

# *Aircraft Movement Area Familiarization Manual For Ground Vehicle Operators*



*Version: 3/27/2020*



## Table of Contents

General Information .....	4
Safety and Security .....	6
Non-Movement Areas .....	15
Aircraft Movement Areas.....	22
Taxiways.....	34
Runways .....	47
Runway Lighting .....	56
Airfield Signage.....	68
NAVAIDs.....	78
Runway and Taxiway Protected Areas.....	81
Appendix A: Key Acronym Definitions .....	87
Appendix B: Phonetic (ICAO) Alphabet and Numbers.....	88
Appendix C: Dallas/Fort Worth International Airport – Runway Configuration .....	89
Appendix D: Key Airfield Pavement Markings .....	90
Appendix E: Key Airfield Signs.....	91



DALLAS  
FORT WORTH  
INTERNATIONAL  
AIRPORT

*Published by the DFW Airport Operations Department, Technical and Simulated Training. For questions, comments, or corrections please contact us via email at [techtrain@dfwairport.com](mailto:techtrain@dfwairport.com)*

## General Information

### IMPORTANT! Driver Policy

Effective October 1, 2018, all drivers on the Airport Operations Area (AOA) **must abide** by the requirements set forth in the Airport Driving Handbook. This document can be found by visiting <http://dfwairport.com/drivinghandbook>. Questions regarding this policy or the handbook can be directed to [airfield.safety@dfwairport.com](mailto:airfield.safety@dfwairport.com).

### General Information

The Dallas/Fort Worth International Airport (DFW) is one of the busiest airports in the world, averaging approximately 1,800 operations (combined landings and takeoffs) daily. It provides service to over 200 destinations including approximately 40 international destinations around the world. DFW annually ranks within the top five busiest airports in total operations in the world, and, ranks in the top ten of the busiest passenger traffic airports in the world.

The airport is surrounded by the cities of Grapevine, Coppell, Irving, Grand Prairie, Fort Worth, and Euless, encompassing more than 27 square miles of land. DFW is the third largest airport in land size area, in the world. DFW is owned by the cities of Dallas and Fort Worth.

American Airlines (AA) and Envoy (previously American Eagle) Airlines (AE) carry approximately 85% of passenger traffic at DFW.

The airport is generally considered to be defined by two areas of operations: Landside and Airside.

Landside includes the public side of the airport such as toll & non-toll roadways, parking areas & garages, hotels and the ticketing counters/baggage claim areas of the terminals.

The Airside portion of the airport refers to the restricted-access and secured Air Operations Area (AOA). This is the portion of the airport where aircraft land, takeoff, taxi, and park.

**The AOA of Dallas/Fort Worth International Airport is a highly restrictive portion of the airport where only authorized persons may enter.**

### Introduction to this Familiarization Manual

The information contained in this Aircraft Movement Area (AMA) Familiarization Manual for Ground Vehicle Operators is for persons who will operate unescorted on the AMAs. This unescorted access requires authorization, training, and certification. AMAs are restricted-access/operation areas of the Air Operations Area (AOA).

This manual is a review of the regulatory and safety information related to unescorted access and operations by ground vehicles and personnel on the AMAs. It covers information required by Title 14,



---

## General Information

---

United States (U.S.) Code of Federal Regulations (CFR) Part139, “CERTIFICATION OF AIRPORTS”, and Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5210-20A “GROUND VEHICLE OPERATIONS ON AIRPORTS”. This manual includes information pertaining to the AOA, the AMA, and also to applicable information on the aircraft non-movement areas (which are the Passenger Terminals and Hangar ramp areas).

Each person who operates unescorted on the AMA is responsible for being familiar with this material. Personnel must be able to answer FAA Airport Safety Inspector’s questions during their inspection visits about this material.

### Learning Hub

**Prior to obtaining a driving endorsement and operating a vehicle unescorted on the AOA, an individual must successfully complete the training program applicable to the requested driving endorsement level to learn the procedures, rules, enforcement actions and requirements of these driving policies. (Airport Driving Handbook, page 9 Sec B Training).**

Each person is required to complete several online training units before operating unescorted on the AMA. The Movement Area Driver Training Curriculum is found in the DFW’s Learning Hub. If the Curriculum is not displayed in your Learning Plan, contact [TechTrain@dfwairport.com](mailto:TechTrain@dfwairport.com).

The Movement Area Curriculum covers subjects such as Safety, Security and the Non-Movement Area, Radio Communications Procedures and Runway Incursion Avoidance, Protected & Safety Areas and Low Visibility Operations, Vehicle Equipment, and, Airfield Signs, Lighting and Markings.

Additionally, each person who will have unescorted access to the AMA will also need to complete a Driver Simulation Scenario, demonstrating their competency in operating on the AMA. Annual & biannual recurrent training is required for all AMA-unescorted access persons. Information on the AMA online and simulator training can be found in the individual’s Learning Plan of the Learning Hub:

- For DFW Airport Board Employees ONLY: Go to the Learning Hub (Found under Career Development on Connected). All required courses will be displayed under My Learning Plan.
- For all others who are new to the Learning Hub, please contact [techtrain@dfwairport.com](mailto:techtrain@dfwairport.com) to confirm your eligibility for this training. Once approved, you will register at [www.dfwairport.com/learninghub](http://www.dfwairport.com/learninghub). Once registered, the required training can be added to your Learning Plan.



# Safety and Security

## Security and Safety on the AOA

The Air Operations Area (AOA) includes all airfield portions of the airport that are designed and used for landing, take off, and surface maneuvering of aircraft. The AOA also includes aircraft parking, loading/unloading, and maintenance/hangar ramp areas. A six-foot-tall chain link fence, topped with barbed and razor wire, as well as positive-controlled AOA entry/exit gates, protect all such areas. No unguarded openings to the AOA perimeter fencing are allowed.



The security protection of the AOA is maintained in accordance with CFR PART 1542, entitled "Airport Security." The DFW Department of Public Safety (DPS) is responsible for airport security and maintaining the DFW Security Program. Any person authorized to be in the AOA is also responsible for ensuring that unauthorized access is prevented, and if observed, reported. Open gates shall be guarded and no person shall be allowed AOA entry without proper identification, nor will any vehicle be allowed entry without a valid Vehicle Access Permit, unless that person and/or vehicle is under escort at all times by a person authorized to escort.

Any person/vehicle not displaying a proper access badge and/or Vehicle Access Permit, that is not being properly escorted, shall be escorted off the AOA by Airfield Operations or DPS.

Report any unescorted person who does not display proper identification and/or any vehicle that does not display a valid Vehicle Access Permit, to the DFW DPS immediately.

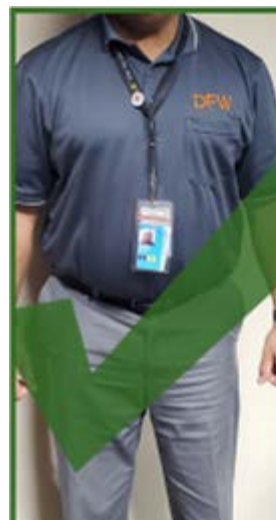
## Security Identification Display Area (SIDA)

The SIDA is that portion of the airport identified by the airport's security plan as the area requiring each person to continuously display airport-approved security identification medium (i.e., an Airport-issued personal picture badge) over their outermost garment and above the waist-belt area, unless that person is under airport-approved escort, and the escort is displaying a valid DFW SIDA badge.

The SIDA encompasses Passenger Terminals A, B, C, D, E, and E-Satellite ramp areas. It also includes the Airline Cargo/Terminal 5E (previously the Delta Airlines Cargo) ramp area, the East and West Airfreight/Air Cargo ramp areas, the DFW International Air Cargo ramp areas, all American Airlines hangar ramp areas, the Envoy/American Eagle Airlines hangar ramp area, and the present Corporate Aviation (CA)/Terminal 1E and the previous General Aviation (GA) ramp areas.

## Valid Driver's License

Everyone must have in their possession a valid state-issued driver license or a limited state-issued driver license that allows the individual to operate a vehicle under the terms of the limited driver license.



**OK. Badge worn over outermost garment and above waist-belt.**



**NOT OK! Badge worn over outermost garment, but NOT above waist-belt.**

## AOA Badges

The Airport Identification Badge, also known as the AOA Badge, is issued by Access DFW to persons who are authorized access to secure areas of DFW Airport through doors and gates controlled by the Automated Access Control System (AACCS). For SIDA Badge information, go to the web site: [www.dfwairport.com/badge](http://www.dfwairport.com/badge)

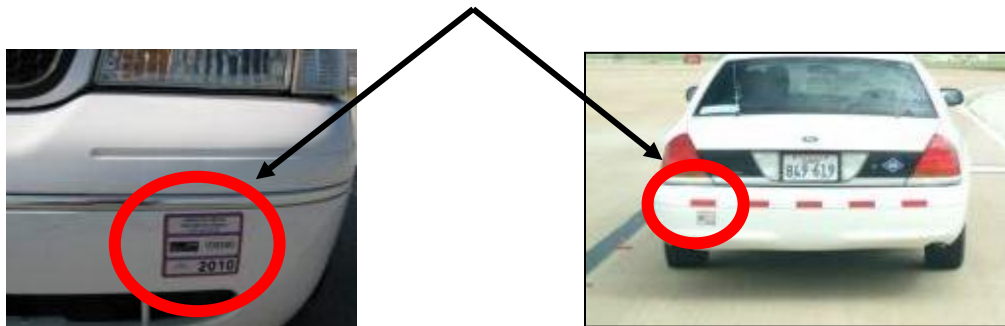
## Authorized Access to the SIDA

No person shall enter the SIDA without proper authorization. Any person found in the SIDA without a valid DFW AOA/SIDA Badge, and not being properly escorted by someone with a current DFW AOA/SIDA Badge, will be considered unauthorized, reported to DFW DPS and removed from the SIDA immediately. The unauthorized person will be subject to prosecution. Additionally, any vehicle not displaying a valid DFW AOA Vehicle Access Permit, that is not being properly escorted by a person with a current DFW AOA/SIDA Badge, shall be reported to DFW DPS and escorted off the AOA.

## AOA Vehicle Access Permits

Access DFW administers the AOA Vehicle Access Permit program. There are three types of Vehicle Access Permits – Permanent, and Temporary & Escorted Vehicle Access Permits.

The Permanent AOA Vehicle Access Permit (consisting of 2 identical decals for each vehicle – examples shown below) is affixed to the front and rear bumpers of the vehicle that receives the permit. The Permanent Permit decal displays the permit number and expiration date, and is valid for a maximum of three years.



The Temporary AOA Vehicle Access Permit consists of a blue hanger-type placard designed to be hung on the inside rear view mirror of the vehicle to which the permit is issued. It contains the permit number, the vehicle's license plate number, and the expiration date of the permit which is a specific period of time that is less than one year.



**(Temporary AOA Vehicle Access Permit)**



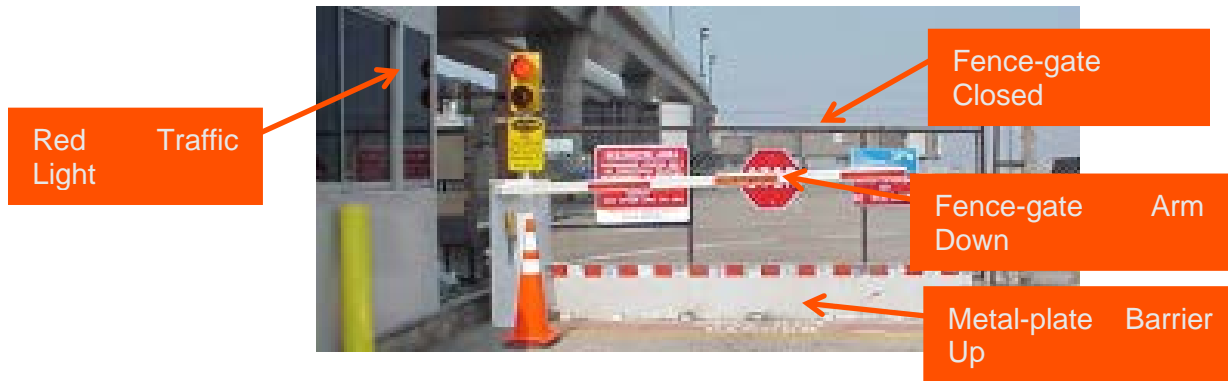
**(Escorted Vehicle Access Permit)**

The Escorted Vehicle Access Permit is also a temporary but a more restrictive duration permit. It is a blue hanger-type placard designed to be hung on the inside rear view mirror of the vehicle being escorted. This

## Safety and Security

permit is issued by DPS at the AOA entry gate, and is valid for only 24 hours! This vehicle must be constantly escorted by an SIDA/AOA Badge - holder.

Only authorized vehicles with valid AOA Vehicle Access Permits (i.e., Permanent or Temporary) are allowed on the AOA without an escort. The person driving the vehicle must have a valid SIDA AOA Badge. The maximum speed limit in the aircraft non-movement areas is 20 mph.



### AOA Gate Barrier System – SIDA Vehicle Entry/Exit

When approaching one of these gates for entry into, or exit out of the AOA, a Red Traffic Light will be seen, the fence-gate closed, the fence-gate arm DOWN (horizontal position), and the metal-plate barrier UP (vertical position).

When the AOA Gate Barrier System is activated, the traffic light turns Yellow, the fence-gate opens, the fence-gate arm rises (vertical position), and the metal-plate barrier lowers (horizontal position).

For exits, the system activates when the vehicle drives over an in-pavement detection loop, located before the gate. Once open, the vehicle pulls forward to a point just beyond the opened gate side over an in-pavement detection loop, and STOP.

### WARNING: In all cases:

- If the traffic light is Red, DO NOT ATTEMPT to cross the metal barricade!
- DO NOT TAILGATE OR ATTEMPT TO PIGGYBACK WITH A VEHICLE AHEAD.
- The vehicle driver is responsible for any damage caused to the barricade, the fence-gate arm, the traffic light, the AOA fence-gate, or the driver's vehicle.
- ALWAYS wait for the gate to completely close behind you, regardless of whether or not the AOA Gate is staffed with a security guard. YOU ALONE ARE RESPONSIBLE FOR INSURING THE GATE'S SECURITY IN THIS SITUATION! To ensure this secure closure, pull forward far enough for the gate to swing closed behind you. Once the fence-gate is closed and secure, you may drive away. NOTE: If there is a vehicle exiting immediately behind you, pull forward leaving enough space for that vehicle to exit, pass over the in-pavement loop, and thereby activate the fence-gate closing mechanism. That following vehicle must then take the position of ensuring the AOA fence-gate opening is closed and secure. The security of the gate becomes the responsibility of the vehicle that has just exited.





### AOA Ground Vehicle Operator Safety



#### Safety Belts

Safety belt use is mandatory, and vehicle restraints shall be used at all times by occupants traveling in a vehicle that is equipped with such safety items.

#### Safe Operation of Vehicles

Operators of ground vehicles in the AOA will operate their vehicles in a safe and responsible manner. Be courteous, and obey all posted speed limits. Keep in mind that during inclement weather lower speeds are prudent in order to maintain a safe and secure working environment.

No vehicle shall be operated on the AOA in a careless or negligent manner, in disregard of the safety of others, or at a speed or in a manner which endangers persons or property.

#### Safety Equipment

Safety vests with reflective striping are required for all personnel working or driving on the AOA. It is recommended that other personal safety equipment appropriate to the work area also be utilized. Using items such as hearing protection, break-away neck lanyards, and other safety items may reduce the risk of injury in the workplace.



#### Personal Communications/Electronic Devices

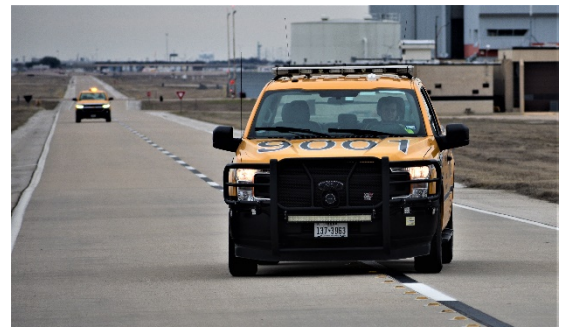
According to the Airport Driving Handbook: "Mobile devices cannot be used to text, use internet applications or to video or capture images while vehicles are in motion."

**Penalties: Violations of DFW Airport Rules and Regulations are grounds for immediate suspension or revocation of an Airport Identification Badge, SIDA badge, Driving Endorsement, and/or Vehicle Access Permit(s).**

#### Ground Vehicle Operator Responsibilities

The following are the responsibilities of ALL vehicle operators intending to operate on the DFW AMA:

- Ensuring each vehicle they operate is equipped with an operational light-bar or flashing/rotating beacon on top of their vehicle. These lights will be on when operating on the AMA. (NOTE: Not all DPS vehicles are equipped with exterior flashing lights/light bar/rotating beacon atop the vehicle. Some DPS vehicles have these lights installed inside the vehicle but visible to outside the vehicle.)



## Safety and Security

- Vehicle operators authorized to operate unescorted on the AMA must have an operational two-way VHF (Very High Frequency) radio capable of receiving & transmitting on the DFW Airport Traffic Control Tower (ATCT) frequencies. The operator shall (1) monitor the appropriate ATCT frequency that the ATCT uses for the vehicle's location; (2) be aware of aircraft movement(s) around their vehicle, and (3) be alert to the possibility of the ATCT attempting to contact the vehicle operator.
- The vehicle must be equipped with a current Airfield Emergency Grid Map.
- Vehicle operators must use correct phraseology and procedures when requesting access on or to cross a runway.
- DFW Airport Board vehicle operators must also have a two-way 800 MHz (digital) Airport Board radio tuned to "Ops Primary." (DPS Fire will monitor Fire-1, and DPS Police will monitor Police-1, unless responding to an emergency, then they will use a frequency as assigned).
- ALL vehicle operators must always remember that:

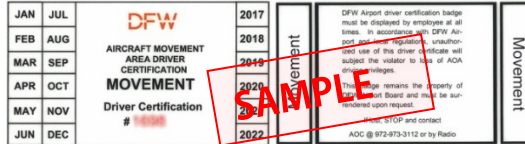
**AIRCRAFT ALWAYS HAVE THE RIGHT OF WAY,  
EVERYWHERE IN THE AOA!**



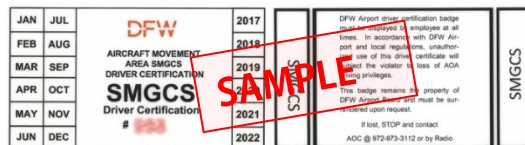
**AOA Driver Authorization/Identification**

DFW Airport Administrative Policy and Procedure, AO.014.02, Ground Vehicle Driver Training for Air Operations Area, effective 08/01/2015, states that vehicle operators shall receive a Driver Certification card which clearly indicates when all required training has been successfully completed. This authorization shall indicate in which area(s) of the AOA where the vehicle operator is authorized to drive”. The expiration month & year will be punched at issuance. Facsimiles of the Authorizations’ fronts & backs are shown below:

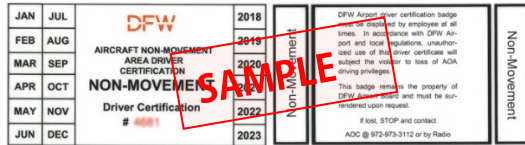
**MOVEMENT** Applies to vehicle operators “authorized to operate a ground vehicle on any area of the AOA, excluding during SMGCS conditions.”



**SMGCS** Applies to vehicle operators “authorized to operate a ground vehicle on any part of the AOA, including during declared SMGCS conditions.”

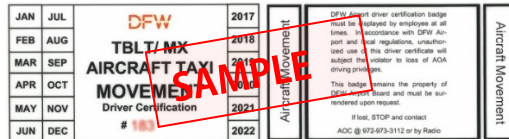


**NON-MOVEMENT** Applies to vehicle operators “authorized to operate a ground vehicle, unescorted, but only in the Non-Movement Area of the AOA.”

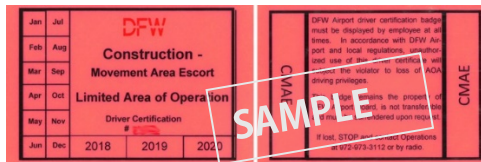


**Limited Access Badges**

**TBLT/MX AIRCRAFT TAXI** This badge allows limited access to the Movement Area of the AOA. Applies to Towbar-less Tractor (TBLT) operators and Aircraft Mechanics moving aircraft across the AMA. This badge does not allow unescorted access to the AMA at any time other than when relocating an aircraft.”



**Construction Movement Area Escort (CMAE)** This badge allows limited access to the Movement Area of the AOA. Applies to trained and certified Construction area escorts and allows access to the Movement Area on the designated haul route only.



**Flagger (FLG)**



### Ground Vehicle Lighting Equipment

#### Ground Vehicle Lighting

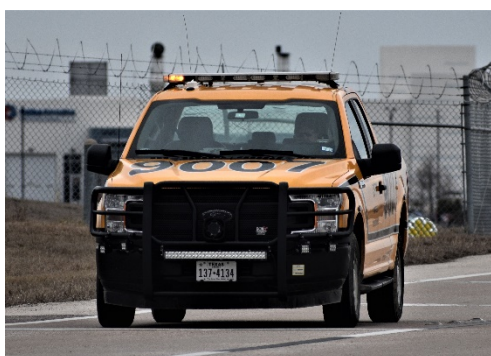
Before operating in the Air Operations Area (AOA):

All headlights, tail lights, running/clearance lights, and beacons/light bars on the vehicle shall be in operational condition.

Headlights, and if equipped, beacons/light bars, and running/clearance lights should be on while operating on the AOA.

#### Lighting Equipment/Colors

- Aircraft Rescue and Fire Fighting (ARFF) Vehicles – Red or combination of red-and-white flashing beacons. During non-emergency driving, amber/yellow flashing beacons will be used.



- Airfield Operation's Vehicles – Yellow flashing beacons/bars.
- Aircraft Support Vehicles – Yellow or red steady burning beacons.
- DPS Police & Airport Security Vehicles – Signal blue or a combination of red-and-signal blue flashing beacons for most.
- Other vehicles (Ex. Construction, Tenants, etc.) – Yellow flashing/rotating beacons at the highest vertical point of the vehicle.



### Aircraft Push Back Operations Safety

Aircraft which are parked at passenger terminal gates "push back" to exit the gate area, and taxi for takeoff.

