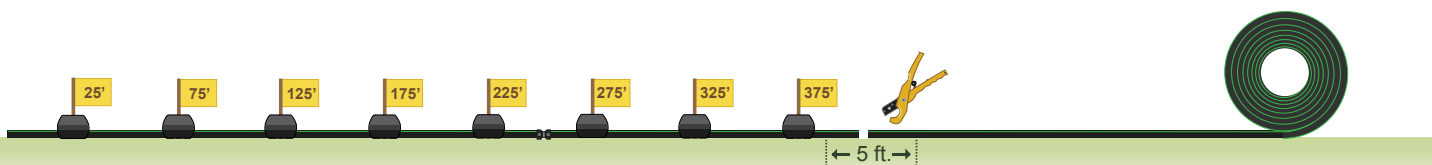
F

Use the Tow Rope and Hook to pull all pods to the first marker in both directions. Unhook a pod, leaving it at the marker.



G

Continue on to the remaining markers, leaving a pod at each.



Use $1\frac{1}{2}$ " or 2" Poly Pipe cutters or a Hacksaw to make a square cut at the end of the Pod Line 5' past the final marker. Make sure that the cut end is square and that any burrs are removed. **RESUME INSTRUCTIONS ON PAGE 5, STEP 8.**

K-Line Trouble Shooting Guide

Symptom	Possible Cause / Solution
Partial or poor distribution from sprinkler	<ul style="list-style-type: none"> ■ plugged nozzle - remove nozzle, check for obstruction. ■ obstruction in tubing - remove hook cap and flush line ■ improper pump pressure - check pump ■ damaged tubing leaking water - make square cuts to remove the damage, install Straight Coupling as described on page 6, STEP 11C ■ saddle improperly mounted on tubing - remove and mount according to pages 4 and 5, STEP 8
Pods rolling over during shifting	<ul style="list-style-type: none"> ■ towing vehicle is too far from K-Line - keep 6 - 8' from the pod line while shifting
Connectors coming loose	<ul style="list-style-type: none"> ■ improper tightening of the K-Line connectors - cut off and discard 3" of old scarred tubing when repairing (make sure that you have a square cut), then use pipe wrenches to more firmly tighten the connectors - see page 6, STEP 10A. If this fails, replace fitting with new fitting with sharp edges.
Water Stream hits the inside of the pod	<ul style="list-style-type: none"> ■ tapping saddle is improperly tightened down - reposition tapping saddle and tighten down evenly, see pages 4 and 5, STEP 8
Feed Line loop gets too tight	<ul style="list-style-type: none"> ■ Feed Line needs to be repositioned - see page 9, "Repositioning the Feed Line" ■ Feed Line is too short - add more tubing or narrow the width of the irrigated area
K-Line tubing gets kinked	<ul style="list-style-type: none"> ■ failure to reposition Feed Line - see page 9, "Repositioning the Feed Line" - ■ shifting the K-Line without water running when temperatures are hot - -straighten the kinked K-Line tubing and use a rubber mallet to lightly pound the tubing back into shape

K-Line Accessories



K-Line Stock Tank

K-Line's Portable Stock Tank can be pulled behind an ATV or small tow vehicle and is designed to be moved with the cattle as they move through the grazing rotation.



Benefits:

- Heavy duty stainless steel tank with rugged steel tubing framework for maximum durability and longevity.
- Low tank profile and center of gravity minimizes rubbing and potential of cattle tipping the tank.
- Minimal physical labor involved in moving the tank.
- Fields are more efficiently grazed when water is readily available.
- Minimal walking distances to water increases milk production and weight gain.
- A portable tank is rarely placed in the same location, minimizing mud holes.
- Compaction and pugging around the stock tank is minimal - when water is close, cows drink in ones and twos instead of as a mob that causes competition at the tank.
- Manure is more evenly distributed and not concentrated around a permanent tank.



K-Line Stock Guard

K-Line's Stock Guard is available to prevent animals from loosening or breaking the sprinklers. Most stocking situations do not require Stock Guards.



See the K-Line website, www.k-linena.com, for other K-Line accessories - pop-up sprinklers, Nelson Windfighter sprinklers, spool-out reels, fittings, regulators, couplings, and connectors.







K-Line Kwik Shifter II

The Kwik Shifter II with adjustable hitch is pulled behind the tow vehicle and is designed to catch a heavy-duty, bright colored plastic ball that is attached to the end of the K-Lines. After catching the ball, the driver shifts the K-Line (at speeds up to 15mph) to the next set (area to be irrigated), pulls the trip rope which releases the ball, and then moves on to shift the next K-Line - all without stopping or dismounting. The time to shift multiple K-Lines can be easily cut in half and mounting/dismounting the tow vehicle is greatly reduced.







