

Appendix Y

Guiding Traffic Control Principles for Intersection Operations

47.1 Guiding Traffic Control Principles for Intersection Operations

July 16, 2013

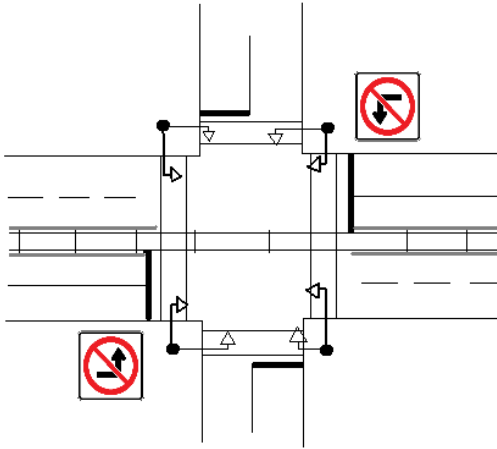
Light rail transit infrastructure will impact how intersections (signalized or not) operate. The following operational guidelines are to be used so that intersections operate consistently, meet driver expectations and minimize collisions involving light rail transit vehicles. Impacted intersections will include signalized and unsignalized intersections, commercial accesses and private driveways. All intersections regardless of type will accommodate both centre running and curb-side running (and potentially boulevard running) light rail transit envelopes. The following guiding principles shall be used consistently to maintain effective and safe operation at intersections that accommodate light rail transit operation. For the illustrative purposes of this guideline, the rail envelope in all cases (centre-running and curbside running) has been shown as a unidirectional track however there may be cases where bidirectional track is provided. In general centre-running track is typically bi-directional and curbside running track is unidirectional relative to direction of general traffic. If bidirectional track has been provided on curbside or boulevard running tracks, special consideration will be required to fully protect left-turn movements for the direction otherwise not normally protected with unidirectional light-rail transit ways.

General Principles (See diagrams below)

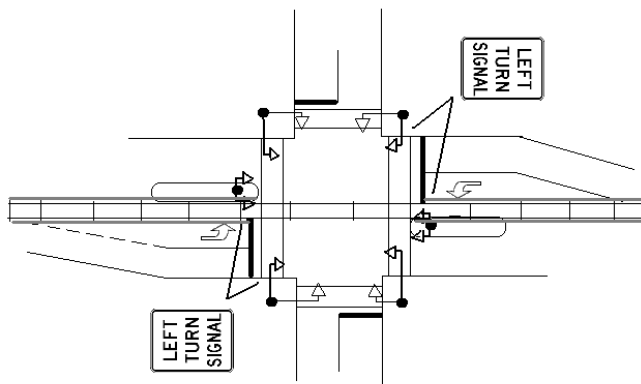
1. Unless restricted by one of the following principles, all turns may operate permissively.
2. With dual-center running LRT and **no** left-turn lanes on the main street, no left-turns will be permitted from the main street (Time-of-day restrictions coinciding with LRT hours of operation may be considered).
3. With dual-center running LRT and **with** left-turn lanes on main street, left-turns may be permitted from the main street using fully protected left-turn operation.
4. With center-running LRT, side street movements will generally operate under normal rules of the road according to the control in place with no special restrictions (unless collision countermeasure intervention is justified)
5. With LRT making a turn/transition through an intersection, the intersection shall be signalized and the LRT will be provided an exclusive all-red phase. Non-conflicting movements may be permitted with phase overlaps during exclusive LRT all-red phase.
6. If a turn is permissive, actuated turning restrictions will be provided for any turn crossing a track where an LRV may approach the vehicle **from behind** at all intersections and major driveways.
7. If a turn is permissive, restrictions may be provided (by way or turn prohibition or fully-protected LT phasing) should a collision problem become apparent for any turn crossing a track where an LRV approaches the vehicle **from the opposing direction** at all intersections and major driveways.
8. With curbside or boulevard running LRT, actuated “no right-turn” and/or “no left-turn” restrictions may be used on the side street approach adjacent to the side running track at all intersections and major driveways where sight lines impact visibility of LRT vehicles or where a collision problem arises involving right-turning and or left-turning vehicles/LRV.
9. With side (curb or boulevard) running LRT, turn restrictions may be provided should a collision problem become apparent for turns at minor driveways.
10. During emergency / unusual circumstances when LRT vehicle is required to run in non-typical reverse direction, traffic control signals will operate exclusive all-red phase operation to facilitate reverse LRV movement and to prevent collisions with vehicular movements. LRT vehicles will have to operate at a predefined lower speed when negotiating unsignalized intersections.