Push backs occur when aircraft are slowly pushed backwards by a tug-tractor. Be alert for wing walkers and their signals, this will alert you to aircraft preparing to "push back" from the gate, under the power of a tractor. When it is clear behind the aircraft, the wing walkers will raise their batons, which signal the tug driver it is "all clear", and the "push back" process begins. All vehicles must yield to this operation!

**DO NOT DRIVE behind aircraft pushing back! STOP and give way to the aircraft operation.**

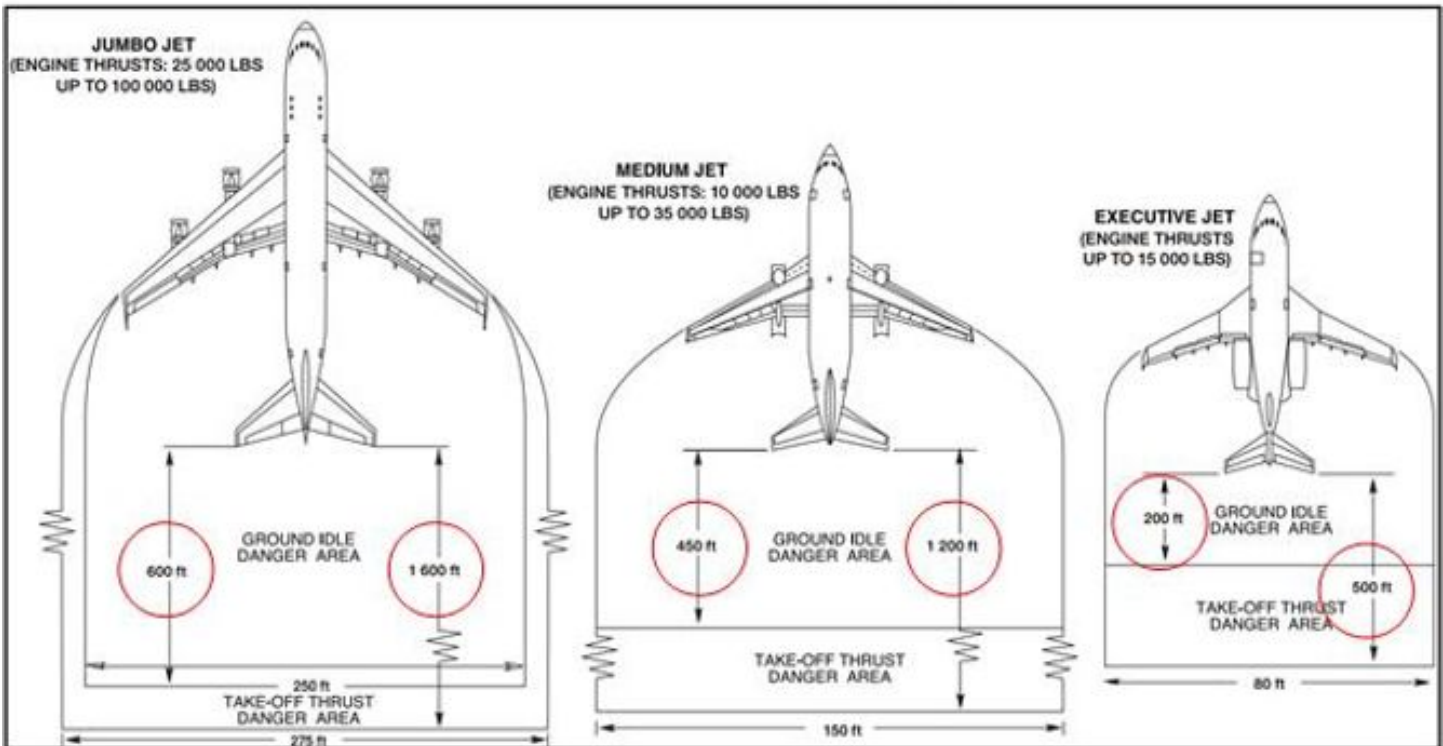
**DO NOT DRIVE between any wing walker or aircraft marshaller while the aircraft is being pushed, or pulled by an aircraft tug-tractor.** Stop when directed by the aircraft handlers and yield to the operation.



### Jet Blast Danger

When driving behind aircraft that are taxiing, be aware of the hazards of jet blast and use caution when aircraft apply "extra power" to begin taxiing from a standstill, or increase the aircraft's speed while taxiing. Avoid the "ingestion area" in front of the engine inlets.

## Jet Blast Danger Area



### Nighttime Driving Conditions Safety

Nighttime driving requires total concentration on the part of the vehicle operator. Nighttime driving can be disorienting and confusing. Aircraft can taxi with or without their taxi or landing lights on, at their discretion. Navigation/Position/Anti-collision lights alone may be hard to see by vehicle operators.

When driving on the AOA at night, always use caution. Open your side window(s) slightly to detect engine noise, and look for the Navigation/Position/Anti-collision lights of taxiing aircraft.



### Vehicle Accident Reporting

Any accidents occurring anywhere on the airport should be reported immediately to the Airport Operations Center (AOC) at 972-973-3112 and a written report made of the incident. DPS will respond to the location, evaluate the damage and include that information in the report. **Report any personnel injury immediately to 911.**





## Foreign Object Debris/Foreign Object Damage (FOD)

FOD is Foreign Object Debris, or a substance, part, component, natural element or live animal that has the potential to accidentally encounter an aircraft and threaten its safe operation, and/or cause such damage that requires repair to the aircraft. FOD also stands for Foreign Object Damage to an aircraft attributed to foreign object debris.



FOD can be found in equipment, at terminal gates, cargo aprons, taxiways, runways, and run-up pads. It causes damage through direct contact with airplanes, such as cutting airplane tires or being ingested into engines, or as a result of being thrown by jet blast and damaging airplanes or injuring people. FOD can cause severe, or even fatal, injuries.

FOD barrels are located on each gate. FOD represents an enormous cost for aircraft repair and millions of dollars in lost revenue while the aircraft are out of service. FOD can cause personal injury, which can result in lost wages or even permanent disability.

Effective FOD prevention requires daily attention.

Do not eat or drink inside vehicles on the ramp, as the trash this generates can lead to additional FOD. Do not leave trash in the open bed of a truck.



**A truck bed is not a place for trash. Trash can fly or fall out and become FOD.**

If you find debris or trash – PICK IT UP immediately and place it in a FOD container.



**Concrete pavement breaking up! Pieces of concrete are becoming FOD.**

# Non-Movement Areas

## Aircraft Non-Movement Area Definition and Location

The term Aircraft Non-Movement Area, or just the **Non-Movement Area**, is an airfield area where vehicle & pedestrian activities are not managed by the DFW FAA Control Tower. This term has nothing to do with aircraft movements in the area.



The airport's Control Tower is **ONLY** responsible for, and **ONLY CONTROLS** aircraft, vehicle and pedestrian activities in the area designated as the Aircraft Movement Area (AMA). The AMA consists of the runways, taxiways, and other areas of an airport which are utilized for taxiing, air taxiing, takeoff, and landing of aircraft, not including loading ramps and aircraft parking areas.

Personnel who work in the Non-Movement Area (i.e., ramps, aprons, or hardstands) of the AOA are considered Non-Movement Area Personnel, and they must remain within these Non-Movement Areas while in the "airside" portion of the airport.

The Movement and Non-Movement areas are visibly separated by a surface-painted boundary line – the **Non-Movement Area Boundary Marking** (==). Persons not authorized in the AMA unescorted (i.e., ramp personnel), who cross this Non-Movement Area Boundary Marking are committing an unauthorized entry of the AMA, and are in violation of Federal and DFW AOA Driving Rules!

DFW's Non-Movement Areas include the ramps of Passenger Terminals' A, B, C, D, E, E Satellite, Terminal F Hardstand, West & East Air Freight ramps, the United Parcel Service (UPS) ramp, American Airlines (AA) Hangars 1–5 ramps, Airline Cargo (Terminal 5E) ramp, the Corporate Aviation (CA)/(Terminal 1E) ramp and the previously-used General Aviation (GA) ramp, the DFW International Cargo ramps, and Taxilane H1 on the Southwest Hold Pad (which cannot be reached without entering the AMA! Non-Movement Area Personnel must call the AOC 972-973-3112 for an escort.)

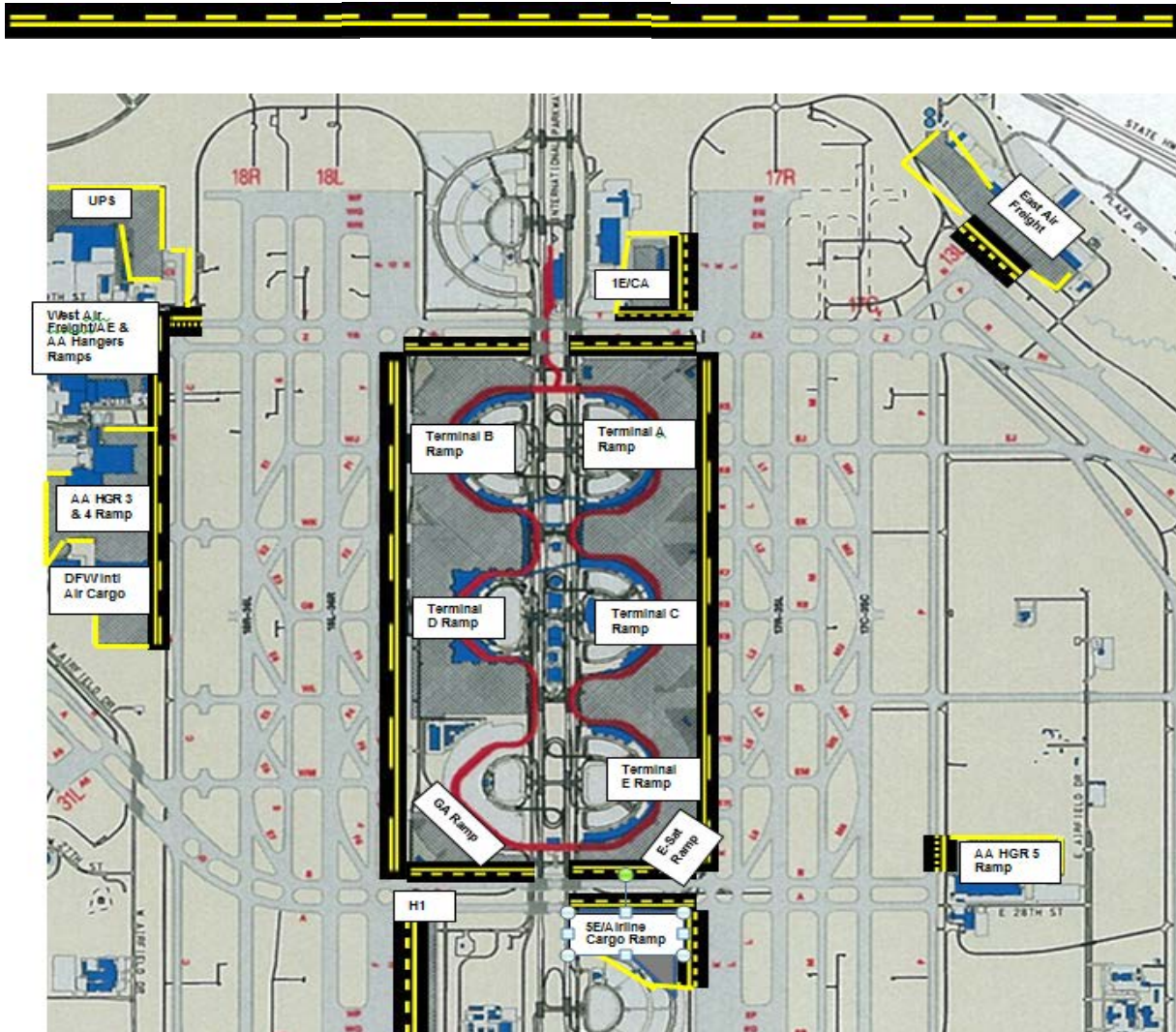


**DFW** International Cargo Ramp



**DFW** Terminal C Ramp

## Non-Movement Areas



The above depiction shows an overhead view of the DFW Non-Movement Areas (NMAs) shaded in gray, within the yellow/black-outlined Non-Movement Area Boundary Markings and the yellow fence/AOA Boundary line.

### Central Terminal Area Definition & General AOA Driving Rules

The Central Terminal Area (**CTA**) is the area encompassing Passenger Terminals A, B, C, D, E, and E-Satellite ramps, and, the Corporate/General Aviation ramps. The CTA is a part of the aircraft Non-Movement Area.

## Non-Movement Areas



Terminal A Ramp



Corporate Aviation Ramp

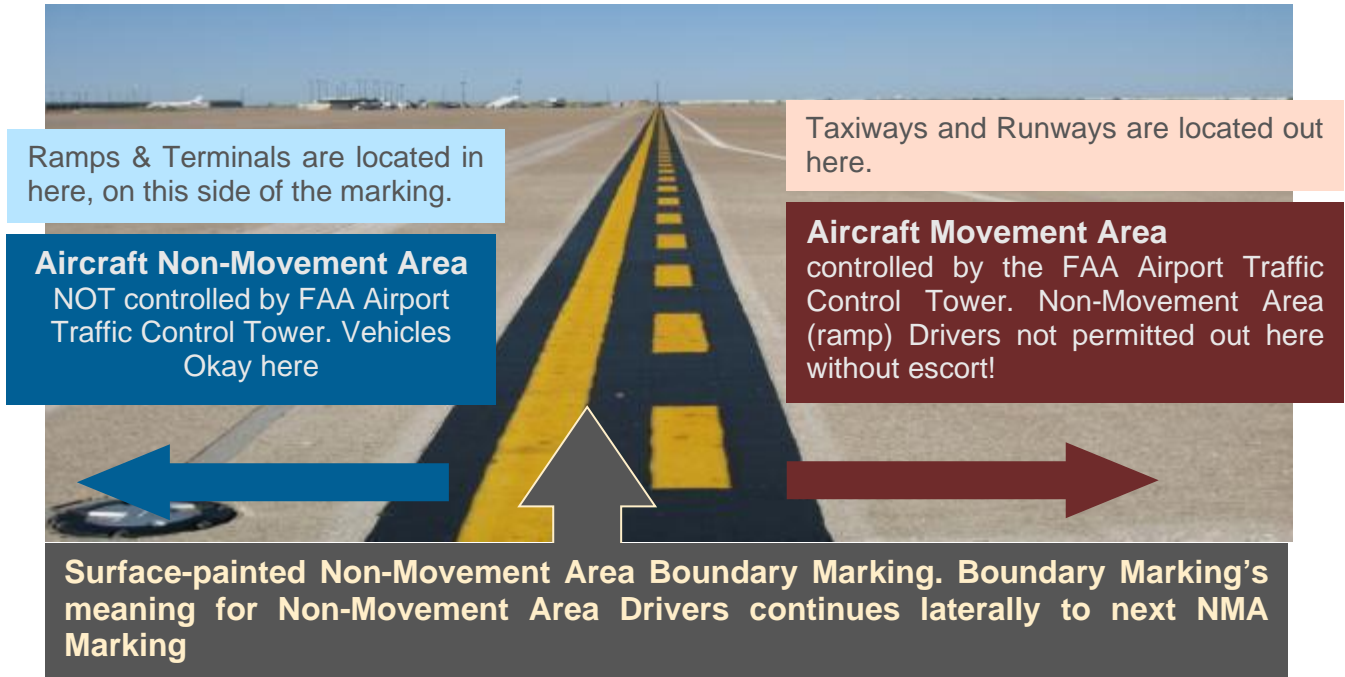
### General rules on the AOA while operating in the aircraft Non-Movement Area

- **Aircraft always have the right-of-way, everywhere in the AOA.**
- Maximum speed limit on ramp areas is 20 MPH. Inclement weather may dictate lower speeds.
- On ramp areas, aircraft taxi via taxilanes which are designated by a solid line usually yellow in color, but in some cases airline tenants may utilize other colors. Always use caution when driving near aircraft in these areas.
- Fire lanes are designated by RED LINES and must always remain clear.
- Do not block driveways or AOA gates.
- Do not park within (15) feet of a fire hydrant in any direction.
- Do not drive under any portion of an aircraft or allow the wing of an aircraft to pass over your vehicle.
- Do not drive between an aircraft and a loading gate when passengers are using the Passenger Boarding Bridge.
- Do not drive under or park under a Passenger Boarding/Jet Bridge.



## Non-Movement Areas

### Non-Movement Area Boundary Marking



The DFW Airport Certification Manual (**ACM**) specifies that only ground vehicles necessary for the operation of the airport shall be authorized unescorted access into the Aircraft Movement Area (AMA). Ground vehicle operators/drivers/pedestrians that are “necessary for the operation of the airport”, are identified in the ACM, and this manual.

Non-Movement Area (that is, ramp and apron) personnel SHALL NOT CROSS the Non-Movement Area Boundary Marking unless they are accompanied by an Authorized Escort.

Immediately report to DFW Airfield Operations any Non-Movement-Area-ONLY vehicles or pedestrians who are observed unescorted beyond the Non-Movement Area Boundary Marking. Crossing this Boundary Marking can lead to suspension of the violator's SIDA/AOA Badge, and prohibit the violator from entering the AOA.

Vehicles or pedestrians who have a valid need to leave the Non-Movement Area and cross into the AMA, are required to obtain an Airport Board escort by contacting the Airport Operations Center (AOC) at 972-973-3112.

### Non-Movement Area Boundary Marking Lateral Extensions

Non-Movement Area Drivers and Personnel are prohibited from being in the AMA (on the dashed side of the marking) without an authorized Escort. These surface-painted boundary markings are only found on paved surfaces that intersect Movement Area taxiways; however, they by no means end there.



## Non-Movement Areas

Although not marked or visible, the “Non-Movement Area Boundary” extends laterally to either side of the Marking, across the asphalt shoulders of the taxiway, and across any of non-taxiway areas to join the next Non-Movement Area Boundary Marking. (See the example of red solid/dashed lines depicting this Marking’s extension below.) This implied border also applies to Runway Holding Position Markings.



**The Non-Movement Area Boundary Marking, and its significance for Non-Movement Area Personnel, extends and continues invisibly across the asphalt shoulders, and any adjacent grass, dirt or vehicle roads until reaching and joining the next taxiway’s or taxilane’s Non-Movement Area Boundary Marking. DO NOT CROSS THE LINE!**



**This extended and invisible boundary line is an invisible “No Ramp Personnel beyond this point” line.**

## Non-Movement Areas

### Emergency Access (ARFF) Roads In The Aircraft Non-Movement Area

Aircraft Rescue and FireFighting (**ARFF** - pronounced “arf”) roads can also be known as emergency access roads, emergency roads, or simply ARFF Roads. These roads are used for DPS emergency personnel & equipment responses to airfield locations, from each DPS fire station.

When operating a ground vehicle, do not block or obstruct ARFF roads. Should you become aware of any ARFF road being blocked, immediately notify Airfield Operations (PORT 102, PORT 110, or PORT 111) or call the AOC at 972-973-3112.

**Always give way to EMERGENCY equipment. Always yield to aircraft.**

### Special/Joint-Use Emergency Roadway Procedures

DFW has a unique joint-use ARFF/ground service vehicle road on the northwest side of the airfield. Authorized ground service vehicle operators are permitted to drive on these roads, but only on the outer (shoulder) surface lanes as identified here by the black arrows in the image below.



The center lanes (identified here by the red arrows) are for airport emergency vehicles only! The maximum speed on all ARFF roads, including the Northwest ARFF/Service Road is 45 mph. Of course, weather conditions may dictate a lesser safe operating speed.



- Use caution while driving on ARFF roads as many of these cross active taxiways and taxilanes, especially those adjacent to the terminal and cargo areas where aircraft operations may be in progress.
- **DO NOT DRIVE on the UPS (UNITED PARCEL SERVICE) RAMP when travelling on this route!!**

### Special Emergency Roadway (ARFF) Procedures for the Joint-Use of the West Cargo Area Emergency Access Roadway Route.

There are 6 taxiway/taxilane & roadway intersections located on the 18R ARFF Road & the Northwest Emergency Loop Route (aka West Cargo ARF Roadway) that require special attention by all vehicle drivers due to these taxiway/taxilane & roadway intersections being used by taxiing aircraft and Emergency Vehicles. These Intersections are denoted by special white and black pavement markings called **zippers** where they cross taxiways/taxilanes.



## Non-Movement Areas

Personnel authorized to drive on the West Cargo Area ARFF must ALWAYS give the right-of-way to aircraft & airport emergency vehicles. Ground Service Vehicles must yield completely when being approached from head-on, from behind, or when following behind emergency traffic.

Due to the weight of emergency vehicles, DPS emergency trucks cannot travel on the shoulder of the road. Ground Service Vehicle drivers must move to the right shoulder of the roadway (as far as the shoulder and the ground service vehicle's weight will allow), come to a complete stop, and let the emergency vehicle(s) pass.

### Authorized Non-Movement Area Drivers' Vehicle Access to the American Airlines/Delta Air Lines Southeast Glycol Storage Area



This ARFF Emergency road leads from the Terminal 5E/Airline Cargo ramp, south to the American (AA) and Delta (DL) Air Lines' Southeast Glycol Storage area. AA and DL ground service vehicles driven by non-movement area personnel are the only tenants authorized to use this road.

This access road to the AA and DL Southeast Glycol Storage area continues past the blast wall. AA/DL drivers must remain on this road depicted by the green arrows! NON-MOVEMENT AREA DRIVERS DO NOT TURN LEFT WHERE THE RED ARROW INDICATES!



WHEN EXITING THE GYCOL STORAGE AREA, NON-AMA DRIVERS DO NOT TURN or PROCEED EAST towards the Taxiways, the Southeast Hold Pad, the Southeast Perimeter Road or the Runways! Travel beyond the point shown below, in those directions, requires an Authorized Escort.

# Aircraft Movement Areas

## Vehicles Operating on the AMA

Letters of Agreement (LOAs) between the DFW International Airport Board and the FAA Air Traffic Control (ATC) authority at DFW, provide guidance on DFW Airport Board-owned ground vehicles operating on the ATC-controlled Aircraft Movement Area.

## Jurisdiction of the Aircraft Movement Area

These LOAs, (attachments to the ACM), define jurisdictional responsibilities for the control of aircraft and ground vehicular movement on specific areas of DFW Airport. These “specific areas” are under the control of FAA ATC.

