Frequently Asked Questions

Traffic signals staff receives many questions about the operation of traffic signals. A few of the more common questions under the following general categories are listed below.

If you have further questions, please feel free to submit an online service request at 311.lethbridge.ca or call 311.

Traffic Signals

How are traffic signals warranted?
As intersection traffic and pedestrian volumes increase beyond the capability of lesser controls such as a two- or four-way stop, it may be necessary to install a traffic signal. Traffic signals relay messages of what to do and what not to do by assigning the right-of-way to conflicting traffic and pedestrian movements.

Installation Considerations
Before installing a traffic signal, the following criteria are evaluated:

- the amount of vehicular and pedestrian traffic;
- the need to interrupt the major street traffic for side street vehicles and pedestrians;
- special conditions such as hills and curves;
- the accident history of the intersection;
- the proximity of schools or facilities that generate increased conflicting traffic;
- the amount of time per day that a traffic signal may be beneficial; and
- the comparison of positive/negative effects of installing a signal at the location.

Advantages of Signals

- Signals establish right-of-way
- Reduce right-angle accidents
- Provide adequate time for pedestrians and vehicles to cross the intersection

Disadvantages of Signals

- Increase rear-end accidents
- Can cause excessive delay
- Can increase disobedience of signals
- Can divert traffic to other residential streets

- Can attract additional traffic to the intersection

For more on traffic signals, see How Traffic Signals Work.

Pedestrian Signal Indications

Why is the duration of a walk light so short?

The walk light indicates when pedestrians are permitted to begin crossing. In Lethbridge, the standard duration of the walk light is six seconds but for some directions it can be greater when different modes of signal operation are in effect.

The walk light is followed by an orange flashing hand "pedestrian clearance" indication. The clearance duration is timed, based on a specific pedestrian walking speed to cross the entire intersection. If a pedestrian steps off the curb and begins crossing just as the hand starts flashing, there is adequate time to finish crossing. If a pedestrian starts crossing after the hand indication starts flashing, there may not be adequate time to cross safely.

Do I have to press the button many times to get a walk light?

It is only necessary to press the button once to register the request for a walk light in the controller which “locks" in the button call until the walk light comes on. Pressing the button multiple times will not make the walk light come on sooner.

Some times I press the button and get a walk light very quickly. At other times, I press the button and have to wait noticeably longer. Why?

In order to minimize stops and reduce vehicle delays on high traffic corridors, many traffic signals are coordinated with adjacent traffic signals. The pedestrian must then wait for the point in the cycle that the walk light is displayed. The wait time at coordinated traffic signals depends on when the button is activated during the signal cycle and could range from a few seconds to up to more than a minute.

Vehicle Detection

How are vehicles detected at traffic signals?

There are different technologies for detecting vehicles – microwave sensors, video cameras, magnetometers, and the inductive loop. An inductive loop is simply a coil of wire embedded in the road's pavement that acts somewhat like a magnet. When a vehicle drives over or stops on the loop, metal mass in the vehicle changes the characteristics of the magnetic field, electronic equipment detects the change and tells the signal controller that a vehicle is present.

To install a loop, a saw-cut is made in the pavement in a rectangular or square pattern, electrical wire is laid in the groove and sealed with a tar compound. You can often see the loops cut in the pavement because the compound is visible. In some cases, loops are installed before a new layer of asphalt is placed, and thus are not visible. Loop detectors are sensitive enough to detect motorcycles and bicycles. However, because of the low metal mass of bicycles, they must be placed very close to the edge of the

detector.

All loops are installed behind the white stop line. Vehicles that move past the stop line into the pedestrian crosswalk will not be detected. Sometimes drivers stop more than 2 car lengths behind the stop line but this is too far back from the detection zone. The first vehicle should stop immediately behind the stop line and not move until the light is green.

