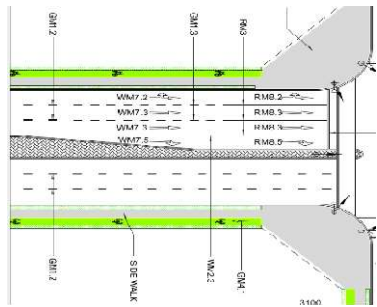


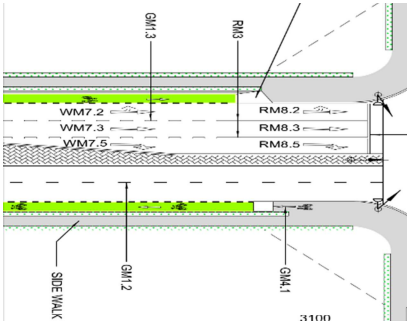
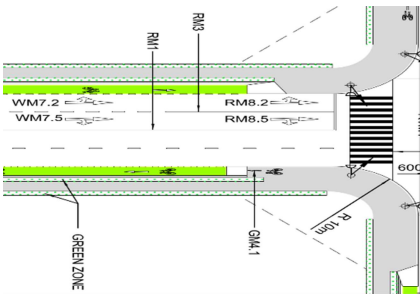
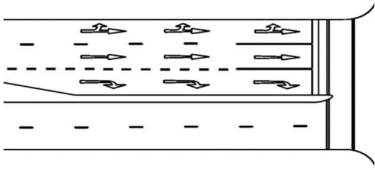
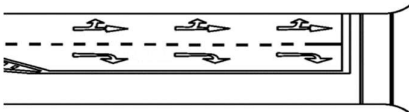
Name of Priority Infrastructure	Summary of Key Design Treatments Requirements	Place or Country of application ¹
Queue Jumping Lane	<ul style="list-style-type: none"> Designed by converting a dedicated left-turn lane (based on SA lane conversion) to also allow priority vehicles to proceed ahead of general traffic. Uses Priority Traffic Signal (PTS) to call for an early green phase. <p><u>Comment on design needs:</u> Key design needs therefore entail presence or provision of an auxiliary left- turning lane (based on SA lane conversion) and priority traffic signals to allow queue bypass. Space availability is also considered where provision of new lane is required.</p>	<p>USA (West Valley City, State of Utah)</p> <p>Canada (Calgary, Alberta; M86, New York City)</p>
Queue Bypass Lane (Transit Approach Lane)	<ul style="list-style-type: none"> Designed by converting one of the approach lanes into a short, dedicated lane for priority vehicles on the approach side. A queue bypass extends to the other end of a signalised intersection hence does not use priority signals. <p><u>Key design needs:</u> The design needs therefore entail presence or provision of a short dedicated nearside lane with corresponding receiving lane. However, this study preferred to use internal lane as bypass lane to prevent potential traffic movement conflicts between through transits and left turning vehicles if a nearside lane is used as a bypass lane. Space availability is also considered where provision of new lane is required.</p>	<p>USA (Stockton St, San Francisco,</p> <p>USA; Washington Street in Chicago; SBS86, New York City)</p>
Transit Signal Priority (TSP)	<ul style="list-style-type: none"> Designed by allowing transit vehicles to communicate with signals to: <ul style="list-style-type: none"> extend green lights, end red lights early, add a transit-only signal phase. Transit vehicles use either a dedicated lane or bypass lane. It acts as a complimentary design treatment for a bypass or dedicated lane. <p><u>Key design needs:</u> The design needs therefore entail presence or provision of extended green lights or transit only signal phase for transit vehicles on a dedicated or bypass lane. The design therefore requires an immediate receiving lane for the dedicated lane. Space availability is also considered where provision of new elements is involved.</p>	<p>USA (New York City; Seattle, Washington)</p>

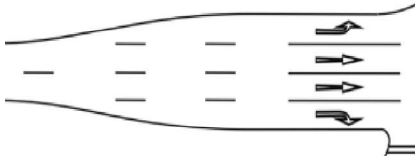
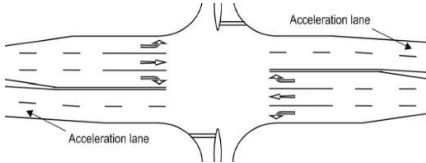
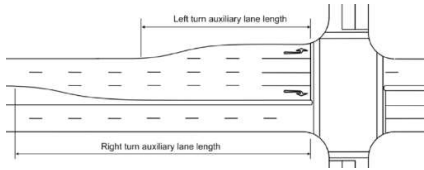
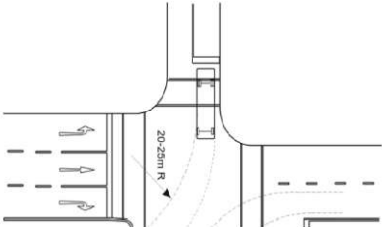
¹ See Appendix A for photographs and sources of information.