Airport Board-Owned Ground Vehicles Authorized to Operate Unescorted in the AMA. The DFW/FAA LOAs also define operating procedures for control of Airport Board vehicles/operators on the DFW Airport AMA. Authorized Airport Board vehicle operators are those designated employees of the Dallas/Fort Worth International Airport Board who have received driver training in accordance with Title 14 CFR Part 139.301, 139.303, and 139.329. Additionally, these operators/drivers are required to receive training in procedures and rules for vehicle operation within the AMA, and, certification by the Airport Board Operations Department as knowledgeable and proficient to operate an Airport Board-owned vehicle in accordance with those procedures and rules.

The DFW ACM further specifies that the employees of the following Airport Board Departments are “necessary for the operation of the airport” and are therefore “authorized access into the movement and safety areas” unescorted. They are:

- Operations Department – Airfield Section - All
- Department of Public Safety – Fire and Police – All
- Energy, Transportation and Asset Management Department – Designated positions
- Airport Development & Engineering Department – Designated positions
- Environmental Affairs Department – Designated positions
- Information Technology Services – Designated positions

Ground Service Vehicles that are not DFW Airport Board-owned, but are also authorized to Operate Unescorted in the AMA. The LOAs and DFW ACM also contain provisions for certain Non-Airport Board-owned vehicles to operate on the AMA, without escort, in accordance with established rules and procedures. They are:

- FAA NAVAIDS Maintenance (also called “FAA SOC” or “Tech Ops”)
- American Airlines Maintenance Towbarless Tractor (“SuperTug”) Operations.
- Certified Movement Area Escorts (CMAE) have very limited access to haul routes only.

All other ground vehicles/drivers needing to access the AMA are required to be escorted by personnel authorized to perform AMA escorts.



### Surface Incidents and Runway Incursions

A Surface Incident is any event where unauthorized movement by an aircraft, vehicle, or pedestrian occurs on the Aircraft Movement Area that affects or could affect the safety of flight. The term Surface Incident will apply only to non-runway locations such as taxiways.

#### Examples of a Surface Incident include:

- Tenant vehicle operators that are not authorized unescorted access to the AMA, driving past the Non-Movement Area Boundary Marking and into the Aircraft Movement Area, without an Airport Board escort.
- Construction vehicles driving beyond the cone line defining the closed portion of the airfield that is their work area, into the Aircraft Movement Area, unescorted.
- Airport Board-owned vehicle operators not authorized unescorted access to the AMA, driving on an ARFF road that intersects with a Taxiway, and then crossing that Taxiway, unescorted.



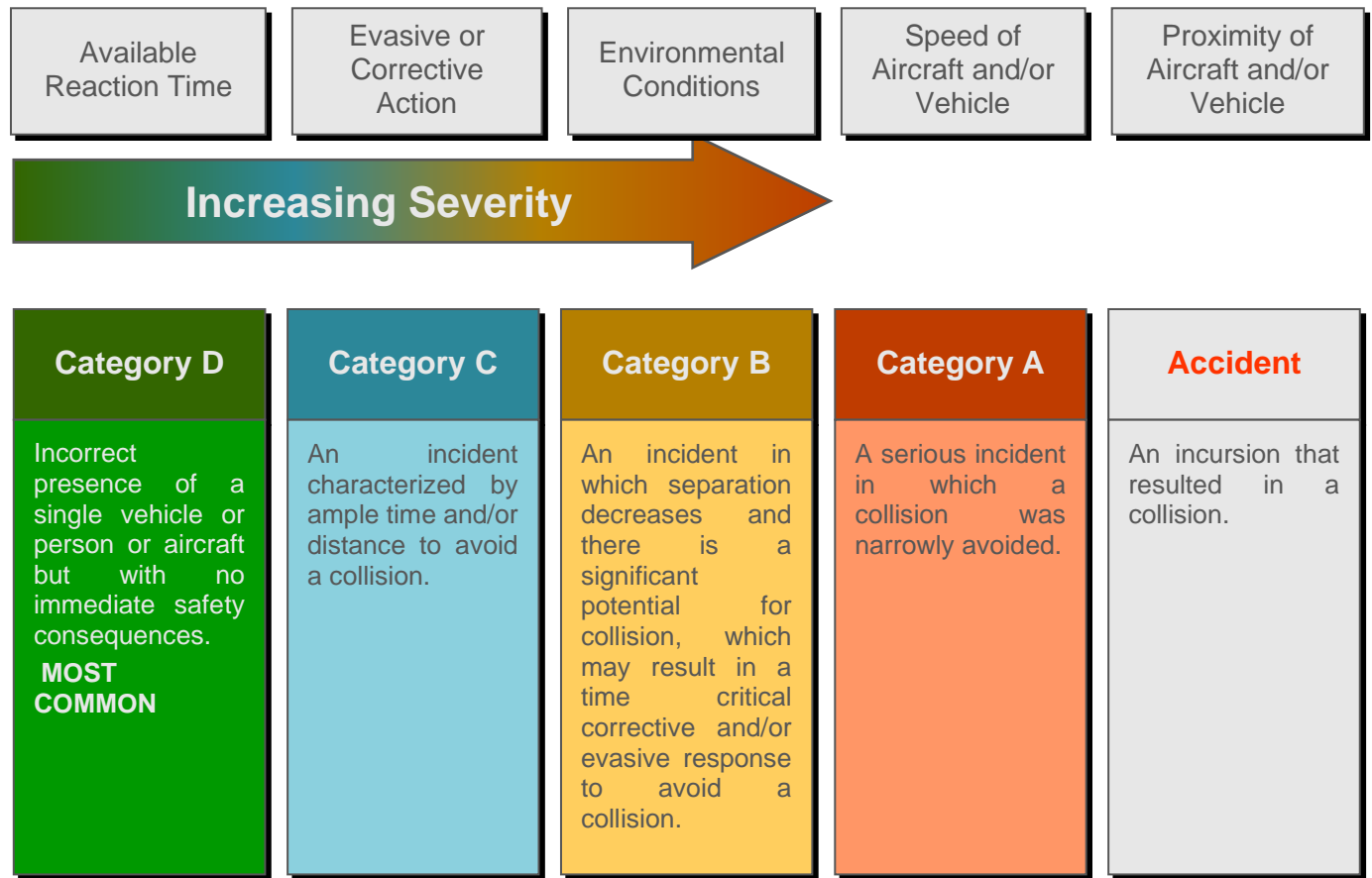


## Runway Incursions

### Severity

A Runway Incursion is any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of the surface designated for the landing and take-off of aircraft.

The severity of a Runway Incursion is categorized by letter designation: A, B, C, and D. The category **A** Runway Incursion is the most severe.



### Types of Incursions

Runway Incursions are classified and grouped into three types:

- 1) Operational Errors/Deviations (OE/D) – an air traffic controller commits an error
- 2) Pilot Deviations (PD) – commercial, general aviation, or military pilot error
- 3) Vehicle & Pedestrian Deviations (V/PD) – Airport Board vehicles, ARFF (Fire Trucks), Super Tugs, Tenant vehicles, delivery trucks, trash trucks, construction vehicles, fuel trucks, and pedestrians are examples of who commits this type of error.

### Operational Incident OI

Action of an Air Traffic Controller that results in:  
Less than required minimum separation between 2 or more aircraft, or between an aircraft and obstacles, (vehicles, equipment, personnel on runways) or clearing an aircraft to take off or land on a closed runway.

### Pilot Deviations PD

Action of a pilot that violates any Federal Aviation Regulation  
Example: a pilot crosses a runway without prior authorization from FAA air traffic control.

### Vehicle/Pedestrian Deviation V/PD

Pedestrians or vehicles entering any portion of the runway environment without prior authorization from **FAA** air traffic control.

The three main causes of Runway Incursions are:

- 1) Breakdown in communications
- 2) Lack of airport familiarity
- 3) Loss of situational awareness



### Situational Awareness

#### Incident/Incursion Prevention By Using Situational Awareness

Situational awareness is the ability to identify, process, and comprehend the critical elements of information about where you are and what is happening around you. Situational awareness is a skill necessary to both ground and in-flight operations.

- KNOW where you are and where aircraft are operating around you at all times.
- LISTEN AND LOOK – be aware of your surroundings. Open the driver's window slightly.
- LOCATE where you want to go. If outside of the NMA, call for an Escort.
- REQUEST your selected/desired route if this routing requires approval.
- COMPARE your requested route with the route(s) you are directed to take.
- WHEN IN DOUBT get assistance by radio or telephone!

Always have a pre-planned route of travel prior to driving on or around the AOA. Never travel into locations where you are not permitted. If ever in doubt about anything, get help before getting yourself or others into a potentially dangerous situation.

### **Maintaining SITUATIONAL AWARENESS is essential to preventing surface incidents and runway incursions!**

Vehicles operating on the AMA shall monitor the appropriate DFW ATC radio frequency, thus allowing the Control Tower the ability to directly contact and control these vehicles if needed.

AMA-authorized vehicle operators may access taxiways and emergency access roads by maintaining a listening watch on the appropriate FAA ATC frequency and also on an airport board-owned, land-mobile-radio (LMR) tuned to DFW Operations Primary ("Ops Pri") channel/frequency.



Even if operating under direct FAA ATCT-issued clearance or direction to your vehicle, any driving movement that you recognize would put you in conflict with an aircraft, must be avoided. Always drive at a safe and controllable speed consistent with weather and visibility conditions, and indicate your intent to give way to approaching aircraft by slowing down before intersections and exiting taxiways for oncoming aircraft.

When driving on taxiways, be as visible as possible so that the FAA ATCT and aircraft can see you.

Occasionally, ground vehicles and/or personnel may receive temporary authorization from Airfield Operations to operate on a "pull back clear" basis inside an active taxiway's "Object Free Area" (OFA) (i.e., within 160' of the taxiway's centerline, on either side of the centerline), while that taxiway remains open for use by aircraft. It is critically important that the persons receiving this temporary authorization use situational awareness and good judgment when operating in this area in order to fully comply with the "pull back clear" restriction. The ground vehicles and/or personnel presence & activities in the OFA associated with this temporary authorization must permit suspension of those activities and withdrawal to be clear of the OFA, in order to allow aircraft to pass through this area.

Remember, ground vehicles shall not drive, pass or be under the wings of moving aircraft! Vehicles shall also be clear of the OFA!

### **Vehicle Operations and Taxiing Aircraft Directions on Taxiway Bridges**

Use caution when crossing Taxiways Y (YANKEE) & Z (ZULU), Taxiways B (BRAVO) and A (ALPHA) (i.e., the segments over International Parkway), Taxiway ER (ECHO ROMEO), and Taxiway EL (ECHO LIMA) Bridges. The elevated mid-points of these bridges make it impossible to see what is on the other side of the mid-way high-point, coming towards you.

The normal direction of flow used by the Control Tower is from east to west for taxiing aircraft on the Taxiways Z & B Bridges, between Taxiways G (GOLF) & K (KILO). The normal direction of flow for Taxiways Y & A Bridges is from west to east, between Taxiways G (GOLF) & K (KILO).

---

## Aircraft Movement Areas

---

However, this is not a hard and fast rule! The Control Tower may use any bridge for either direction of travel at their discretion, so be alert and use caution.

The normal direction of traffic for the Taxiway ER Bridge is from east to west when the airport is in a south flow. If Runway 35R were to be used in a north flow, the direction of taxi could be west to east over this bridge; however, the likelihood this departure runway/taxi route would be used for departures in a north flow is very remote due to the availability of other closer runways.

The normal direction of taxiing traffic for the Taxiway EL Bridge is from east to west, regardless of whether the airport is in a north or south flow. This taxiway bridge is located at a mid-point where landings from either the north or south on runways 17L/35R can use it to get to the terminals.

Remember, the Control Tower may use any bridge for either direction of travel, so be alert and use caution.

Contact ATC on the appropriate "GROUND CONTROL" frequency for assistance in crossing these bridges if you are escorting a large convoy of vehicles, slow moving vehicles, or cumbersome equipment that cannot yield to and/or avoid taxiing aircraft.

When driving behind aircraft that are taxiing, be cognizant of the hazards of jet blast and use caution when aircraft apply extra power to climb inclines, cross runways, or if the ATC instructs the aircraft to "EXPEDITE" or "TAXI WITHOUT DELAY".

Use caution when approaching an acute angle runway exit, especially when travelling in the same direction as landings/takeoffs and these operations can be behind you. Aircraft could be exiting the runway at a high rate of speed via these exits.

### Escorting Ground Vehicles/Personnel

No motor vehicle shall enter the AOA unless the vehicle displays an AOA Vehicle Access Permit or is being escorted by an authorized escort of the Airport Board, the FAA, or the tenant responsible for the AOA gate, through which the person and vehicle is to enter.



When escorting vehicle drivers that are not familiar with the AOA, verbally explain what you expect of the driver. Use hand signals, if needed, and make sure the driver knows he/she is to remain close behind your vehicle and needs to FOLLOW YOU AT ALL TIMES UNTIL YOU RELEASE THE DRIVER FROM THE ESCORT.

Take the following into consideration when you escort:

- Aircraft traffic: Is it heavy or light volume?
- What distance will you be traveling with the escort?
- Is it daylight hours or hours of darkness?
- Speed of the vehicles being escorted, particularly the slowest ones.
- Place the slowest driving vehicle directly behind the escort vehicle. This will set the pace for the entire escorted convoy.



---

## Aircraft Movement Areas

---

When escorting large heavy equipment vehicles, such as a loaded dump truck or a convoy of vehicles, keep in mind that these vehicles cannot stop as fast as a car or pickup truck can.

If you are escorting numerous vehicles back and forth from a gate to a construction site, use the same route of travel and avoid the taxiways/runways when possible. This will help minimize FOD, the clean-up phase, and the closure-reopening inspection process.

The maximum ratio for escorting individuals in the SIDA is one (1) AOA badged individual to five (5) non-AOA-badged individuals, BUT, in any event, non-badged individuals must remain within sight, and physical and voice control of their escort at all times.

Additionally, Airport Board employees who provide escorts are required to:

- Physically meet with the party(s) to be escorted and verbally instruct them to follow the employee escort at all times, as considerations of safety permit, and until the party(s) being escorted are released by the employee performing the escort,
- Ensure the party(s) being escorted clearly understand their instructions,
- Confirm the release point with the party(s) to be escorted,
- Before beginning the escort, issue a laminated “Release/Pickup Point Escort Instruction Sheet” to the operator of each vehicle being escorted,
- Ensure the party(s) being escorted follow the employee escort at all times,
- Before releasing the party(s) being escorted, retrieve each of the laminated “Release/Pickup Point Escort Instruction Sheets” issued,
- Release the party(s) being escorted at the pre-determined Release Point.

### **NOTE: Asphalt Shoulders and FAA Navigational Aid Roads**

HEAVY equipment should avoid traveling on the soft asphalt surfaces of shoulders, blast pads, and FAA roads to prevent damaging the surface. If damage to the asphalt surface does occur, report the damage to Airport Operations Center (AOC) at 972-973-3112, and notify the Assistant Airfield Operations Officer responsible for that area via “Ops Pri” radio channel.

Construction vehicles shall be marked with a 3'x3' orange and white checkered flag.





**Vehicle Communications with the Airport Traffic Control Tower (ATCT)**

FAA’s DFW ATCT radio frequencies are divided into West Airfield and East Airfield frequencies. When radio contact is necessary (e.g., to request and receive clearance to enter/cross all runway environments, including Runway Safety Areas), ground vehicle-to-ATCT radio communications are initiated by vehicle operators on the appropriate ATCT’s Ground Control frequency (listed below) using the ATCT callsigns “GROUND” or “GROUND CONTROL”, followed by the vehicle operator’s call sign.



Do not attempt to initiate contact with the ATCT on a “TOWER CONTROL” frequency, unless you need access to the 17L – APCH area on taxiway R. In this case, procedures DO require contact on “TOWER” frequency 127.5 MHz for ATC clearance.



Monitoring the appropriate “TOWER CONTROL” frequency is useful for acquiring and/or maintaining Situational Awareness when operating on or adjacent to the areas that this ATCT controller position is exclusively responsible for; i.e., next to the runways and on outlying taxiways.

West Airfield Ground Control Frequencies Ground or Ground Control	
Arrivals/Departures:	121.85 MHz
Alternate/Spare:	132.8 MHz

East Airfield Ground Control Frequencies Ground or Ground Control	
Arrivals:	121.8 MHz
Departures:	121.65 MHz

West Airfield Tower Control Frequencies Tower or Tower Control	
18L/36R 18R/36L:	124.15 MHz
13R/31L:	134.9 MHz

East Airfield Tower Control Frequencies Tower or Tower Control	
17R/35L 17C/35C:	126.55 MHz
17L/35R 13L/31R:	127.5 MHz

The Dedicated Emergency Frequency (DEF) is 135.7 MHz - Used for either side of airfield.

(The DEF is for emergency use only by the ATCT, DPS, and Airfield Operations personnel, and then only after its initiation and notification by the appropriate ATCT.)

### Airfield Operations Radio Call Signs

- **PORT 100** – Vice President, Operations Department
- **PORT 101** – Assistant Vice President, Airfield Operations
- **PORT 102** (and/or PORT 103) – Airfield Operations Officer(s). Responsible for assigned shift including all airfield activities.
- **PORT 104**, (and/or PORT 105 and/or PORT 106) – Airfield Operations Officer(s). Added as needed, for weather, airfield emergencies, or other special events.
- **PORT 107** – Airfield Operations Trainer
- **PORT 108** – Airfield Compliance Administrator
- **PORT 109** – Manager, Airfield Operations
- **PORT 110** – Assistant Airfield Operations Officer. Point of contact for the east airfield, or when a PORT 112 is assigned, for just the area from the CTA to the east edge of Runway 17C/35C.
- **PORT 111** – Assistant Airfield Operations Officer. Point of contact for the west airfield.
- **PORT 112** – Staff Assistant Airfield Operations Officer
- **PORT 113** through PORT 119 – Assistant Airfield Operations Officer(s). Added as needed, for weather, airfield emergencies, or other special events.
- **WILDLIFE 1** – Wildlife Administrator; **WILDLIFE 2** – Wildlife Inspector
- **PORT 120** – **PORT 129**, Airfield Operations Agent. Assigned for escort duties and inspections.



### ATCT Controller –Vehicle Operator Communications Procedures

The following is an example of phraseology used in a radio communication exchange between a vehicle operator from Airfield Operations (in this example - “PORT 110”) and the FAA ATCT Ground Controller (“GROUND”) for crossing an active runway:

Initial contact. Contact the appropriate Ground Controller by first stating "DFW GROUND" (or just “GROUND”) and then your call sign, then wait for a response. (In this example, Assistant Airfield Operations Officer “PORT 110” is calling the ATCT.)

**PORT 110: "DFW GROUND, PORT ONE-TEN."**

Make Request. When the Ground controller responds for you to "GO AHEAD" or responds with your call sign followed by his, state your request (including the runway designation), your location, your direction of travel, and the number of vehicles if more than just yourself. Example:

**GROUND: "PORT ONE-TEN, GO AHEAD."**

**PORT 110: “PORT ONE-TEN REQUESTS TO CROSS RUNWAY ONE-EIGHT-LEFT AT TAXIWAY BRAVO, EASTBOUND, TWO VEHICLES.”**

NEXT: Acknowledgment! Read back the instructions the controller gives you verbatim.

If Ground Control instructs you to “HOLD SHORT RUNWAY (number)”, STOP YOUR VEHICLE AND DO NOT CROSS! Read back the instructions verbatim, remaining behind the Runway Holding Position Marking, yielding to aircraft using the taxiway you are on, and awaiting further instructions. Listen for your call sign.

Your verbatim read-back indicates to the controller that you have heard, understand and will comply (i.e., hold short of the runway), and, that while continuing to yield to aircraft on that taxiway, you will await further instructions. Then listen for the controller to state your call sign. The Ground Controller will issue you clearance to cross when he/she is able. Example:

**GROUND: “PORT ONE-TEN HOLD SHORT OF RUNWAY ONE-EIGHT- LEFT.”**

**PORT 110: “PORT ONE-TEN HOLDING SHORT OF RUNWAY ONE-EIGHT- LEFT”**

If Ground Control instructs you to “CROSS THE RUNWAY”, then read back the instructions issued verbatim and immediately comply by crossing the runway!

**GROUND: “PORT ONE-TEN CROSS RUNWAY ONE-EIGHT-LEFT.”**

**PORT 110: “PORT ONE-TEN CROSSING RUNWAY ONE-EIGHT-LEFT.”**

Report Clear When Requested. When all vehicles are across and clear of the runway environment, report "(call sign) CLEAR" to the controller if the controller has specifically requested that you call clear, or if you cannot see the Control Tower you are communicating with due to low visibility. Otherwise the call is not necessary because the controller can see you are clear and you're contributing to frequency congestion.

**PORT 110: “PORT ONE-TEN IS CLEAR OF RUNWAY ONE-EIGHT-LEFT.”**

**ATCT/Vehicle Communications Techniques**

**Listen before you transmit.** Pause, listen, and make sure the frequency is clear. When ATC issues a control instruction, expect the pilot to respond so plan accordingly and do not cut someone out.

**Think before keying your transmitter.** Know what you want to say. If it's lengthy, communicate it in another way.

**Speak in a normal, conversational tone.** Place your lips close to, but not touching the microphone.

**Wait a few seconds before calling again,** the controller may be on another radio, telephone or doing something and unable to reply at the moment.

**Be Alert to the sounds in your receiver,** check the radio volume (you can pull the squelch control knob out to check the volume on the VHF radios), ensure the microphone is not stuck in the transmit position (stuck mike), and be sure you are on the correct frequency.



### Procedures

"DFW TOWER" or just "TOWER" is the correct Control Tower radio call sign/frequency to be used by vehicle operators for communicating with the TOWER CONTROLLER (the controller who is responsible for the runways), while cleared by them to operate on a runway, other than for the purpose of crossing. An example of this would include Airfield Operations personnel conducting a runway inspection.

**IMPORTANT:** Read back all control instructions issued by a Tower controller, exactly as the instructions were issued to you!

When communicating with the FAA Control Tower regarding taxiway names and locations designated by letters, DFW Airport Board personnel who are authorized to communicate on ATC frequencies will use the International Civil Aviation Organization (ICAO) phonetic alphabet. (See appendix B.)

