

**FLORIDA DEPARTMENT OF TRANSPORTATION**



# **SURVEY SAFETY HANDBOOK**

**January 28, 2026**

## Table of Contents

<b>INTRODUCTION .....</b>	<b>4</b>
<b>AUTHORITY.....</b>	<b>4</b>
<b>TRAINING.....</b>	<b>4</b>
<b>FORMS/TEMPLATES.....</b>	<b>4</b>
<b>CHAPTER 1      TEMPORARY TRAFFIC CONTROL (TTC) .....</b>	<b>5</b>
WEARING OF PERSONAL PROTECTIVE EQUIPMENT .....	5
USE OF TRAFFIC CONTROL DEVICES .....	6
Warning Signs.....	6
Channelizing Devices.....	7
Advanced Warning Arrow Boards.....	7
Portable Changeable Message Signs (PCMS) .....	8
Truck/Trailer-Mounted Attenuators (TMA) .....	8
FLAGGING OPERATIONS .....	8
SURVEYING SAFETY PROCEDURES IN TRAFFIC.....	8
SAFETY INSPECTIONS .....	9
VEHICLE WARNING LIGHTS .....	9
SAFETY RULES WHILE WORKING IN TRAFFIC .....	10
<b>CHAPTER 2      PROPER USE OF EACH TOOL .....</b>	<b>11</b>
MACHETES .....	11
AXES AND BRUSH HOOKS .....	11
DIGGING TOOLS, HAND .....	12
DRIVING TOOLS, HAND .....	12
CHAIN SAWS.....	13
PRESSURIZED SPRAY CANS .....	14
UNMANNED AIRCRAFT SYSTEM (UAS) OPERATIONS .....	14
<b>CHAPTER 3      WORKING NEAR RAILROADS .....</b>	<b>15</b>
<b>CHAPTER 4      FENCE CROSSINGS .....</b>	<b>16</b>
<b>CHAPTER 5      ANIMAL HAZARDS .....</b>	<b>17</b>
<b>CHAPTER 6      SNAKEBITES .....</b>	<b>18</b>
<b>CHAPTER 7      POISONOUS PLANTS.....</b>	<b>20</b>
<b>CHAPTER 8      POWER LINES.....</b>	<b>21</b>
ELECTRICAL STORMS.....	21
<b>CHAPTER 9      CONFINED SPACE ENTRY.....</b>	<b>22</b>
DEFINITIONS .....	22
GENERAL REQUIREMENTS.....	22
Confined Space Identification/Classification.....	22
Periodic Evaluation of Hazards.....	23
Marking of Confined Spaces.....	23
Entry into Confined Spaces .....	23

Consultants .....	24
Use of Safety belts, Safety Harness and Lifelines.....	24
MANHOLE COVERS AND GRATES.....	24
Equipment.....	24
Freeing .....	25
Unseating .....	25
Removing .....	25
Replacing A Round Cover or Grate.....	25
Rectangular Covers and Grates .....	26
<b>CHAPTER 10      WORKING IN WATER .....</b>	<b>27</b>
BOATING OPERATIONS.....	27
WADING .....	27
Wading in moving water .....	28
Wading along shorelines, trenches and fills.....	28
<b>CHAPTER 11      PROPER LIFTING PROCEDURES.....</b>	<b>29</b>
LIFTING SMALL LOADS .....	29
LIFTING LARGE LOADS.....	29
<b>CONCLUSION .....</b>	<b>30</b>
<b>APPENDIX A – SAFETY PROCEDURES AND RULES WHILE WORKING IN TRAFFIC.....</b>	<b>31</b>
1. <b>OFFSETTING OLD BASELINES.....</b>	<b>31</b>
2. <b>TYING SECTION CORNERS BETWEEN ACTIVE TRAFFIC LANES .....</b>	<b>31</b>
3. <b>BENCH RUNS.....</b>	<b>32</b>
4. <b>FINDING UTILITIES .....</b>	<b>32</b>
5. <b>OBTAINING ELEVATIONS BETWEEN ACTIVE TRAFFIC LANES .....</b>	<b>32</b>
6. <b>OBTAINING ELEVATIONS ON HIGH-SPEED HIGHWAYS.....</b>	<b>33</b>
7. <b>REPLACING OLD BASELINES .....</b>	<b>33</b>
8. <b>AUXILIARY LANE AND LANE CLOSURES .....</b>	<b>33</b>
9. <b>WORKING IN INTERSECTIONS .....</b>	<b>34</b>
<b>HORIZONTAL CONTROL DIAGRAM 1 .....</b>	<b>35</b>
<b>HORIZONTAL CONTROL DIAGRAM 2 .....</b>	<b>36</b>
<b>HORIZONTAL CONTROL DIAGRAM 3 .....</b>	<b>37</b>
<b>ELEVATION SURVEY DIAGRAM 4.....</b>	<b>38</b>
<b>ELEVATION SURVEY DIAGRAM 5.....</b>	<b>39</b>
<b>ELEVATION SURVEY DIAGRAM 6.....</b>	<b>40</b>
<b>ELEVATION SURVEY DIAGRAM 7 .....</b>	<b>41</b>
<b>APPENDIX B – SAFETY INDOCTRINATION .....</b>	<b>42</b>
<b>EXHIBIT “A” .....</b>	<b>43</b>

## INTRODUCTION

The purpose of this handbook is to provide information regarding acceptable safety and health standards in the performance of assigned, contracted, and permitted operations within areas under the jurisdiction of the Florida Department of Transportation. Survey personnel should have a fundamental understanding of basic safety requirements. They should be competent to recognize possible serious problems that should be corrected to protect their employees as well as the public.

Accidents do not happen without cause. The identification, isolation, and control of these causes are underlying principles of all accident prevention techniques. Even accidents caused by natural elements can be controlled to some extent. Accidents caused by phenomena such as lightning, storms, earthquakes, or floods are extremely difficult to prevent. However, even the effects of these can be minimized by taking preventive measures when forewarned. Accidents resulting from extreme forces of nature (natural phenomena) are estimated to be only two percent of all accidents.

Education and training - Just as safety engineering is the most effective way to prevent environmental accident causes (unsafe conditions), safety education is the most effective tool in the prevention of unsafe acts by humans. Through adequate instruction, personnel gain useful knowledge and develop safe attitudes. Safety consciousness developed through education will be supplemented and broadened by specific additional instruction in safe working habits, practices, and skills. Training is a particularly important accident prevention control, by developing habits of safe practice and operation.

Material for this handbook was researched and edited by the Florida Department of Transportation Professional Surveyors and Mappers, in cooperation with the Surveying & Mapping Office and the Department's Safety Office.

## AUTHORITY

Sections 20.23(3)(a), F.S. and 334.048(3), F.S.

## TRAINING

See [\*Temporary Traffic Control Training Handbook, Topic No. 625-010-010\*](#) for information on Maintenance of Traffic training and certification.

## FORMS/TEMPLATES

See [\*\*Exhibit "A"\*\*](#) for Safety Indoctrination check list.

For additional forms, checklist, documents, and useful links, see [\*FDOT Surveying and Mapping Documents and Publications\*](#)

## CHAPTER 1 TEMPORARY TRAFFIC CONTROL (TTC)

This handbook is a brief overview of the safety regulations with which you must become familiar. Please also read the [Manual on Uniform Traffic Control Devices \(MUTCD\)](#), [FDOT Standard Plans, Series 102-600 \(herein referred to as "Standard Plans"\)](#), and other Safety Standards which may be adopted by the Department. This Chapter of the Survey Safety Handbook was taken largely from Part VI, Standards for Work Zone Traffic Control of the Manual on Uniform Traffic Control Devices (MUTCD) Federal Standards.

*Work duration, work location, highway type and posted speed limit are major factors in selecting the proper typical application of traffic control through work zones (Standard Plans) including the number and types of devices used in temporary traffic control zones.*

### Certification

Department Policy (see FDOT TTC Handbook), as well as Federal Policy (23 CFR 630, Subpart J) requires that all personnel responsible for the set up, maintenance and removal of Traffic Control devices on the state highway system be certified in an approved Temporary Traffic Control course.

### Wearing of Personal Protective Equipment

The rule, as stated in the [Loss Prevention Manual](#), requires all personnel to wear the appropriate personal protective equipment during all operations where exposure to hazardous conditions exists.

Frequently, surveyors operate tools which, if not used correctly, could cause harm. Where there is a possibility that an eye injury could occur during the performance of assigned duties, the Department is required to supply its employees suitable face shields or goggles. However, the Department is not required to provide individuals with prescription safety glasses.

Steel-toe safety boots are not required and are not furnished by the Department. High-top leather work boots provide the most protection and should be worn.

All personnel working or visiting locations designated by the resident engineer as "Hard Hat Areas" shall wear approved protective helmets. Helmets shall meet or exceed specifications contained in the [Loss Prevention Manual](#). These helmets will be inspected on a regular basis and shall be replaced immediately if found to be defective. Helmets shall be worn while working underneath overpasses and at any other time the party chief deems it necessary.

All Department employees working on DOT Right of Way, regardless of the distance from the roadway, and on any other non-DOT Right of Way where there is exposure to traffic are required to wear approved high visibility apparel. Surveyors are also required to wear the High Visibility Safety Apparel at any time they are exposed to traffic such as driveways, parking lots, construction sites, etc., and at any other time deemed necessary.

by the supervisor on site (See the [Standard Plans](#)). A minimum of an ANSI/ISEA Class 2 high visibility safety apparel is required during the daytime and at night an ANSI/ISEA Class 3 high visibility safety apparel. Raincoats or rain suits must be a class 2 or 3 high visibility apparel with reflective stripes on the sleeves, the front and the back of the rainwear or the Surveyor must wear at least Class 2 Apparel over the orange or yellow rainwear during the day and Class 3 Apparel over the rainwear at night.

## **Use of Traffic Control Devices**

The two most commonly use devices are warning signs and channelizing devices.

### **Warning Signs**

Required warning signs must be installed prior to the start of all work in the Right of Way.

Since surveyors are constantly moving on the highway, it is important that warning signs be moved as the work progresses. When the devices are no longer needed or are not applicable, these devices must be removed or fully covered. This includes break time, lunch periods or termination of the workday. This simple procedure will prevent a host of potential problems for surveyors as well as motorists. Whenever the activities are changed such that a particular sign or other warning device is no longer appropriate, the sign or device shall be removed, or fully covered, and replaced, if necessary, with the appropriate device.

