

CITY OF NORTH LAS VEGAS
FIRE DEPARTMENT



HOSE MANUAL

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FIRE HOSE HISTORY

Fire hose is the vital link between the water supply and the nozzle by which a stream of water is played on a fire. Without the proper grade and size of well-maintained fire hose, the dependability and effectiveness of the fire attack would be lost.

For many years firefighters used buckets to deliver water to the fire scene and apply it to the seat of a fire. The weight of the water and need to pass a full bucket from person to person made these operations man power intensive. Although the bucket brigade was used often, it was not very effective or efficient at delivering large amounts of water to the seat of the fire.

In 1673 a Holland Fire Brigade Superintendent and his son fashioned the first “fire hose”. The hose was 50 foot lengths of leather that were sewn together in a tube configuration. This allowed the delivery of water under pressure and with a gooseneck nozzle; water was able to be applied closer to the seat of a fire than ever. The basic design of fire hose was next improved in 1807 by two Philadelphia firefighters, who replaced the thread by rivets. The leather hose was stiff, extremely heavy when wet, leaked badly, difficult to couple and in freezing weather handled about as easily as iron pipe. Nevertheless, it was better than buckets. It has been said that a 100 foot section of fire hose was the same as 60 men with buckets.

Rubber hose evolved in answer to the challenge for an easier, safer, more reliable and efficient means of getting a large volume of water on a fire. The first patent for rubber lined, cotton webbed fire hose was issued in 1821 and by 1871 the entire Cincinnati Fire Department was using the hose produced by the B.F. Goodrich Company. This new type of hose was made by plying alternate layers of heavy, square woven, cotton duck and thin rubber over a rubber tube, with a final layer of rubber covering the fabric. By modern standards, this rubber fabric hose was stiff and unwieldy, but it was greatly appreciated by firefighters who previously had to struggle with leather hose.

In 1878 the American Fire Hose Manufacturing Company of Chelsea MA began advertising the circular woven seamless fabric jacket we know today. This new method eliminated the heavy duck piles and rubber cover. Although this design was not as resistant to abrasion or the elements, it did permit equal or greater strength with marked savings in weight and greatly increased flexibility. This meant that hose could be stored more compactly and in greater quantity both at the station and on fire apparatus.

With advances in the manufacturing process and the development of lighter, stronger materials the modern fire hose of today is certainly far superior to the original leather hose and buckets of our forefathers.



FIRE HOSE CONSTRUCTION



SINGLE JACKET FIRE HOSE

Single jacket constructions consist of a thermoplastic or synthetic rubber liner combined with a closely woven textile single jacket. The jacket may be a combination of cotton and polyester, or 100% synthetic material. This type of hose is generally used for wildland and high-rise firefighting where weight is a primary consideration for selection.



DOUBLE JACKET FIRE HOSE

Double jacket constructions include a second closely woven jacket for extra durability, safety factor, and higher test pressures. The jackets are matched to assure a precision fit to meet precise hydrostatic test requirements. This hose is generally used for fire attack lines.

SYNTHETIC COVERED FIRE HOSE

With today's technology most new types of hose are made using with synthetic materials either integrated in their covers or for the covers themselves. These hoses can be loaded wet if clean, will last longer, are stronger and are easy to clean. This should not deter one from using proper cleaning and storage techniques for fire hose.

3-PLY SYNTHETIC HOSE

This 3-ply synthetic hose has an inner layer made of polyurethane, a polyester-reinforced layer in the center, and a light weight ribbed synthetic fiber with vulcanized rubber coating or other synthetic material for the outer layer. This hose is used on our department as 5" supply line with locking storz couplings.



BOOSTER FIRE HOSE

Booster hose is a high pressure, typically up to 800 PSI working pressure, with a vertical braid construction overlaid with a premium ozone resistant cover. It is used on our department as 1" booster line, connected to an electric hose reel. It is very resistive to abrasion and all types of fluids and chemicals. This hose should always be wiped down after each use.

HOSE LOADS



- BOOSTER REEL
- BUMPER LINE
- PRE-CONNECTED LINES
- HOSE TRAYS
- HIGH-RISE HOSE BUNDLE
- 2 1/2" SPLIT HOSE BEDS
- 5" SUPPLY HOSE

BOOSTER REEL

This is a rubber-lined rubber-covered braided hose. It is 1" in diameter and is stored on a reel in the mid-ship of the engines. The reel is operated by an electric motor. In the event of an electrical failure, the reel can be operated with a hand crank. The booster line is used for small fire operations (i.e., overhaul, dumpster fires, trash fires, brush fires). The only cleaning necessary for this hose is to wipe it down with a wet cloth as its being rewound.