Why does the signal turn green for a side street when no one is there?
The most common reason that a signal turns green for a side street when there is no one waiting is that a vehicle detector or pedestrian pushbutton has had a temporary failure, or is broken from road or utility construction. When a detector loop has failed, the controller interprets this as if a vehicle was constantly parked on the detector, which causes the green light to stay on longer. This is most noticeable at night when traffic volumes are low causing the perception the signal is slow to react. Detector failures are monitored by the central traffic control computers and are generally short-term problems.

Left Turn Arrows

How do left turn arrows work?
Protected-permissive left turn signals are the most common in Lethbridge. A “flashing” left turn arrow is activated when a vehicle is detected in the left lane. When the left arrow is deactivated, left turns are permitted when there is a green ball signal indication and there are safe breaks in opposing through traffic. This type of left turn phasing is designed to minimize delay to all intersection traffic since left turns can also be made during gaps in opposing traffic when the green ball is displayed.

Why do some left-turn arrows allow vehicles to turn only when the green arrow is displayed and not during the through phase?

This type of left-turn phase, known as "protected-only" is designed to separate left-turning traffic from opposing through traffic. Even if an acceptable gap exists in the oncoming through traffic, vehicles are required to wait for the green arrow to turn left. This operation is used when a combination of vehicle approach speeds, intersection widths and other intersection factors are such that left turns cannot be made safely without the protection of an arrow each cycle.

Signal Timing

Are traffic signals in Lethbridge coordinated? Why can’t the signals be timed so that I can arrive at more green lights?

Yes, traffic signals in the City are coordinated in peak hours to minimize stops and delays. Ideal or “perfect” signal coordination is difficult to achieve due to varying traffic speeds, congestion, the distance between signals and the need to vary the amount of green time at each intersection.

“Perfect” coordination for one direction of travel often results in frequent stops and delays for the other direction. When traffic volumes are relatively balanced, the traffic signals are timed so that the “reds” and “greens” are balanced in both directions. When the traffic flow is heavier in one direction, the signals are coordinated to favor the highest volume of vehicles.

For more information on signal operations see How Traffic Signals Work.

Miscellaneous

What are Special Crosswalks?
Special Crosswalks consist of overhead illuminated signs with downward lighting and pedestrian pushbutton activated amber flashers. They are installed to increase motorists' awareness of the presence of a pedestrian by improving their visibility to approaching traffic.

What are the audible sounds for at some intersections?
Audible pedestrian signals are installed at selected traffic signals frequented by the visually impaired and provide audible sounds to indicate an active walk light. These devices make crosswalks accessible to visually impaired pedestrians. They are known as accessible pedestrian signals.

What do I do if all of the signal indications are blank?
When a traffic signal has gone dark due to power failure, it is considered to function the same as a four-way stop controlled intersection. A driver must stop and yield according to the four-way stop rules before entering the intersection.

Why do some traffic signals go into "flashing" operation?
Flashing red on all approaches usually indicates a traffic signal malfunction. If the signal is flashing yellow it means to proceed with caution. The side street will flash red and these vehicles must stop. Some signals operate in a flashing yellow mode during the night.

How Traffic Signals Work

The following sections outline the major components and issues regarding how Lethbridge traffic signals work and related operations issues:

Traffic Signal Equipment

- Traffic Signal Equipment includes:
  the traffic signal controller (the signal's brain),
- vehicle detection and pedestrian pushbutton systems,
- underground concrete bases for pole support,
- signal poles and arms,
- conduit and wiring between the controller and all signal equipment,
- signal heads and faces (green, yellow, red lights, etc.) and mounting equipment.

The signal controller is a specialized computer that controls the selection and duration of displays for conflicting traffic movements by continuously analyzing intersection traffic registered by vehicle detectors and pedestrian pushbuttons.