Three signs most frequently used SURVEY CREW AHEAD, STAY IN YOUR LANE, and WORKERS AHEAD. Additional sign warning of SHOULDER CLOSED and lane closure MUST also be used if any though lanes or auxiliary lanes are closed. Refer to the [Standard Plans](#) for signage size and installation/ placement

The SURVEY CREW symbol or legend shall be the principle advance warning sign used for traffic control through survey work zones and may replace the ROADWORK AHEAD sign at the discretion of the party chief. When survey crew members are working between active traffic lanes, a STAY IN YOUR LANE sign shall be added as the second immediate sign from the work area.

Advance Warning Signs shall be used at extended distance when limited sight distance or the nature of the obstruction may require a motorist to bring the vehicle to a stop. Extended distance Advance Warning Signs may be required on any type of roadway, but particularly on multi-lane divided highways where vehicle speed is generally in the higher range (45 M.P.H. or more). Signs shall have a black legend and border with a high visibility orange background (reflectorized for night operations). Color, sizes, wording and placement of signs shall conform with approved standards as specified in the [Standard Plans](#), and other Safety Standards which may be adopted by the Department.

The placement of warning signs is critical to the effectiveness of their individual messages and shall therefore be customized to meet roadway design and alignment. All signs

should be mounted at right angles to the direction of and facing the traffic they are to serve. Proper positioning will give the driver adequate time to adjust to rapidly changing traffic conditions.

Actual field conditions may require adjustments to device spacing; it is important to consider that the **Standard Plans** represent minimum requirements. When adjustments are required to harmonize field conditions, minimum standards must always be considered and followed.

### **Channelizing Devices**

There are several approved types of channelization devices available for use: cones, vertical panels, plastic drums, and Type I and Type II barricades. Typically, cones are used by most survey crews but note that there are some limitations for use. See FDOT **Standard Plans** for limitations.

Cones may typically be used for any application including shoulder closures, lane closures, and for traffic diversions. Cones must meet Department requirements and are subject to certain restrictions.

Type I & II barricades should be used whenever appropriate. They are, however, more difficult to carry and store than cones.

Plastic drums may also be used when other types of devices are not available. Drums are less practical than cones for daily use because of their size. Generally, they are used for construction and maintenance operations exceeding one day.

If it is necessary to place an instrument or other tripod within the traveled way or within 15 feet of the traveled way, the tripod will be protected by channelizing devices according to field conditions. See the MUTCD for typical applications.

For Elevation Surveys between active traffic lanes or within two-way left turn lanes, additional devices may be used at the discretion of the party chief to protect prism holder and flagger(s).

These device placements for surveying between active traffic lanes or two-way left turn lanes apply to main roadway traffic control work zones. When the survey work zone includes intersections, devices may be adjusted by the party chief to fit roadway and traffic conditions.

### **Advanced Warning Arrow Boards**

Advance Warning Arrow Boards are intended to supplement other traffic control devices when closing a lane on a multilane, divided or undivided, highway. For stationary lane closures, the arrow board should be placed on the shoulder at the beginning of the taper or where there are narrow shoulders in the closed lane. The board shall be located behind any channelizing devices used to transition traffic from the closed lane. The Advanced

Warning Arrow Board may be used on two-lane, two-way roadways or on the shoulder of any road in caution mode only. Advance Warning Arrow Board placement and specifications shall conform to the [Standard Plans](#).

### **Portable Changeable Message Signs (PCMS)**

Portable Changeable Message Signs may be used by surveyors to advise the traveling public of survey work being done on the highway. The information on these signs should make the driver more aware of surveyors on the highway increase the surveyors' safety. They are used to supplement the standard signing in the survey work zone. Typically, the PCMS should be installed in advance of the first warning sign.

### **Truck/Trailer-Mounted Attenuators (TMA)**

Truck/trailer-mounted attenuators should be used when using the Topo-Lift on a truck for static scanning or for truck mounted mobile lidar. This will protect the Surveyors while in the vehicle working and may be used at any time but are required when using several typical Indices including Mobile Operations. See [Standard Plans](#).

### **Flagging Operations**

When operations are such that material, equipment or workers impact a travel lane, auxiliary lane or are adjacent to the edge of travel way, flaggers or other appropriate traffic control shall be provided in accordance with the [Standard Plans](#).

Flaggers shall be located far enough ahead of the workspace, so that approaching traffic has sufficient distance to stop before entering the workspace.

Stop/Slow Paddles are the primary hand-signaling device. Flag use is limited to Immediate Emergencies, Intersections, and when working on centerline or two-way left turn lanes where two (2) flagmen are required and there is opposing traffic in the adjacent traffic lanes.

Where flaggers are used, a FLAGGER symbol or Legend sign shall replace the WORKERS symbol or Legend sign.

The party chief may at his discretion use a traffic control officer. A traffic control officer, along with a car with flashing lights at the beginning of the work zone is an effective way to reduce speed in the work zone and get the attention of drivers.

### **Surveying Safety Procedures in Traffic**

See [Appendix A](#) for safety procedures and rules while working in traffic.

Surveyors working in and around active traffic lanes are required at a minimum to follow safety standards as described in the [Standard Plans](#) and must possess a valid MOT certification as per [Temporary Traffic Control Training Handbook, Topic No. 625-010-010](#).



Note that referenced Manuals, Specs, etc. and the information referenced in those documents will be updated periodically and it is the responsibility of the user to confirm they are using the current and appropriate information for their application (Please see the [\*Manual on Uniform Traffic Control Devices \(MUTCD\)\*](#) for additional information).

## **Safety Inspections**

To ensure that surveyors and consultants are following the proper safety procedures for each job, the Department will make random safety inspections of all DOT survey crews and consultants. The DOT District Safety Program Administrator or his or her designee will be making these inspections. The inspector has the right to tell the crew chief to pull the crew off the road until all safety requirements are met. If a party chief repeats safety procedure violations, disciplinary action may be taken. It is important to note that this rule is for consultants as well as DOT personnel. Violating safety procedures and rules could constitute a breach of contract by a consultant. Fines can be levied against those consultants found to be habitually violating safety procedures and rules. It may also affect his qualification grade since it adversely reflects the consultant's willingness to cooperate and abide by the Department's policies and procedures.

## **Vehicle Warning Lights**

The use of flashing amber lights is another tool used by surveyors to let motorists know that they are working in the area.

During daytime flashing or strobe lights should be used during the following conditions:

1. When your vehicle is parked in the median without closure of the adjacent traffic lane.
2. When your vehicle is parked on the shoulder and work is being done in the immediate vicinity.
3. When your vehicle is accelerating to move from the shoulder, median, or lane closure into traffic. These lights should also be used when your vehicle is slowing down in preparation to pull off the road onto a shoulder, median or lane closure.
4. When highway conditions exist which, in the operator's opinion, warrant the use of flashing or strobe warning lights to protect workers and the public during conditions of reduced visibility such as fog or heavy rain.
5. Use of flashing or strobe lights can be required at any other time at the discretion of the supervisor on site.

## Safety Rules While Working in Traffic

Here are some safety rules that will be beneficial for you and your crew while working in traffic. Please see [Appendix A](#) for safety standards and procedures while working in traffic.

1. Always face traffic when working on the traveled way of a divided road or on shoulders of highways. When necessary, a coworker should be a spotter, particularly when working in between two-way traffic standing parallel to the traveled way.
2. Do not make sudden movements that might confuse a motorist and cause him or her to take evasive action that could result in injury to the motorist as well as to surveyors.
3. Avoid interrupting traffic as much as possible. Plan work that involves lane closures during non-rush hour time frames. One of the best ways to avoid traffic impact is to use offset lines as much as possible. This procedure should keep you and your crew safe from oncoming traffic. Minimize the crossing of traffic lanes on high-speed heavily traveled highways. Do not try to walk or run across traffic lanes. On highways with wide shoulders and medians the best way to cross is with your vehicle. If possible, use ramps or service roads to ensure a safe crossing. If traffic lanes must be crossed on foot, wait for all lanes to be clear.
4. Protect your crew with the use of an approved barrier to shield them from traffic. Whenever possible place a truck mounted attenuator between your workers and traffic.
5. Proper equipment carrying procedures: When working near a heavily traveled highway, or when working parallel to traffic, be careful to keep level rods, range poles, etc., from extending into a lane of traffic.
6. Wet Pavement: avoid working on wet pavement in an active traffic area, except for the emergency survey of a danger area which poses grave hazards to the public. This would probably involve the declaration of an emergency by the appropriate government agency and the presence of law enforcement for the safety of surveyors and the public.
7. Avoid setting secondary control points on sidewalks. Also do not place signs on sidewalks. If the total station or the scanner are on the sidewalk for more than 60 minutes while obtaining elevations for a DTM then the sidewalk must be closed, and pedestrians must be detoured onto a temporary pedestrian way (see [Standard Plans](#)).

## **CHAPTER 2                      PROPER USE OF EACH TOOL**

### **Machetes**

1. Sharpen machete blades only from six (6) inches from the butt of the handle to Within two (2) inches of the point.
2. Station machete users at no closer than ten (10) feet intervals. Protect yourself by retaining this minimum safety zone.
3. While chopping, if possible, lean forward.
4. Always chop away from the body. The arc of the swing should never intersect the body/legs.
5. Swing with a full swing at an approximate 45°, but do not overswing or swing too hard.
6. Clear small vines, etc., before cutting larger vegetation.
7. Right-handed: Right foot forward - when swinging downward toward the left or when swinging upward to the right. Left foot forward - when swinging downward toward the right or when swinging upward to the left.
8. Left-handed - reverse the right-handed procedure.
9. Do not use machetes for heavy cutting.
10. Use long-handed lopping shears or brush hooks instead of machetes for cutting thorny bushes and briars.
11. Wear eye protection.

### **Axes and Brush Hooks**

1. Clear away any impeding, light growth with a machete or a hatchet before chopping.
2. Allow ample space between adjacent chopping and keep unessential persons outside the area.
3. Carry with the handle grip behind the head and the cutting edge facing outward.
4. Do not use double-bit axes.
5. Extended heavy brushing should be cut with a chain saw.

**Digging Tools, Hand**

1. Picks
  - a. Do not use a pick head that is either sharply pointed or badly blunted.
  - b. Make sure the head is "bound" tightly to a good handle before swinging.
  - c. Allow ample space for swinging.
  - d. Do not overswing on the backswing.
  - e. Use eye protection when digging in very hard material.
  - f. As you swing, squat by flexing the knees so the pick handle will be horizontal when the point strikes the earth (this will keep the point away from your feet).
2. Shovels
  - a. Use a round-pointed shovel for digging in hard earth.
  - b. Do not use the shovel in the same manner as you use a digging bar. Place the blade of the shovel on the earth and force it into the earth with your foot.
  - c. Keep one foot on the ground at all times.
  - d. Discard a cracked shovel. "Dress" one that has a blunted blade.
  - e. Do not use the shovel as a pry bar.
3. Digging Bars
  - a. Work with the feet widespread.
  - b. Hold the bar close to the body and lift and drop it vertically.
  - c. Keep the point sharp enough to do the job without having to lift the bar excessively high.
  - d. Do not use a bar that is bent.