CENTRE RUNNING LIGHT RAIL TRANSIT WAYS

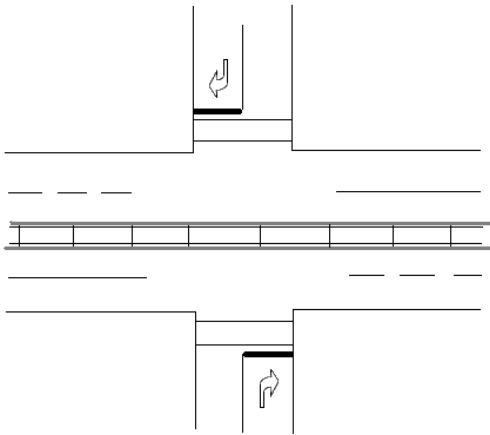
Signalized Intersection with no Exclusive Left-turn Lanes (Potential times prohibiting left-turn operation coinciding with LRT hours of operation to be considered)



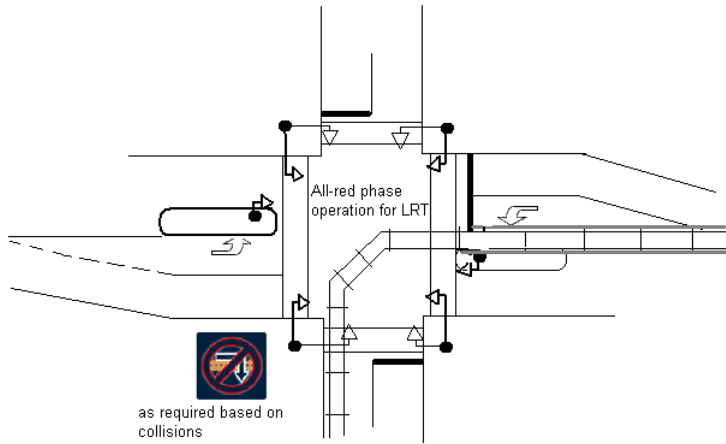
Signalized Intersection with Exclusive Left-turn Lanes (Fully-protected Left-turn Operation)



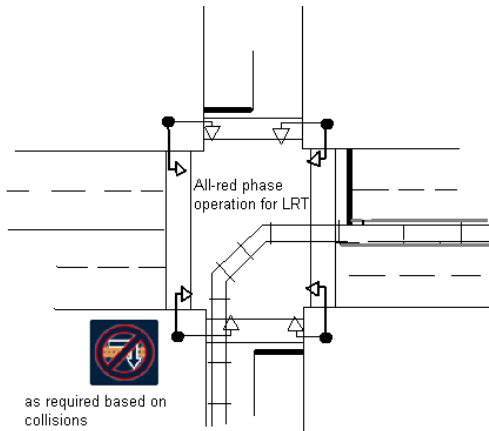
Unsignalized Intersection (self regulating right-in / right-out operation)



Transition at Signalized Intersection With Left-turn Lanes

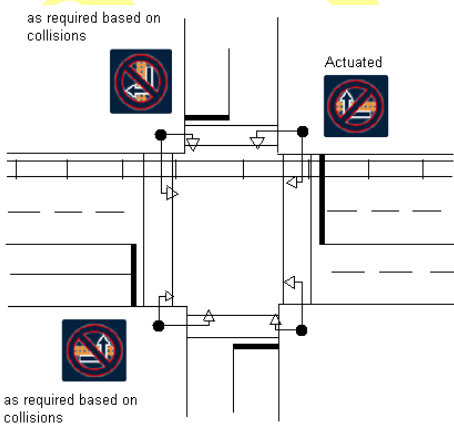


Transition at Signalized Intersection Without Left-turn Lane

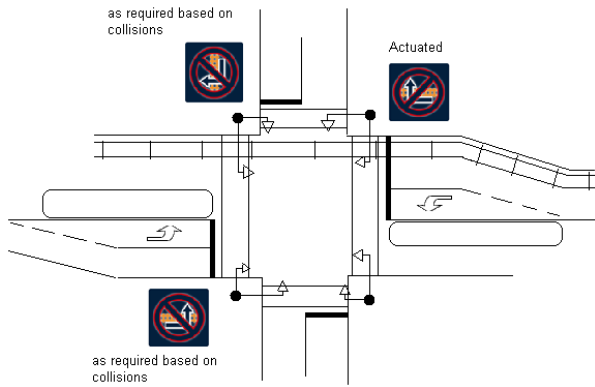


CURBSIDE RUNNING LIGHT RAIL TRANSIT WAYS (typically unidirectional track)