Performance Chart

2 Acre K-Line Irrigation Kit # 5022 NAAN impact sprinkler options with 45' between sprinklers and a 50' shift width

Nozzle Color & Size	Operating Pressure	Output per Sprinkler (gallons per minute)	Total Water Required for 4 Sprinklers	Water Application Rate/Hour	Total Applied Water in 24 hr. Set	Average Application Rate Per Week <small>Based on 8 Shifts with Continuous Running</small>
 Orange - 7/64"	40 psi.	2.3 gpm	9.2 gpm	.10 inches	2.4 inches	2.1 inches
	45 psi.	2.44 gpm	9.76 gpm	.11 inches	2.6 inches	2.2 inches
	50 psi.	2.57 gpm	10.28 gpm	.12 inches	2.7 inches	2.4 inches
 Red - .118"	40 psi.	2.64 gpm	10.51 gpm	.12 inches	2.8 inches	2.5 inches
	45 psi.	2.81 gpm	11.24 gpm	.13 inches	3.0 inches	2.6 inches
	50 psi.	2.96 gpm	11.84 gpm	.14 inches	3.1 inches	2.7 inches
 Black - 5/32"	40 psi.	4.4 gpm	17.6 gpm	.20 inches	4.7 inches	4.1 inches
	45 psi.	4.64 gpm	18.56 gpm	.21 inches	4.9 inches	4.3 inches
	50 psi.	4.86 gpm	19.44 gpm	.22 inches	5.2 inches	4.5 inches
The green and blue nozzles below are optional sprinkler nozzles available from your Dealer						
 Green - 1/8"	40 psi.	3.0 gpm	12 gpm	.13 inches	3.2 inches	2.8 inches
	45 psi.	3.17 gpm	12.68 gpm	.14 inches	3.4 inches	2.9 inches
	50 psi.	3.33 gpm	13.32 gpm	.15 inches	3.6 inches	3.1 inches
 Blue - 9/64"	40 psi.	3.44 gpm	13.76 gpm	.15 inches	3.7 inches	3.2 inches
	45 psi.	3.64 gpm	14.56 gpm	.16 inches	3.9 inches	3.4 inches
	50 psi.	3.82 gpm	15.28 gpm	.17 inches	4.1 inches	3.5 inches

5.6 Acre K-Line Irrigation Kit # 5022 NAAN impact sprinkler options with 50' between sprinklers and a 50' shift width

Nozzle Color & Size	Operating Pressure	Output per Sprinkler (gallons per minute)	Total Water Required for 10 Sprinklers	Water Application Rate/Hour	Total Applied Water in 24 hr. Set	Average Application Rate Per Week <small>Based on 8 Shifts with Continuous Running</small>
 Orange - 7/64"	40 psi.	2.36 gpm	18.88 gpm	.09 inches	2.2 inches	1.5 inches
	45 psi.	2.49 gpm	19.92 gpm	.10 inches	2.4 inches	1.6 inches
	50 psi.	2.62 gpm	20.96 gpm	.11 inches	2.5 inches	1.7 inches
 Red - .118"	40 psi.	2.71 gpm	21.68 gpm	.11 inches	2.6 inches	1.8 inches
	45 psi.	2.88 gpm	23.04 gpm	.11 inches	2.7 inches	1.9 inches
	50 psi.	3.03 gpm	24.24 gpm	.12 inches	2.9 inches	2.0 inches
 Black - 5/32"	40 psi.	4.54 gpm	36.32 gpm	.18 inches	4.3 inches	3.0 inches
	45 psi.	4.78 gpm	38.24 gpm	.19 inches	4.6 inches	3.2 inches
	50 psi.	5.02 gpm	40.16 gpm	.20 inches	4.8 inches	3.3 inches
The green and blue nozzles below are optional sprinkler nozzles available from your Dealer						
 Green - 1/8"	40 psi.	3.0 gpm	24 gpm	.12 inches	2.9 inches	2.0 inches
	45 psi.	3.19 gpm	25.52 gpm	.13 inches	3.0 inches	2.1 inches
	50 psi.	3.35 gpm	26.80 gpm	.14 inches	3.2 inches	2.2 inches
 Blue - 9/64"	40 psi.	3.51 gpm	28.08 gpm	.14 inches	3.3 inches	2.3 inches
	45 psi.	3.71 gpm	29.68 gpm	.15 inches	3.5 inches	2.5 inches
	50 psi.	3.90 gpm	31.20 gpm	.16 inches	3.7 inches	2.6 inches