### Difficulty in Establishing Radio Communications

On occasion you may experience difficulty contacting or establishing communications with the FAA Control Tower. Listed below are several conditions that could exist and solutions to correct them:

- Unable to establish communications due to frequency congestion. During busy peak periods it may be difficult to establish communications, so travel via the roadway system.
- Unable to establish communications due to the vehicle possibly in a radio "dead spot". VHF frequencies are subject to "line of sight" restrictions and there are some locations where this "line of sight" is located that presents a problem. Reposition the vehicle at least 100 feet and re-attempt contact with the FAA Control Tower.
- Unable to establish communications due to a stuck mike blocking that frequency. Tune to an alternate frequency for that Tower, or contact the Airfield Operations Officer or Assistant Airfield Officer, and advise one of them of the situation. They may be able to give you an alternative method the Tower position is using due to the stuck mike.
- Unable to establish communications due to an "out of service" or broken VHF transmitter. The vehicle operator should clear the movement area immediately, or if unable to do so, contact Airport Operation Communication (AOC) at 972-973-3112 or on "Ops Primary" for an escort.

### Radio Courtesy and Confidentiality

DFW Airport Board personnel must use extreme care when transmitting information via radio communications networks. Airport staff, tenant airlines, outside agencies, or news media, may monitor all frequencies. Transmissions should be limited to official airport business and should not contain comments or information, which may be considered confidential. Professionalism includes courtesy however, extraneous chatter is undesirable.



**Airport Traffic Control Tower Light Gun Signals and their meanings**

All personnel operating on the AMA must be aware of and understand the meanings of ATCT light gun signals emitted from the ATCT cab. The following are signals and meanings intended for vehicles that are used by the control tower when radio communications fail.

- A. **Steady Green**.....**CLEARED TO CROSS, PROCEED OR GO.**
- B. **Steady Red** .....**STOP!**
- C. **Flashing Red** .....**CLEAR THE TAXIWAY/RUNWAY.**
- D. **Flashing White**.....**RETURN TO STARTING POINT.**
- E. **Alternating Red/Green** .....**EXERCISE EXTREME CAUTION.**

# Taxiways

## Types of Taxiways

There are three basic types of taxiways at DFW Airport. They are as follows:

### Primary Taxiways

These are taxiways that parallel runways and/or connect the east and west sides of the airport. They are identified by a single letter designation and generally progress in alphabetical order from A – Z (Alpha through Zulu), from the west to the east. Several letters between A and Z are not used.


### Secondary Taxiways

These are taxiways that generally run east and west and in most cases, connect primary taxiways and CTA ramps with runways. They are identified by double letters with the first letter indicating the east "E" or west "W" side of the airport.


### Stub Taxiways which include Acute Angle Runway Exits

These Taxiways link primary taxiways with runways or other primary taxiways. This includes all Acute Angle Runway Exits which are sometimes referred to as "High Speed Exits". These taxiways are identified by an alphanumeric designation such as K10 or L6.

## Non-Movement Area Boundary Marking

The Non-Movement Area Boundary Marking , painted on paved surfaces used by taxiing aircraft, delineates the FAA-controlled Aircraft Movement Area, or AMA (i.e., the area under FAA ATCT control), from the non-ATCT-controlled aircraft non-movement area, (i.e., the area not under the watch, control and responsibility of the FAA ATCT such as ramps and aprons).



This area delineation marking  is used when the airport operator (DFW) and the airport traffic control tower (FAA) agree to a need for it. In doing so, the FAA designates what constitutes the AMA of an airport.

**IMPORTANT NOTE:** This Boundary's meaning (i.e., the separation of the FAA-controlled Movement Area from the uncontrolled ramp areas) continues laterally and invisibly across adjacent non-taxiway/taxilane areas (e.g., grass medians, emergency roads, etc.) to join the next painted Boundary Marking.

### Taxiway Centerline Stripe

- The Taxiway Centerline Stripe marking provides the pilot a visual cue to permit taxiing along a designated path.
- Taxiway Centerline Stripes are continuous and 6" in width (yellow portion) with a 6" black border on each side of the stripe to enhance the markings.
- The Taxiway Centerline Stripe for a designated SMGCS (Surface Movement Guidance and Control System) Plan route is also continuous, but is 12" in width (yellow portion) with a 6" black border on each side of the stripe.



### Taxiway Edge Markings

Taxiway Edge Markings are used to delineate the edge of the taxiway. They are primarily used when the usable taxiway edge does not correspond with the edge of the pavement. Two types of markings are used depending upon whether the aircraft is permitted to cross the taxiway edge. The outer edge of the stripe defines the edge of the usable pavement.

#### Continuous Taxiway Edge Markings.

These markings are used to delineate the taxiway edge from the shoulder or some other contiguous paved surface NOT intended for use by aircraft.



#### Dashed Taxiway Edge Markings.

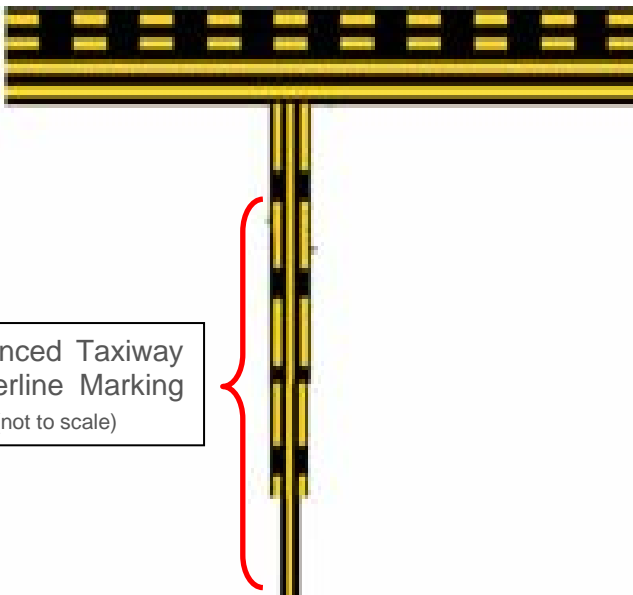
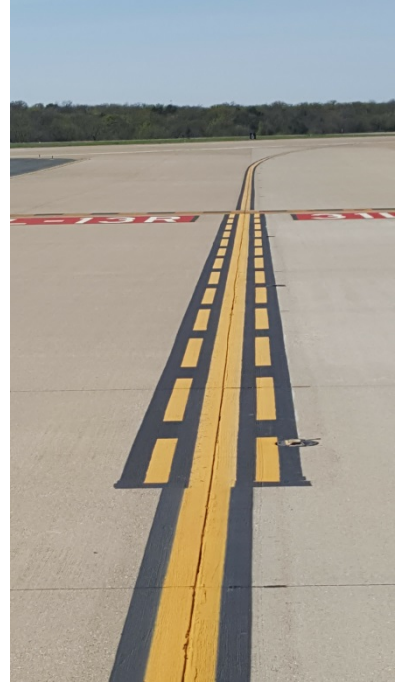
This type of marking is used when there is an operational need to define the edge of a taxiway or taxilane on a paved surface, where the pavement adjacent to the taxiway edge **IS** intended for use by aircraft, e.g., an apron next to a taxiway/taxilane. The black background is dashed as are the yellow markings on top of them





### Enhanced Taxiway Centerline Markings

- These markings were applied to all Taxiway Centerline Stripes that intersect with a Runway Holding Position Marking as a result of a safety enhancement change to FAA Advisory Circular 150/5340-1J, Standards for Airport Markings.
- Taxiway Centerline Markings are enhanced beginning approximately 150 feet prior to a Runway Holding Position Marking, stopping just short of the holding marking.
- The enhancement scheme consists of two dashed yellow lines, one on each side of the taxiway centerline, with a continuous black border alongside the dashed lines.



Enhanced Taxiway Centerline Marking  
150' (not to scale)

### Intermediate Holding Position Markings

These markings identify the location on a taxiway where an aircraft is to stop at when instructed by the FAA ATCT to hold short of another taxiway.

The Intermediate Holding Position Marking is a single dashed yellow line, with a black background, perpendicular to the direction of travel on the taxiway.



Ground Side View

**MANDATORY INSTRUCTION MARKING**



**The Runway Holding Position Marking**

- The Runway Holding Position Marking identifies the location on a taxiway at a taxiway/runway intersection, where aircraft or vehicles must STOP when the aircraft or vehicles do not have clearance to proceed beyond the marking into the runway environment. This includes Runway Safety Areas.
- This marking is four yellow (two solid and two dashed lines), on a black background, and it is perpendicular across the taxiway's direction of travel.
- The solid lines are ALWAYS on the side where aircraft and vehicles are to hold UNTIL receiving FAA ATCT clearance to proceed onto the runway.



Any aircraft/vehicles on the dashed-side of the marking have been directed by ATC to be there and are cleared to cross the dashed lines.

**Mandatory!**  
Hold Position on this side of the marking behind the solid-side of the lines until cleared by ATC to cross the marking.

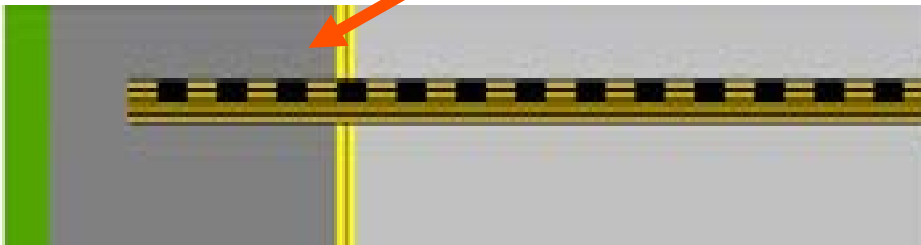
**Warning: Never cross a Runway Holding Position Marking without receipt of an ATC clearance to do so!**

### Extended Runway Holding Position Markings


- Holding Position Markings were extended onto the asphalt shoulders as a result of a safety enhancement change to the FAA Advisory Circular on Standard Airport Markings. Their meaning (i.e., to stay behind the solid yellow lines, displayed or not), like the Non-Movement Area Boundary Marking, extends laterally to either side across shoulders, unpaved areas, and emergency roads, to connect with the next Holding Position Marking. (Review on page 22.)
- At airports that have regular service by aircraft in Aircraft Design Group (ADG) V (such as the Airbus A330 & A340, some versions of the Boeing B747, the Boeing B777 & B787, & MD11); and, ADG VI (such as the Airbus A380 & longer wingtip versions of the Boeing B747), the Extended Runway Holding Position Markings are the only acceptable means of compliance with PART 139.



Area of Extension



### ILS Holding Position Marking


- The Instrument Landing System (ILS) Critical Area/Precision Obstacle Free Zone (POFZ) Holding Position Marking  identifies the location on a taxiway or holding bay where an aircraft is expected to stop when it does not have clearance to enter the ILS Critical Area or the POFZ.

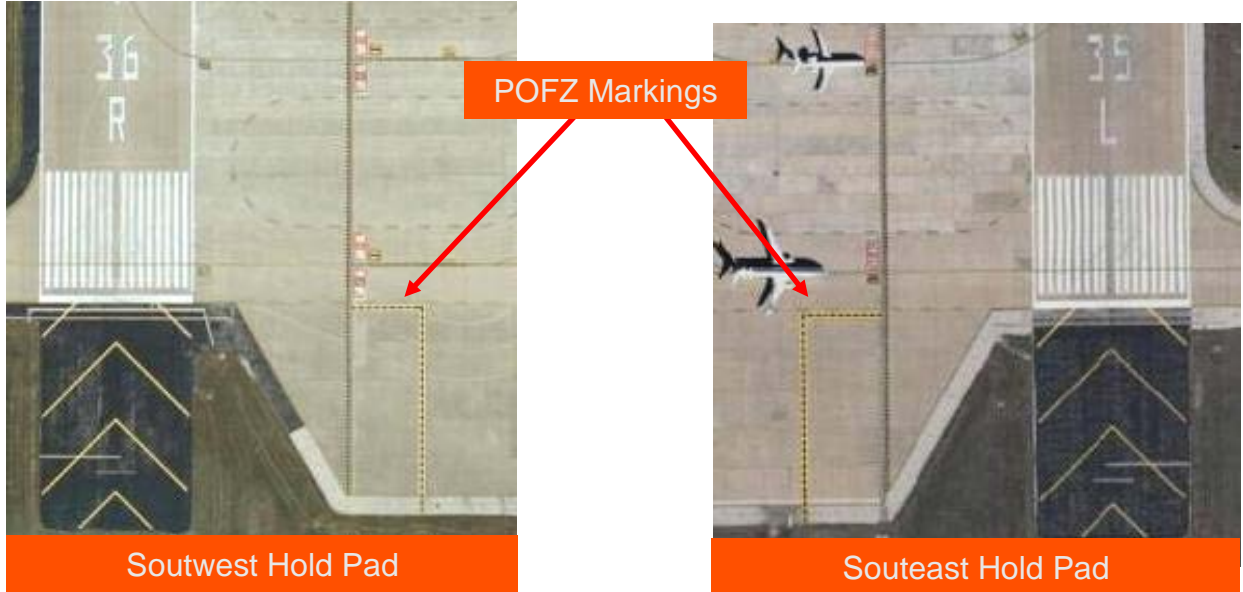


Note: Aircraft and vehicles must receive clearance from the FAA ATCT to enter ILS Critical Areas when weather conditions are below 800' ceiling and/or less than 2 miles of visibility. If in doubt about whether these weather conditions exist, or whether ILS Critical Areas/POFZs are being protected, contact the AOC at (972)973-3112, or call Airfield Operations on "Ops Pri" radio frequency.



**Precision Obstacle Free Zone Holding Position Markings (POFZ)**

 – there are only two (2) marked POFZ's at DFW. One is on the Southwest Hold Pad and the other is located on the Southeast Hold Pad.



NOTE: Aircraft and vehicles must receive clearance from the FAA Control Tower to enter ILS Critical Areas when weather conditions are below 800' ceiling and/or less than 2 miles of visibility. If in doubt about whether these weather conditions exist, or whether ILS Critical Areas/POFZs are being protected, contact the AOC at (972)973-3112, or call Airfield Operations on "Ops Pri" radio frequency.

**Surface-Painted Taxiway Guidance Signs**  & 

Surface-painted signs are used when it is not possible to provide vertical, lighted, taxiway direction or location signs.

Surface-painted Taxiway Direction Guidance Signs have a yellow background with a black outline, and a black inscription inside. They are located adjacent to the centerline, appropriately left or right of centerline, depending on direction of turn. They indicate the intersecting taxiway you are approaching. In the first picture below, you are approaching intersecting Taxiway K, which allows for a right or left turn to join that taxiway.

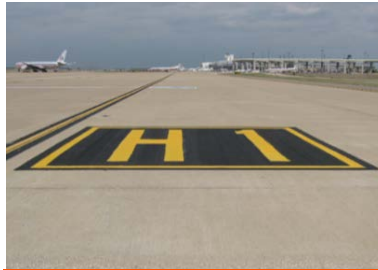


In the picture right, you are approaching Taxiway A5 intersection, which only goes the left



### Surface-Painted Location Signs **A**

- Surface-Painted Location Signs **A** are used to supplement vertical and lighted signs located along the side of a taxiway.
- They have a black background with a yellow inscription and border. Normally, they are located on the right side of the taxiway centerline, readable in the direction you are traveling, and indicate the taxiway you are on.



You are on Taxiway H1



You are on Taxiway G


### No-Taxi Islands

No taxi islands can be found on the north and south ends of Runway 17C-35C. These areas are surfaced with green Astroturf and are surrounded by solid Taxiway Edge markings.



MANDATORY INSTRUCTION MARKING

Surface-Painted Holding Position Signs

- Surface-Painted Holding Position Signs **36R - 18L** are used to supplement the vertical (above ground) lighted holding position signs, or where vertical signs are not possible.
- These signs have a red background with white inscription. The Surface-Painted Holding Position Signs **36R - 18L** are located adjacent to taxiway centerline, prior to reaching the runway Holding Position marking .



**Apron Entry/Exit Points (AEPs) - 35**

DFW has a system of identifying the numerous taxiways that lead from/to the ramps to/from the taxiways; they are called AEPs, and are commonly referred to as “SPOTS” by pilots and FAA ATC controllers.

AEPs are surface-painted circles, 9 foot in diameter, with yellow background and black inscription and outline.

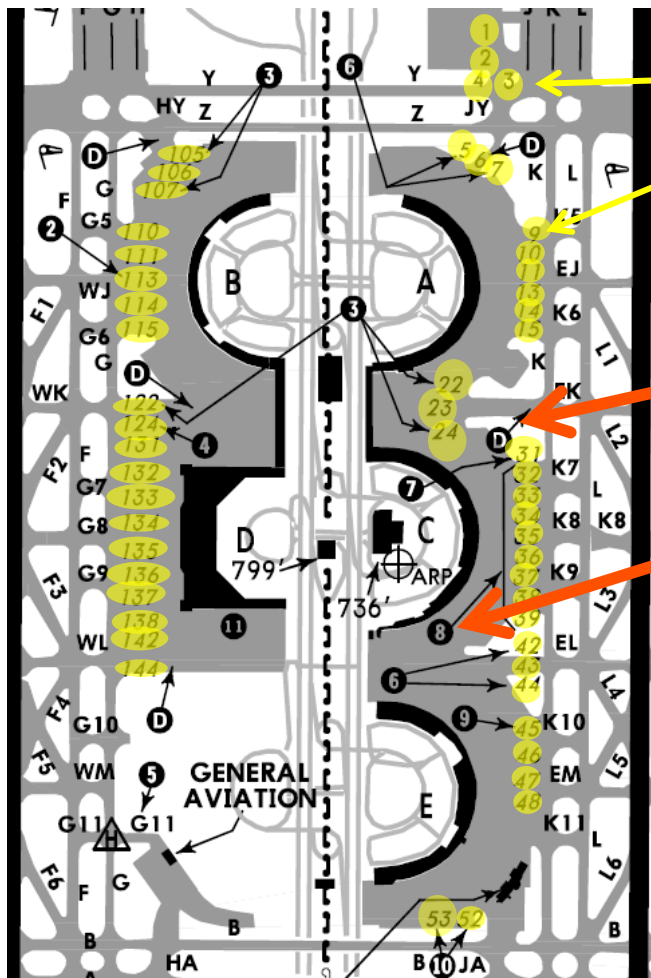


**Numbering**

AEPs are numbered starting with lower numbers at the north and ascend in a numerical order to the south; (e.g., the two northernmost eastside AEPs – AEPs 1 and 2 – are on the taxiways into/out of the 1E/Corporate Aviation; the two southernmost eastside AEPs – AEPs 52 and 53 – are on the taxiways leading into/out of the south end of Terminals E & E- Satellite ramp.

East airfield AEPs are numbered 1 – 53; but not in continuous numerical order; i.e., there is not 53 of them.

West side AEPs are numbered 105 – 150; but not continuous as above.



Apron Entry/Exit Points (AEPs) are highlighted in yellow on this diagram.

The white letter “D” in black circles with arrows on this multi-informational diagram, is associated with “deicing” areas.

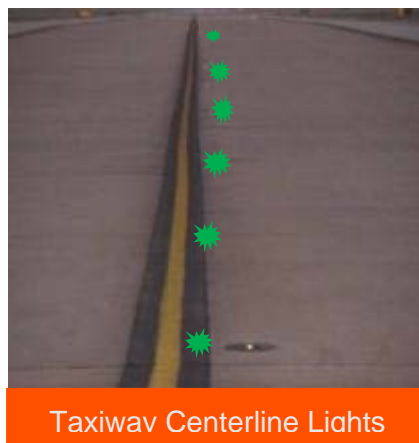
The white numbers “2” – “11” in black circles with arrows on this multi-informational diagram, are associated with aircraft wingspan restrictions for these areas.

### Taxiway Lighting

Taxiway Centerline Lights - are green, spaced 50 feet apart and provide bi-directional lighting (i.e., the light shines in the two directions the taxiway runs).

Taxiway Edge Lights/Reflectors - The edges of the taxiways are marked with blue lights and/or stanchion-type reflectors. On long, straight taxiways, these are spaced a maximum of 200 feet apart. They are spaced close together around curves and at intersections.

Taxiway Intersection Lights - are yellow, are located at the center of taxiway intersections and are “omni-directional” (i.e., the light can be seen in the four or more directions the intersecting taxiways run).





### Taxiway Lighting

DFW Airport has Hold Bar Lights that are yellow in color and are located at various locations on the airfield to include Runway Holding Positions (these are in-pavement runway guard lights) and some ILS Critical Areas, and, Acute Angle Runway Exits or High Speed Exits (these are Elevated Runway Guard Lights).



In-Pavement Runway Guard Lights



Elevated Runway Guard Lights

### Denied Area Lights

- These lights are red and are located at certain taxiway ends and stub outs.
- These red lights are also used as taxiway bridge edge lights across on top of the concrete walls which are alongside the shoulder edges of the taxiway. All eight of DFW's taxiway bridges for aircraft operations have red edge lights.
- They indicate areas not intended for aircraft movement.



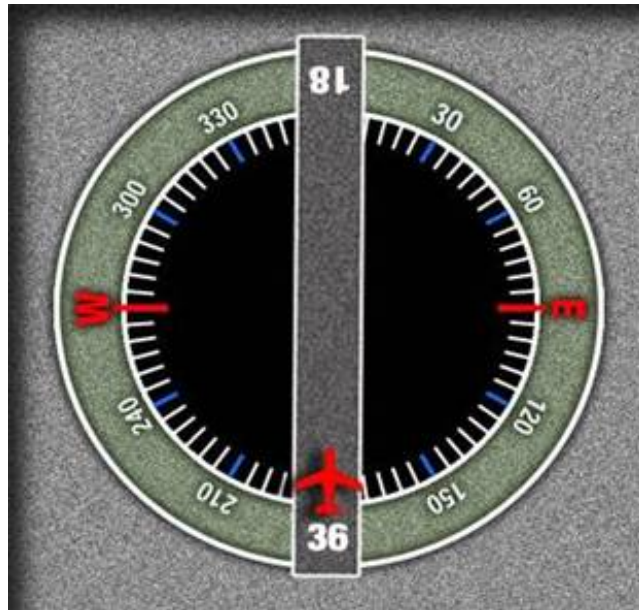
Denied Area / No Entry Lights

# Runways

## Runway Designations

Runway Designations are based on a runway's magnetic heading, using the 360 degree compass system. Since runways can be used in either direction, all runways have TWO (2) numerical runway designations.

