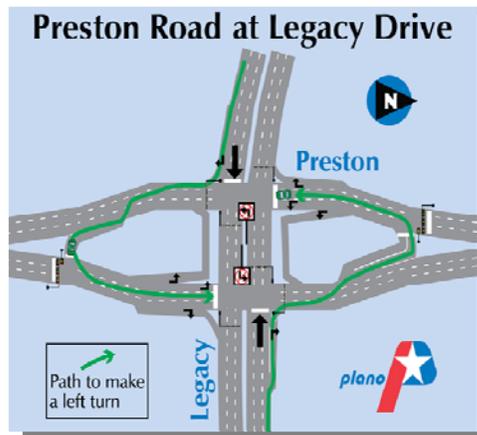


## **Median Left-Turn Project - Post Construction Review** ***Legacy Drive @ Preston Road***

### **BACKGROUND**

The signalized intersection of Preston Road and Legacy Drive, located in the north-western portion of Plano, carries over 79,000 entering vehicles per day. The traffic consists primarily of pass-through commuter traffic with origins and destinations outside of city limits. Traffic volume growth, although having slowed in recent years, has averaged 2.6% over the past eight years. Both Legacy Drive and Preston Road are six-lane divided arterial roads that carry less than 4% truck traffic. Preston Road is a controlled access facility owned by the Texas Department of Transportation (TxDOT), and operated by Plano. Adjacent land use consists of major retail centers, multi-family dwellings, and major medical facilities,



The intersection has received a fair share of complaints from road users who cited their frustration with excessive traffic congestion, delays, long lines of waiting traffic, and traffic collisions. Staff typically retimes this signal every three years with periodic verification that signal displays, pavement markings, and traffic safety signs are clearly visible. A review of crash history between the years 2007 – 2009 determined that traffic collisions involving “disregarding signals” increased, while collisions involving “left-turn failure to yield” have decreased (due to signal re-phasing, timing optimization, and emphasis traffic enforcement efforts). A more extensive comparison of before/after traffic collisions history will be conducted after a significant amount of “after” crash history is available.

A detailed traffic study performed by an independent transportation consultant confirmed that a conventional intersection design (i.e. double left-turn lanes, three through lanes, dedicated right-

turn lane) would continue to produce poor traffic flow and negative air-quality impacts under current and future traffic volumes. After considering the benefits of conventional, grade separation, Continuous Flow, and Median Left-Turn intersection designs it was determined that the Median Left-Turn design produced the greatest benefit under both current and future traffic demand. The analysis also determined that there is benefit from continuing to allow left-turns off of Preston Road, but prohibiting left-turns off of Legacy Drive.

The Median Left-Turn design was constructed and opened to traffic on 7/27/10. Prior to this opening staff provided project presentations to interested civic groups, at scheduled community meetings, and to news media staff. Informational posters and brochures were also provided to near-by apartment complexes, libraries, and businesses.

### PROJECT DESCRIPTION

- Add additional north/south through-lanes on Preston Road (one in each direction)
- Create or lengthen northbound, southbound, westbound right-turn lanes
- Add Median U-Turn lanes north and south of the intersection
- Retain the two Texas U-turn lanes existing at the intersection
- Add traffic signals at the two Median U-Turn areas
- Continue allowing left-turns off of Preston Road, prohibit left-turns from Legacy Drive
- Add traffic monitoring camera
- Retime traffic signals
- Add traffic signing and pavement markings to safely guide drivers through the Intersection

### FINDINGS (Opening Day Operations)

The newly reconfigured intersection opened to traffic on 7/27/10 with a visible 2/3 reduction in the number of waiting cars on Preston Road. During the first week of operation the Police Department issued warning citations and educational pamphlets to drivers making prohibited left-turns off of Legacy Drive. The following weeks required their continued presence as drivers continued their learning on how to safely use the intersection. Some drivers on Legacy Drive were found circumventing the design by using the median openings immediately east and west of the intersection to make a U-turn, come back to Preston Road, and make a right-turn. These behaviors were addressed by prohibiting U-turns at these median openings, placing additional

lane-use signing at the intersection, and removing signal displays located over former left-turn lanes. These actions resulted in an overall reduction in these types of violations.