HOSE LOADS

BUMPER “QUICK ATTACK” LINE

This line is 100 feet of pre-connected 1¾” hose which is loaded in the compartment located in the front bumper of the apparatus. This line is loaded in the following manner.

- 1) Begin by flat loading three flakes of hose in the bottom of the compartment so it is covered by hose.



- 2) Next form two small hand loops on opposite sides (front and back) of the compartment to facilitate the removal of the hose bundle during the hose pull. The loops must extend above the top of the compartment approximately 18” and are kept clear of the loading operation until the final step.



- 3) Hose is then flat loaded, back and forth until the first coupling is reached. Place the coupling on the bumper to the right side, just outside of the compartment.



- 4) Continue loading until the nozzle is reached. Lay nozzle and previous coupling flat into compartment.



H O S E L O A D S

- 5) Cross the hand loops over them and secure the lid.



When finished you should be able to remove the entire load by pulling up on both loops and setting the entire load on the ground directly in front of the engine.

HOSE LOADS

PRE-CONNECTED LINES

Pre-connected lines consist of the following:

- 150 feet of 1 ¾" hose loaded in the forward hose bed of the cross lay section of the apparatus -or- in the bottom hose tray with an adjustable fog nozzle attached.
- 200 feet of 1 ¾" hose loaded in the middle or rear hose bed of the cross lay section of the apparatus -or- in the top hose tray with an adjustable fog nozzle attached.
- 300 feet of 1 ¾" hose loaded in the rear hose bed of the apparatus to either side of the supply and split hose beds with an adjustable fog nozzle attached.

Some apparatus are also equipped with 200 feet of pre-connected 2 ½" hose which is loaded in the rear hose bed of the crosslay section of the apparatus with an adjustable fog nozzle attached.

All pre-connected hose lines are flat loaded with two loops at each access point for quick removal by a right-handed pull. They are loaded in the following manner.

- 1) Begin by flat loading the hose alternating sides of the bed to keep the hose stacks level until the first set of couplings are reached.



- 2) While facing the apparatus, form a loop to the extreme left side of the hose bed by allowing approximately 18" to 24" of hose to hang below the bottom of the bed. This is done on both sides of the apparatus if loading a cross lay.



HOSE LOADS

- 3) Continue flat loading the hose until the last set of couplings are reached. Form a matching loop to the extreme right side of the hose bed. This is done on both sides of the apparatus if loading a cross lay.



- 4) Finish by continuing the flat load until the nozzle is reached. Place the nozzle half way between each side of the apparatus if applicable.



- 5) Finally, tuck the loops into the hose load for a clean finish.



HOSE LOADS

SPEED TRAYS

Speed trays are located mid-ship behind the cab of vehicle. They are loaded in the same manner as the pre-connected lines with the following exceptions.

- 1) From the start position, pull out the speed tray on the side of the male connection by releasing the safety lock.



- 2) Next, drop the female hose coupling approximately **8 inches** below the tray or over the side and flat load the hose placing the folds to outer edge of tray.



- 3) Load hose in the same manner as listed in the pre-connect section.

- 4) When all hose is loaded, nozzle is attached and stowed, close the speed tray and connect the female coupling to the male connection located above the speed tray.



HOSE LOADS

HIGH-RISE BUNDLE

The high-rise bundle consists of 100' of 1 ¾" light weight hose, one 2 ½ inch gated wye and one 75 psi, 125 gpm nozzle. It is packaged in the following manner.

- 1) Using the accordion hose load, begin with the female coupling laying approximately 18" beyond the end folds creating an approximately 3' wide bundle of hose.



- 2) Once you have completed the first section of hose (50'), attach the second section of hose and bring the couplings to the side opposite of the gated wye. This creates a "cradle" for the first layer of hose.



- 3) Transition to a second tier of hose and continue to use the accordion method in the same direction as the first tier.



- 4) Once you have completed the second section, secure the hose pack with the hose strap system supplied.



- 5) Securely fasten the nozzle, gated wye and spanner wrenches on/in the pack with the remaining straps. At this point the pack can be carried by a fire fighter to the appropriate location for deployment.