Detectors are devices for indicating the presence and passage of vehicles. In Lethbridge, they primarily consist of wire loops cut into the pavement approaching the stop line at every intersection. They are activated by the change of electrical inductance caused by a metal mass (vehicle, bicycle, etc.) passing or standing over the wire loop. Some traffic signals in Lethbridge utilize video detection. Video cameras use imaging recognition to track vehicle movements and detect vehicles.

Signal Faces are part of a signal head that control traffic for specific movements in a single direction and consist of one or more signal sections. These usually include solid red, yellow, and green lights and/or green/yellow turn arrows. A Signal Head can contain one or more signal faces.

Signal Indications

Flashing Red

As stated in the **Use Of Highway And Rules Of The Road Regulation AR 304/2002**. When a red lens is illuminated with rapid intermittent red flashes, a driver shall stop before entering the crosswalk on the near side of the intersection. A driver must stop and yield to other vehicles and pedestrians subject to the rules applicable to a four-way stop controlled intersection.

Flashing Yellow

When a yellow lens is illuminated with rapid intermittent yellow flashes, a driver may proceed through the intersection or past the signal only with caution. Alternating flashing yellow lights are seen at special pedestrian crosswalks and are activated by pedestrians to warn drivers of pedestrians in the crosswalk.

Pedestrian Signal Indications

Pedestrian signal indications consist of “Walking Person” and “Hand” symbols. To cross, simply push the button and the signal will stop vehicles on the perpendicular street and provide a sequence for pedestrians to cross.

When the “Walking Person” light is displayed

- Look in all directions and check for turning cars
- Be sure to look LEFT-RIGHT-LEFT
- When it is safe to proceed, step into the crosswalk
- The walk light indicates to “start” the crossing

When the “Flashing Hand” light is displayed

- Complete your crossing to the other side at a normal pace
- If not already in the crosswalk, **do not start** to cross the street, push the button and wait for the next walk light

- The flashing hand "pedestrian clearance" is timed and based on a specific pedestrian walking speed cross the entire intersection.
- Pedestrian Digital Countdown Timers
  Lethbridge uses a digital countdown timer to inform pedestrians of the number of seconds remaining in the flashing don't walk sequence. This is also known as the flashing don't walk or pedestrian clearance interval.

When the "Solid Hand" light is displayed

- Do not enter the crosswalk. Wait for the next walk light.

Left Turn Signals

In Lethbridge, there are two types of left turn signal operation.

Protected Only Left Turn Signals

With this operation, left turn lanes have a dedicated Green/Yellow/Red Arrow signal indication. Motorists can only turn left during the green left arrow. This operation is used when a combination of vehicle approach speeds, intersection widths and other intersection factors are such that left turns cannot be made as safely without the protection of an arrow each cycle. The left arrow must activate for one vehicle 24 hours per day, which results in longer signal cycle lengths and increased delay for all intersection traffic, particularly during off-peak traffic conditions.

Protected/Permissive Left Turn Signals

Left-turning drivers are initially directed to turn left in a protected manner during the display of a flashing green arrow indication. They are subsequently permitted to turn left during the display of a green ball indication when adequate gaps are available in opposing traffic.

Traffic Signal Preemption

The transfer of signal control to a special priority signal operation is called preemption. To obtain the required priority light sequence as soon as possible, other signal phases can be abbreviated or skipped. There are three types of preemption: Railway, Emergency Vehicle, and Transit.

Railway Preemption

The purpose of railway preemption is to clear the railroad tracks of traffic before the train arrives. The traffic signal will be instructed to provide a safe and orderly flow of traffic that will not conflict with the operation of the railway crossing. Because it is difficult for a train to make an abrupt stop, railway preemption has the highest level of priority in traffic signal control logic.

Emergency Vehicle Preemption

In Lethbridge, Fire-Rescue vehicles are equipped with optical strobe emitters which instruct traffic signals to change to a specific green light sequence to favor an approaching Fire-Rescue vehicle. In the absence of a railway, Emergency Vehicle Preemption will be given priority override of the traffic signal.