**Driving Tools, Hand**

1. Use the right type and right size tool for each driving operation.
2. Check for defects before using.
3. Do not use hatchets, axes and other wood cutting or driving tools for driving or hammering metal.

4. Avoid striking brittle or mushroomed metal with a hammer because bits of steel might chip off and cause serious flesh or eye injuries.
5. Use safety glasses when driving metal objects or cutting anything except paper.
6. Do not use tools with splintered or loose handles or with mushroomed or cracked heads (this includes the driving tools and the implement being driven).
7. Allow ample space for the swinging required. When squatting, use either a short-handled tool, or keep the long handle from between your legs (groin injury can result).
8. When swinging, have the handle horizontal when the face of the driving head contacts the object being driven. Use of long-handled sledges requires flexing the knees to lower the body during the swing.
9. Do not use a full swing to drive objects that are more than waist high.
10. Do not hold an object for someone to drive while they are full swinging.
11. When driving masonry nails, spikes, or stakes into pavement or very hard earth, use extra care. Be sure the object being driven is well started before releasing it and driving it with full swings of the hammer.

### **Chain Saws**

1. Training - employees shall be given proper instructions before being allowed to operate chain saws.
2. Chain sawyers shall wear hard hats, eye protection, gloves and chaps.
3. Chain sawyers shall not wear any jewelry or excessively loose-fitting clothing which could become entangled in the machine's operating parts.
4. Chain saws shall be inspected prior to each use to assure that all handles and guards are in place and functioning correctly, that all controls function properly, and that the muffler is in good condition.
5. All of the manufacturer's instructions shall be followed.
6. Chain saws shall be fueled only in safe areas, and not under conditions conducive to fire, such as near smoking areas, hot engines, etc.
7. Fuel shall be stored and dispensed from approved, plainly marked safety containers.
8. Chain saws shall be started at least 10 feet away from refueling areas.

9. Chain saws shall be started only on the ground or when otherwise firmly supported.
10. Sawyers shall be certain of footing and shall clear away all brush which might interfere with cutting prior to starting a cut.
11. Chain saws shall be held with both hands in order to maintain control of saws during operation.
12. Chain saws shall be turned off when carried in hazardous conditions such as slippery surfaces or heavy underbrush.
13. Chain saws shall not be used to cut directly overhead or at a distance that would require the operator to lose a safe grip on the saw.
14. The above rules apply for using the chain saw for cutting brush only. The falling of live or dead trees is not covered and should not be attempted by inexperienced, untrained personnel.

### **Pressurized Spray Cans**

Serious injuries and costly cleanup have resulted from improper handling of pressurized spray cans.

1. Do not puncture or incinerate.
2. Store at temperatures lower than 120°F.
3. Do not carry in vehicle passenger compartments or on dash boards.
4. Dispose of through local refuse disposal systems. Do not discard any spray cans in a receptacle that is normally accessible to children.

### **Unmanned Aircraft System (UAS) Operations**

When Unmanned Aircraft Systems (UAS) are used to support surveying activities within or adjacent to Florida Department of Transportation (FDOT) right-of-way, all flight operations shall comply with applicable Federal Aviation Administration (FAA) regulations and FDOT UAS policies, including the FDOT Standard Operating Guidelines for UAS. Temporary Traffic Control (TTC) measures shall be implemented in accordance with FDOT Standard Plans 102-600, whenever UAS launch, recovery, or ground control activities expose personnel to traffic or require occupation of the roadway, shoulder, or median, UAS operations shall be conducted in a manner that does not reduce required traffic control measures or compromise safety. See [FDOT Standard Operation Guidelines](#) for UAS safety guidelines.

## CHAPTER 3                      WORKING NEAR RAILROADS

Railroad Guidelines are to be used when working within an "operating right-of-way" and are for the safety of the surveyor and the railroad. These general rules are:

1. Surveyors must secure a Right-of-Entry permit or agreement from the railroad company that owns the property. This process typically requires detailing the purpose and scope of your work. See [Railroad Ownership](#).
2. Always be alert around railroads. Railroad equipment is not always heard, especially if there is other noise. If a railroad car or locomotive is coasting, or if a train is moving slowly, hearing alone might not provide adequate protection. When necessary, use a lookout.
3. Never crawl under stopped cars and do not cross tracks between closely spaced cars, they might be bumped at any time (the engineer and brakemen work only one side of the train).
4. Do not leave protruding stakes or any holes within 10 feet of the centerline of the tracks.
5. Do not park vehicles within 10 feet of the tracks; train crews need this area for their operations.
6. When taping across railroad tracks, support steel tapes above the rails at all times. The contact of both rails simultaneously by a steel tape can activate signals even when laid parallel to the rails. Therefore, only nonmetallic tapes should be grounded.

## **CHAPTER 4                      FENCE CROSSINGS**

Accessing Fenced and Restricted Areas - FDOT personnel and consultant survey teams frequently encounter fenced or otherwise restricted areas during field operations. These may include private property, active or passive right-of-way boundaries, utility corridors, and easements with limited or no public access.

1.            Use gates when possible and avoid crossings.
2.            Use portable chain link fence climber steps or a trestle ladder.
3.            Do not attempt to carry anything when climbing on or over obstacles.
4.            Do not straddle fences, watch for barbed wire and electric fences, be alert for livestock etc.
5.            Cross barbed wire fences at the center of a span and have a co-worker hold the wire(s) for you.
6.            When stepping over a barbed wire fence, lay a piece of heavy canvas, such as an empty material bag, over the top strand.



**CHAPTER 5                      ANIMAL HAZARDS**

1.            Assume that all animals are potentially dangerous.
2.            Have owners secure hostile-acting animals before entering enclosures containing such animals.
3.            Do not enter an enclosure with high fences if a hazardous animal is within.
4.            Carry a pointed lath or a range pole to ward off an attacking animal. Retreat is usually advisable but do not turn your back and run unless you can reach a haven before the animal reaches you.
5.            Do not approach, attempt to capture or kill, or attempt to pet either domesticated or wild creatures (this includes snakes and other reptiles).
6.            Be especially wary of sick-appearing animals, animals with young, stallions, bulls and guard dogs. Do not handle dead or seemingly dead animals, fowl or reptiles.

## CHAPTER 6                      SNAKEBITES

Snakebites of surveyors are quite rare, yet the dreaded hazard of rattlesnakes abounds through Florida. Even if preventive measures fail, current knowledge and treatment offer the best prognosis ever for snakebite victims.

Though seemingly rare, poisonous snakes annually bite 6,500 to 7,000 Americans. Always take the following precautions:

1.            Always assume snakes are active. Do not relax your vigil on sunny winter days.
2.            Do not make "solo" trips across snake country which is remote from habitations and frequently used roads.
3.            When traversing brush or grassy terrain, use a "decoy" such as a level rod or a lath, alongside your legs. Walk heavily to create vibrations that can be felt by snakes (a snake does not hear very well).
4.            Walk away from the shaded side of clumps and bushes when the weather is hot and sunny.
5.            Step atop logs and large rocks, instead of stepping over them and into unseen areas. The safest policy is to walk around such obstacles.
6.            Do not jump down from overhangs onto areas where snakes might be hidden from view.
7.            Avoid steep climbs, if possible, where a snake uphill from you could strike the upper portions of your body. Bites on the torso, the neck, and the head are much more damaging and more difficult to treat than those on the limbs.
8.            Never climb vertical or near vertical faces where handholds on unseen areas above your head are required.
9.            Do not attempt, under any circumstances, to capture snakes!!
10.           Do not try to kill a snake unless it is a positive threat to safety.
11.           Avoid likely snake areas such as small rodent trails, pack rats' nests or gopher tortoise dens.
12.           When it is necessary to move low-lying logs, large rocks and boards, use a pry bar, not your hands.
13.           Double your precautions at night, especially in warm weather.
14.           Keep vehicles near your work area for rapid transport if a snakebite should occur.

15. If at all possible, maintain communication with isolated employees.
16. Know the location of the nearest medical facility where antivenom is available and the quickest route there.
17. Do not collect rattles. A fine and highly abrasive dust often accumulates inside the rattles and can cause lasting damage to the eyes.
18. Wear high leather boots or snake-leggings in high-hazard areas.
19. Remember that rattlesnakes do not always signal their presence by rattling.

## **CHAPTER 7                      POISONOUS PLANTS**

Poison ivy, poison oak and poison sumac can cause skin irritation. Learn to recognize these plants so that you can avoid them. Furthermore, if you know when you have touched them, you can start first aid before symptoms appear. The sooner first aid is given for exposure, the milder the effects will be.

Poison ivy is a creeper plant that has three leaves on each stem. The leaves are shiny and pointed and have prominent veins. Poison ivy grows along fences and stone walls and in wooded areas.

Poison oak is a vine similar to poison ivy in appearance, except that the edges of the leaves are more deeply notched. The leaves are arranged in characteristic groups of three.

Poison sumac is a shrub or small tree. Clusters of white berries identify the poison sumac from the nonpoisonous sumac.

If exposed to a poisonous plant, wash the affected area of your body promptly and thoroughly with water and soap. The rash starts with redness and intense itching. Later, little blisters appear. If a rash has already developed, do not wash it. Avoid scratching. Get medical attention.

## **CHAPTER 8                      POWER LINES**

Regard all power lines as dangerous.

1.            Avoid actual contact with or possible arcing to any equipment from electrical lines. In damp conditions, double your precautions.
2.            Do not tape across terrain where a tape might possibly be pulled up, into, or lowered atop a power line. Use an E.D.M. or another form of tachymetry instead of taping.
3.            Power line elevations - do not make a "direct" measurement of the height of a power line, even with a fiberglass rod. Triangulate these vertical distances.

### **Electrical Storms**

If an electrical storm approaches while you are working, discontinue working and seek shelter. Rule of Thumb: If you hear it, fear it. If you see it, flee it.

Do not use any metal objects, such as chains, transits, E.D.M.'s, levels, range poles or Philadelphia rods during an electrical storm.

The best thing to do is to get into your truck or building and wait out the storm.

## **CHAPTER 9                      CONFINED SPACE ENTRY**

### **Definitions**

**A confined space is an enclosed space that:**

1. is large enough for an employee to enter.
2. has limited or restricted means of entry or exit (for example, tanks, vaults, wells, tunnels, pits, manholes, catch basins).
3. is not designed for continuous human occupancy.