HOSE LOADS

SPLIT HOSE BEDS

There are two, side-by-side, rear beds of 2 ½" hose. Each is 400 to 700 feet in length with an adjustable fog nozzle attached. They are intended to be used as either a 2 ½" attack line or as forward/reverse supply lines. Their deployment for these instances will be described later. They are loaded in the following manner.

- 1) Begin by flat loading the hose, alternating long and short folds and utilizing "Dutchmen", to create a level load until the last two or three lengths, depending on bed width, are reached.



- 2) Facing the apparatus, place the first coupling towards the front of the apparatus (rear of the hose bed) and along the extreme-left side.



- 3) Next form a loop that extends off the rear of the engine approximately 18" to 24".



- 4) Then, load the remainder of the first length of hose directly over the loop creating a stack until the next set of couplings is reached.



H O S E L O A D S

- 5) Place the next set of couplings to the rear of the hose bed and along the side of the first length of hose.



- 6) Continue to load hose in this manner until all hose is loaded.



- 7) Finally attach the nozzle to the end and place it in the hose bed so that it is easily reached from the tailboard. When finished there should be two or three loops in a line.



H O S E L O A D S

SUPPLY HOSE

This is not a pre-connected hose. It is 500 to 1000 feet of 5" Large Diameter Hose (LDH). Each section is 100 feet in length with locking storz couplings. It is used as a supply line or to deliver water to a portable master stream base. It can be used for supplying directly to a pumper or as part of a relay operation from one pumper to another. It is loaded in the following manner.

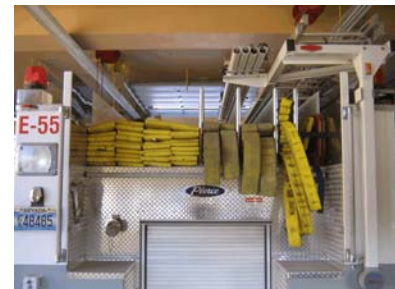
- 1) Begin by either placing the first coupling in the front of the hose bed or connecting to an existing coupling ensuring both locks are engaged.



- 2) Load hose using the flat hose load method, alternating long and short folds and using "Dutchmen" folds to create a level hose load.



- 3) Once the last section is reached, attach the hydrant adapter and place a hydrant wrench in the folds of the load for convenience when making hydrant connections.



In addition, there are also two short sections of 5" hose on the apparatus in the form of 25' or 50' sections for short hydrant connections or extensions. These are stored in different locations on each apparatus depending on the available space and configuration.

H O S E L O A D S

H O S E P U L L S



- **BOOSTER REEL**
- **BUMPER LINE**
- **PRE-CONNECTED LINES**
- **HIGH-RISE HOSE BUNDLE**
- **2 1/2" SPLIT HOSE BEDS**
 - **APPARATUS**
 - **ADVANCE**
 - **SINGLE REVERSE**
 - **DOUBLE REVERSE**
 - **FORWARD HYDRANT SUPPLY**
 - **REVERSE HYDRANT SUPPLY**
 - **FDC/STANDPIPE CONNECTION**
- **5" SUPPLY HOSE**
 - **FORWARD SUPPLY**
 - **REVERSE SUPPLY**
- **GROUND MONITOR – MASTER STREAM**

BOOSTER LINE

The “Booster Line” is utilized in situations that do not require large amounts of water flow. It is deployed in the following manner.

- 1) Stand facing the apparatus and remove nozzle from holder.



- 2) With nozzle in right hand, turn clock-wise (towards the right) allowing the hose to drape over the left shoulder.



- 3) Grasp nozzle with left hand and the hose with the right hand ensuring the hose is on top of and between the roller guides.



- 4) Proceed forward to desired location and signal (visual, audible) the engineer to charge the line.



H O S E P U L L S

BUMPER LINE

The “Bumper Line” is used in situations where distance from the apparatus is minimal but required flow rates are best met by a 1 ¾” hose line. It is deployed in the following manner.

- 1) Face the apparatus and open the compartment.



- 2) Grasps both loops firmly and remove the hose bundle placing it on the ground.



- 3) Position the hose line over the left shoulder with the nozzle in the left hand.



H O S E P U L L S

- 4) Grasp the set of connected couplings in the right hand and advance the hose line to desired location until it becomes taught.