With a substantially greater number of vehicles expected to use the northern Median U-turn (as compared to the southern Median U-turn), two approach lanes were designed for use. At the northern facility, the “left-turn on red” movement is prohibited due to a limited view to southbound Preston Road traffic. At the southern Median U-turn there is only one approach lane and making a “left-turn on red” is permitted when the view to northbound Preston Road traffic allows it to be done safely.

### Traffic Collisions

There have been a total of seven collisions (two illegal left-turns, two running red-light, two sideswipes, and one rear-end) in the five months since fully opening the project to traffic. Only the two illegal left-turn collisions are considered to be associated with the new MLT design. Although the “after” period of 5 months is too short to make any reasonable conclusions it appears that the MLT design is successful in reducing/eliminating left-turn collisions while increasing traffic throughput. It is noted that a sufficient amount of time must pass before a statistically valid study of collisions can be made. The study should be performed a minimum of one year after traffic normalizes at the intersection.

### Traffic Volumes

Post-construction traffic flow on all road approaches, except for westbound Legacy Drive, now exceeds pre-construction levels. The right-turn traffic on westbound Legacy Drive has not increased as expected from prohibiting left-turn movements at the intersection. It is expected that this volume will increase as traffic congestion at surrounding signalized intersections increases, and drivers come back to the MLT intersection to take advantage of its improved efficiency, reduced delays, and increased traffic flow and safety. A check of surrounding area signals found no decrease in their quality of vehicular flow (due to diverted traffic). This could be interpreted as the number of former Legacy left-turn drivers using near-by signalized intersections being so few that they do not impact service levels at these intersections. This phenomenon may also indicate that drivers get onto Preston Road at signalized intersections north and south of Legacy Drive to avoid the new median left-turn design.

## CONCLUSION

The Median Left-Turn Project has significantly improved traffic flow with continued improvement to safety at the intersection. As traffic adapts to the new intersection configuration and congestion increases at surrounding area intersections drivers will begin acknowledging the benefits of the MLT concept and gravitate to using this unconventional design. The expected improvement to traffic flow, safety, and air quality will continue as traffic volumes increase into the future. The median left-turn project has a high benefit/cost ratio, was constructed within right-of-way formerly reserved for an overpass, caused minimal disruption to traffic while being constructed, is increasingly accepted by road users, and operates effectively using simple traffic signal control.

## RECOMMENDATIONS

- Continue refinement of signal timing to minimized the time it takes a driver to use the median u-turn system
- Study the need to continue prohibiting “left-turn on red” at the northern median u-turn
- Periodically run public service announcements on the Plano Television Network describing the performance of the intersection design
- Consider recommendations from the upcoming project review by the Texas Transportation Institute
- Increase the presence of traffic enforcement to reduce intersection and near-by median opening violations
- Study traffic collision patterns a minimum of one year after project opening
- Where appropriate, consider constructing the MLT design at other intersections with unacceptable traffic flow and safety issues.

# **APPENDIX**

**TRAFFIC DATA**  
(Pre-construction conditions)

- AM peak-hour entering intersection traffic volume = 6,638 vehicles/hour
- 3-year traffic collisions = *See attached chart*
- Intersection traffic Violations = *See attached chart*
  
- Preston Road (SH-289):
  - Serves as a major north/south regional corridor with 49,000 vehicles/day, posted 55 mph north of Legacy Drive, 45 mph south of Legacy Drive
  - 3 lanes south of Legacy Drive, 2 lanes north of Legacy Drive
  - Limited contiguous concrete sidewalks located adjacent to properties
  