**A permit-required confined space (PRCS) is a confined space that:**

1. contains or has the potential to contain a hazardous atmosphere.
2. contains material that has the potential for engulfing an entrant.
3. has an inside configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section.
4. contains any other recognized serious hazards.

Entry is the action by which a person passes through an opening into a permit-required confined space.

An entry permit is the written or printed document that is provided to allow and control entry into a permit space.

Engulfment is the surrounding, capturing, or both, of an entrant by divided particulate matter or liquid.

A hazardous atmosphere is one that may expose employees to risk of death or incapacitation, injury or illness by reason of oxygen deficiency or enrichment (less than 19.5% or greater than 23% oxygen by volume), flammability, explosivity, or toxicity.

A non-permit confined space is a space which, by configuration meets the definition of a confined space but which after evaluation is found not to contain or with respect to atmospheric hazards, does not have the potential to contain any hazard capable of causing death or serious physical harm.

### **General Requirements**

#### **Confined Space Identification/Classification**

Unit managers and office heads shall ensure that the following are conducted:

1. Confined space awareness training.

2. A survey of their respective areas of responsibility to identify all potential permit-required confined spaces (PRCS).
3. An evaluation of the potential PRCS to identify hazards for each confined space.
4. An evaluation of the hazards, considering the scope of hazard exposure; magnitude of hazard; likelihood and consequences of hazard occurrence; changing conditions/activities; and impact on the need for emergency response.
5. Based on the evaluation of hazards, classify and list confined spaces as either permit-required or non-permit confined spaces.

### **Periodic Evaluation of Hazards**

Periodic re-evaluation of the hazards based on possible changes in activities in the confined space or other physical or environmental conditions which could affect the space adversely, shall be conducted.

A space that is identified but has not been classified and listed as a confined space shall be evaluated on an individual basis.

### **Marking of Confined Spaces**

Signs shall be posted or other warnings shall be used to alert employees of the danger of the particular confined space. "Danger. Permit-Required Confined Space. Do Not Enter" signs or barriers or other means to keep unauthorized persons out of the permit space may be used.

There are occasions when DOT employees are required to enter manholes, cable vaults, sewers, tunnels or pits to accomplish their assigned work.

### **Entry into Confined Spaces**

**EXCEPT UNDER CERTAIN CONDITIONS, NO DEPARTMENT EMPLOYEE WILL BE ALLOWED TO ENTER A PRCS.** Effective measures such as those mentioned above in "Marking of Confined Spaces", shall be taken to prevent employees from entering the permit spaces.

If the unit manager/office head has determined that the only hazard in the identified confined space is atmospheric and ventilation alone can control the hazard, entry into the confined space may be authorized. In such a case, the requirements for alternative protection procedures under 29 CFR 1910.146© (5) shall be followed.

### **Consultants**

Consultants working on Department projects, or on or in a Department facility shall in all cases adhere to all the procedures above for confined space entry.

Prior to opening a manhole or inlet, the atmosphere shall be checked for hazards. While working in a confined space the atmosphere shall be continuously monitored.

Proper traffic control, warning devices and guards will be set in accordance with **Standard Plans** and other Safety Standards which may be adopted by the Department to warn the public and private sector passing through the areas, and to protect the surveyors.

No open flame, torch or lighted smoking material shall be brought near an open manhole, cable vault, or sewer nor taken into any of the named areas, even though tests indicate the atmosphere inside is free of combustible gases, vapors, or fumes. No employee will enter these even momentarily, until it has been tested properly with detecting devices for explosive gases, oxygen deficiency and hydrogen sulfide.

### **Use of Safety belts, Safety Harness and Lifelines**

DOT employees who are required to enter manholes, cable vaults, sewers or pits shall wear a safety belt/safety harness and a lifeline. Hard hats shall be worn in all such structures that are over four feet deep. Two responsible persons will remain outside the entrance to tend the line and provide emergency assistance if needed during the entire time anyone is inside the underground facility. These persons tending the lifeline will have immediately available rescue breathing apparatus, fitted safety belts or harnesses and lifeline for use in the event they must enter the underground facility to affect a rescue. These persons attending the lifeline shall be trained in the use of all the above-mentioned equipment.

Some manholes, etc., have steel steps that are rusted to the point that they are hazardous. Use a ladder and do not use the steps at all.

### **Manhole Covers and Grates**

In some of the details that follow, the term "cover" also means "grate."

### **Equipment**

Two tools may be used for unseating and moving covers and grates. They were devised specifically for these operations.

1. Manhole cover hook - 28" long, four pounds, made of 5/8" octagonal, plated tool steel and hardened to prevent bending.
2. Manhole cover lifter - 42.5" L-shaped lever with handle, foot, and swing-out hook with the same details as that of the "cover hook".



The instructions that follow are written for removal and replacement with these tools.

### **Freeing**

When a cover or grate is stuck in its frame, remove any encrustation with a cold chisel. Then, place a block of wood on the cover near the rim, and hit the block with a heavy hammer. Do this at different points until the cover is loosened. Try to avoid causing sparks by any of your activities. Use a railroad pick to complete the freeing operation.

### **Unseating**

1. Lift with a tool that provides adequate handhold and a positive hold on the cover.
2. On a round manhole cover, engage the circumferential bib before lifting.
3. Unseat the grate or cover about four inches by pulling and lifting with the leg and arm muscles.
4. NEVER place fingers or hands under a cover. Spider bites or mashing can result.

### **Removing**

1. Use a helper when available.
2. Clear the area of any hazards to footing.
3. With your feet spread and footing secure, pull the cover, clear of the frame and keep pulling until the cover or grate is in a nonhazardous location. Pull with the arm and leg muscles. Pull parallel to any traffic so you do not tumble into the path of a vehicle if your hook slips. Also, do not pull toward precipices (steep slopes) or other hazards that are near the manhole.

### **Replacing A Round Cover or Grate**

1. Stand parallel to the desired direction of travel with the toes in the clear.
2. Place the point of the hook under the edge of the cover nearest you. Lift slightly and swing the cover toward the structure.
3. Move to the opposite side and repeat the lifting and swinging.
4. Continue this alternate lifting and swinging until the cover is partially over the structure's opening.
5. With the hook, lift the edge that is farthest from the opening. Lift until the cover or grate slips into the frame of the structure.

6. If a helper is available with another hook, stand on opposite sides of the cover and parallel to the direction of travel, securely hook under the cover and slide it to the frame.

### **Rectangular Covers and Grates**

1. Follow items A through D above.
2. Use a helper. Single grates weigh up to 326 pounds.
3. When pulling the cover clear of the frame, be sure you pull in line with the frame so the cover cannot fall into the opening.
4. When replacing, be sure you pull straight into the frame so the cover or grate cannot fall into the opening.

**CHAPTER 10****WORKING IN WATER****Boating Operations**

Technically, a boat is classified as a vessel, but for Department purposes they will also be classified as vehicles.

1. Smoking in boats is prohibited.
2. Employees shall not be authorized to use a boat (with the exception of john boats used in culverts or streams) unless they have successfully completed an approved safety course.
3. All personnel in boats shall wear U.S. Coast Guard approved life vests.
4. All boats except john boats shall be required to carry visual distress signals for use during daylight and night operations.
5. Because certain navigational rules require sound signals, a whistle, horn or bell shall be carried on board all boats, except john boats used in coastal waters.
6. For diving operations, the red and white divers' flag shall be displayed.
7. A first aid kit should be carried in the boat.
8. Standing in small utility boats while afloat should be avoided.
9. Unless anchoring both fore and aft, boats shall not be anchored by the stern.
10. All equipment in the boat shall be secured before getting underway.
11. Remove portable fuel tanks from the boat before fueling. Wipe off all spilled fuel and oil immediately.
12. All gas- or diesel-powered boats shall have at least one Type B-1 hand portable fire extinguisher on board.

**Wading**

1. Do not wade barefoot, wear rubber boots to protect against cuts, cold and water.
2. Work with a buddy.
3. Wear a life jacket.
4. In still waters:

- a. Limit wading to waist-deep water. Chest-waders are recommended. When wearing chest waders, a chest belt shall be worn to prevent the waders from filling if you slip. A life jacket shall be worn with chest waders.
- b. Probe with a pole for holes and soft ground before proceeding.

### **Wading in moving water**

Do not Wade if:

1. The water is more than mid-thigh high.
2. The product of stream velocity in f.p.s. and stream depth in feet equals ten or more.
3. Footing is difficult to retain because of any combination of stream velocity, stream roughness or slipperiness, unless a tautly stretched lifeline is used as a handrail.
4. Do not wear a backpack while crossing a stream. Use a wading staff.

### **Wading along shorelines, trenches and fills**

1. Ocean shores
  - a. Wear boots even if you are working only along the edges of the surf.
  - b. Schedule work at low tides.
  - c. Do not work in the surf unless you are adept at ocean shore swimming and wearing a life jacket.
  - d. Do not work in heavy surf.
2. Inland shores - wear rubber or leather boots for snake protection.
3. Do not walk on floating debris, in reservoirs or debris basins.
4. Be cautious of recently puddled trenches and dredging fills.

## CHAPTER 11

## PROPER LIFTING PROCEDURES

If there is a machine or piece of equipment designed to do the job of lifting or moving the material, use it. Don't expose yourself unnecessarily to accident or injury by trying to do a machine job.

### Lifting Small Loads

If you are going to lift something by hand and the load is compact enough to pass between your knees, use the following steps:

1. Your feet should be apart, with one foot alongside the object to be lifted and one foot behind. Spreading your feet like this gives you greater stability and your rear foot will be in a position for upward thrust of your lift. It also gives your body better positioning over the object you are lifting.
2. Use the sit-down position and keep your back straight but remember that straight does not mean vertical. The trick is to keep the spine, back muscles and body organs in correct alignment.
3. Tuck in your chin. Not down on your breastbone but tucked in so that your head and neck continue the straight back line. This helps to keep the spine straight and firm.
4. Use the palms of your hands. Gripping with the palm is one of the most important elements of correct lifting. The fingers and palm should be extended around the object you are going to lift. Use the FULL PALM! Your fingers alone have very little power. The strength of your entire hand is needed if you are going to lift correctly.
5. Keep your arms and elbows close to your body. Tip the object away from you and draw it close in with your arms and elbows tucked in so the weight is close to the spinal axis. Begin the lift with a thrust of the rear foot.
6. When you set down the load, reverse the entire procedure. Remember to set it down close to your body and then slide or move it back. Do not "reach out" to set the load down.