- 5) At this point, stop and signal (visual, audible) the engineer to charge the line. This is your 50' of working line.



HOSE PULLS

PRE-CONNECTED LINES

All pre-connected lines will be deployed with a **Right Hand Hose Pull** in the following manner:

- 1) Face the apparatus near the appropriate hose line and remove the nozzle from the hose bed.



- 2) With nozzle in right hand, turn clockwise (towards the right) allowing the hose to drape over the left shoulder.



- 3) Grasp nozzle with left hand. Place right arm through the loops being sure to grasp the farthest loop with your right hand.



H O S E P U L L S

- 4) Proceed forward towards desired location until all hose is out of hose bed and line is taught.



- 5) Drop the loop from right hand and continue forward to desired location, retaining second loop, until line is taught.



- 6) At this point, stop and signal (visual, audible) the engineer to charge the line. This is your 50' of working line.



HOSE PULLS

HIGH-RISE HOSE BUNDLE

The “High-Rise Pack” is used in situations where having a 1 ¾” hose line connected to the apparatus is not practical due to the distance between the desired location and the apparatus. It is deployed in the following manner.

- 1) Remove the bundle from the apparatus compartment and proceed to the desired location.



- 2) Position bundle on ground and remove hose strap system.



- 3) Attach gated wye -or- end of hose to standpipe or other discharge point. (Ex. Break away tip, reducer, another gated wye, etc.)



H O S E P U L L S

- 4) Position the hose line shoulder with the nozzle in one hand and set of couplings in other.



- 5) Advance the hose line to desired location utilizing appropriate method. (I.E. stairs, hallway, open area)



- 5) At this point, stop and signal (visual, audible) the engineer to charge the line. This is your 50' of working line.



HOSE PULLS

SPLIT HOSE BEDS

The “Split Hose Beds” serve many purposes ranging from initial attack to defensive operations, supply and everything in between. The following text describes the five most common applications of the 2 ½” hose that is loaded in the split beds.

APPARATUS LINE

The “Apparatus Line” is used when large volumes of water are needed and the firefighter must connect the hose line to the apparatus discharge to assist the engineer. It is deployed in the following manner.

- 1) Face the apparatus and access the split hose bed in preparation for a **Right Hand Hose Pull**.



- 2) With nozzle in right hand, turn clockwise (towards the right) allowing the hose to drape over the left shoulder.



- 3) Grasp nozzle with left hand. Place right arm through the loops being sure to grasp the appropriate loop for the desired length with your right hand.



RIGHT HAND HOSE PULLS

- 4) Proceed forward away from apparatus at an angle towards desired location (fire side) until the first sections of hose clear the tailboard.



- 5) Set hose on ground ensuring loops are kept neat and in order.



- 6) Uncouple the hose at the desired length, being sure to neatly remove any additional hose that is needed, and connect to desired discharge.



- 7) Inform Engineer of the following:
 - a. Discharge Number
 - b. Length and size of hose pulled
 - c. Type of nozzle being used



HOSE PULLS

- 8) Return to loops and nozzle and resume Right Hand Hose Pull to desired location maintaining a minimum of ONE loop of hose for 50' of working line.



- 9) At this point, stop and signal (visual, audible) the engineer to charge the line.



*** If a keenan loop is indicated, 50' of hose in addition to the line needed for a loop is needed for working line.***

H O S E P U L L S

ADVANCE LINE

The “Advance Line” is used when large volumes of water are needed and the firefighter must advance the hose line. Examples include a long distance between the desired location and the apparatus, urgency or when the engineer is available to make the connection. It is deployed in the following manner.

- 1) Face the apparatus and access the split hose bed in preparation for a **Right Hand Hose Pull**.



- 2) With nozzle in right hand, turn clockwise (towards the right) allowing the hose to drape over the left shoulder.



- 3) Grasp nozzle with left hand. Place right arm through the loops being sure to grasp the appropriate loop for the desired length with your right hand.



H O S E P U L L S

- 4) Proceed forward away from apparatus at an angle towards desired location until the appropriate length of additional hose clears the tailboard.



- 5) At this point, begin allowing loops to fall to the ground with continuing to advance to the desired location. Maintain a minimum of ONE loop of hose for 50' of working line.



- 6) At this point, stop and signal (visual, audible) the engineer to charge the line.