- Legacy Drive:
  - Serves as a primary east/west arterial road with 24,000 vehicles/day, 6-lanes divided, posted 40 mph, with limited contiguous 5 foot concrete sidewalks adjacent to properties
  - Westbound (AM peak-hour) left turns = 509 vehicles/hour (7.7% of total entering volume)
  
- Signal Data
  - Cycle Length (AM peak hour) = 160 sec
  - Legacy Drive left-turn green time/cycle length = 34%

*Traffic Simulation Model Results (Post-construction comparison)*

*AM Peak Period*

- Annual Cost Savings; \$480,000
- Annual Fuel Savings: \$20,000

*PM Peak Period*

- Annual Delay Cost Savings \$412,000
- Annual Fuel Cost Savings; \$45,900

Total Annual Motorist Economical Benefit: \$957,900

### Annual Air Quality Reductions

- CO Emissions: 1.9 tons
- NOx Emissions: 0.37 tons
- VOC Emissions: 0.27 tons

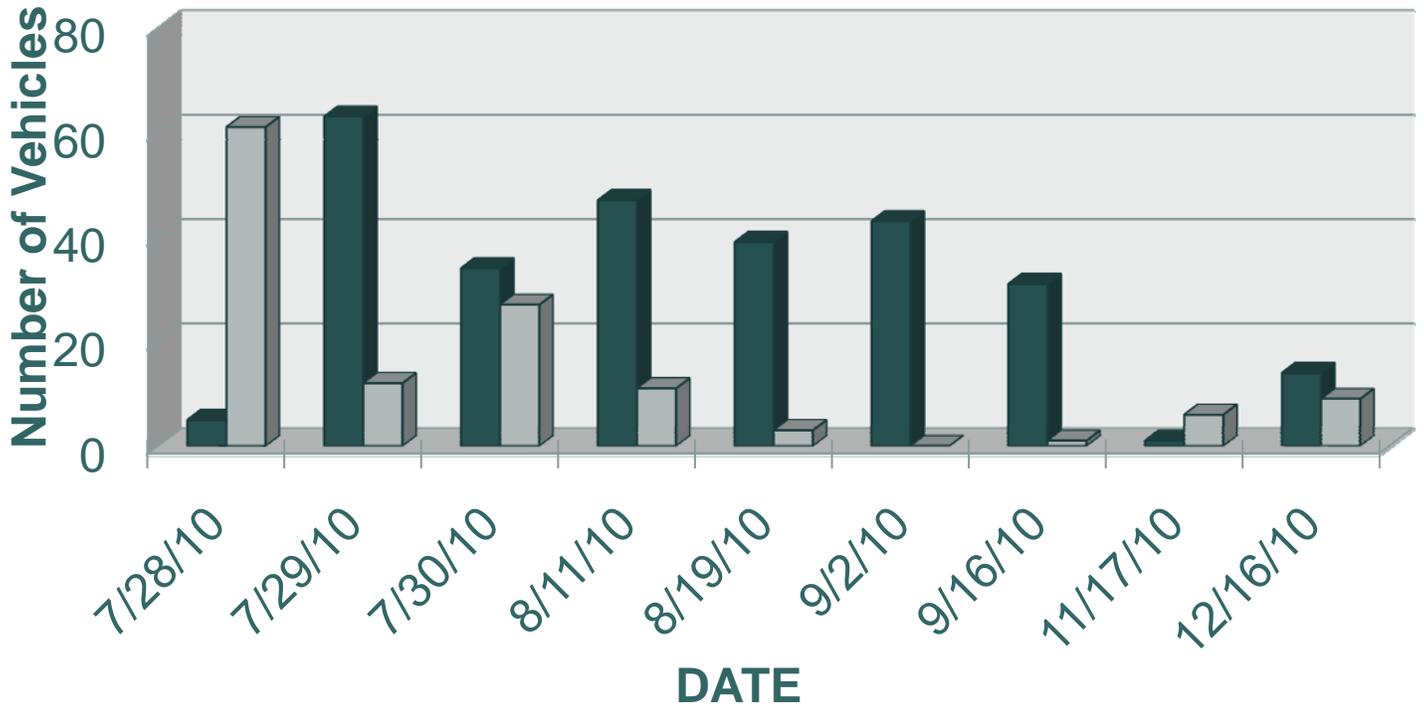
### Public Outreach

- Neighborhood roundtable meetings
- Speaking engagements
- Public events
- City of Plano website
- Public service announcements
- Water bill inserts