- Runways are numbered in relation to their magnetic direction rounded off to the nearest 10 degrees.
- The pictured grey-shaded runway overlying the compass below is oriented in the north-south direction as evidenced by its north/south placement. The runway is aligned to the magnetic headings of 180 & 360 degrees, which makes its Runway Designation 18/36.
- When pronouncing the runway heading of this example, use the phrase "RUNWAY ONE EIGHT"; and, when there is more than one runway aligned parallel to the other runway with the same magnetic heading (for example 18L and 18R), state it as either "RUNWAY ONE EIGHT LEFT" or "RUNWAY ONE EIGHT RIGHT" as appropriate. If a third runway were involved and parallel, the middle runway would be designated "RUNWAY ONE EIGHT CENTER".



## Runways



### Aircraft/Airport Traffic Flow – Runway Use Determination

The prevailing wind determines the direction of arrivals and departures. Aircraft typically land and takeoff into the wind. At DFW, those prevailing wind directions usually dictate that aircraft activity occur in either a south or north direction (flow). In a south flow, aircraft land and takeoff to the south, while in north flow, aircraft land and takeoff to the north. Throughout the year, DFW operates predominately in a south flow and the remainder of the time in north flow\*(see below qualifying statement).



**SOUTH FLOW:** DFW's South flow runways are: 17R, 17C, 17L, 13L, 18R, 18L, 13R (Example: Wind direction of 190 degrees means the wind is coming from that direction (from almost due south); therefore the tower would choose South flow.)

**NORTH FLOW:** DFW's North flow runways are: 35R, 35C, 35L, 31R, 36R, 36L, 31L (Example: Wind direction of 340 degrees means the wind is coming from that direction (from almost north-northwest); therefore the tower would choose North flow.)

\* On rare occasions ATC will elect to go to a Northwest or West flow, using Runway 31L and 31R for arrivals and departures.

### Runway Specifications

Runway Identification: (ACM Section I, Chapter C. paragraph 2.a.)

Runway	Length	Width	Surface	Strength	Safety Area
17L/35R	8,500	150	Concrete, Grooved	850K (DDT)	500 X 1000
17C/35C	13,401	150	Concrete, Grooved	850K (DDT)	500 X 1000
17R/35L	13,400	200	Concrete, Grooved	850K (DDT)	500 X 1000
18L/36R	13,400	200	Concrete, Grooved	850K (DDT)	500 X 1000
18R/36L	13,400	150	Concrete, Grooved	850K (DDT)	500 X 1000
13L/31R	9,000	200	Concrete, Grooved	850K (DDT)	500 X 1000
13R/31L	9,301	150	Concrete, Grooved	850K (DDT)	500 X 1000

### Runway Markings

#### Runway Threshold Bar

Runway Threshold Bar delineates the beginning of the runway that is available for landing when there is pavement aligned with the runway on the approach side of the threshold. The bar is 10 feet wide and extends across the threshold.

## Runways



### Runway Threshold Stripe

Runway Threshold Stripes help identify the beginning of the runway that is available for landing. Runway Threshold Stripes come in two configurations; they either consist of either twelve or sixteen longitudinal stripes of uniform dimensions disposed symmetrically about the runway centerline. Threshold Stripes are 150 feet in length.

### Runway Designation Markings

Runway numbers and, if appropriate, letters – Runway Designation – are determined from the landing approach direction. The runway number is the whole number nearest one-tenth the magnetic azimuth of the centerline of the runway, measured clockwise from the magnetic north. The letters, differentiate between left (L), right (R), or center (C), parallel runways, as applicable. Runway Designation Markings are white.

### Runway Centerline Markings

Runway Centerline Markings are white in color, are on the center of the runway and provide alignment guidance during takeoff and landing operations. Centerline stripes are 120 feet in length and are 80 feet apart.

### Runway Touchdown Zone Marking (TDZ)

Touchdown Zone Markings identify the touchdown zone for landing operations while also providing distance information. TDZs are white in color and are arranged in pairs of one, two and three bars about the runway centerline, at 500 foot interval spacing between each set of markings.

### Runway Aiming Point

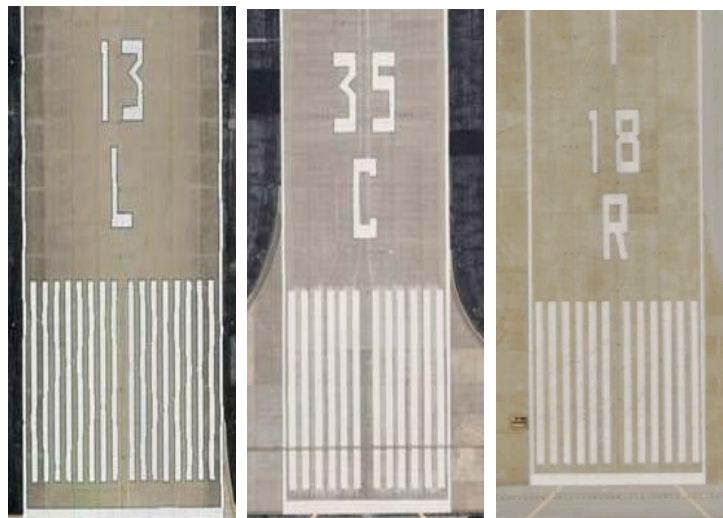
The Runway Aiming Point serves as a visual aiming point for landing operations. The preferred beginning of the aiming point marking starts 1,020 feet from the threshold.

### Runway Side Stripe Markings

Runway Side Stripe Markings are white in color and delineate the width of the paved area that is intended to be used as a runway.

### Runway Designation Markings

They identify a runway by its approximate magnetic azimuth. They are white and consist of a number and if there is a parallel or triple runway, it will be supplemented with a letter, e.g., L for Left, C for Center, and R for Right.

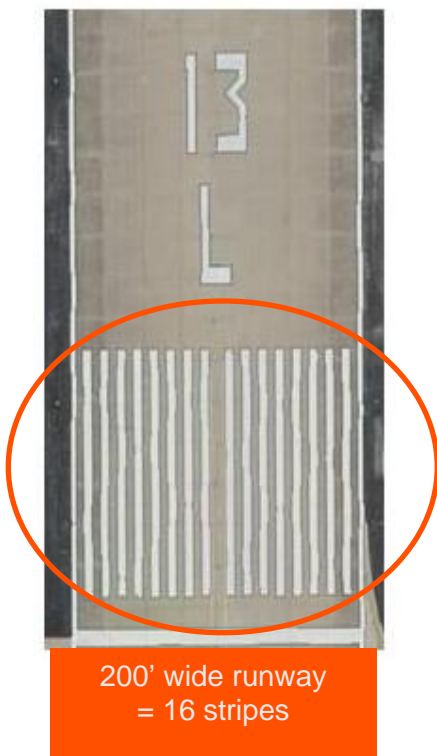


## Runways

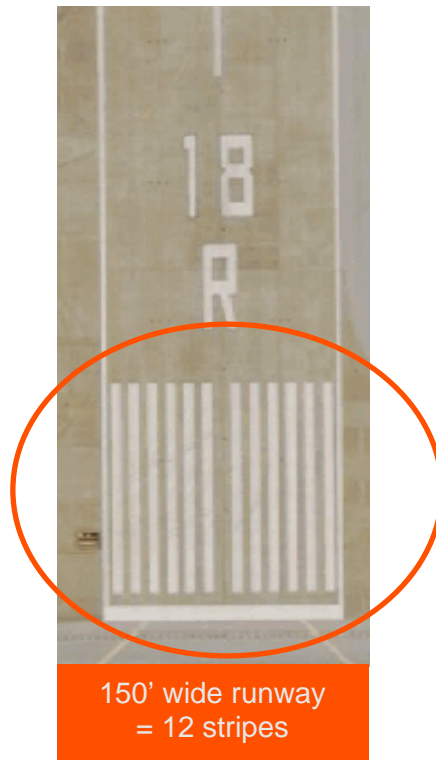


### Runway Threshold Markings

- Runway Threshold Marking helps identify the beginning of the runway that is available for landing.
- The number of stripes vary with the width of the runway:
  - 150 feet width runway - 12 stripes
  - 200 feet width runways - 16 stripes
- At DFW, Runways 13L/31R, 17R/35L and 18L/36R have 16 threshold stripes at each end of the runway.



200' wide runway  
= 16 stripes



150' wide runway  
= 12 stripes

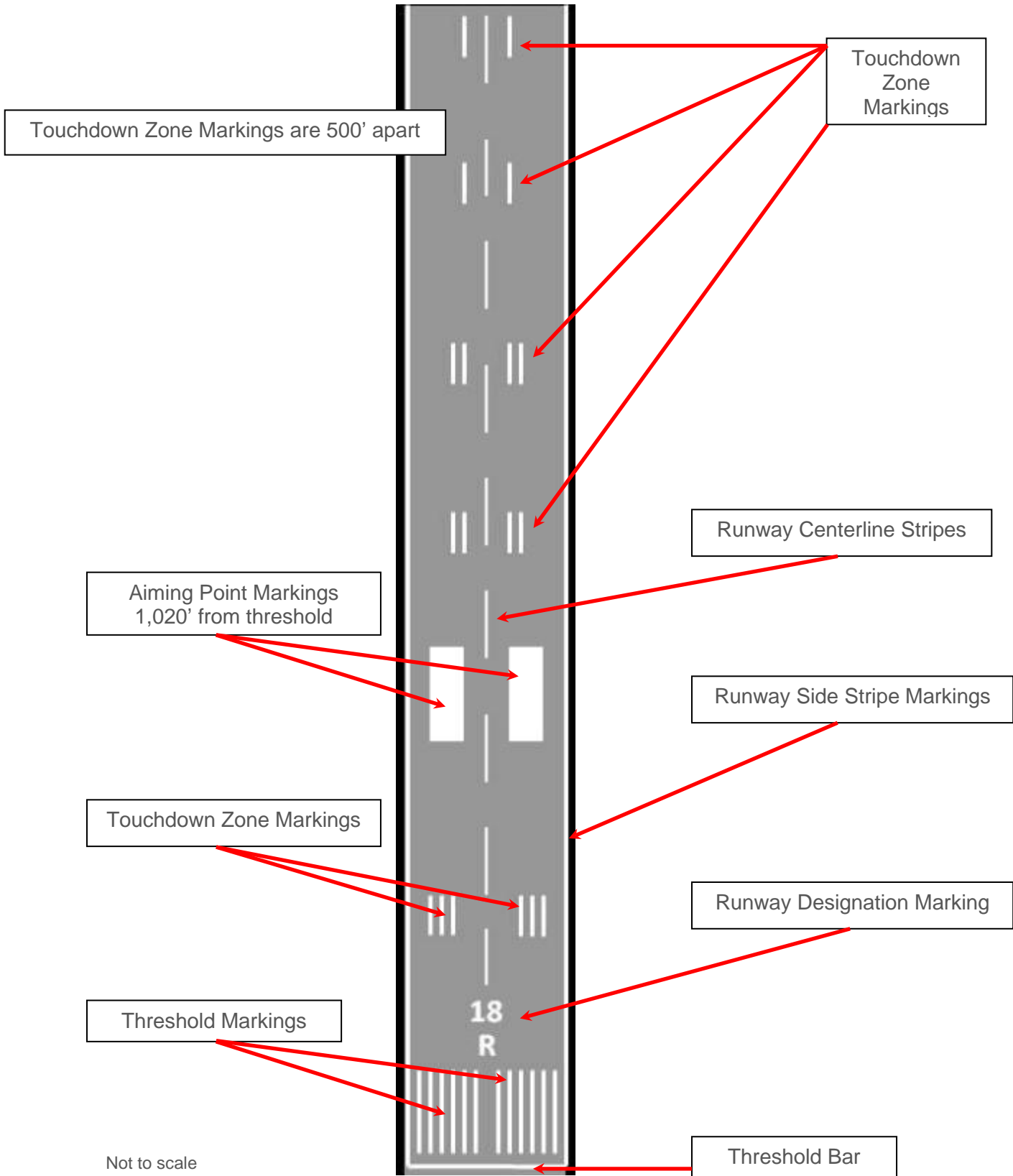
**Note:** All runway markings are white.



# Runways



## Precision Instrument Runway

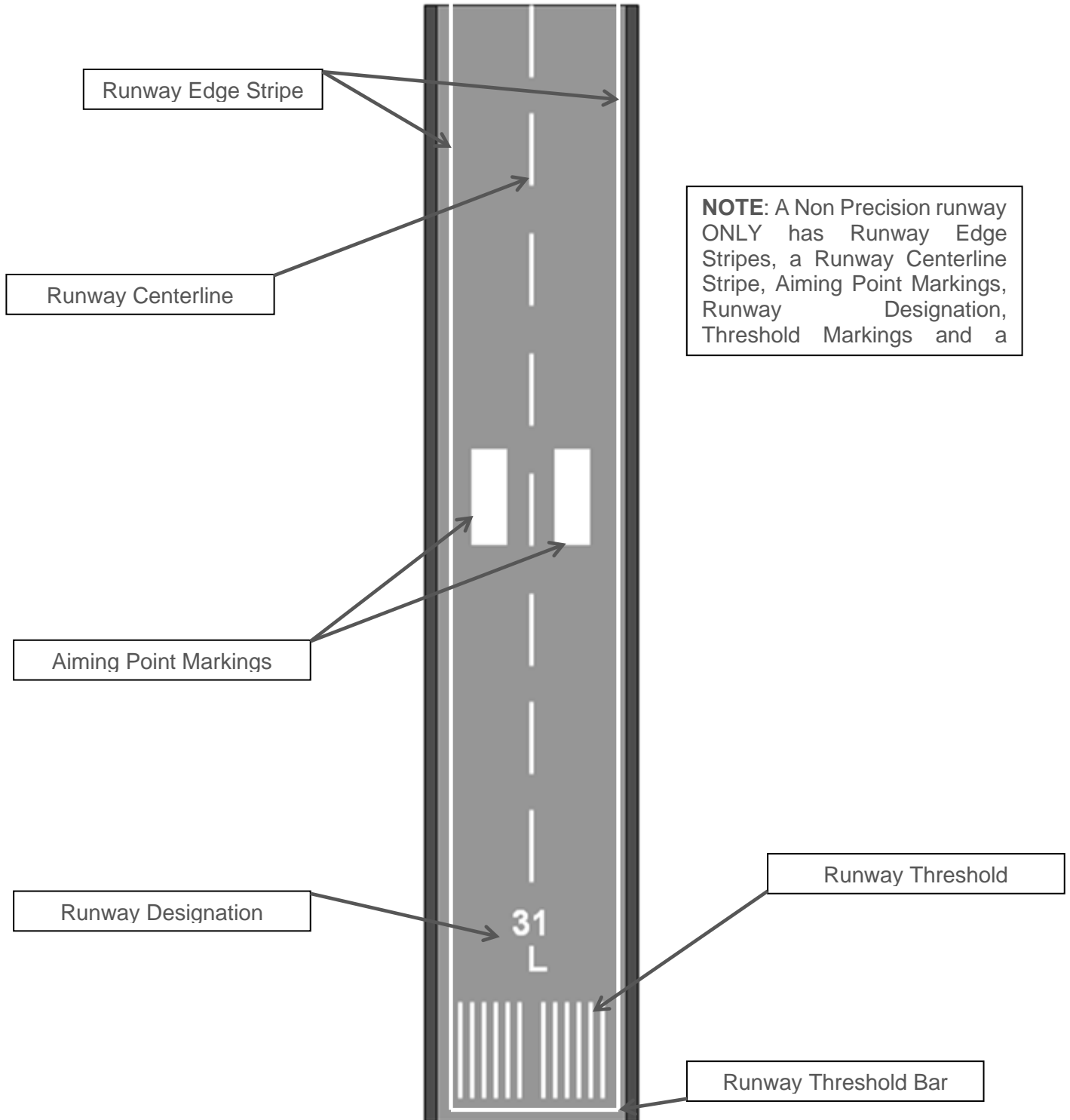


## Runways



### Non Precision Instrument Runway

Non precision instrument runways do not have touchdown zone stripes (TDZs). All other markings remain the same. DFW has two runway ends marked as non-precision instrument runways; runway 31L and runway 13L.



## Runways



### Unique Runway Markings

#### Runway 13L displaced threshold markings



Four white arrowheads are used in conjunction with the Threshold Bar to further highlight the beginning of the runways.

Three white arrows are used to identify the Displaced Landing Threshold

Yellow Demarcation Bar – located on the asphalt blast pad for Runway 13L, adjacent to the edge of concrete

Runway 13L/31R data, and landing/takeoff distance:

Length of runway - 9,000 feet;

13L take-off distance – 9,000 feet available (includes the 625 feet of displaced landing threshold)

13L landing distance available – 8,375 feet after excluding the 625 foot landing threshold displacement

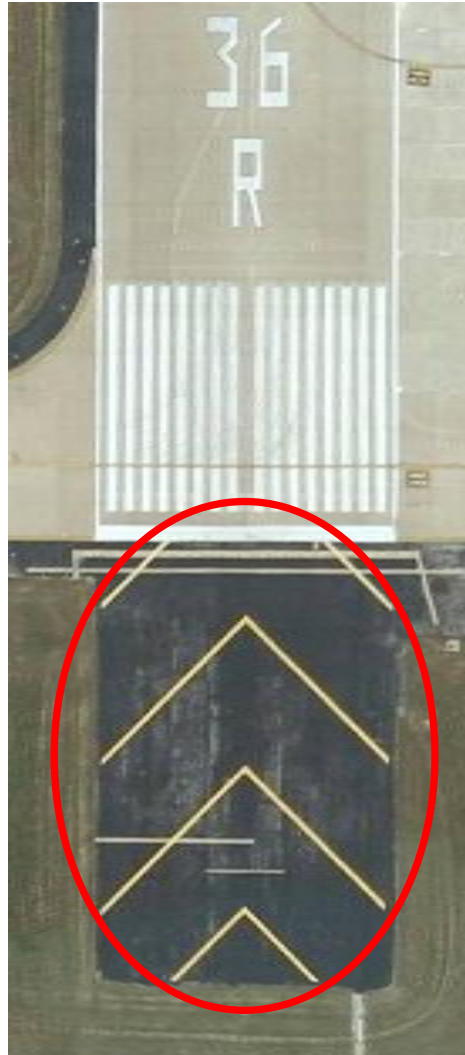
## Runways



31R landing or take-off distance available – 8,375 feet

### Chevrons

Chevron markings are located on the blast pad at both ends of the runway and are yellow in color. Chevrons are used to identify pavement areas unusable for landing, takeoff, and taxiing.



## Runways

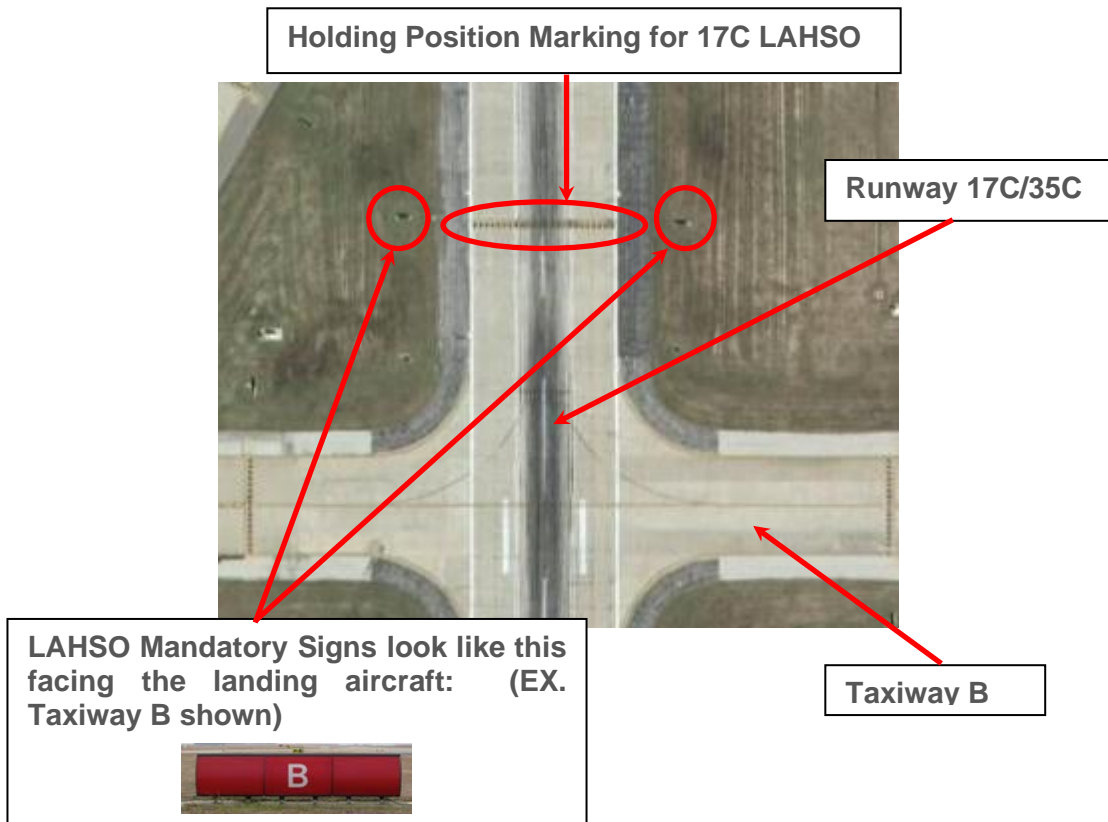


### Land and Hold Short Operations (LAHSO) – Markings and Signage

These markings/signs are used on runways where aircraft on landing roll can be directed by the Control Tower to “stop and hold” in order to allow the ATCT to cross taxiing aircraft on a taxiway-intersecting the runway ahead. LAHSO at DFW is done on arrival runways 17C/35C & 18R/36L. The pavement LAHSO holding position marking is the same marking as that used for a Runway Holding Position marking at a taxiway entrance to a runway. It consists of two solid and two dashed yellow lines on black backgrounds. The marking is aligned perpendicular to the runway centerline. The solid lines are always on the side where the landing aircraft is to hold so as to give way to the crossing taxiing aircraft.



In addition to the pavement markings for **LAHSO** there are in-pavement white pulsating lights co-located with the holding position marking, and mandatory lighted signs located east and west of the runway at the holding position marking. See below for an example of what the above-ground sign for taxiway “**B**” look like.





# Runway Lighting

## Runway Edge Light System

- Runway edge lights are used to outline the edges of runways during periods of darkness or restricted visibility conditions. Runway edge lights are a maximum of 200 feet apart
- Runway edge lights are white, except for the last 2,000 feet which are yellow.
- The lights marking the end of a runway (Runway End Lights) show red light toward the runway
  - to indicate the end of runway to a departing aircraft
  - The lights marking the beginning of a runway show green outward from the runway end (Threshold Lights)
  - to indicate the threshold to landing aircraft.