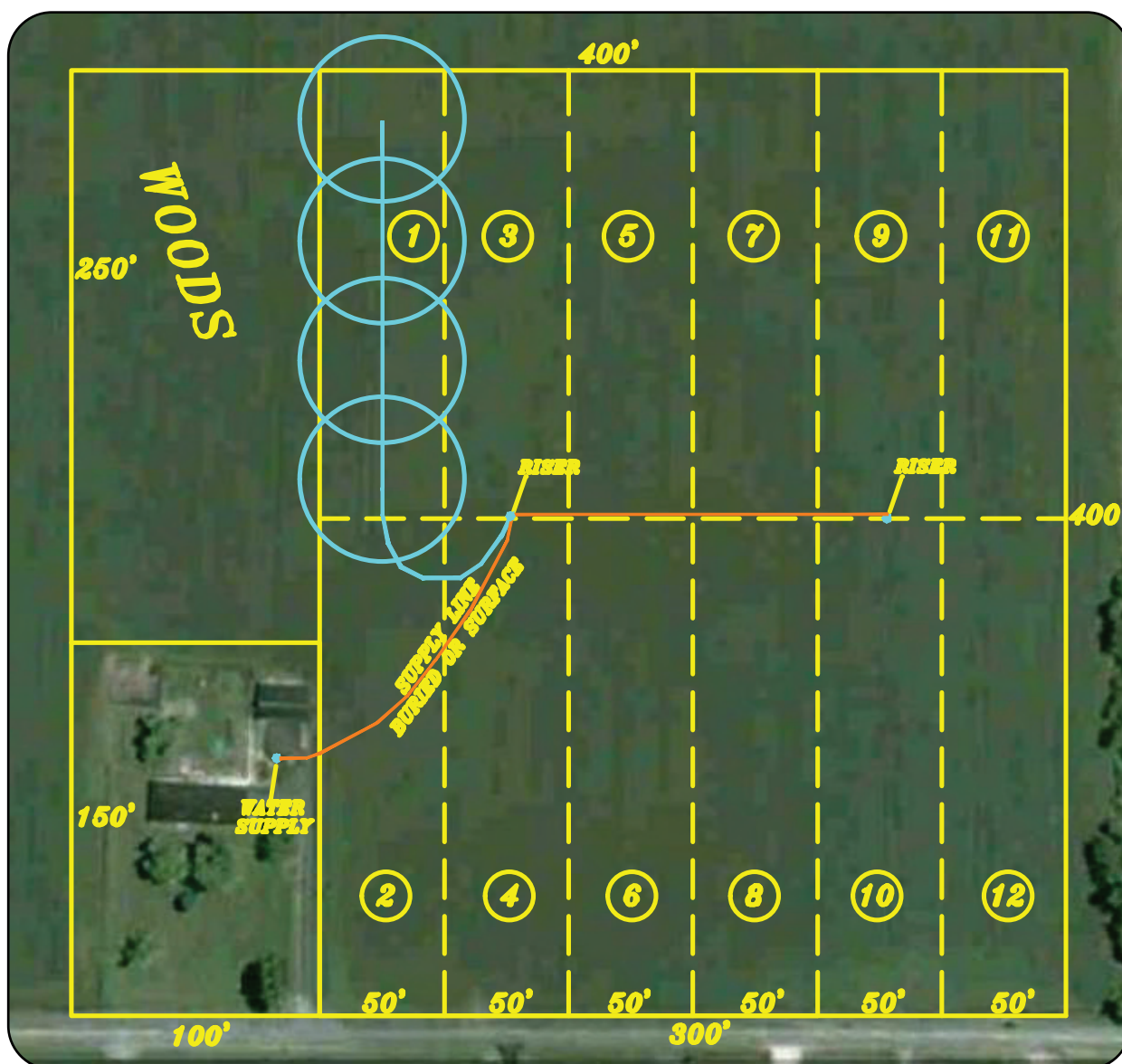
The amount of water needed for this K-Line sprinkler/pod kit varies by the nozzle used and the water pressure available. From the nozzles provided, choose the one that best fits your situation. The best operating pressure is between 40 and 50 psi.

Changing a Sprinkler Nozzle

To change a NAAN sprinkler nozzle, grip the nozzle already in the sprinkler between your thumb and forefinger, (or with a small pair of pliers), turn the nozzle counter clockwise for about 1/8 turn. Now the nozzle can be pulled straight out and the new nozzle inserted. Lock the new nozzle in place by turning it clockwise until it clicks (or the locking arms are horizontal). If unplugging a clogged nozzle, use the same procedure.