# MLT Non-Compliance

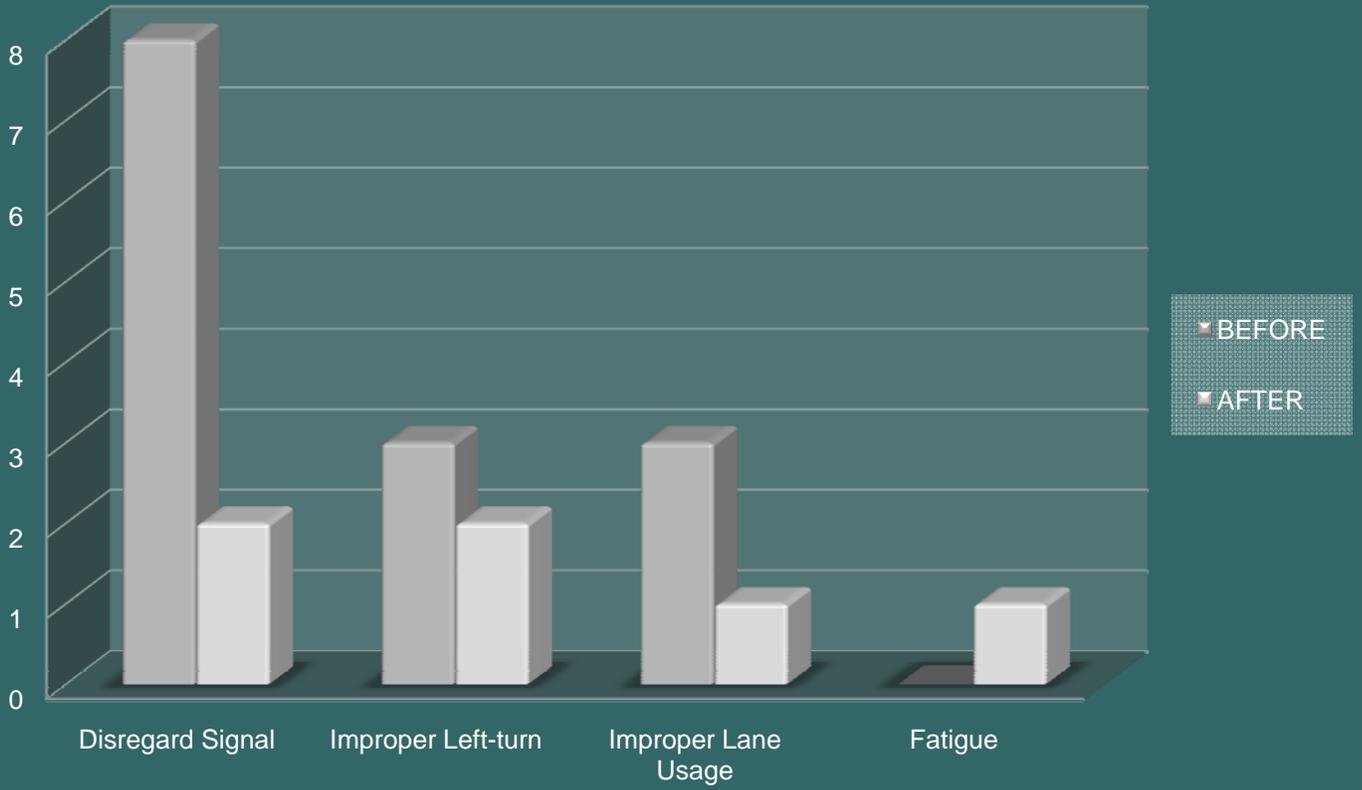
07:00 to 08:00 Weekdays

- Illegal Left-Turns from Legacy
- U-Turns at the Westerly Median Opening



# Before/After Traffic Collisions

2/1/09 - 9/1/09 and 9/1/10 - 3/31/11



## **Public Outreach Efforts**

December 2008 – Posted first Median Left-Turn (MLT) video on the Plano Television network (PTN). The MLT video was pulled up from the Swagit on-demand service 371 times during between Sept. 21, 2009 and Aug. 21, 2010.

Sept. 21, 2009 – [www.plano.gov/turn](http://www.plano.gov/turn) went live, including a link on the main city Web page and under “More News.” For the time period of Sept. 21, 2009 to Aug. 21, 2010, [www.plano.gov/turn](http://www.plano.gov/turn) was viewed 8,431 times.

November 2009 – Updated online video reflect the delay of other planned MLT intersections.

March 4, 2010 – Plano Police Web site posts the MLT video.

July 14, 2010 – MLT opening story on main page of [www.plano.gov](http://www.plano.gov) with link to navigation info. at [www.plano.gov](http://www.plano.gov) (main page) and [www.plano.gov/turn](http://www.plano.gov/turn) (project page)

### **PTN Coverage**

As a “Plano Wired” segment, Median Left Turn (MLT) information was aired an estimated 425 times on PTN. It also played repeatedly during programming breaks and as a regularly scheduled Public Service Announcement (PSA). The MLT project received air time at least 600 times on the key dates and segments listed below:

- Oct. 10, 2008 – Redesigning Intersections
- Oct. 10, 2008 – Median Left-Turn PSA airs regularly as a PSA during commercial breaks.
- Jan. 9, 2009 – Busy Intersections Receive Facelifts
- Jan. 23, 2009 – Road Construction Changes
- Feb. 27, 2009 – Road Construction Changes
- Jan. 5, 2010 – Median Left-Turn Intersection
- Jan. 15, 2010 – Median Left-Turn Intersection