Runway Edge Lights



Yellow Color seen from this side of the light during the last 2000' (the upcoming ending) of the runway.

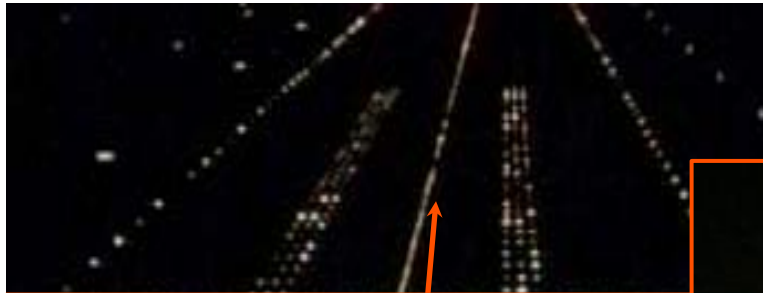
White Color seen from this side since it is within the beginning (first 2000') of the runway.



Runway Edge Light

### Runway Centerline Lighting System (RCLS)

- Runway Centerline lights are installed on precision instrument runways to facilitate landing under adverse visibility conditions.
- When the centerline lights are viewed from the landing threshold, the lights are white until the last 3,000 feet of the runway, at which point the lights alternate between red and white colors.
- For the last 1,000 feet of the runway all runway centerline lights are red.

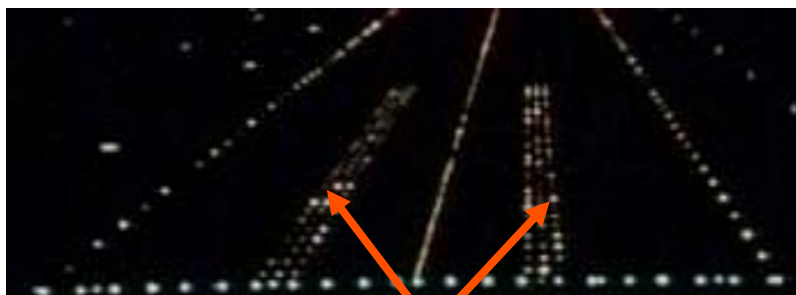


Runway Centerline Lights



### Touchdown Zone Lights (TDZL)

- Touchdown Zone Lights (TDZLs) are installed on precision approach runways to indicate the touchdown zone when landing under adverse visibility conditions.
- TDZLs consist of two rows of transverse light bars located on either side of the runway centerline.
- TDZLs are steady-burning white lights which start 100 feet beyond the landing threshold and extend to 3,000 feet beyond the landing threshold

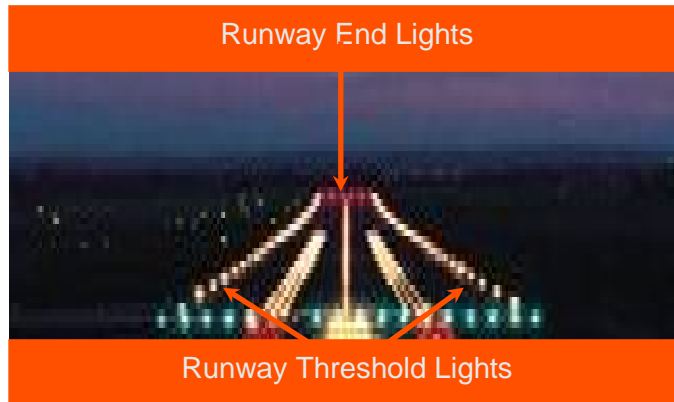


Touchdown Zone Lights (TDZLs)

## Runway Lighting

### Runway End Lights

Runway End Lights are the opposite side of the Runway Threshold Lights, are red in color and are located at the end of the runway's full strength pavement.

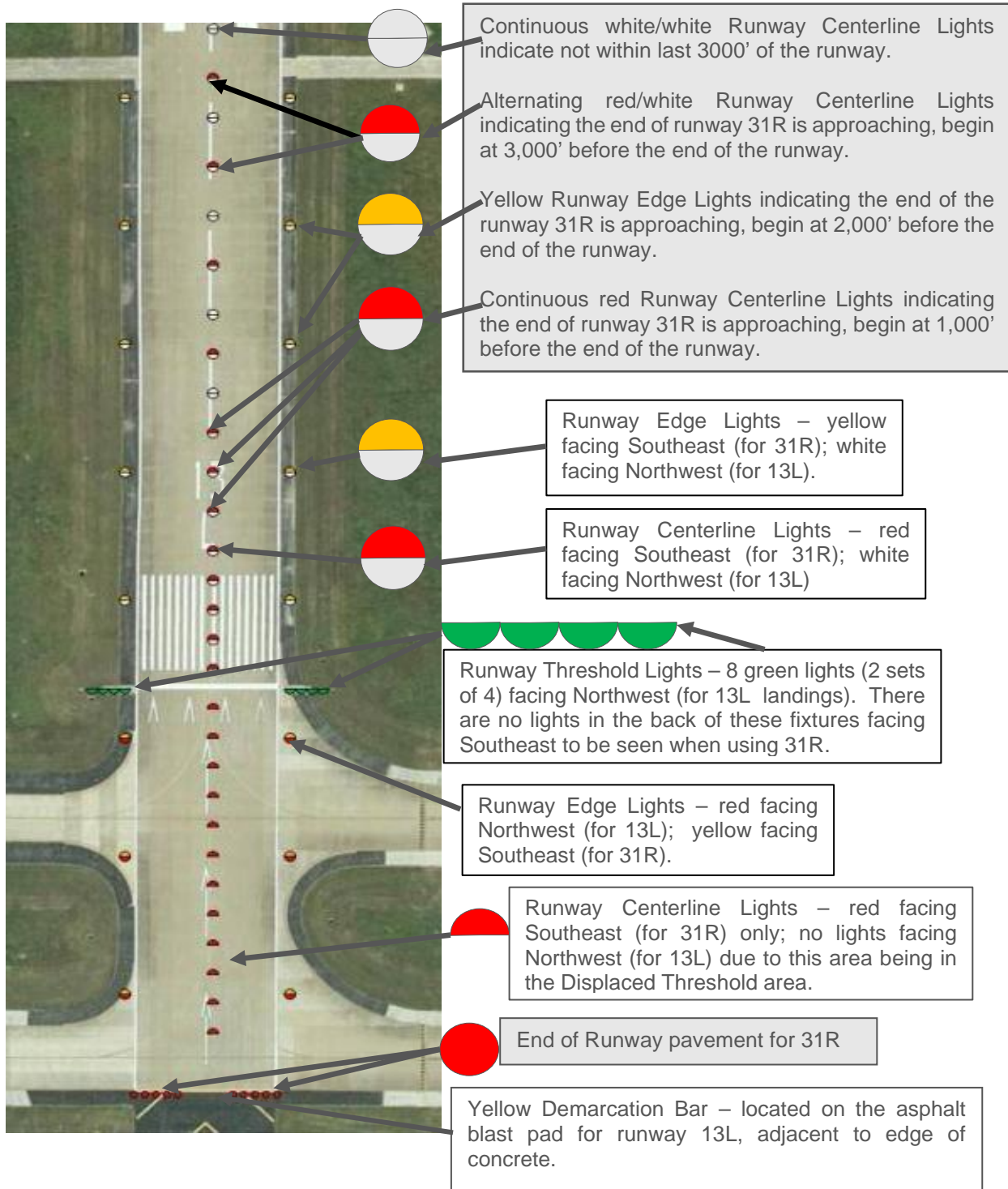


### Runway Threshold Lights

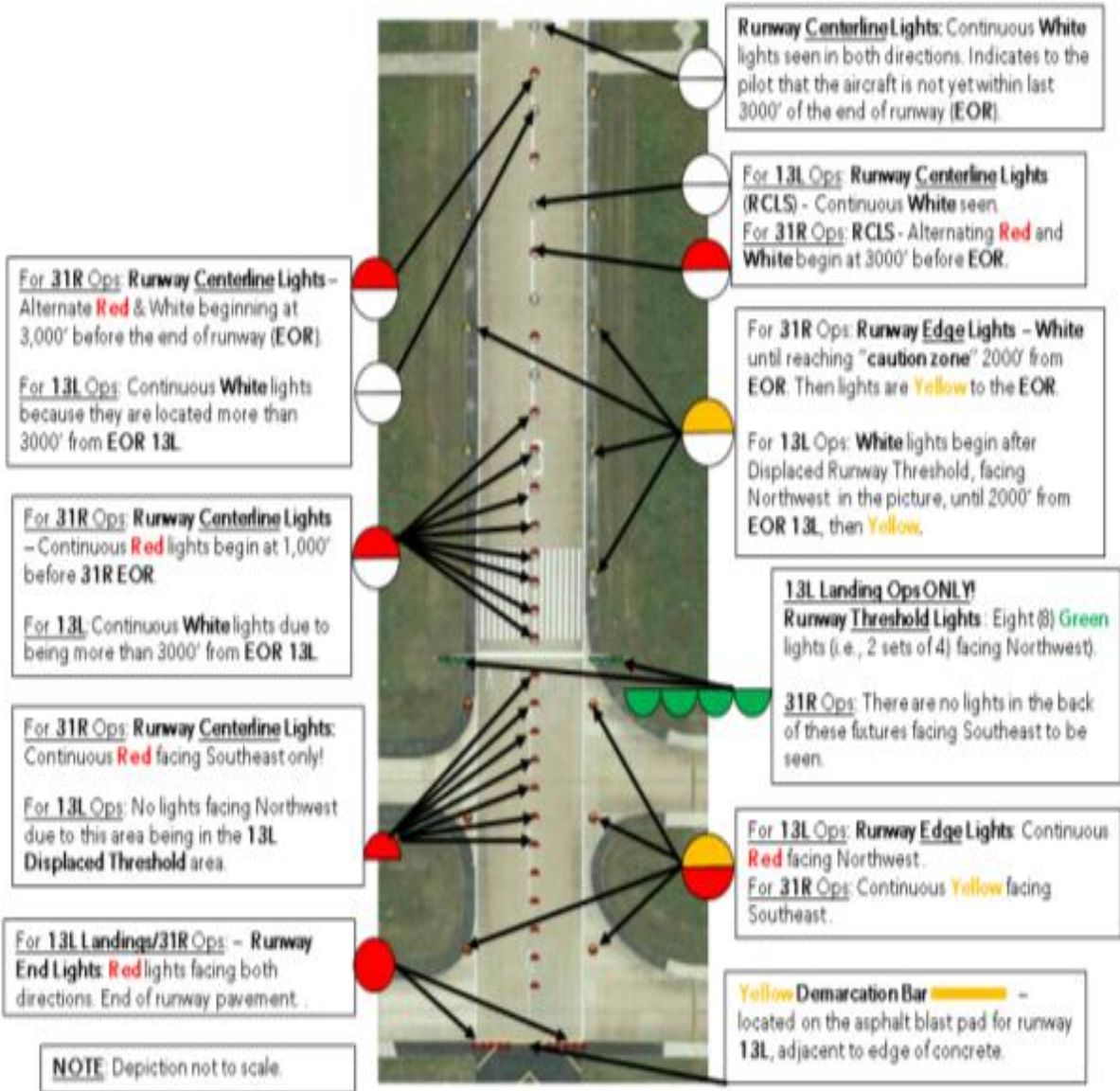
Runway Threshold Lights are green in color and denote the beginning of full strength pavement for the runway. NOTE: Runway End Lights and Threshold Lights are on the same lighting fixture; however, they are different colored lenses. See below.



Runway 13L/31R Lighting Configuration



Runway 13L/31R Unique Lighting Configuration





### Acute Angle Runway Exit Lights

Also called High Speed Exit (HSE) lights, these lights define the curved path aircraft travel from the runway centerline to a point on the taxiway beyond the Runway Holding Position Marking or the Instrument Landing System Critical Area Holding Position Marking.

They are alternating green and yellow in color and spaced 50 feet apart.

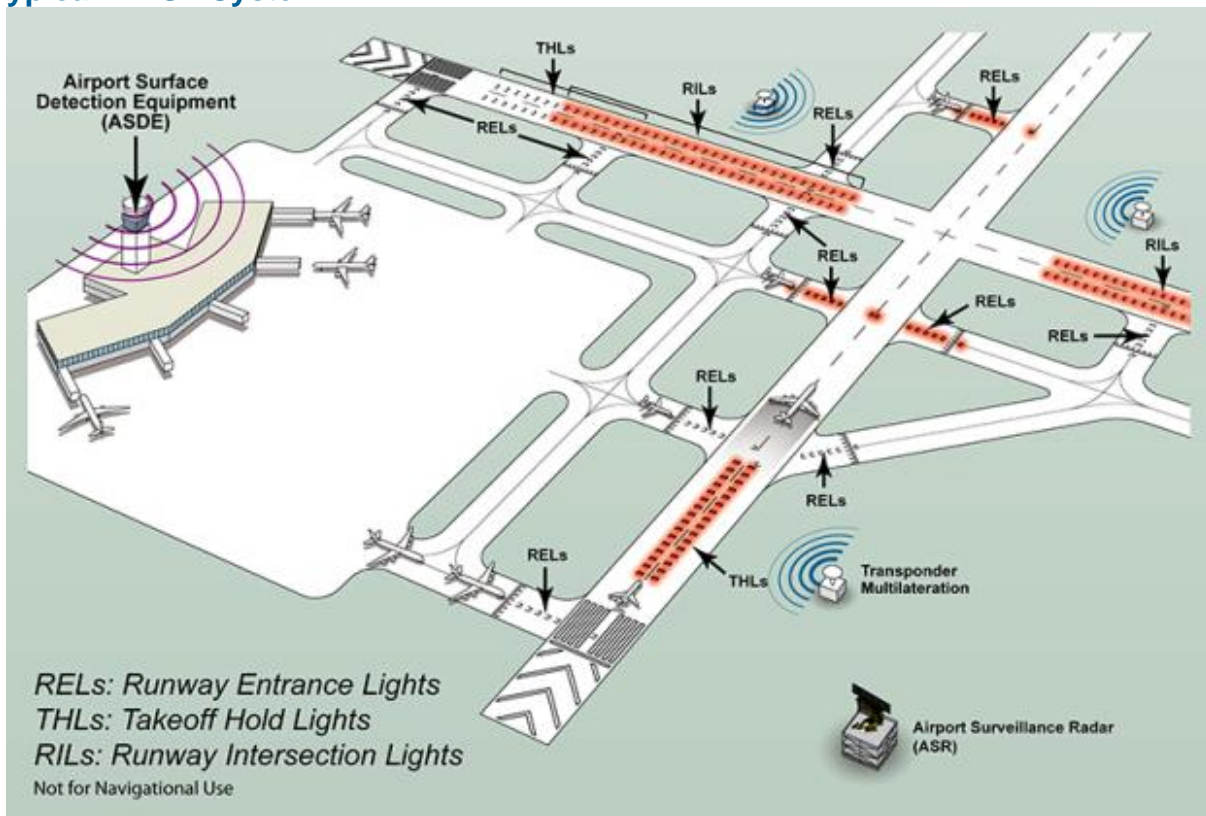


### Runway Status Light (RWSL) System

RWSL Operational Concept and Solution:

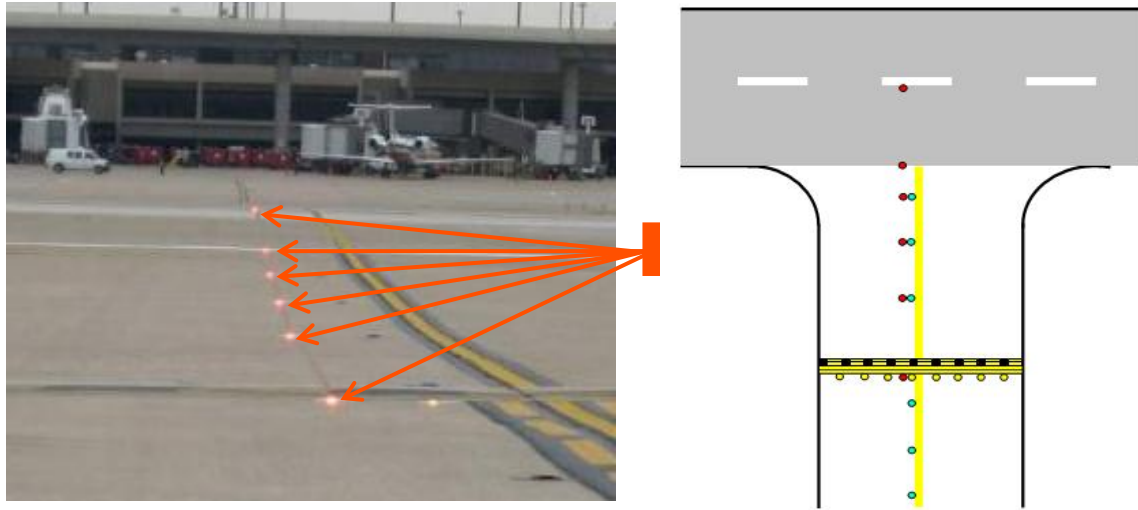
- Reduce frequency and severity of runway incursions,
- Prevent runway accidents,
- Improve situational awareness of pilots and vehicle operators by having a clear direct indication that a runway is unsafe to:
  - enter or cross for aircraft/vehicles on a taxiway (Runway Entrance Lights – RELs), or
  - Takeoff from or land on for aircraft (Takeoff Hold Lights – THLs).

### Typical RWSL System



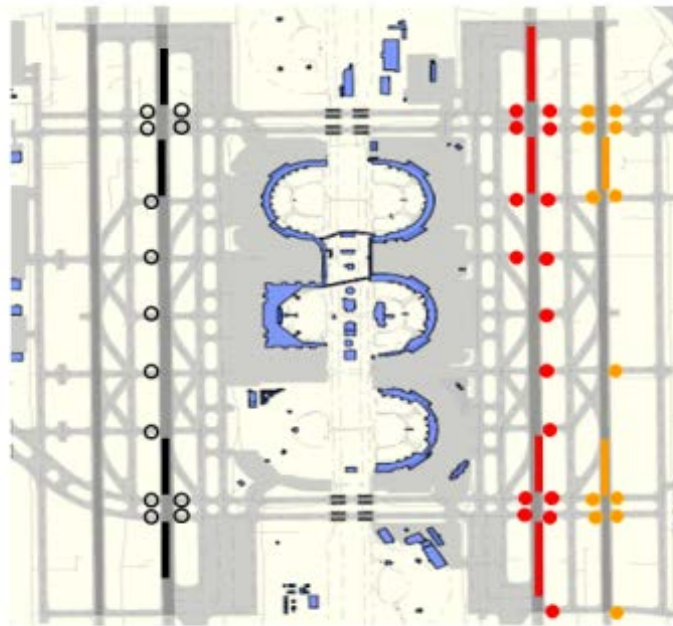
Note: At DFW, Runway 18L/36R is currently configured with only a single row of THLs at both ends of the runway instead of the two rows of lights as shown above. Runways 17R/35L and 17C/35C have the two row configuration of THLs (as depicted above) centered on the runway centerline, at both ends of those runways. DFW DOES NOT HAVE Runway Intersection Lights (RILs) because none of DFW's runways intersect each other.

Runway Entrance Lights (REL)



An example of RELs on the east side of Runway 17R/35L.

Runway Status Lights (RWSL) System



- Legend:
- Runway Entrance Lights (REL)
  - Runway 18L/36R RWSL Locations
  - Runway 17R/35L RWSL Locations
  - Runway 17C/35C RWSL Locations
- Take-off Hold Lights (THL)
- Runway 18L/36R THL Locations
  - Runway 17R/35L THL Locations
  - Runway 17C/35C THL Locations

### Approach Lighting Systems (ALS)

This is the lighting system used during the final phase of the approach for landing, when the pilot is transitioning from looking at his instruments, to looking at the runway. There are two different types of approach lighting systems at DFW airport, depending on the weather conditions they support.

ALSF-2 – Supports visibility conditions from good, down to zero visibility.

- Approach Light (AL) System with Sequenced Flashing (SF) Lights, Type-2
- ALSF-2 equipped runways at DFW are - 17L, 35R, 17C, 35C and 18R
- ALSF-2 are utilized on category (CAT) II & CAT III ILS approach runways.

MALSR – Supports visibility conditions from good, down to fair visibility.

- Medium-Intensity Approach Lighting System (MALSR) with Runway Alignment Indicator Lights
- MALSR equipped runways at DFW - 17R, 18L, 13R, 31R, 35L, 36R, and 36L
- MALSR are utilized on CAT I ILS approach runways.



**Runway 35C ALSF-2 Lights**



**Runway 35L MALSR Lights**



This picture depicts the nighttime ALSF-2 approach lighting that a pilot sees at approximately 1400' from the beginning of the runway. The top bar of green lights denotes the beginning of the concrete runway. The wide perpendicular bar of yellowish lights is 1000' from the end-of-runway. The wide bar on the ALS is useful in determining the edge of the Runway Safety Area.

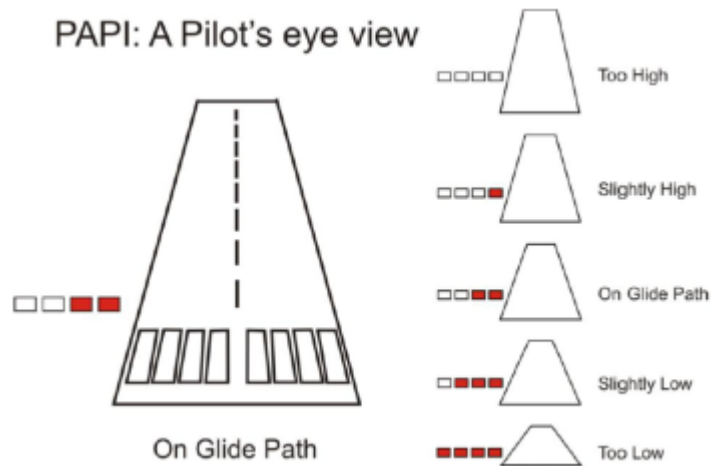
## Visual Approach Lighting Systems

### Precision Approach Path Indicator (PAPI)

The PAPI light system is positioned alongside a runway and consists of a horizontal array of four light boxes. Each light box has three lights in it. The array provides the pilot with a visual indication (no cockpit instrumentation for PAPI) of an aircraft's position on the recommended glide path to touchdown on the landing runway. These lights are visible from 3 to 5 miles during the day and up to 20 miles or more at night. The array of light units is normally installed on the left side of the runway, and all runways at DFW have PAPI systems installed to the left of the runway, except runway 35R which has its PAPI system installed to the right. See the system images below. At DFW, the FAA owns and maintains these visual aids.