Sample Field Designs

Sample Design: One K-Line 4 Pod Kit



Design Specifications

Sets 1-12

Size of total area to be irrigated:	2.75 Acres
Number of sets or watering days required:	12 days
Distance between sprinkler pods:	50 ft.
Shift widths:	50 ft.
Sprinkler nozzle color and size:	Red .118"
Operating pressure available:	50 psi
Sprinkler application rate in inches per hour:	114 in/hr
Length of watering time per set:	24 hours
Total amount of irrigation water applied during each set period:	2.74 inches
System capability in inches per week applied:	1.60
Number of sprinkler pods per K-line:	4
Output per sprinkler:	2.98 gal/min
Total gallons per minute of water needed for this area:	11.9 gpm

Notes

If the water holding capacity of the soil is good and small rainfall is usually available, then the number of sets can be increased as in the example. Additional K-Line tubing would be required but the acreage irrigated is large and economical.

Sample Design: One K-Line 4 Pod Kit

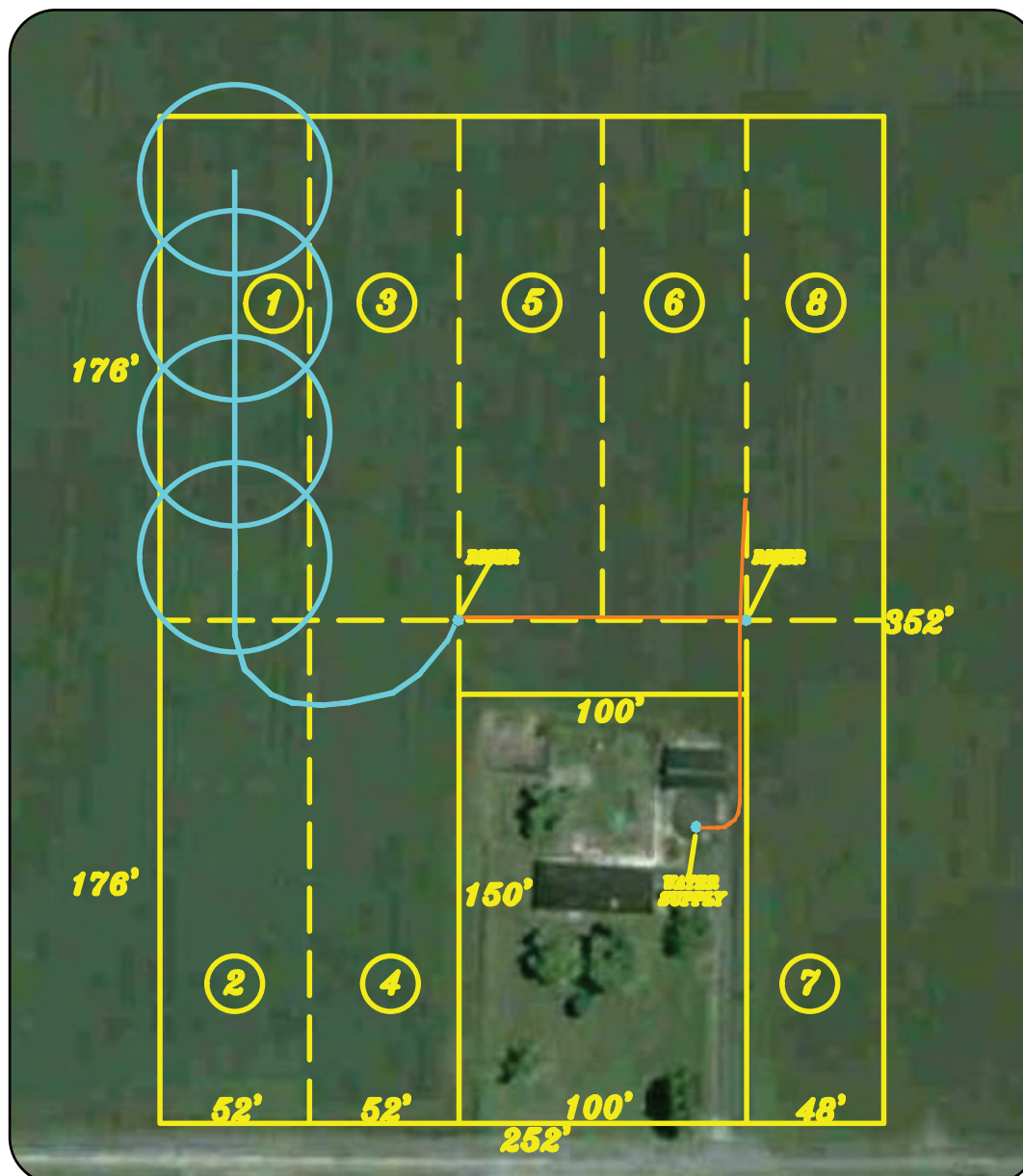


Design Specifications

Size of total area to be irrigated:.....	2.15 Acres
Number of sets or watering days required.....	12 sets in 6 days
Distance between sprinkler pods:.....	45 ft.
Shift widths:.....	46 - 50 ft.
Sprinkler nozzle color and size:.....	Black 5/32"