- Feb. 26, 2010 – Median Left-Turn Intersection
- March 19, 2010 – Intersection Changes
- Aug. 06, 2010 – New Median Left-Turn

### **Community Outreach**

- May 2010 – Water Bill Insert, delivered to 74,000 residents
- May 5, 2010 – A driver’s flyer (304 copies) was printed for Police to handout during the transition period after opening the project.
- May 18, 2010 – Contacted major employers, worship centers and apartment complexes in the area of Legacy/Preston.
- June 14, 2010 – Provided City of Frisco Director of Communications info on the MLT.
- June 16, 2010 – Posters delivered to recreation centers and libraries.
- July 7, 2010 – Dallas Area Rapid Transit (DART) alerted to the change at the intersection.
- July 9, 2010 – Dynamic message signs placed at the intersection
- July 12, 2010 – Plano Independent School District (ISD) and Frisco ISD were e-mailed information about the opening with navigation information for bus drivers.
- July 13, 2010 – Press release sent to City of Frisco Director of Communications.
- July 28, 2010 – Provided 500 additional copies of the “Driver Flyer” to the Police Department.

## Community Presentations

- Aug. 25, 2008 – First City Council presentation (preliminary open meeting)
- May 26, 2009 – City Council Mobility Report, discussion on MLT and SPUI,
- Dec. 10, 2009 – Neighborhood Roundtable District 2 (east area)
- Dec. 17, 2009 – Sent e-mail to Plano community organizations offering the MLT presentation. Below is a list of the presentations made:
  - Feb. 10, 2010 – Kiwanis Club
  - March 8, 2010 – City Council Update on MLT (preliminary open meeting)
  - March 16, 2010 – Greater Plano Kiwanis Club
  - March 23, 2010 – City of Plano Management Team presentation
  - April 17, 2010 – Booth at the Live Green Expo with looped video of MLT and SPUI
  - May 20, 2010 – Neighborhood Roundtable District 3 (west and south area)