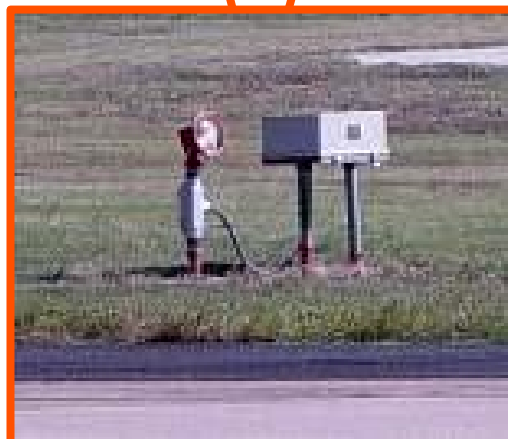
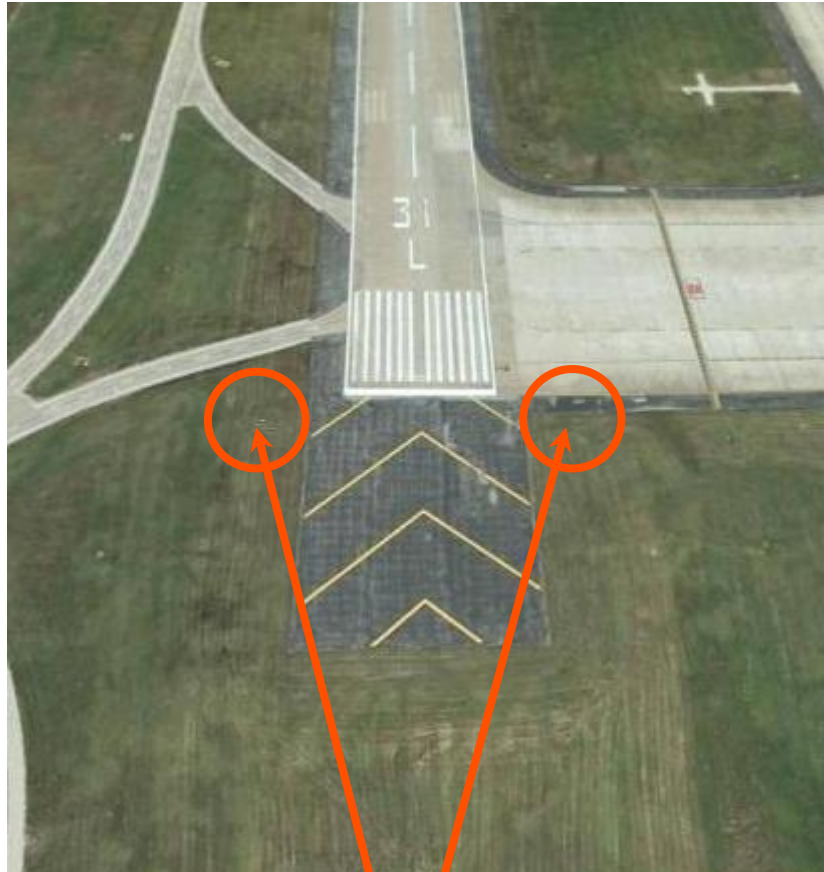
PAPI: A Pilot's eye view





### Runway End Identifier Lights (REILs)

- REILs are comprised of two synchronized strobing (flashing) lights, one to each side of the runway threshold. They provide rapid and positive identification of the approach end of a runway.
- REILs at DFW are installed on runways 31L and 13L only. Both of these runways are visual approach runways and this is the only approach-type lighting available to them for these runways other than PAPIs.



### Airport Rotating Beacon

- The airport rotating beacon is located on the northwest quadrant of the airport at Founder's Plaza and typically is in operation from sunset to sunrise. While operating, the beacon's lights are white and green. The beacon is activated by a sensor and is not controlled by the FAA ATCT.

### Obstruction Lights

- Any temporary or permanent object that exceeds any obstruction standard contained in PART 77, SAFE, EFFICIENT USE, AND PRESERVATION OF THE NAVIGABLE AIRSPACE, should normally be marked and/or lighted. The FAA may determine that marking and/or lighting is not required if the obstruction light will impair aviation safety. The FAA may also recommend marking and/or lighting a structure that does not exceed any obstruction standard defined in FAR Part 77, because of its particular location or function. Steady red obstruction lights are located throughout the airport.



Airport Rotating Beacon



Obstruction  
Lights

# Airfield Signage

## Mandatory Instruction Signs

Mandatory instruction signs have white inscriptions with a black outline on a red background. (See the five examples below.)



They denote an entrance to a Runway, a protected Runway Approach Area, an Instrument Landing System (ILS) Critical Area, a Land and Hold Short Operation (LAHSO) hold area, and paved areas not intended for aircraft to operate. At airports with an operating airport traffic control tower such as DFW, vehicles and aircraft are required to HOLD at, or prior to these signs unless, or until, cleared by air traffic control to proceed past them. Mandatory instruction signs found at DFW Airport include:

- Holding Position Signs for Taxiway/Runway Intersections.
- Holding Position Signs for protection of Runway Approach Areas.
- ILS Critical Area Holding Position Signs.
- LAHSO Hold Position Signs.
- No Entry Signs.

Holding Position Sign for Taxiway/Runway Intersections. The inscription on a Holding Position Sign at a taxiway and runway intersection contains the Runway Designation (s) such as the “35C-17C” and the intersecting taxiway “P2”, as shown below. The Runway Designations are separated by a dash, and their arrangement indicates the direction of the corresponding runway threshold.



In the example shown, the “P2 35C – 17C” sign indicates that you’re on Taxiway (acute angle exit/high speed exit) “P2”, and the runway threshold for Runway “35C” is to the left and the runway threshold for Runway “17C” is to the right.

### Holding Position Sign for ILS Critical Areas

The mandatory sign to indicate the holding position for the Instrument Landing System (ILS) Critical Area is the white lettering “ILS” with black outlines, on a red background. Two examples of locations at DFW where these signs can be found are:

- Taxiway M between Taxiways Y and EG
- Taxiway WF east of Runway 18R/36L



### Holding Position Sign for Runway Approach Areas

The inscription on a sign protecting a Runway Approach Area contains the associated Runway Designation followed by a dash symbol and the abbreviation “APCH” (for approach), in white characters with black outlines, on a red background. The sign is installed where taxiways are located in protected approach areas. These signs prevent an aircraft/vehicle on a taxiway from entering the Runway Safety Area or penetrating the protected airspace required for the runway. DFW has only two holding position signs for Runway Approach Areas, both are located along taxiway R, near the approach end of runway 17L.



### Holding Position Sign for Land and Hold Short Operations (LAHSO)

These signs indicate the holding position for an arrival aircraft to hold short of after landing, while still on the runway. There are eight LAHSO signs currently in use at DFW at the following locations:

- East and west of runway 17C/35C north of taxiway B (depicted below)
- East and west of runway 17C/35C south of taxiway EJ
- East and west of runway 18R/36L north of taxiway B
- East and west of runway 18R/36L south of taxiway Z



### No Entry Sign

This sign indicates that entry into a particular area is prohibited to aircraft and is installed on the left side as seen by the pilot approaching the prohibited area. Examples of where these signs can be found at DFW Airport are along and parallel to Taxiway Q. NOTE: For DFW Airport, No Entry Signs are installed adjacent to the ARFF Roads and are intended for aircraft not vehicle operators.





## Taxiway Guidance Signs

### Direction Signs

These signs indicate directions of other taxiways leading out of an intersection. The signs have black inscriptions on a yellow background and always contain arrows. The arrows should be oriented to approximate the direction of turn.



### Destination Signs

Destination signs have black inscriptions on a yellow background and always contain an arrow. These signs indicate the general direction to a remote location.

### Protected Area Boundary Signs

This sign is used to identify the location of the boundary of a Runway Safety Area (RSA)/Obstacle Free Zone (OFZ) or a Runway Approach Area while in those areas. The sign has a black inscription on a yellow background. When aircraft/vehicle has passed beyond this sign, it is clear of the RSA/OFZ or Runway Approach Area.



### ILS Critical Area Boundary Sign

This sign identifies the boundary of an ILS Critical Area from within that area. The sign has a black inscription that depicts the ILS Holding Position Marking, on a yellow background. The sign is used to determine when to report "clear of the ILS critical area" (if so requested by ATC, when in these areas). This sign is installed only on the reverse side of a red Mandatory ILS Holding Position Sign.



### Taxiway Location Sign

Like the surface-painted marking, this sign identifies the taxiway on which an aircraft is located. A typical sign is shown below. This sign has yellow inscriptions on a black background with a yellow border and does not contain arrows.



### Taxiway Location/Direction Sign

Like the surface-painted marking, this sign identifies not only the taxiway on which you are located, but also the direction of the nearest next taxiway. A typical sign is shown below. The location portion of the sign has yellow inscriptions on a black background with a yellow border while the destination portion of the sign is the opposite in which the panel has black inscriptions on a yellow background with an arrow(s) for direction.



### Runway Exit Signs

Typical Runway Exit Signs to intersecting taxiways are shown below. Runway Exit Signs are located prior to the runway/taxiway intersection on the side, and in the direction from which the aircraft is expected to exit.



### Runway Distance Remaining Signs

Runway Distance Remaining Signs provide pilots with information on how much runway distance is remaining from that point during takeoff and landing operations.



These lighted signs are located along the side of the runway, and the inscription is a white numeral on a black background, as shown above, to indicate the approximate, but minimum, Runway Distance Remaining, in increments of 1,000 feet. The example above indicates at least 10,000 feet remaining for this runway, at this point. (Because all DFW runway lengths are thousands plus hundreds of feet in length, the “Distance Remaining” displayed is the minimum amount of feet (in thousands) left on the particular runway.)

All seven runways at DFW Airport have Distance Remaining Signs installed.

### Runway Location Signs

Runway Location Signs are used to provide additional information to pilots by identifying the runway they are located on. This sign is installed at runways and at runway/taxiway intersections that are used for intersection takeoffs (instead of full length takeoffs). Since the Runway Designation Marking/Sign is located behind the runway entry point, the Runway Location Sign provides this important Runway Designation information to the pilot. These Runway Location Signs only contain the Runway Designation for the runway being used.

An example of this would be an aircraft that is cleared by the ATCT to enter runway 18R at Z Taxiway for departure. Once the aircraft enters the runway and turns south to align itself for departure, this sign confirms that the aircraft is indeed on Runway 18R, even though the pilot did not see the Runway Designation Sign/Marking well north of his position. Runway Location Signs have a yellow inscription on a black background with a yellow border and do not contain any information other than the Runway Designation.

Installing Runway Location Signs is a safety enhancement for DFW Airport in an effort to improve pilot’s situational awareness.





Runway location signs are installed at the following locations (both sides of the runway):

- Runway 13L, southeast of taxiway P
- Runway 17C/35C, south of taxiway Z, north of taxiway B
- Runway 17R/35L, south of taxiway Z, north of taxiway B
- Runway 18L/36R, south of taxiway Z, north of taxiway B
- Runway 18R/36L, south of taxiway Z, north of taxiway B
- Runway 31L, northwest of taxiway A5

### Information Signs

Information Signs are those signs installed on the airside of an airport which are not Mandatory Instruction signs, Runway Location sign, area boundary signs, runway distance remaining signs, and taxiway location or guidance signs. Information Signs have black inscriptions on a yellow background. Information signs do not have to be lighted.








### General Signing Conventions

Unless otherwise stated, signs are always placed on the left side of the taxiway as seen by the pilot of the approaching aircraft. If signs are installed on both sides of the taxiway at the same location, the sign faces are identical (an exception is for Runway Holding Position Signs).


Signs are not installed between a taxiway/runway intersection Runway Holding Position Sign **36R - 18L** and the Runway itself.

Signs may be located on the right side of the taxiway when necessary to meet clearance requirements or where it is impractical to install them on the left side because of terrain or conflicts with other objects.

Some signs may be installed on the back side of other signs although it may result in the sign being on the right side of the taxiway. Signs that may be installed in this manner include:

1. RSA/OFZ and Runway Approach Area Boundary Signs  may be installed on the back of a red Mandatory Instruction, taxiway & runway intersection, Runway Holding Position Sign **36R - 18L**, or a Runway Approach Area Holding Position Sign **17L - APCH**.
2. An ILS Critical Area Boundary Sign  that may be installed on the back of ILS Critical Area Holding Position Sign **ILS**.
3. Taxiway Location Signs **B** may be installed on the back of Taxiway Direction Signs  when they are installed on the far side of an intersection.


NOTE: Location signs installed in this manner do not replace the need for location signs installed on the left of the Runway Holding Position Sign prior to the intersection.

4. Taxiway Location Signs **B** may be installed on the back of Holding Position Signs **36R - 18L**.
5. Destination Signs may be installed on the back of Taxiway Direction Signs  on the far side of intersections when the Destination referred to is straight ahead.

### General Taxiway Signing Conventions



When a taxiway intersection comprises only two intersecting/crossing taxiways, it is permissible to place the Taxiway Location sign to the left of the sign array as indicated below. In this case, two arrows will accompany the designation for the intersecting taxiway on the direction sign.





Taxiway Location signs are normally included as part of a Direction Sign array (as depicted below), which is located prior to the taxiway intersection. Except for intersections of only two taxiways the Taxiway Location sign **JS** is placed in the array so the designations for all turns to the left  are located to the left of the Taxiway Location sign **JS**, and the designations for all turns ahead or to the right



## Airfield Signage

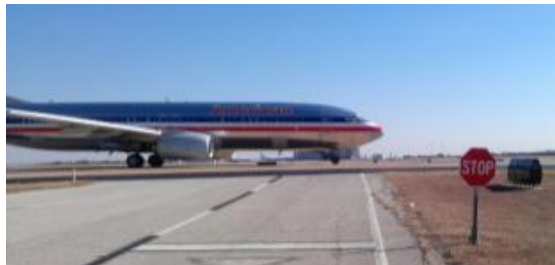
 , are located to the right of the Taxiway Location  sign. Below is an example of this configuration.

All Taxiway Direction signs have arrows. Arrows on signs are oriented to the approximate direction of the turn. Each Taxiway designation appearing in an array of Taxiway Direction Signs is accompanied by only one arrow. A Taxiway Direction sign with an arrow indicating that a taxiway continues straight ahead (25 degrees or less change in alignment at the intersection) is NOT normally needed. Where the Taxiway intersection alignment changes more than 25 degrees, a sign with an arrow approximating the direction of the taxiway  is used. If the taxiway continues straight ahead (25 degrees or less change in alignment) and the designation of the taxiway changes at the intersection, then a direction sign with an arrow  is used. Below is an example of this configuration.



### Mandatory Ground Vehicle Traffic Instruction Signs

Mandatory Ground Vehicle Traffic Instruction Signs have white inscriptions on a red background. They denote a vehicle roadway entrance to a taxiway, runway or ILS Critical Area.



Roadway Entry to Taxiway



Roadway Entry to Runway

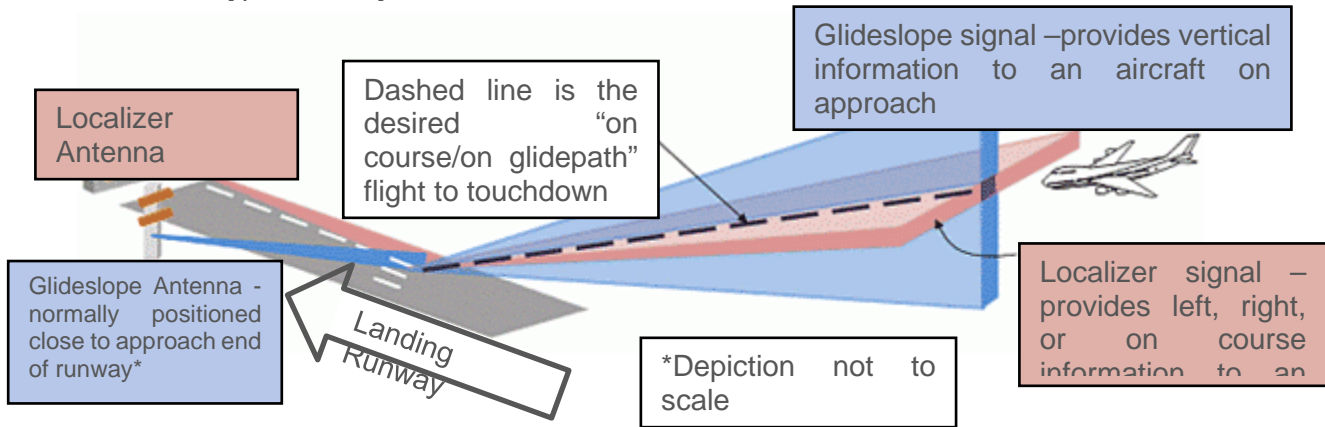


Roadway Entry to ILS Critical Area

# NAVAIDs

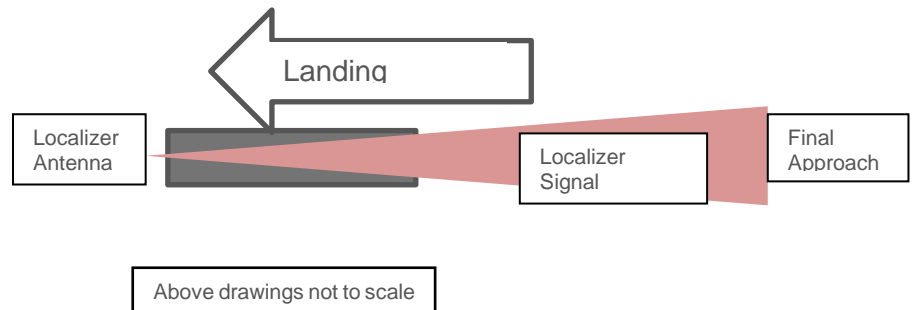
## ILS

The Instrument Landing System (ILS) is designed to provide an approach path for exact alignment and descent rate of an aircraft on final approach to a runway. This NAVAID allows electronic devices both on the aircraft and on the ground to work together to provide point-to-point guidance information to aircraft in flight. All runways at DFW with the exception of Runway 13L and Runway 31L, are Instrument Runways and have Instrument Landing Systems installed. During poor visibility conditions, all aircraft and ground vehicles must remain clear of the ILS Critical Area. Below is a typical ILS system.



## ILS Components: Localizer

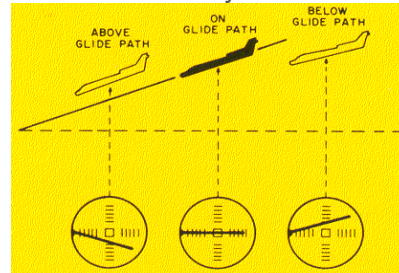
The Localizer is the component of an ILS system which provides runway centerline course guidance throughout the final approach descent path to touchdown. The Localizer signal is transmitted from the departure end (far end) of the runway so that the electronic beam travels down the full length of the runway and out into the runway's final approach area. The image below is the runway 31R Localizer antenna array which is located at the north end of runway 31R, just west of the FedEx/East Airfreight Cargo Ramp area.



### ILS Components: Glideslope

The Glideslope signal provides critical altitude/descent guidance for aircraft during final approach and landing. The glideslope is a ground-based electronic transmitter emitting signals to the cockpit instruments which help the pilot maintain a smooth and gradual descent during final approach to touchdown. The glideslope signal is transmitted from the approach end area of the runway, from the side of a runway, at a point abeam where the aircraft ideally should touchdown.

This is a “side view” drawing of how the aircraft uses the glideslope information to determine if the descent angle to touchdown is too steep (above), too low (below), or on the proper descent angle (on) to the runway.



Above are examples of how glideslope information is presented to the cockpit crew of an aircraft on final approach to the runway.



Above is the Glideslope antenna and electronic components facility for runway 35L.

**WARNING!** The signals emitted by the Localizer and Glideslope antennas are subject to distortion, diversion, blockage and other unintended results when metallic objects (e.g., mower tractor, cars, pickup trucks, and larger) enter the path of their emitting signals. During low visibility conditions, this has a serious effect on the information pilots receive in the cockpit. Therefore, remain clear of the protected areas for these facilities.

## Wind Cone

DFW has 18 lighted wind cones in the AOA located near the approach (beginning) end of the runways, usually opposite the 1,000 foot mark and 150 feet off to the left or right side of the runway. Each wind cone has lights to illuminate it during hours of darkness as well as a red obstruction light on top. Pilots use this aid as a visual reference to wind direction and speed at their most critical phases (landing & takeoff) of flight.





# Runway and Taxiway Protected Areas

## Surface Movement Guidance Control System (SMGCS)

Low visibility conditions exist when visibility is measured to be less than 1,200 foot on the RVR meter. RVR or “Runway Visual Range” is a term of measurement of light values in which distance is expressed in feet along certain parts of the runway. The RVR is the horizontal distance, in feet, in which a pilot would be able to see during takeoff or landing.

RVR values are measured by an instrument called the Transmissometer which is mounted on 14-foot tall towers parallel to and near the runways. Transmissometers provide readings for the touchdown, mid-point, and roll-out areas of a runway.

Low visibility operations can be declared INDEPENDENTLY for the east or the west side of the DFW Airport

Low visibility conditions will restrict vehicle operations within the aircraft movement area. Non-movement areas may also have restrictions.



Runway 17C/35C mid-point Transmissometer RVR tower

DFW Airport’s Surface Movement Guidance and Control System (SMGCS) Plan goes in effect when the RVR is measured to be 1,200 feet or less.

The SMGCS operation consists of the provision of guidance to, and control or regulation of, all aircraft, ground vehicles and personnel on the aircraft movement area of an aerodrome.

Guidance relates to facilities, information and advice necessary to enable the pilots of aircraft or the drivers of ground vehicles to find their way on the aerodrome and to keep the aircraft or vehicles on the surfaces or within the areas intended for their use.

Control or regulation means the measures necessary to prevent collisions and to ensure that the traffic flows smooth and freely.