Operating pressure available:.....	50 psi
Sprinkler application rate in inches per hour:.....	.22 in/hr
Length of watering time per set:.....	12 hours
Total amount of irrigation water applied during each set period:.....	2.73 inches
System capability in inches per week applied:.....	1.59
Number of sprinkler pods per K-line:.....	4
Output per sprinkler:.....	4.90 gal/min
Total gallons per minute of water needed for this area:.....	19.6 gpm

Notes

This layout uses only 4 pods of the kit, but there are two 12 hour shifts per day. By using the larger black 5/32" sprinkler nozzle, this entire area can be covered in 6 days and still apply over 2 1/2" of water per set.



Design Specifications

Sets 1-8

Size of total area to be irrigated:.....	2.04 Acres
Number of sets or watering days required.....	8 days
Distance between sprinkler pods:.....	44 ft.
Shift widths:.....	48 - 52 ft.
Sprinkler nozzle color and size:.....	Red .118"
Operating pressure available:.....	50 psi
Sprinkler application rate in inches per hour:.....	114 in/hr
Length of watering time per set:.....	24 hours
Total amount of irrigation water applied during each set period:.....	2.74 inches
System capability in inches per week applied:.....	2.40
Number of sprinkler pods per K-line:.....	5
Output per sprinkler:.....	2.98 gal/min