### Lifting Large Loads

If you are going to lift something by hand and the load is too large or bulky to pass between your knees, use the following lifting procedures:

1. Use a "stooped back" posture for lifting. You can get the load closer to the body.
2. Next, bend over the load slightly, not bending the knee, but keeping yourself in as close to the load as possible.

3. Grab the load using the full palm and pull it toward your abdomen; then carry it.
4. When you set the load down, reverse this procedure, making sure that you set it down close to your body.

Do not twist your body while holding the load. If you must turn with a load, shift your feet and turn the whole body.

If you must lift higher than your waist, do not do it all at once. First, set the load on a bench or table, then change grips for higher lifting.

If you must hand a load to a fellow employee, make sure that he/she has a good grip before you let go. Work together.

For any load that you carry, make sure that your path is clear, and you can see over or around the load. Do not carry a "lazy man's load" - that is trying to make it all in one trip.

In any material handling situation, if you need help, ask for it and get it.

## CONCLUSION

This handbook has given you a brief introduction to some of the safety guidelines established by the Department of Transportation for surveyors.

The word safety can be interpreted in many different ways. To some it can mean to be free from injury to others it means to be secure from danger. Those are all good definitions, but the one the Department of Transportation likes best is "The giving of protection."

We hope that these safety guidelines will give you a little more protection on the highways and roads. There will always be risk for surveyors working in traffic. The odds, however, can be made more favorable.

## IMPORTANT

\*All other procedures in the *Loss Prevention Manual*, the *Standard Plans* and other Safety Standards which may be adopted by the Department that relate to surveying must be followed by all DOT personnel and consultants working for DOT.

## APPENDIX A – Safety Procedures and Rules While Working in Traffic

Here are nine common surveying procedures and the recommended safety precautions that should be utilized for each. The procedures below are minimums and shall be expanded if traffic volume and/or work zone conditions require them.

### 1. Offsetting Old Baselines

This involves the process of digging up pavement to find an old baseline and offsetting that line from the pavement to the side of the road. This safety procedure is designed to get surveyors off the roads and away from traffic. We know from prior experience that the first action we need to perform is the positioning of warning signs. For this procedure, you are required to use three types of signs, SURVEYORS, STAY IN YOUR LANE, and FLAGGERS signs.

The SURVEYORS sign and the FLAGGERS sign should be positioned in accordance with sign spacing criteria in the [Standard Plans](#) on both sides of the road, depending upon the posted speed limit and the location of the survey baseline. When survey crew members are working between active traffic lanes, a STAY IN YOUR LANE sign shall be added as the second most immediate sign from the work area. (See also [Standard Plans](#) where appropriate.) Once these signs are in place you can put devices around one of the old baseline points.

The next step involves the actual digging up of the pavement to find the old baseline point. The person doing the digging shall be protected from traffic by flaggers as he will not be able to watch the traffic as he is digging. He shall wear eye protection to guard against flying debris from the pavement as he is digging.

Once all of the old baseline control points have been tied into the Project Network Control and all of the existing Right of Way information has been found and tied in, the position of the old historical baseline is then calculated back in the office. Then the new reference baseline control points are set preferably greater than 15 feet off the traveled way, opposite the old control points. The reference baseline is then run, which keeps the crew out of traffic as much as possible.

If any control point is placed within 15 feet of the edge of the traveled way, then the instrument and/or backsight requires channelizing devices for protection. Channelizing device placement shall follow the [Standard Plans](#).

### 2. Tying Section Corners Between Active Traffic Lanes

Tying in a section corner on a two-lane, two-way highway, between active traffic lanes with survey equipment, requires the use of cones to protect the equipment and workers. The cones are placed with the equipment and additional cones placed at up to 50 feet intervals along the lane line for at least 200 feet towards the flow of traffic in both directions.

### **3. Bench Runs**

This procedure involves the protection of surveyors from traffic while they are doing bench runs. For maximum safety, bench runs should be run off the road whenever possible. This will move the surveyor away from traffic.

### **4. Finding Utilities**

It is sometimes difficult to locate utilities on a particular project. It is necessary to contact a person from the utility company to come and help you find the utility line crossings. The person from the utility company and the crew chief will walk the job and spray paint on the road where the utility lines are crossing under the pavement.

The safety precautions that shall be taken are to have a flagger keeping pace between them and oncoming traffic to warn motorists of their presence on the road. All personnel will wear proper safety gear. Cone placement is optional and left to the discretion of the party chief.

After the utility lines are marked, the crew will then utilize project survey control to obtain the location of the utilities. If the utility company must dig to find the lines, then barricades or cones shall be used to channel traffic around the work area (See [Standard Plans](#)).

### **5. Obtaining Elevations Between Active Traffic Lanes**

Obtaining elevations for a DTM between active traffic lanes on two lane, two-way highways, two-way left turn lanes and multilane highways should be obtained by the safest manner possible.

Channelizing devices may be used at the discretion of the party chief to protect prism holder and flagger(s) working between active traffic lanes or in a two-way left turn lane. Such devices should be placed at up to 15-foot intervals along the break line throughout the work zone. (Refer to elevation survey diagrams 4 through 7). These devices will help keep the traffic from crossing lanes when the workers are between active traffic lanes, when the traffic is heavy and moving fast. Working between multilane divided highways or undivided highways make surveyors especially vulnerable to vehicles crossing lanes, and the devices serve as an additional warning device.

Obtaining elevations for a DTM on edge of pavement and curb and gutter along the medians and sides of the highway, the surveyor holding the prism pole shall be protected by a flagger. This procedure will reduce the surveyor's risk by allowing surveyors to concentrate on their duties, making sure the level bubble is centered correctly while obtaining the survey data. This procedure shall be used along the main project corridor and major side streets coming into the project. The use of this procedure on minor side streets will be left up to the discretion of the party chief.



## 6. Obtaining Elevations on High-Speed Highways

The dangers to surveyors and consultants while working on high-speed highways are well documented. In Florida alone several fatalities involving consultant personnel have occurred which can be directly attributed to high-speed traffic. One particularly hazardous procedure is the process of obtaining elevations for a DTM on high-speed highways from the edge of the pavement to the right-of-way line. Although there is no sure way to make this procedure 100% safe, there are precautions that can reduce the dangers.

On high-speed highways we are specifically concerned with increasing our crew's visibility to motorists. We must let the motorists know well in advance of our position on the highway. Warning signs must be used to gradually slow traffic through the work area. This will help prevent quick traffic slowdowns which have the potential to create traffic jams and collisions.

Obtaining elevations from the medians is particularly hazardous to survey crews because it increases their exposure to high-speed traffic two-fold. You now must plan for traffic coming at you from opposite directions. Basically, the safety precautions employed for this procedure are the same as the ones just described. Warning signs must be placed to standards, but this time you shall compensate for traffic coming from opposite directions on the highway. Signs or devices may be placed on both sides of the highway in accordance with the [Standard Plans](#).

For additional protection, a lookout should be stationed to warn the crew of changing traffic conditions or errant vehicles straying into the work area at high speeds or slow speeds.

## 7. Replacing Old Baselines

If the old baseline was not offset to the sides of the road (the preferred practice), it is necessary to recover baseline points from the old baseline and then place a new baseline down the center of the road. To protect the surveyors while they are putting the baseline down, devices must be placed around the Instrument Operator, and for added protection, refer to diagram for additional details. This provides protection to the Instrument Operator as well as the rest of the crew while they are working in the centerline area. For added protection, the crew members should be flanked by flaggers who are responsible for directing traffic away from the surveyors in the centerline area and warning them of any vehicles intruding into the work area. They also alert motorists of the presence of surveyors in the area. This procedure also calls for tapering of devices at the end of the work area as well as the beginning.

## 8. AUXILIARY LANE and LANE CLOSURES

Auxiliary lane and lane closures shall conform to the [Standard Plans](#) and shall be done when the auxiliary lane or traffic lane itself is occupied for the time periods indicated.

Occasionally during the course of a design survey, the need arises to channel high-speed traffic around a designated work area. Before your crew can begin the actual process of closing off the lane, the party chief must obtain the correct index from the [Standard Plans](#). Next the crew shall determine the exact length of the taper prior to reaching the work area. To make this calculation use the formulas on Table 2, [Standard Plans Index 102-600](#).

Take note that varying roadway and weather conditions may require an increased taper length. The taper length must never be less than the minimum standard. In non-typical or difficult cases, contact the local Maintenance Office in the area for support and assistance with the maintenance of traffic activities, particularly for work on heavy traffic facilities, i.e., Interstate and Primary, multilane facilities.

## **9. Working in Intersections**

This procedure deals with the protection of personnel while working in main intersections.