## Media Contacts / Coverage

- Oct. 16, 2008 – People Newspaper inquires about upcoming construction of Median Left-Turn intersections in Plano.
- July 27, 2009 – Plano Star Courier (PSC) requests information on the Median Left-Turn Project “Plano: New left turn method intended to alleviate traffic scheduled to come to Plano roads pending council’s OK”
- July 27, 2009 – Interview with NBC 5 on the proposed Median Left-Turn Project “Plano Intersection’s Left Turns Go Yankee”
- July 28, 2009 – PEGASUS NEWS WIRE, “Plano looks to Michigan to fix Preston/Legacy intersection”
- Sept. 8, 2009 – The Urban Transportation Monitor, Vol. 23, No. 7 (page 9), “Plano, TX Applies Median Left Turn to Reduce Congestion and Increase Safety”
- March 19, 2010 – Dallas Morning News (DMN) inquiry about MLT and SPU projects.
- Live Green Expo 2010
- March 22, 2010 – DMN Plano Blog, “Officials worry that ‘Michigan left turn’ at Plano intersection will confuse drivers”
- May 8, 2010 – The “Texas Planning Review” Spring 2010 issue featured the article, “Median-left Turn (MLT) Intersection Design,”
- July 14, 2010 – DMN Plano Blog, “Michigan left turn” at the intersection of Preston Road and Legacy Road will open July 27”
- July 15, 2010 – DMN Neighborstogo.com, posted “Median-Left Turn Opens July 27 at the Legacy/Preston Intersection”
- July 23, 2010 – DMN Plano Blog, “A new traffic configuration at the bustling intersection...”
- July 26, 2010 – KDAF-33, “No Left Turns at Preston & Legacy, New Median Left Turn Design First in Texas”
- July 27, 2010 – DMN Plano Blog, “‘Michigan left turn’ opens in Plano at Preston and Legacy
- July 27, 2010 – DMN, “Michigan left turn debuts today at Plano’s Preston-Legacy intersection”
- July 27, 2010 – CollinCountyBuzz.com, “Michigan U-turn Coming to Plano”
- July 27, 2010 – KTVT-11, 5 a.m. News, intersection change
- July 27, 2010 – WFAA-8 Daybreak News (6:30 a.m.), first Michigan left turn and unauthorized test drive through intersection before opening
- July 27, 2010 – WFAA-8 Midday News (12 p.m.), reported on the cost of the project and Police presence
- July 27, 2010 – KTVT-11, 5 p.m. News, Plano Police presence

- July 27, 2010 – KDFW, Fox 4 News at 6, reported on how to navigate intersection
- July 27, 2010 – KDFW, Fox 4 News at 9, driver interviews & Police presence
- July 27, 2010 – KDFW, Fox 4 News at 10, Police presence and helicopter scout
- July 30, 2010 – WFAA-8 at 5, driver interviews
- July 30, 2010 – WFAA-8 at 5, Weatherman's experience
- July 31, 2010 – WFAA-8 Daybreak Saturday (7:45 a.m.), Police response & flyers
- July 31, 2010 – WFAA-8 Daybreak Saturday (9:35 a.m.), Police give warnings
- July 27, 2010 – DMN, "Confusion – but no accidents – reported at Plano Michigan left turn"
- July 27, 2010 – KVUE (Austin), "State's first 'Michigan left turn' opens at Plano intersection"
- July 28, 2010 – DMN Briefing, Local Section, page 5, "3...PLANO: Preston-Legacy intersection now takes a turn to the right"
- July 28, 2010 – DMN Frisco Blog, "If you are driving along Preston Road in Plano..."
- July 30, 2010 – WFAA-8, "'Michigan left turn' spurs confusion for drivers in Plano" (16 comments)
- Aug. 6, 2010 – TxDOT Podcast, "Turn Right to Go Left: Plano's Median Left Turn Project"