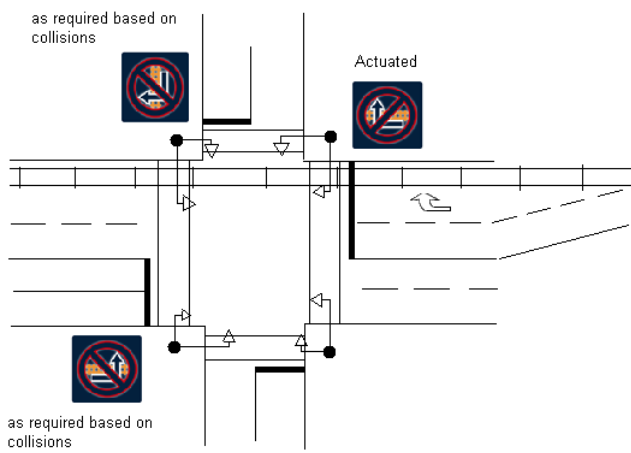
Signalized Intersection Without Left-turn or Right-turn Lanes



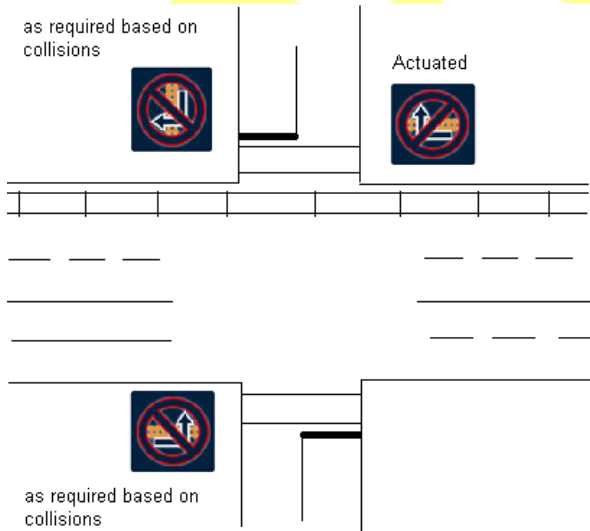
Signalized Intersection with Left-turn Lanes and No Right-turn Lanes



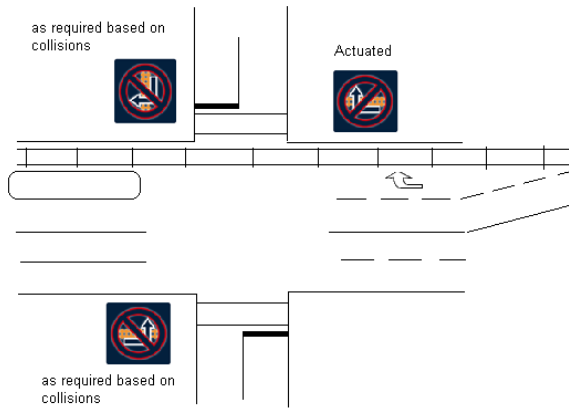
Signalized Intersection with Right-turn Lane



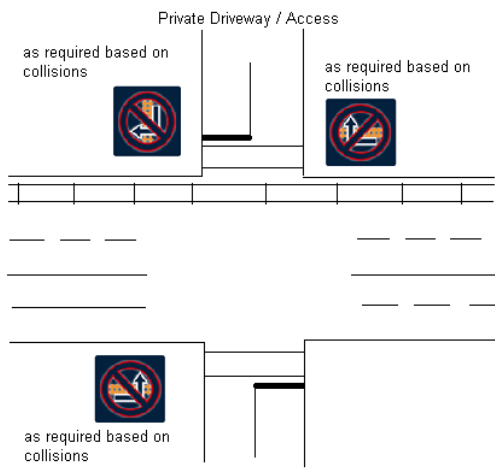
Unsignalized Intersection with No Left or Right-turn Lanes



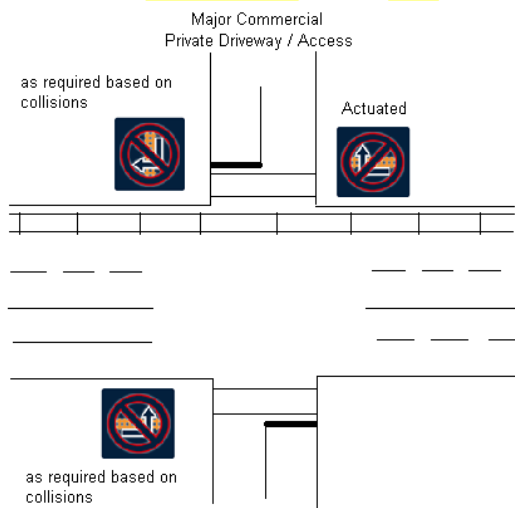
Unsignalized Intersection with Right-turn Lane