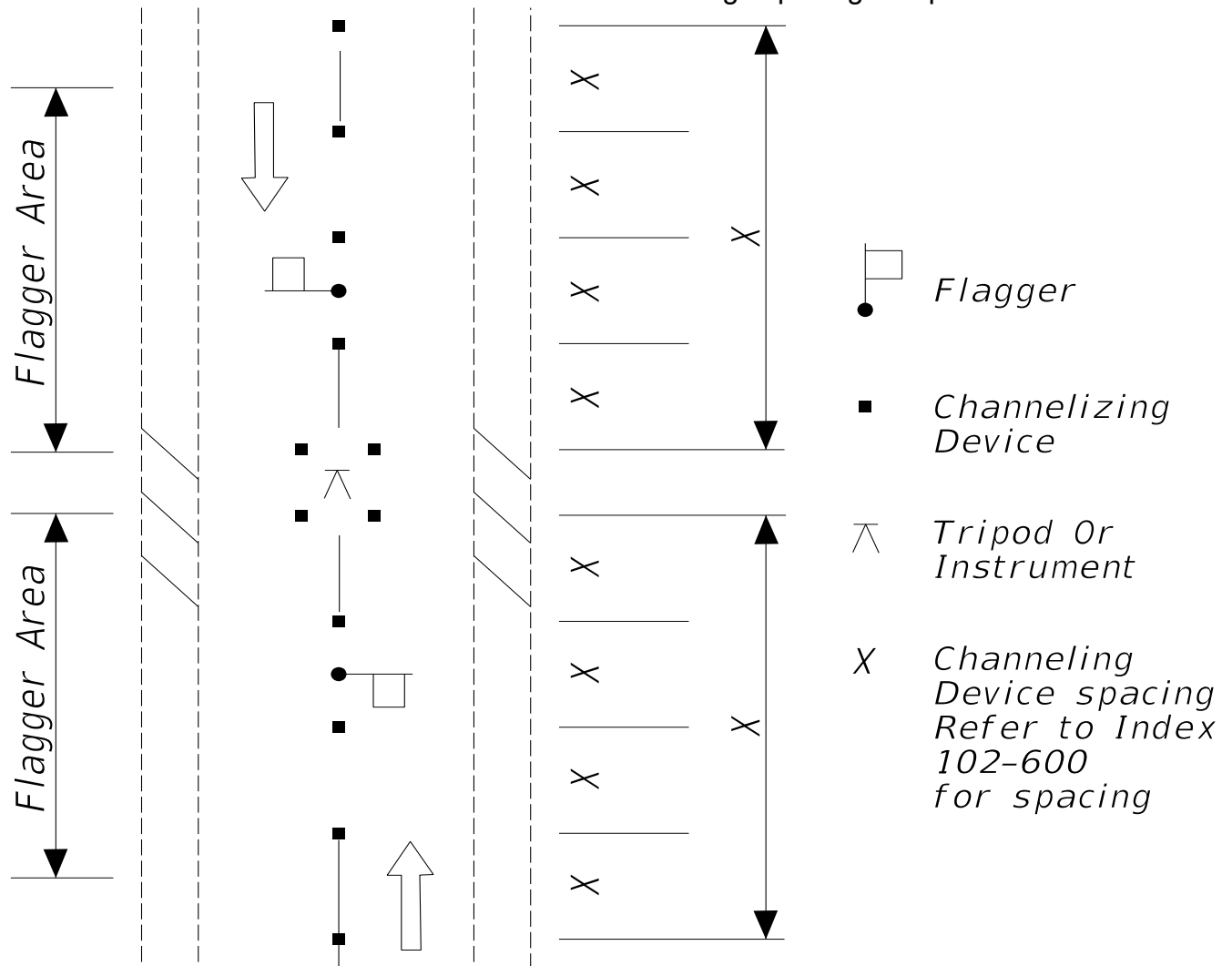
The first step you must take is the positioning of signs. Install warning signs on all main roads leading to the intersection. Install the SURVEYORS sign in accordance with the [Standard Plans](#). Where flaggers are used, a flagger symbol or legend sign must be installed. When survey crew members are working between active traffic lanes, a third sign, STAY IN YOUR LANE, shall be added as the second most immediate sign from the work area. The STAY IN YOUR LANE sign shall be placed only on the streets leading to the intersection where needed. The use of for this procedure is mandatory. The actual positioning of the devices are left to the discretion of the party chief. The [Standard Plans](#) and other Safety Standards which may be adopted by the Department must be consulted for positioning of devices for crew protection.

## Horizontal Control Diagram 1

### Traffic Flow in Opposite Directions

For the survey crew members working between traffic lanes with traffic flow in opposite directions. Horizontal Control requires the use of Cones to protect backsight tripod and instrument and at approximately 50 feet intervals along the lane line for approximately 200 feet in both directions from the instrument towards the flow of traffic. Reference Elevation Survey Diagrams to determine proper placement of signs for Work Zone Maintenance of Traffic. For survey crew members working between traffic lanes with traffic flow in opposite directions, cones shall be used to provide protection for the instrument and backsight tripod. Cones should be placed around the instrument setup and extended along the lane line at regular intervals in both directions toward approaching traffic to provide warning and delineation.

Reference FDOT [Standard Plans Index 102-600](#) for sign spacing and placement.

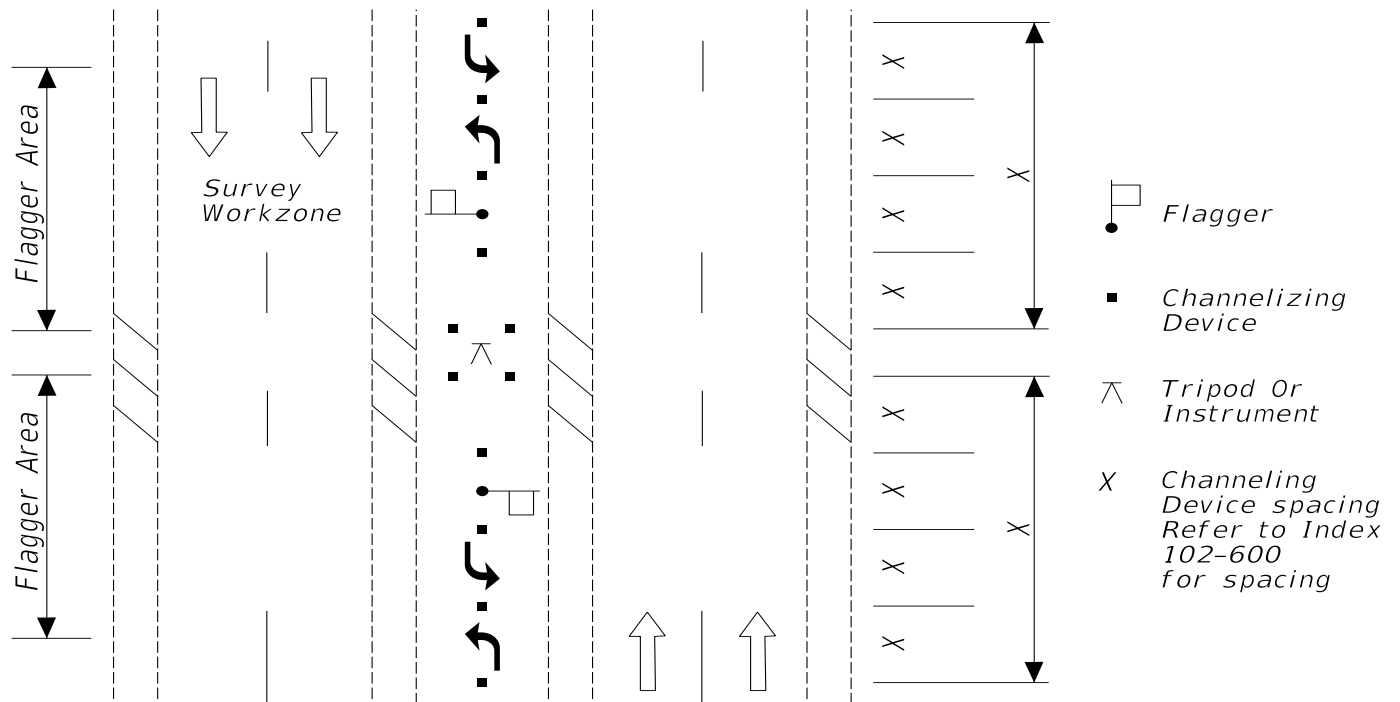


## Horizontal Control Diagram 2

### Two-Way Left Turn Lane

For survey crew members working within a two-way left turn lane or between an inside traffic lane and two-way left turn lane, cones shall be used to provide protection for the instrument and backsight tripod. Cones should be placed around the instrument setup and extended along the lane line at regular intervals in both directions toward approaching traffic to provide warning and delineation.

Reference FDOT [Standard Plans Index 102-600](#) for sign spacing and placement.

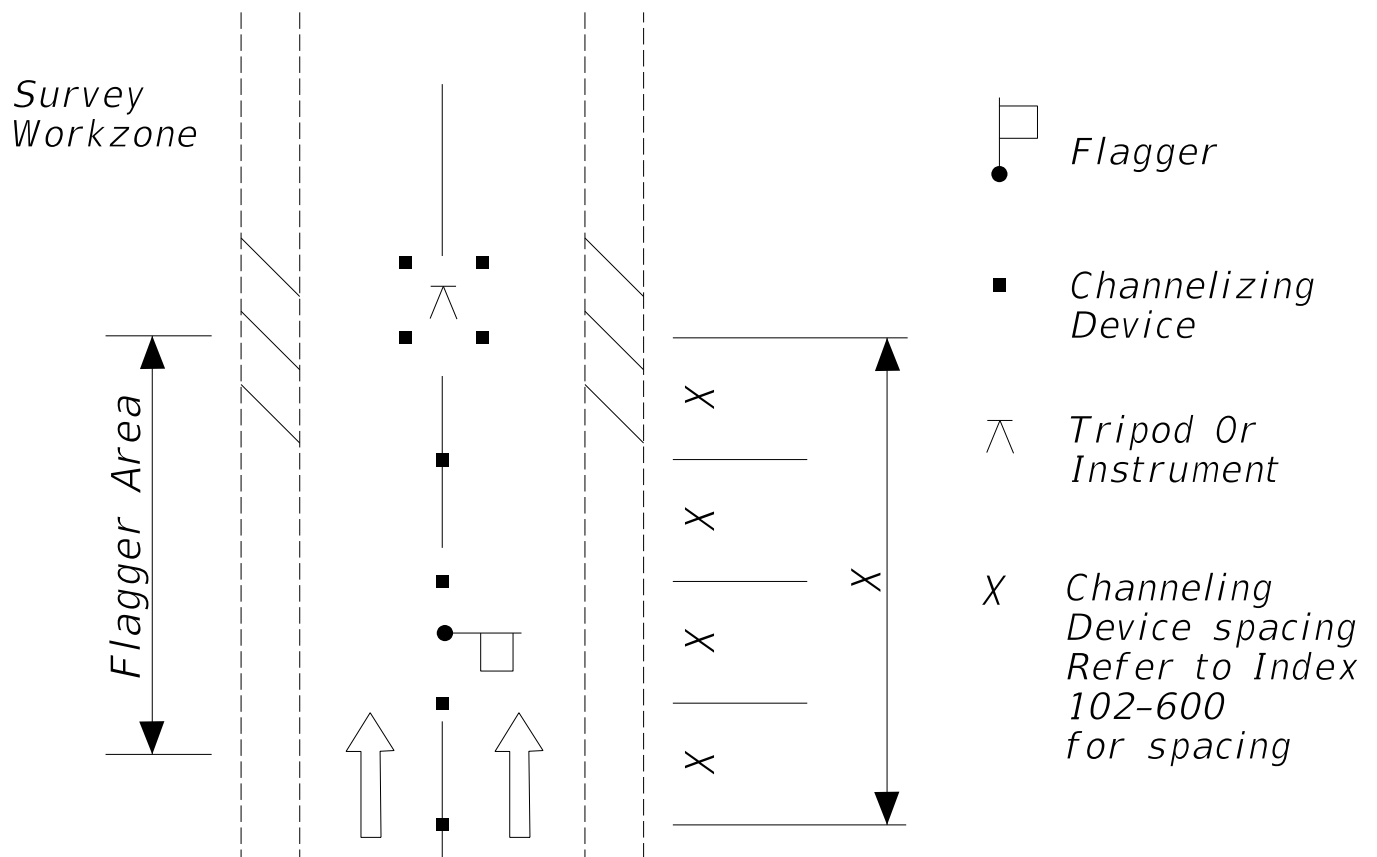


## Horizontal Control Diagram 3

### Traffic Flow in Same Direction

For survey crew members working between traffic lanes with traffic flowing in the same direction, cones shall be used to provide protection for the instrument and backsight tripod. Cones should be placed around the instrument setup and extended along the lane line at regular intervals in both directions toward approaching traffic to provide warning and delineation.