Total gallons per minute of water needed for this area:.....	11.9 gpm

Notes

To move the K-Line from Set 5 to Set 6:
Shut off the water, then disconnect the Feed Line from the Pod Line at the Cam Fitting. Next, shift the K-Line from Set 5 first into the Set 7 area and then immediately return to Set 6 with the Pod Line. Move the Feed Line to Riser 2. Reconnect to the Pod Line and restart the water.

To move the K-Line from Shift 1 to Shift 8:
Use a similar procedure as described above by temporarily using the Set 2 area to line up the K-Line Pod Line.

In this layout, either the orange or red nozzle could be used to match the available water.



Design Specifications

Sets 1-10

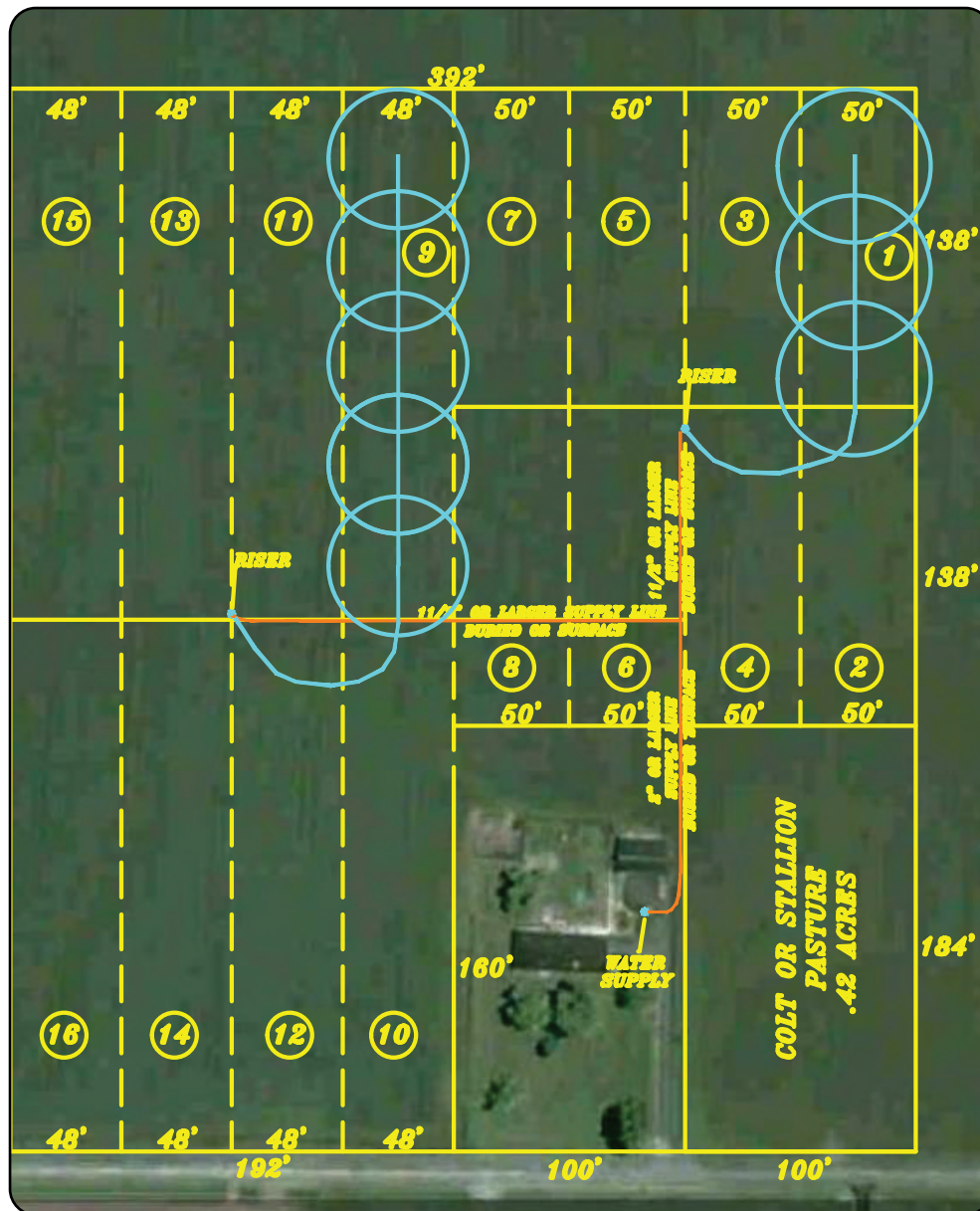
Size of total area to be irrigated:	2.14 Acres
Number of sets or watering days required	10 days
Distance between sprinkler pods:	52 ft.
Shift widths:	50 ft.
Sprinkler nozzle color and size:	Red .118"
Operating pressure available:	50 psi
Sprinkler application rate in inches per hour:	.110 in/hr
Length of watering time per set:	24 hours
Total amount of irrigation water applied during each set period:	2.64 inches
System capability in inches per week applied:	1.84
Number of sprinkler pods per K-line:	4
Output per sprinkler:	2.98 gal/min
Total gallons per minute of water needed for this area:	11.9 gpm