Transit System Priority

Buses can be given low priority preemption to extend green time along a designated bus route.

Conflicting green signal indications can be truncated during Transit System Priority. The Transit System Priority will be ignored if an Emergency Vehicle or Railway Preemption is initiated.

Signal Timing

Most traffic signals in Lethbridge utilize vehicle detectors on all approach lanes and are designed and programmed to efficiently adjust the available green time on the basis of changing traffic demand.

Rest in Main Street Green

This operation is typically used between midnight and 7:00 am at intersections with a primary main street. The traffic signal will rest green on the main street until a vehicle or pedestrian is detected on the side street. Once the side street vehicle and pedestrian traffic has been served, the signal automatically reverts back to a green light on the main street.

Signal Coordination on Main Street (Pedestrian Walk Light On)

This operation is typically used during AM and PM peak periods at most coordinated traffic signals in Lethbridge. The main street green light timing is coordinated with adjacent signals in the predominant traffic flow direction. Once the side street vehicle and pedestrian traffic has been served, the signal automatically reverts back to a green light and walk light on the main street. All signals operating signal coordination must operate on the same cycle length.

Pedestrian Timing

When a pedestrian pushes the button, a call is sent to the signal controller to turn on the "Walk" and flashing "Don't Walk" sequence (which is timed separately from the parallel vehicle green light). The pedestrian pushbutton must be pushed for the pedestrian walk sequence to appear. The signal will not usually change immediately but the controller will fit the pedestrian sequence into its programmed operation for the particular time of day. The signal controller registers the first time the button is pushed and remembers it until the walk light comes on. Pushing the button repeatedly will not make the walk sequence appear sooner.

Sometimes the button is pushed after the light is already green in the desired crossing direction and there is not enough time for the signal controller to activate the walk phase that cycle. The walk light will then come on the next cycle.

Coordination of Traffic Signals

The goal of coordination is to get the greatest number of vehicles through the system with the fewest stops. It would be ideal if every vehicle entering the system could proceed through the system without stopping but this is not mathematically possible, even in well-spaced technologically advanced systems. Therefore, in signal coordination, the busiest traffic movements are given precedence over the lesser traffic movements. Coordination cycle lengths are determined in order to adequately accommodate the many left turn phases and long pedestrian crosswalk clearance time required.

Traffic flow at signalized intersections is monitored and this information is used to determine optimum signal timing parameters to help progress traffic with less delay. How well traffic flows along a street depends on several factors:

- the spacing between traffic signals along the street

- programmed signal timing parameters
- traffic volume
- number of traffic lanes and their availability
- driver behavior and driving speed
- physical characteristics of the roadway
- frequency of left turn arrows
- roadway width (wider roadways increase pedestrian walk/don't walk timing)
- amount of pedestrian activity

Many drivers ask why they have to wait so long for a signal to change particularly when waiting to enter a major arterial street from a side street. It can be even more frustrating when no traffic can be seen on the arterial. To allow the co-ordination of the arterial, the side street must wait until the main traffic movement on the arterial has gone through the intersection. It is possible that the arterial traffic can't be seen immediately, but will soon be passing through the intersection. Major coordinated arterials in the City include Mayor Magrath Drive, Scenic Drive, 13th St., 6th Ave. S. and University Dr. West.

The coordination of traffic signals to facilitate smooth traffic flow (progressed movement) along a street is a proven technique. The quality of flow along a street is basically a function of the spacing of the signals along the street, the prevailing speed of traffic on the street and the traffic signal cycle length. Vehicles starting out straight (i.e., not making a turn from a side street) at a major intersection at the beginning of a green will experience less stops and delays.

The signal timing parameters are adjusted at various times of the day to accommodate the changing traffic patterns. However, there are times when the amount of traffic exceeds the capacity of the roadway. When this happens, backups and delays are inevitable. Flexible signal timing operation helps to efficiently use the available street capacity.