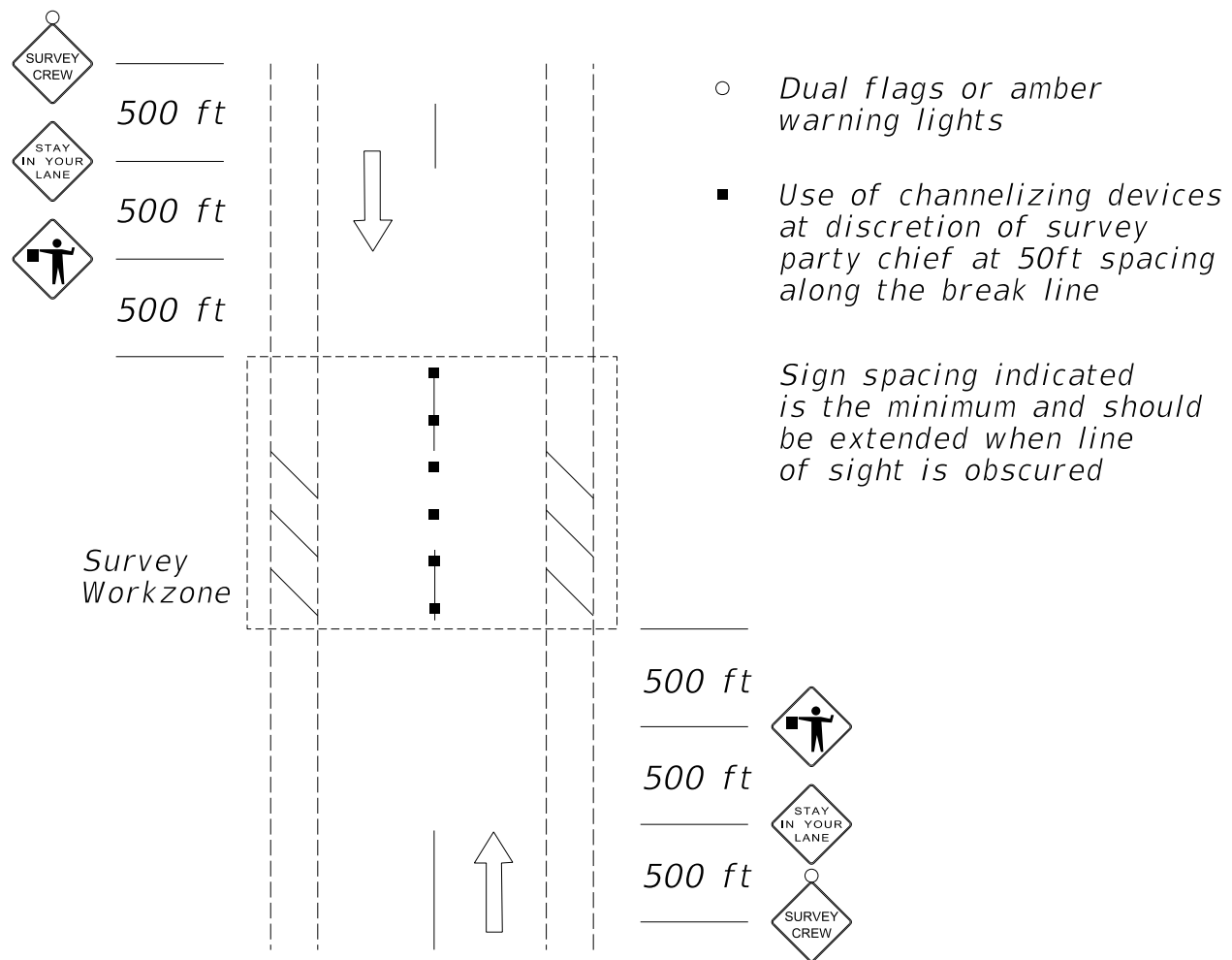
Reference FDOT [Standard Plans Index 102-600](#) for sign spacing and placement.



## Elevation Survey Diagram 4

### Two Lane, Two Way

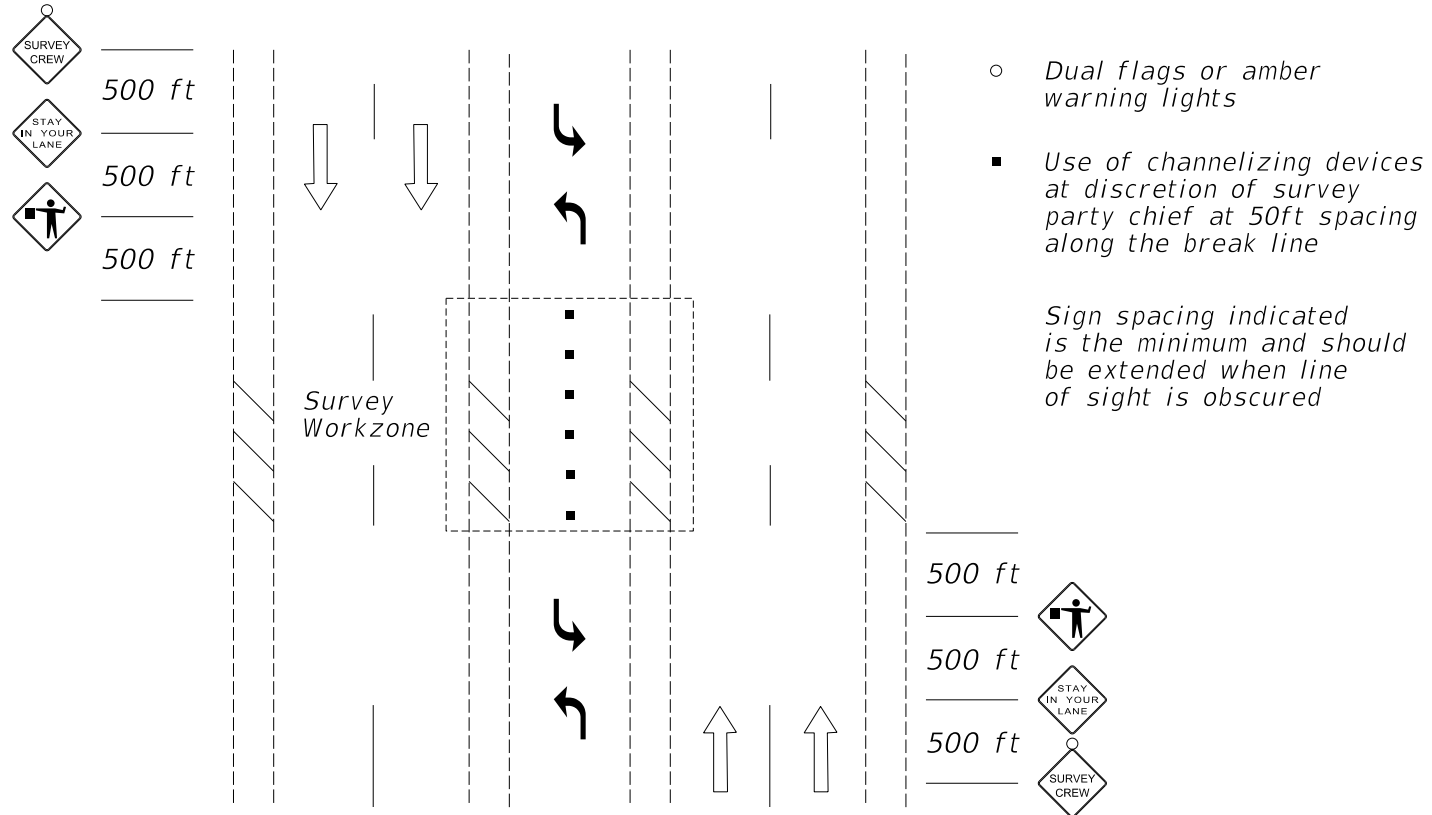
For survey crew members working between active traffic lanes within a survey work zone and the speed limit is 45 M.P.H. or greater. Sign spacing shown is representative of work zone speeds of 45 M.P.H. or greater. FDOT [Standard Plans Index 102-600](#) allows 200 ft spacing for work zone speeds of 40 M.P.H. or less and 1,500 ft spacing on limited access roadways. Minimum spacing may be reduced in accordance with the MUTCD and as approved by the engineer.