Notes

K-Line works easily around curves or other obstacles. On soil with good water holding capacity, the shift rotations can be increased by using additional riser locations. In the plan, the area irrigated would be completed in 10 day rotations.

This design covers 3.54 total acres, 2.7 acres being irrigated, it will require extra K-Line tubing.

Sample Design: Two K-Line 4 Pod Kits Combined



Both K-Line Sprinkler pod lines are operating at the same time

Design Specifications

Size of total area to be irrigated:.....2.03 Acres
 Number of sets or watering days required.....8 days
 Distance between sprinkler pods:.....46 ft.
 Shift widths:.....48 ft.
 Sprinkler nozzle color and size:.....Red .118"
 Operating pressure available:.....50 psi
 Sprinkler application rate in inches per hour:......125 in/hr
 Length of watering time per set:.....24 hours
 Total amount of irrigation water applied during each set period:.....2.98 inches
 System capability in inches per week applied:.....
 Number of sprinkler pods per K-line:.....5
 Output per sprinkler:.....2.98 gal/min
 Total gallons per minute of water needed for this area:.....14.9 gpm

Sets 9-16

Sets 1-8

Totals

1.27 Acres
 8 days
 46 ft.
 50 ft.
 Red .118"
 50 psi
 .125 in/hr
 24 hours
 2.98 inches
 2.61
 3
 2.98 gal/min
 8.9 gpm

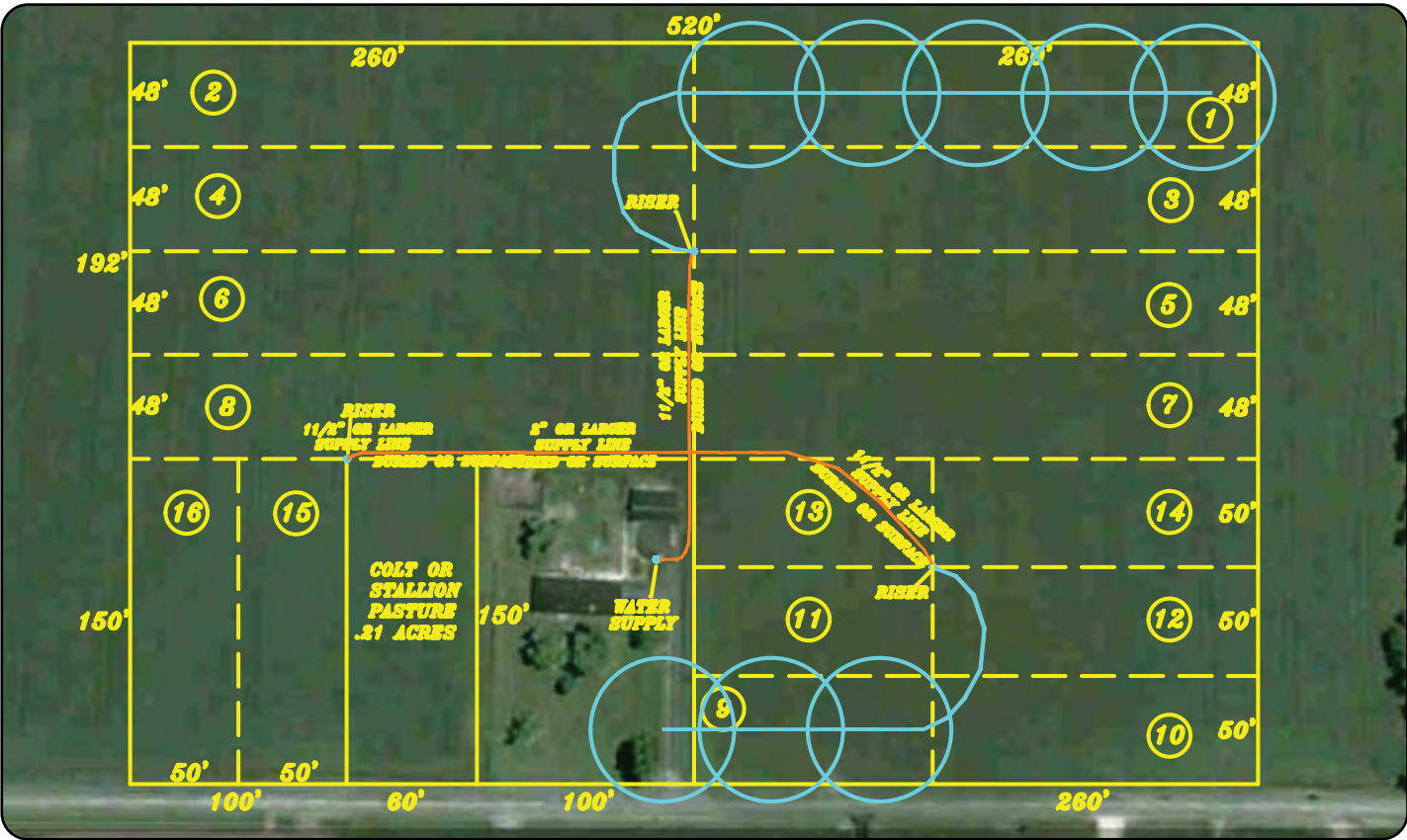
3.3 Acres
 8 days
 Red .118"
 50 psi
 .125 in/hr
 24 hours
 2.98 inches
 8
 23.8 gpm

Notes

Both K-Line sprinkler pod lines are operating at the same time.

By dividing the total parts from 2 K-Line 4 Pod / 1.5 Acre Kits into a 5 sprinkler pod line and a 3 sprinkler pod line and then operating both K-Lines at the same time, a little over 4 acres can be irrigated, applying about 3 inches of water per set. This is designed for an 8 day rotation.