*** If a keenan loop is indicated, 50' of hose in addition to the line needed for a loop is needed for working line.***

HOSE PULLS

SINGLE REVERSE

The “Single Reverse” is used when either large volumes of water or multiple smaller lines are needed in a location where it is not possible to place the apparatus for the duration of the incident. Examples include storage facilities with narrow access, collapse zones, the need to boost water pressure at the hydrant. It is deployed in the same manner as an “**Apparatus Line**” with the following exceptions.

- 1) Proceed with steps 1-5 of the “**Apparatus Line**” as described.
- 2) Gather any additional equipment that may be needed at desired location keeping in mind that the apparatus could be several hundred feet away once the line is charged.
- 3) Return to the hose coming from the hose bed and grasp it firmly approximately 10 feet behind apparatus.
- 4) Make visual contact with Engineer in driver’s side mirror and signal the apparatus to proceed forward.



****DO NOT stand on hose line while anchoring it.
Serious injury or death may result. ****

- 5) When tension is relieved, return to loops and nozzle and resume Right Hand Hose Pull to desired location maintaining a minimum of ONE loop of hose for 50’ of working line.
- 6) At this point, stop and signal (visual, audible) the engineer to charge the line.



H O S E P U L L S

DOUBLE REVERSE

The “Double Reverse” is used when multiple 2 ½” lines are needed in a location where it is not possible to place the apparatus for the duration of the incident. Examples include storage facilities with narrow access, collapse zones, the need to boost water pressure at the hydrant. It is deployed in the same manner as a “**Single Reverse**” with the following exceptions.

- 1) Proceed with steps 1-2 of the “**Single Reverse**” as described.
- 2) Pull a second 2 ½” hose line, beyond the length of the first, using a Right Hand Hose Pull in a straight line from the rear of the apparatus and neatly place it on the ground.
- 3) Gather any additional equipment that may be needed at desired location keeping in mind that the apparatus could be several hundred feet away once the line is charged.
- 4) Return to the hoses coming from the hose bed and grasp both of them firmly approximately 10 feet behind apparatus.
- 5) Make visual contact with Engineer in driver’s side mirror and signal the apparatus to proceed forward.



****DO NOT stand on hose line while anchoring it.
Serious injury or death may result. ****

H O S E P U L L S

- 6) When tension is relived, return to loops and nozzle and resume Right Hand Hose Pull of the first line (fire side) to desired location maintaining a minimum of ONE loop of hose for 50' of working line.



- 7) At this point, stop and signal (visual, audible) the engineer to charge the line.



****The second line is left for another crew and/or assignment.**

H O S E P U L L S

2 1/2" FORWARD HYDRANT SUPPLY

The "2 1/2" Supply" is used when the large diameter opening of a hydrant is unavailable or unserviceable. It is deployed in the same manner as the "Double Reverse" with the following exceptions.

- 1) Proceed with steps 1-2 of the "Double Reverse" as described.
- 2) Remove both nozzles, placing them in the Engineer's compartment and retrieve two double **female** adapters and one hydrant wrench.
- 3) Anchor the hose in the same manner as the Double Reverse and signal the Engineer to proceed forward.
- 4) Once enough hose has been laid out of the hose bed to relieve tension, proceed to the hydrant and make the appropriate connections.
- 5) Advise the Engineer (visual, verbally) when hose lines are ready to be charged.
- 6) Charge hose lines slowly when advised to do so, return to apparatus with hydrant wrench and report to Captain for further assignments.



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PULLS

2 1/2" REVERSE HYDRANT SUPPLY

The "2 1/2" Supply" is used when the large diameter opening of a hydrant is unavailable or unserviceable. It is deployed in the same manner as the "Double Reverse" with the following exceptions.

- 1) Proceed with steps 1-2 of the "Double Reverse" as described.
- 2) Remove both nozzles, placing them in the Engineer's compartment and retrieve one hydrant wrench and two spanner wrenches.
- 3) Anchor the hose in the same manner as the Double Reverse and signal the Engineer to proceed forward.
- 4) Once enough hose has been laid out of the hose bed to relieve tension, proceed to the receiving apparatus and make the appropriate connections.
- 5) Advise the Engineer (visual, verbally) when hose lines are ready to be charged.