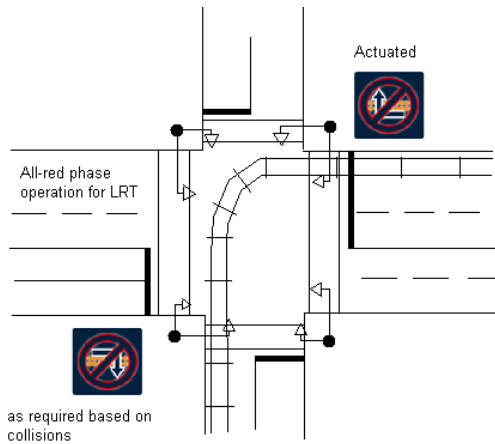
Unsignalized Private Driveway / Access



Major Commercial Unsignalized Private Driveway / Access

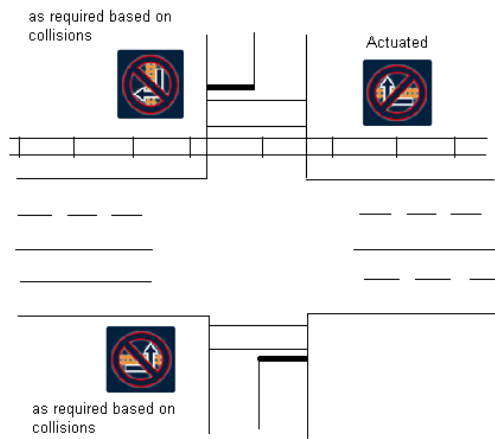


Transition at Signalized Intersection with and without Left-turn Lanes

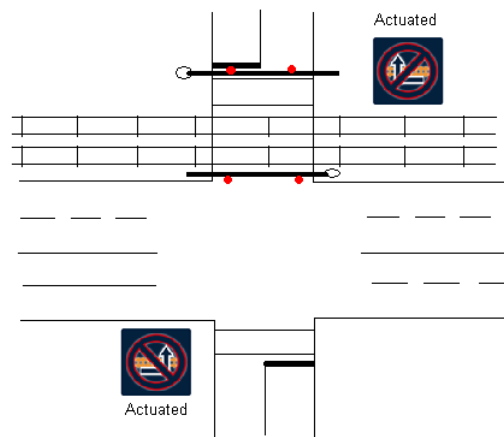


BOUELVARD RUNNING LIGHT RAIL TRANSIT WAYS

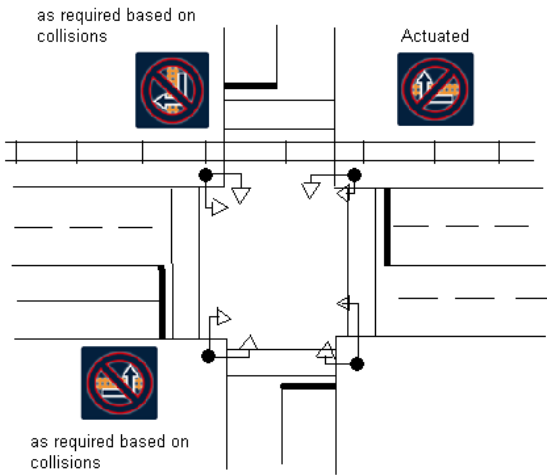
Unsignalized Intersection with or without Left or Right-turn Lanes



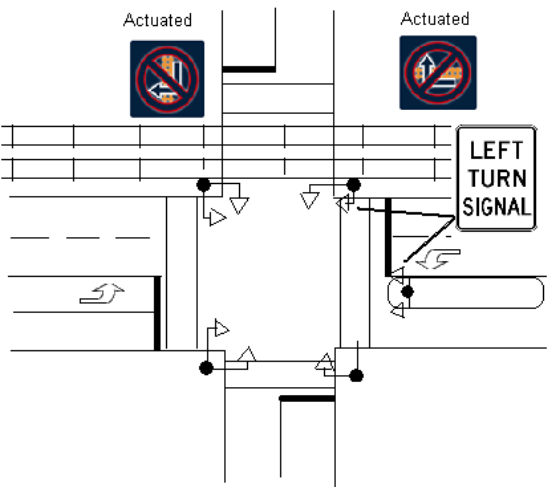
Unsignalized with or without Left and Right-turn Lanes



Signalized Intersection with or without Left-turn Lanes



Signalized Intersection with Left-turn Lanes



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