Sample Design: Two K-Line 4 Pod Kits Combined



Both K-Line Sprinkler pod lines are operating at the same time

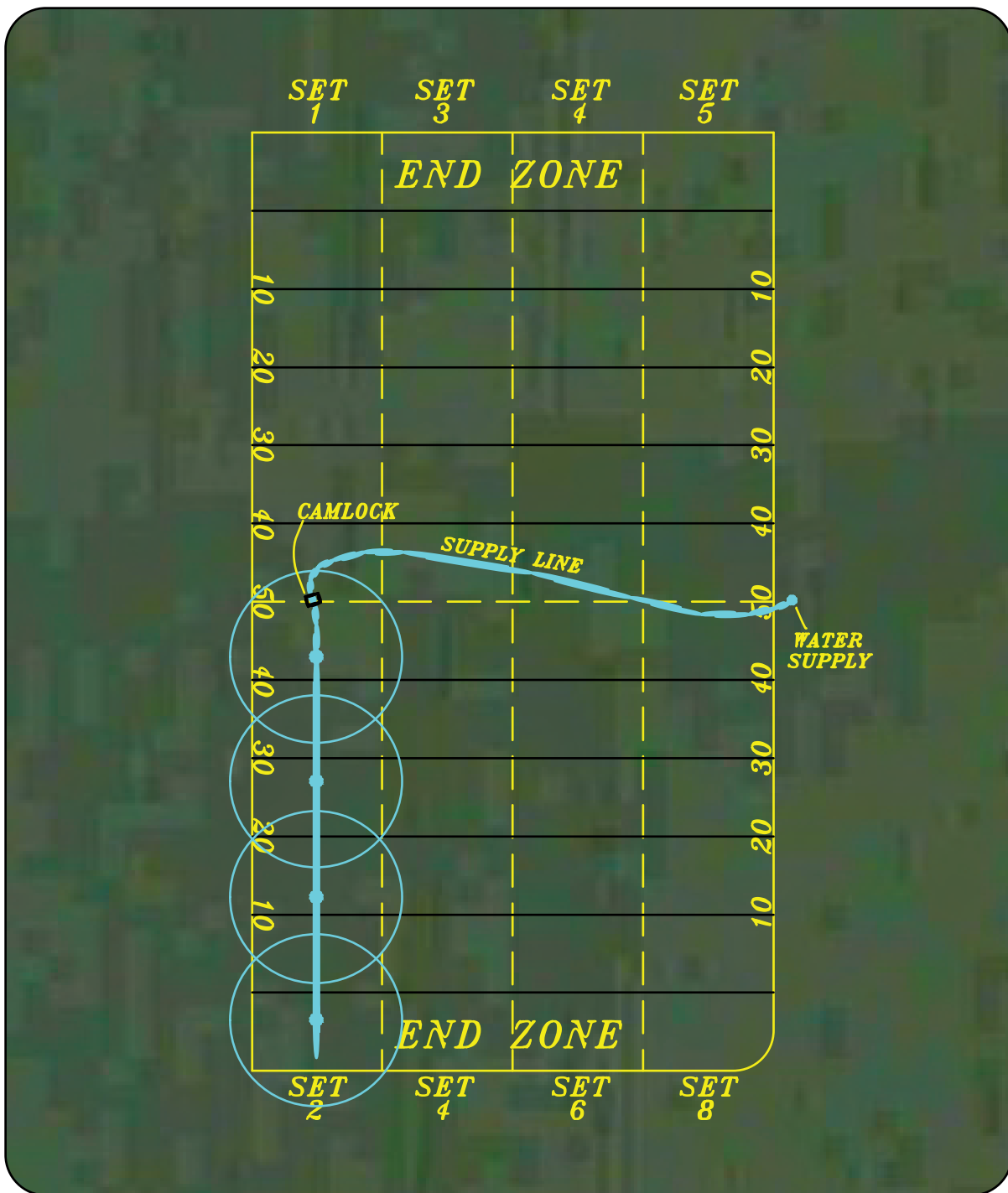
Design Specifications

	Sets 9-16	Sets 1-8	Totals
Size of total area to be irrigated:	1.38 Acres	2.64 Acres	4.02 Acres
Number of sets or watering days required:	8 days	8 days	8 days
Distance between sprinkler pods:	43 ft.	52 ft.	
Shift widths:	50 ft.	48 ft.	
Sprinkler nozzle color and size:	Orange 7/64"	Red .118"	Red /Orange
Operating pressure available:	50 psi	50 psi	50 psi
Sprinkler application rate in inches per hour:	.115 in/hr	.115 in/hr	.115 in/hr
Length of watering time per set:	24 hours	24 hours	24 hours
Total amount of irrigation water applied during each set period:	2.78 inches	2.76 inches	2.7 inches
System capability in inches per week applied:		2.43	
Number of sprinkler pods per K-line:	3	5	8
Output per sprinkler:	2.60 gal/min	2.98 gal/min	
Total gallons per minute of water needed for this area:	7.8 gpm	14.1 gpm	27 gpm

Notes

This layout can be best irrigated with 2 separate K-Line sprinkler pod lines. One line has 5 pods and the other has 3 pods. Because the shift width and pod spacing is different for each K-Line, using a red nozzle in one and an orange nozzle in the other will equalize the water application rate.

Sample Design 7: K-Line Irrigation for your Athletic Field



This design can be used for football or soccer fields and consists of a 4 pod system with 8 sets or shifts.

The pods are spaced at 45' intervals, but spacing can be increased up to approximately 50' to accommodate your field. The Set or Shift widths are 40' wide but can be increased to approximately 50' as required.

When water is applied at 45 psi with a NAAN 5022 sprinkler with a black 5/32" nozzle, the application rate is approximately .25" per hour. In this design, your total water requirement is 18.7 gallons per minute.

Another shifting alternative is that the operator can either move the line every hour through the course of an 8 hour day, or every 2 hours over the course of two days.

Application amounts can be altered using different nozzle sizes and/or by adjusting watering time.