HOSE PULLS

FDC/STANDPIPE CONNECTION

The “FDC/Standpipe Connection” is used when supporting an installed sprinkler and/or standpipe system through the introduction of additional water flow and pressure. It is deployed in the same manner as the “**Double Reverse**” with the following exceptions.

- 6) Proceed with steps 1-2 of the “**Double Reverse**” as described.
- 7) Remove both nozzles, placing them in the Engineer’s compartment and retrieve the following;
 - a. Two 2 ½” spanner wrenches
 - b. One hydrant wrench
 - c. One hose clamp
- 8) Anchor the hose in the same manner as the Double Reverse and signal the Engineer to proceed forward.
- 9) Once enough hose has been laid out of the hose bed to relieve tension, apply the hose clamp on the incoming side of the first set of couplings, no farther than 5 feet away
- 10) Proceed to the FDC/Standpipe, ensure there is no debris inside of the fitting, and make the appropriate connections.
- 11) Advise the Engineer (visual, verbally) when hose lines are ready to be charged.

****Remove the hose clamp with caution. Lines may be under pressure or in progress of being charged. ****



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H05E PULLS

5" SUPPLY HOSE

5" Supply Hose is used when large volumes of water are needed to supply a pumping operation. Since the hose is equipped with locking storz couplings, it can be laid in both forward and reverse applications without using adapters making it the first choice for a water supply hose line. It is deployed in the following manner.

FORWARD SUPPLY

- 1) Face the apparatus and access the 5" supply hose bed placing the first coupling with hydrant adapter over left shoulder in same manner as a Right Hand Hose Pull.



- 2) Grasp hydrant wrench with right hand and proceed forward away from apparatus at an angle towards the hydrant until the appropriate length of additional hose clears the tailboard.



- 3) Wrap the hose around the base of the hydrant, starting on side away from direction of apparatus, until it overlaps on itself.



H O S E P U L L S

- 4) Stand on cross created by hose with one foot placing the other foot behind at an angle for balance and signal engineer to proceed forward.



****Be sure the hose is wrapped snugly around hydrant base and you are not between the hydrant and the hose. ****

- 5) Once the tension is relieved, unwrap the hose from the hydrant and open the large diameter cap.



- 6) Ensure 2 1/2" caps are tight, and flush debris from hydrant.



- 7) Connect hose to hydrant and advise the Engineer (visual, verbally) when hose line is ready to be charged.



HOSE PULLS

- 8) Once the signal is received, open hydrant slowly until it is completely open and line is charged.



- 9) Return to the apparatus with hydrant wrench and report to Captain for further assignments.



HOSE PULLS

REVERSE SUPPLY

- 1) Face the apparatus and access the 5" supply hose bed removing the hydrant adapter and placing it in the engineer's compartment.



- 2) Place the first coupling over left shoulder in same manner as a Right Hand Hose Pull and remove enough hose to reach the intake of the apparatus receiving the supply.



- 3) Anchor the hose in the same manner as the Double Reverse and signal the Engineer to proceed forward.
- 4) Once enough hose has been laid out of the hose bed to relieve tension, proceed to the receiving apparatus and make the appropriate connections.



- 5) Advise the Engineer (visual, verbally) when hose lines are ready to be charged.



H O S E P U L L S

GROUND MONITOR – MASTER STREAM

A ground monitor is used when flow from a master stream device is needed and the location is either inaccessible to apparatus, not safe for apparatus or at a great distance from the apparatus. It is deployed in the following manner.

- 1) Face the apparatus and access the 5” supply hose bed removing the hydrant adapter and placing it in the engineer’s compartment.



- 2) Remove the Master Stream device from the mid-ship area of the apparatus and the Base Assembly from the compartment.



- 3) Place the first coupling over left shoulder in same manner as a Right Hand Hose Pull and remove enough hose to reach the desired location for master stream placement.

****An additional 50 to 75 feet is needed in order to properly anchor the device. ****



- 4) Anchor the hose in the same manner as the Double Reverse and signal the Engineer to proceed forward.

OR

Manually advance hose line to the designated area.



HOSE PULLS

- 5) Once enough hose has been laid out of the hose bed to relieve tension, proceed to the desired location for master stream placement.



- 6) Attach hose to the base and the base to the master stream device.



- 7) Create a loop in the hose that surrounds the master stream device and secure it to the base as appropriate for the specific base.



- 8) Advise the Engineer (visual, verbally) when hose lines are ready to be charged.



H O S E P U L L S