## Elevation Survey Diagram 5

### Within Two-Way Left Turn Lane

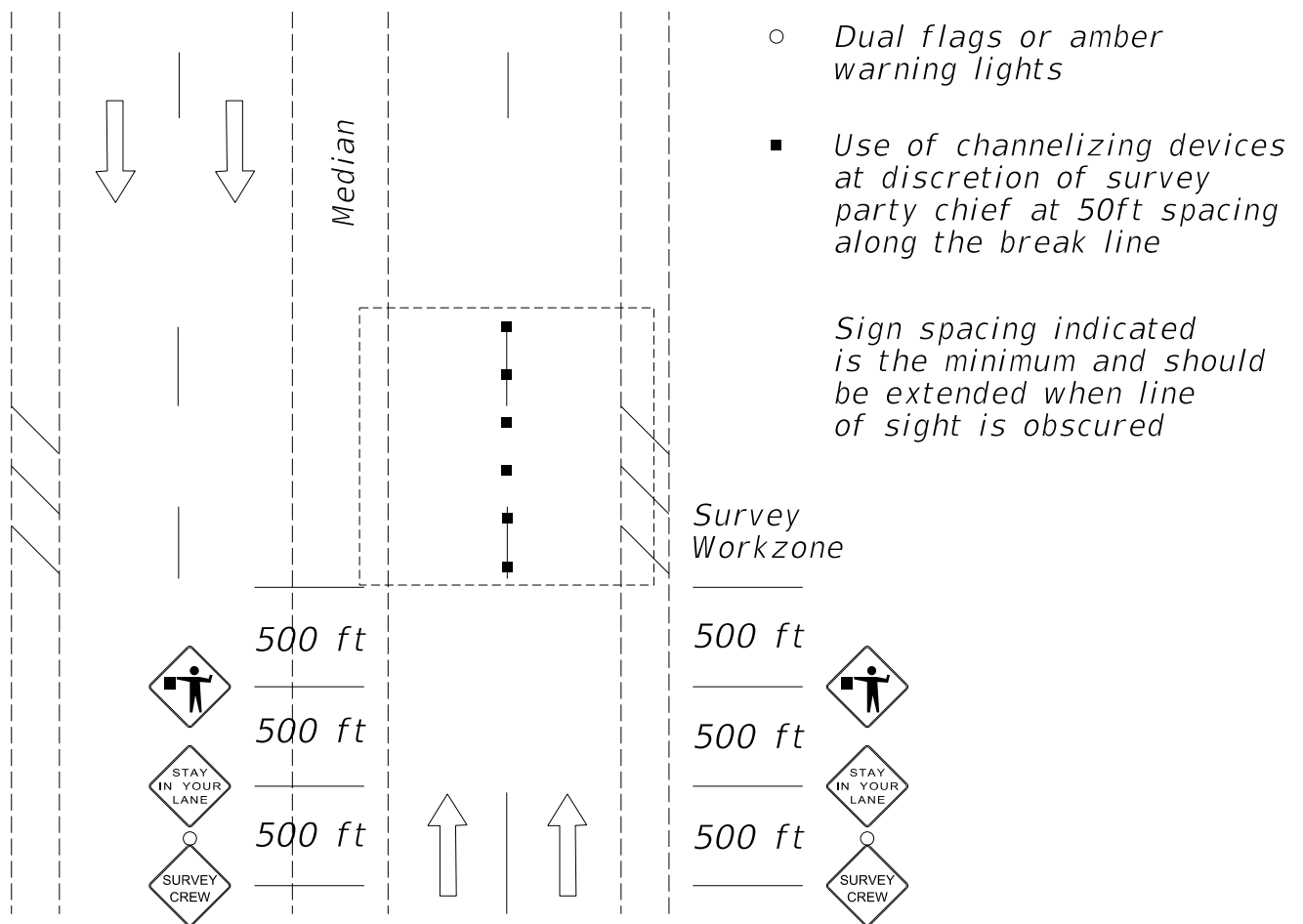
For survey crew members working in a two-way left turn lane within a survey work zone where the posted speed limit is 45 mph or greater.



## Elevation Survey Diagram 6

### Multi-Lane Divided, One Direction

For survey crew members working between active traffic lanes within a survey work zone and the Speed Limit is 45 M.P.H. or greater. Sign spacing shown is representative of work zone speeds of 45 M.P.H. or greater. FDOT *Standard Plans Index 102-600* allows 200 ft spacing for work zone speeds of 40 M.P.H. or less and 1,500 ft spacing on limited access roadways. Minimum spacing may be reduced in accordance with the MUTCD and as approved by the engineer.

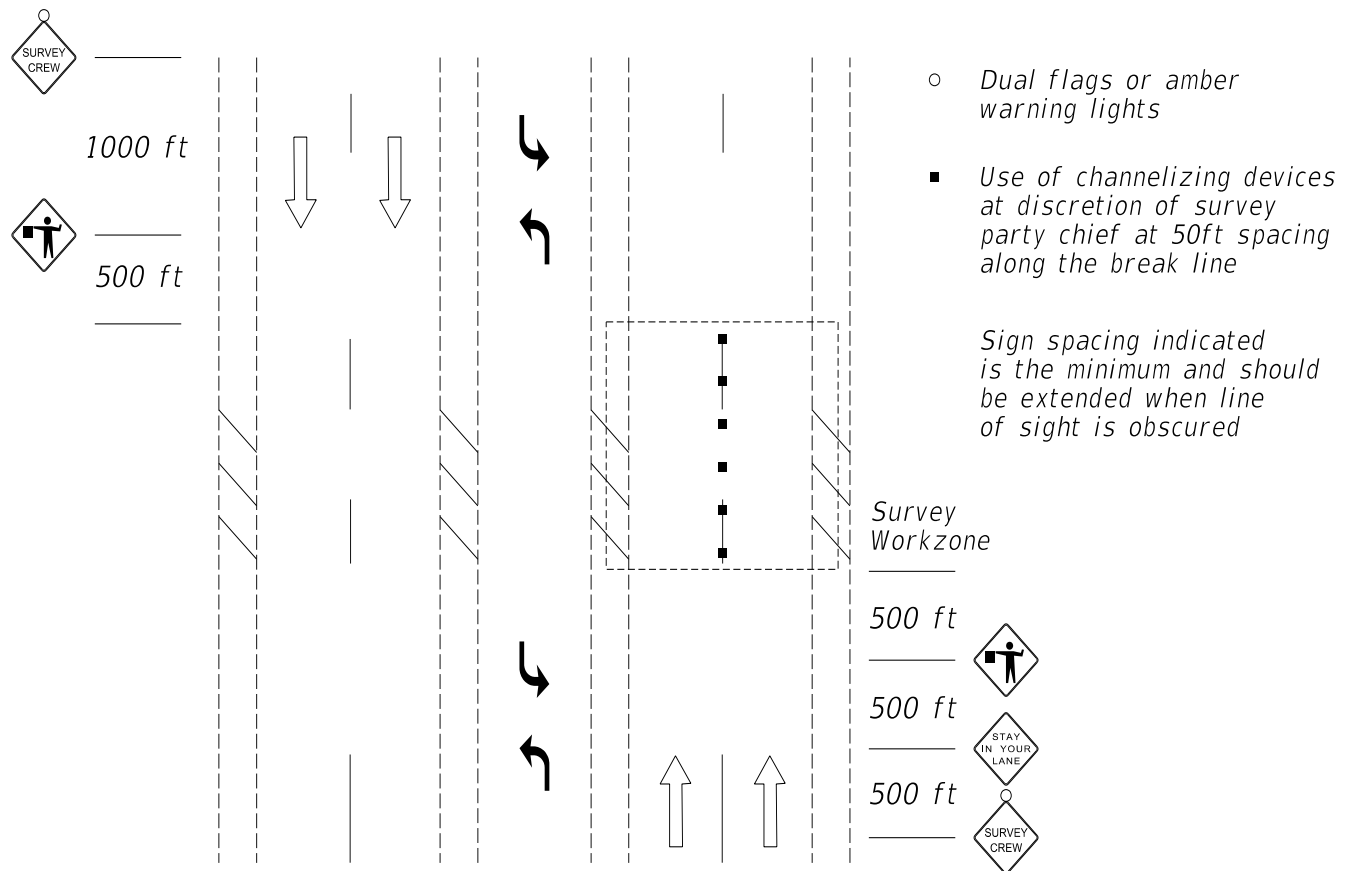




## Elevation Survey Diagram 7

### Multi-Lane with Two-Way Left Turn Lane

For survey crew members working between active traffic lanes or between an active traffic lane and two-way left turn lane when the speed limit is 45 M.P.H. or greater, when survey work zone affects both sides of the two-way left turn lane. Sign spacing shown is representative of work zone speeds of 45 M.P.H or greater. FDOT [Standard Plans Index 102-600](#) allows 200 ft spacing for work zone speeds of 40 M.P.H or less and 1,500 ft spacing on limited access roadways. Minimum spacing may be reduced in accordance with the MUTCD and as approved by the engineer.



**APPENDIX B – Safety Indoctrination**

New personnel shall have a definite understanding of what will be expected of them concerning on-the-job safety. To familiarize a new, promoted, or reassigned employee with the Department of Transportation's Safety policies and procedures, indoctrination is to be accomplished within the first ten (10) working days after the employee reports for work. The indoctrination may be accomplished through a personal interview, group discussion or lecture. An indoctrination form (Exhibit "A") will be used by the supervisor conducting the indoctrination. Upon completion of the indoctrination, the employee is required to sign the form acknowledging the supervisor's briefing. The form will then be placed in the new employee's personnel folder at his or her assigned headquarters and a copy forwarded to Tallahassee Personnel Office along with the employee's profile.

**EXHIBIT “A”****SAFETY INDOCTRINATION**

Check those items that were reviewed.

**Ch. 1                      Working in Traffic**

- ☐ Basic understanding of the typically used Standard Plans
- ☐ The wearing of personal protective equipment
- ☐ The use of traffic control devices
- ☐ Flagging Operations
- ☐ Surveying safety procedures in traffic
  1. Finding old baselines on pavement and then offsetting them.
  2. Tying in a section corner which is between active traffic lanes.
  3. Bench runs.
  4. Finding utilities on a design survey.
  5. Obtaining elevations for a DTM between active traffic lanes or in a two-way left turn lane.
  6. Obtaining elevations for a DTM on high-speed highways.
  7. Recovering POTs from an old baseline and placing a new baseline in its original position.
  8. Auxiliary lane and lane closures.
  9. Working in intersections.
- ☐ Safety inspections
- ☐ Use of vehicle warning lights
- ☐ Safety rules while working in traffic.

**Ch. 2                      Proper Use of Each Tool**

- ☐ Machetes
- ☐ Axes and brush hooks
- ☐ Digging tools, hand
  1. Picks
  2. Shovels
  3. Digging bars
- ☐ Driving tools, hand
- ☐ Chain Saws
- ☐ Pressurized spray cans

- |        |                          |                           |
|--------|--------------------------|---------------------------|
| Ch. 3  | <input type="checkbox"/> | Railroads, working near   |
| Ch. 4  | <input type="checkbox"/> | Fence Crossings           |
| Ch. 5  | <input type="checkbox"/> | Animal hazards            |
| Ch. 6  | <input type="checkbox"/> | Snakebites                |
| Ch. 7  | <input type="checkbox"/> | Poisonous plants          |
| Ch. 8  | <input type="checkbox"/> | Power lines               |
|        | <input type="checkbox"/> | Electrical storms         |
| Ch. 9  | <input type="checkbox"/> | Confined space entry      |
| Ch. 10 | <input type="checkbox"/> | Working in water          |
| Ch. 11 | <input type="checkbox"/> | Proper lifting procedures |

I hereby acknowledge that I have been briefed on the contents of DOT's "Survey Safety Handbook", and the above subjects were discussed and explained to me.

I further certify that it is my responsibility to comply with the provisions of Department Safety Procedures and I understand that my own safety as well as the safety of my co-workers, the general public, and department equipment is an inherent obligation and that it is a part of my duties and responsibilities to identify, correct, eliminate, remove, and report hazardous conditions and unsafe practices that could result in an accident.

Conducted By:

\_\_\_\_\_  
Immediate Supervisor Signature

\_\_\_\_\_  
Employee Signature

\_\_\_\_\_  
Job Title

\_\_\_\_\_  
Job Title

\_\_\_\_\_  
Unit

\_\_\_\_\_  
Date

cc: Central Personnel Office  
Personnel File  
Field Office  
Employee