Only vehicle activities in direct support of SMGCS procedures are authorized to operate within the movement area during SMGCS conditions. Personnel accessing the AMA during SMGCS conditions must display their SMGCS authorization.



SMGCS related support activities include:

- Airfield Operations personnel required to perform airfield inspections and/or escort activities.

---

## Runway & Taxiway Protected Areas

---

- Energy, Transportation & Asset Management personnel required to perform maintenance on lighting equipment.
- DPS personnel responding to any airfield, airport, or aircraft emergency.

If you are in the aircraft movement area (AMA) when SMGCS conditions are declared and you are not authorized to operate in the AMA in SMGCS you MUST leave the AMA immediately. If you need assistance or clarification with this task, immediately notify the Assistant Airfield Operations Officer on “Ops Primary”, “PORT 110” or “PORT 111”, or call the AOC at 972-973-3112. Give them your exact location.



Routine crossings of the AMA by ground vehicles, are prohibited during SMGCS conditions.

- Unauthorized employees found in the aircraft movement area during SMGCS conditions will be escorted off the AOA.

ILS Critical Areas/Precision Obstacle Free Areas (POFZs) are protected when the ceiling (cloud base) is reported to be less than 800 feet and/or the surface visibility is less than 2 miles. During these low visibility conditions, all ground vehicles must remain clear of the ILS Critical Areas/POFZs. ILS Critical Area/POFZ Mandatory signs have white inscriptions on a red background:



Surface painted holding position markings for ILS Critical Areas are yellow in color, with a black background, and designate where aircraft and vehicles must hold short when ILS Critical Areas are protected.



### Runway and Taxiway Safety Areas

Runway and Taxiway Safety Areas (RSAs and TSAs) shall be clear and graded, and have no potentially hazardous ruts, humps, depressions, or other surface variations.

The Safety Area should be free of objects, except for objects that need to be located in the Safety Area because of their function. Objects higher than 3 inches above grade should be constructed on low frangible mounted structures of the lowest practical height with the frangible point no higher than 3 inches.

Each Safety Area shall be drained by grading or storm sewers to prevent water accumulation.

Each Safety Area shall be capable under dry conditions of supporting snow removal equipment, and aircraft rescue and firefighting equipment, and supporting the occasional passage of aircraft without causing major damage to aircraft.

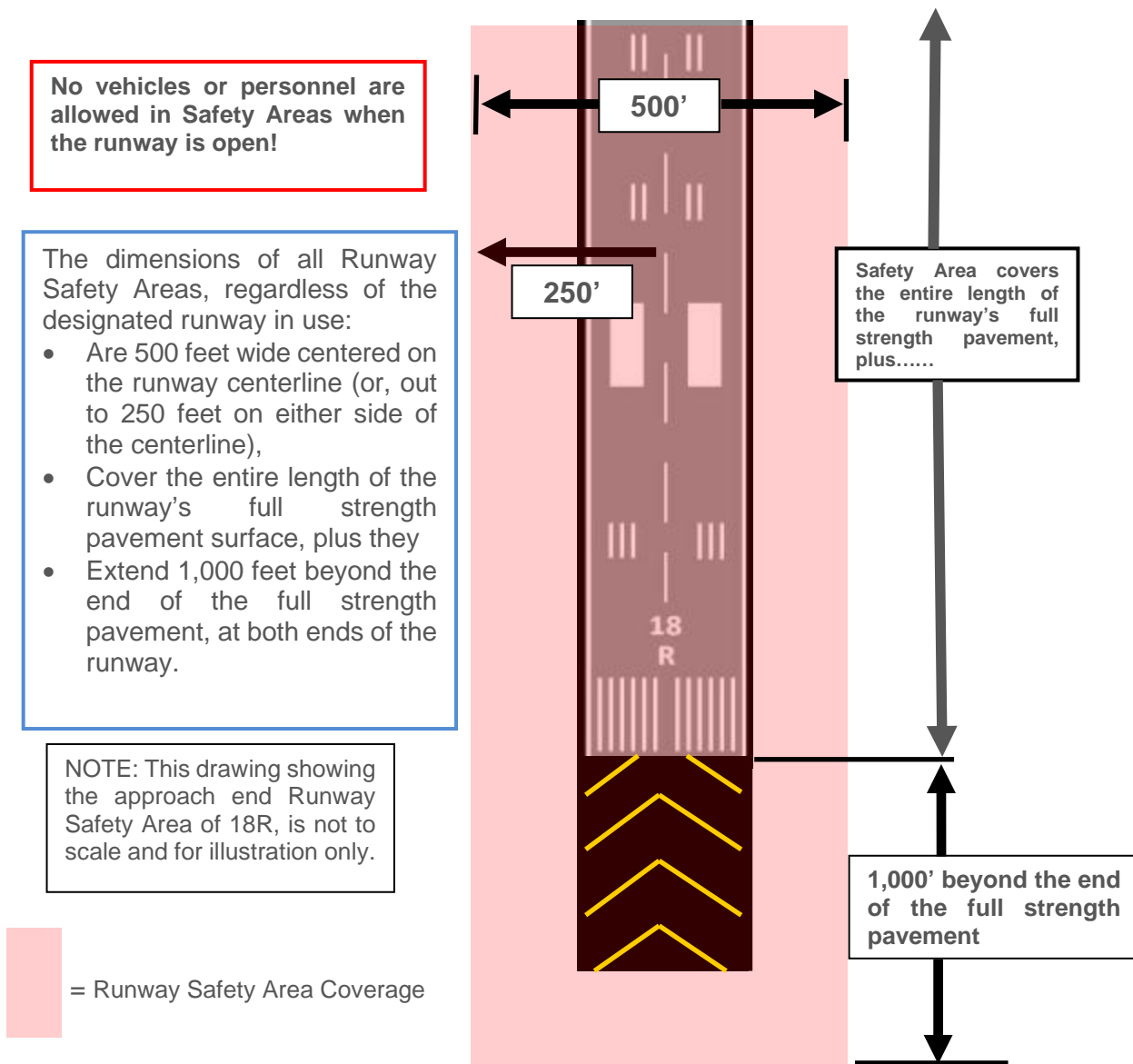
## Runway & Taxiway Protected Areas

No object may be located in any Runway Safety Area, except for objects that need to be located in a Safety Area because of their function.

Runway Safety Areas are 500 feet wide centered on the runway centerline, or 250 feet to either side of the runway centerline, and they extend 1000 feet beyond the end of the full strength of the runway, at each end of the runway.

Taxiway Safety Areas for taxiways constructed before January 1, 1988, are 200 feet wide centered on the taxiway centerline, or 100 feet to either side of the taxiway centerline. Taxiway Safety Areas at DFW constructed after January 1, 1988 are 214 feet wide centered on the taxiway centerline, or 107 feet to either side of the taxiway centerline.

### Runway Safety Area (RSA)



### Obstacle Free Zone (OFZ)

The OFZ is a three dimensional volume of airspace which supports the transition of ground-to-airborne aircraft operations (and vice versa). The OFZ clearing standard precludes taxiing, and parked aircraft and object penetrations, except for frangible objects that need to be located in the OFZ because of their function.

The Runway OFZ, the Inner-Approach OFZ, and the Inner-Transitional OFZ all comprise the Obstacle Free Zone (OFZ).

The Runway OFZ is a defined volume of airspace centered above the surface of the runway and whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The Runway OFZ extends 200 feet beyond each end of the runway, and for runways serving large airplanes the width is 400 feet. The DFW Runway OFZ is 400 feet wide centered on the runway centerline, or 200 feet from the runway centerline to either side. The DFW Runway OFZ extends 200 feet beyond each runway end.



The Inner-Approach OFZ applies only to runways with an approach lighting system and begins 200 feet from the runway threshold extending 200 feet beyond the last light unit in that approach light system. The width of the Inner-Approach OFZ is the same as the Runway OFZ, that being 400 feet. The slope of this defined volume of airspace is 50:1.

The Inner-Transitional OFZ dimensions vary with the type aircraft and instrument approach minimums involved.

### Object Free Area (OFA)

The Object Free Area is a two dimensional ground area centered on a runway, taxiway, or taxilane centerline, which is to be kept clear of objects, except for objects that need to be, located in the OFA for air navigation or aircraft ground-maneuvering purposes.

The Runway OFA is a two-dimensional ground area centered on the runway centerline. This OFA precludes parked airplanes, agricultural operations and objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. The DFW Runway OFA is described as 800 feet wide, or 400 feet from runway centerline to either side, and it extends 1000 feet beyond each runway end.

The Taxiway and Taxilane OFAs are two-dimensional areas surrounding taxiways and taxilanes within which no object may be located that is not completely mobile and capable of clearing the OFA for passage of aircraft.

---

## Runway & Taxiway Protected Areas

---

- However, roadway signs and barricades, markers, and lights used to define excavations are allowed.
- The DFW TAXIWAY OFA is 320 feet wide centered on the taxiway, or 160 feet to either side of the taxiway centerline. (This standard meets FAA Aircraft Design Group (ADG) “V” criteria.)
- The DFW TAXILANE OFA is 276 feet wide centered on the taxilane centerline, or 138 feet from taxilane centerline to either side (This also meets FAA ADG V criteria).

### Imaginary Surfaces

49 CFR PART 77, entitled “Safe, Efficient Use and Preservation of the Navigable Airspace”, establishes a complex structure of imaginary surfaces in relation to each runway at civil airports. The size of each Imaginary Surface is based on the category of each runway according to the type of instrument approach available or planned for that runway.

According to the provisions set forth in PART 77, an object is an “obstruction to Air Navigation” if it is of greater height than any Imaginary Surface established under this regulation.

Imaginary Surfaces exist primarily to prevent existing or proposed manmade objects, objects of natural growth, or terrain from extending upward into navigable airspace.

A Primary Surface is an Imaginary Surface longitudinally centered on a runway, which extends 200 feet beyond the end of each runway, and is 1,000 feet wide, or 500 feet on each side of the runway centerline. (See Part 77 for complete information).

An Approach Surface is also an Imaginary Surface longitudinally centered on the extended runway centerline and extending upward and outward from each end of the Primary Surface. The Approach Surface, depending on type of approach category, extends for a horizontal distance and slope of:

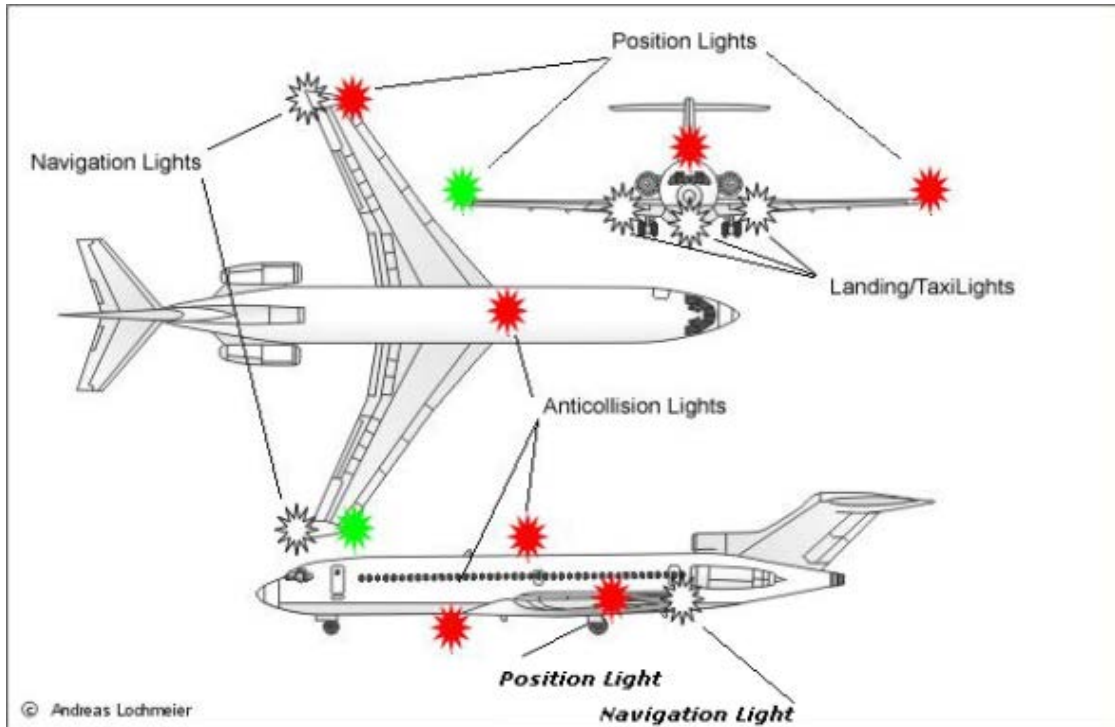
- Visual Approach Category - 5,000 feet horizontal and slope 20:1.
- Non-precision Instrument Approach Category - 10,000 feet horizontal and slope 34:1.
- Precision Instrument Approach Category (ILS) - 10,000 feet horizontal and slope 50:1.

A Transitional Surface is a surface that extends outward and upward at right angles to the runway centerline and the extended runway centerline at a slope of 7 to 1, from the sides of the Primary Surface and from the sides of the Approach Surfaces.



## Aircraft Lighting

When driving at night, or during low visibility conditions, it is important to be on the lookout for aircraft. Aircraft have lights placed at specific locations. Knowing the specific colors and placements of these lights will help you ascertain the size and direction of movement of the aircraft. Please study the graphic below and become acquainted with aircraft lighting.



- Anti-collision lights – These are rotating Beacons or strobe lights which can be red or white. The **FAA** recommends these lights be turned on anytime an aircraft's engines are running.
- Position/Navigation lights - An unobstructed red light on the left side and green on the right near the wing tips and a white light near the tail or on the wingtips, visible from the rear of the aircraft.
- Taxi/Landing Lights – Bright lights used during taxi, landing and take-off operations, during operations below 10,000 ft., and within ten nautical miles of an airport.

## Appendix A: Key Acronym Definitions

AA – American Airlines	HIRL – High Intensity Runway Lights
AACS – Automated Access Control System	HSE – High Speed Exits
ACM – Airport Certification Manual	ILS – Instrument Landing System
AE – American Eagle/Envoy Airlines	MALSR – Medium Intensity Approach Lighting System Runway Indicator Lights
AEPs – Apron Entry/Exit Points	NMA – Non-Movement Area
ALS – Approach Lighting System	OFA – Object Free Area
AMA – Aircraft Movement Area	OFZ – Object Free Zone
AOA – Air Operations Area	PAPI – Precision Approach Path Indicator
AOC – Airport Operations Center	POFZ – Precision Object Free Zone
ARFF – Aircraft Rescue and Fire Fighting	RSA – Runway Safety Area
ATC – Air Traffic Control	REIL – Runway End Identifier Lights
ATCT – Airport Traffic Control Tower	SIDA – Security Identification Display Area
CA – Corporate Aviation	SMGCS – Surface Movement Guidance Control System
CFR – Code of Federal Regulation	TDZL – Touchdown Zone Lights
CTA – Central Terminal Area	TRIP – Terminal Renewal and Improvement Program
DFW – Dallas/Fort Worth International Airport	TSA – Transportation Security Administration; or, Taxiway Safety Area
DL – Delta Airlines	UPS – United Parcel Service
DPS – Department of Public Safety	VFR – Visual Flight Rules
FAA – Federal Aviation Administration	
FOD – Foreign Object Debris/Damage	

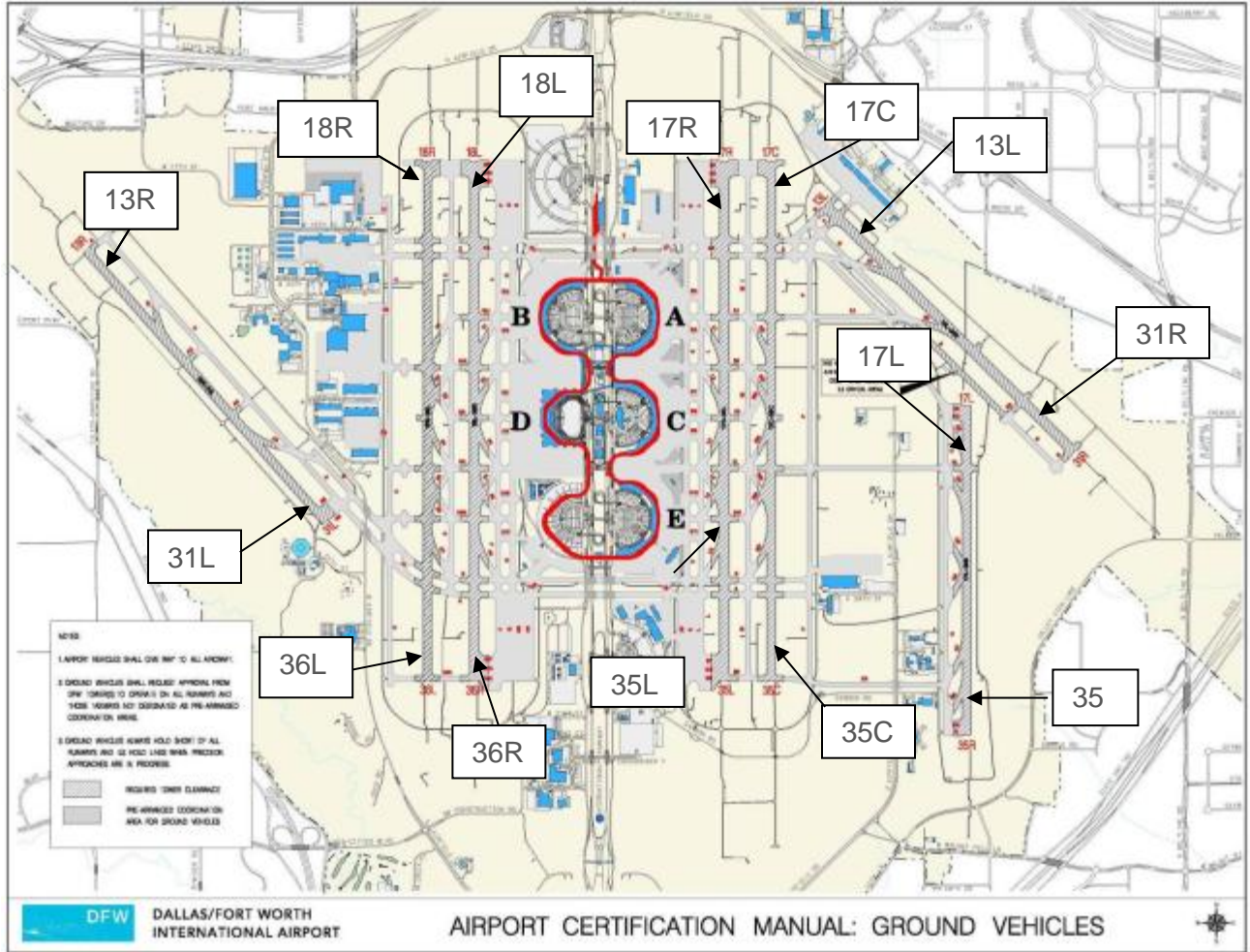
## Appendix B: Phonetic (ICAO) Alphabet and Numbers

DFW Board personnel who are authorized to communicate on **ATC** frequencies use the **International Civil Aviation Organization (ICAO)** phonetic alphabet. That phonetic alphabet is to be used when stating taxiway names and locations designated by letters.

<u>Character</u>	<u>Name</u>	<u>Pronunciation</u>
A.....	Alpha.....	(AL-FAH)
B.....	Bravo .....	(BRAH-VOH)
C.....	Charlie .....	(CHAR-LEE)
D.....	Delta .....	(DELL-TAH)
E.....	Echo.....	(ECK-OH)
F.....	Foxtrot.....	(FOKS-TROT)
G.....	Golf .....	(GOLF)
H.....	Hotel .....	(HOH-TEL)
I.....	India .....	(IN-DEE-AH)
J.....	Juliett .....	(JEW-LEE-ETT)
K.....	Kilo.....	(KEY-LOH)
L.....	Lima .....	(LEE-MAH)
M.....	Mike .....	(MIKE)
N.....	November .....	(NO-VEM-BER)
O.....	Oscar .....	(OSS-CAH)
P.....	Papa .....	(PAH-PAH)
Q.....	Quebec .....	(KEH-BECK)
R.....	Romeo .....	(ROW-ME-OH)
S.....	Sierra .....	(SEE-AIR-RAH)
T.....	Tango.....	(TANG-GO)
U.....	Uniform .....	(YOU-NEE-FORM)
V.....	Victor.....	(VIK-TAH)
W.....	Whiskey .....	(WISS-KEY)
X.....	Xray .....	(ECKS-RAY)
Y.....	Yankee.....	(YANG-KEY)
Z.....	Zulu.....	(ZOO-LOO)

<u>Numeral</u>	<u>Name</u>	<u>Pronunciation</u>
1.....	One.....	(WUN)
2.....	Two.....	(TOO)
3.....	Three .....	(TREE)
4.....	Four .....	(FOW-ER)
5.....	Five.....	(FIFE)
6.....	Six.....	(SIX)
7.....	Seven.....	(SEV-EN)
8.....	Eight.....	(AIT)
9.....	Nine .....	(NIN-ER)
0.....	Zero .....	(ZEE-RO)

## Appendix C: Dallas/Fort Worth International Airport – Runway Configuration



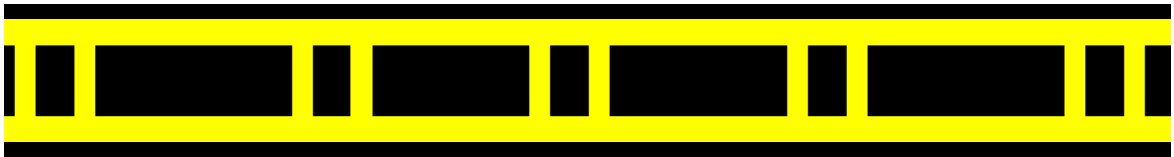
## Appendix D: Key Airfield Pavement Markings



Non-movement area boundary marking



Runway holding position marking



ILS holding position marking



Intermediate holding position marking



Continuous taxiway edge stripe



Dashed taxiway edge stripe



Taxiway centerline stripe



## Appendix E: Key Airfield Signs



Runway Holding Position



ILS Holding Position



Runway Approach Holding Position



No Entry



Yield to Aircraft



Stop



LAHSO Mandatory



Taxiway Direction/Location



Taxiway Direction



Taxiway Direction/Location



RSA/OFZ Boundary



ILS Boundary



Runway Exit



Taxiway Location



Distance Remaining



Information



Runway Location