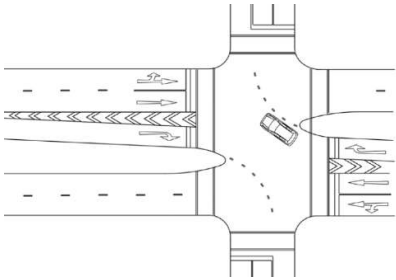
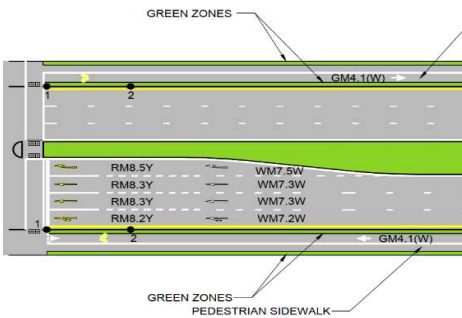
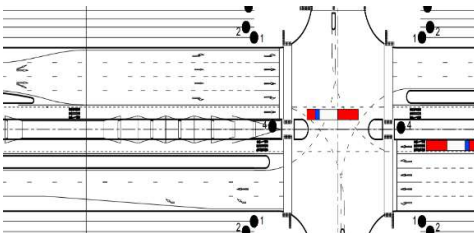
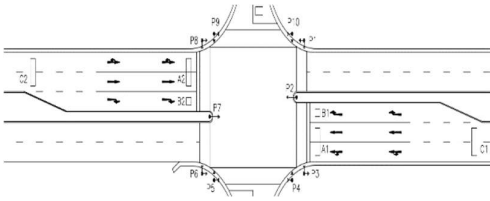
Name of Priority Infrastructure	Summary of Key Design Treatments Requirements	Place or Country of application ¹
Shared Transit Lane	<ul style="list-style-type: none"> Designed by converting left-turning lane to accommodate moderate volume of left turn movements and through movements for transit vehicles. It does not use priority signals unless preferred to do so. Alternatively, also designed by converting through movement on a shared nearside lane to ONLY allow through movements for transit vehicles (Transit Approach Lane). Used at locations where left-turning vehicles can typically clear through the intersection quickly. <p><u>Key design needs:</u> The design needs therefore entail presence or provision of a shared lane that can be converted to a shared transit lane. It also entails presence or provision of an auxiliary left turning lane that can be converted to a shared transit lane. However, the latter treatments require addition of a receiving lane. Space availability is also considered where provision of new elements is involved.</p>	Spain (Barcelona) USA (West Valley City, State of Utah)
Far-side bus or minibus-taxi stops.	<ul style="list-style-type: none"> They are located after an intersection, allowing the bus to travel through the intersection before stopping to load and unload passengers. <p><u>Key design needs:</u> The design needs entail availability of space to accommodate addition of a bus-stop and availability of pedestrian traffic for pick-up. This treatment is therefore considered as complimentary to other design treatments especially those associated with the queue-jumping lanes.</p>	<ul style="list-style-type: none"> USA (Los Angeles, California)

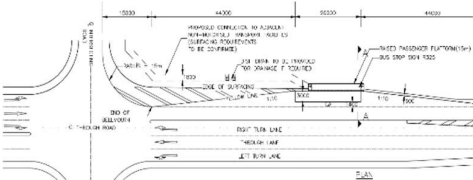
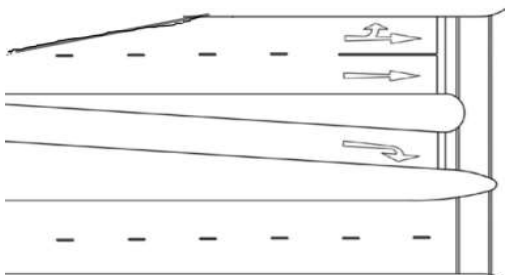
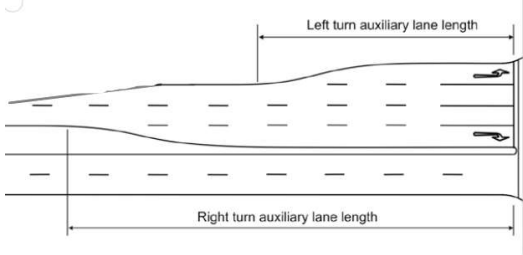
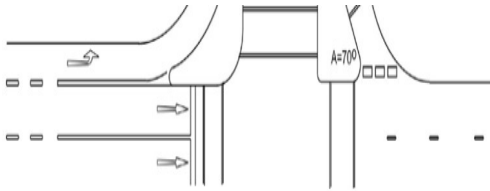
Approach/Exit Layout	Key Geometric and Traffic Elements Present/Absent
<p><u>L1</u></p>  <p>Source: CoJ (2013)</p>	<p>L1 consists of four approaching lanes: two exclusive straight lanes, one shared traffic movement lane and one exclusive right turning lane. The geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of one full-length nearside lane with shared traffic movement. • Presence of two full length inside² lanes with straight traffic movement. • Absence of space for additional lanes as part of the upgrades on the approach.

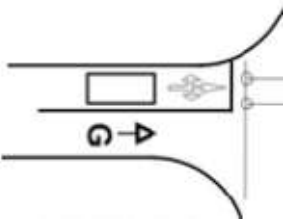
² means through traffic lane which is next to nearside lane at intersections where two or more through traffic movements are present.

Approach/Exit Layout	Key Geometric and Traffic Elements Present/Absent
<p><u>L2</u></p>  <p>Source: CoJ (2013)</p>	<p>L2 consists of three approaching lanes: one exclusive straight lane, one shared traffic lane and one exclusive right turning lane. The geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of one full-length nearside lane with shared traffic movement on the approach. • Absence of space for upgrades available on the approach.
<p><u>L3</u></p>  <p>Source: CoJ (2013)</p>	<p>L3 consists of two full approaching lanes: two full lanes with shared traffic movements. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of one full length nearside lane with shared traffic movement • Absence of space for upgrades on the approach.
<p><u>L4</u></p>  <p>Source: COTO (2014)</p>	<p>L4 consists of three approaching lanes: one full lanes with shared traffic movements, one full lane with exclusive straight traffic movement, and one short right turning lane. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of full-length nearside lane with shared traffic movement. • Presence of space for upgrades on the approach
<p><u>L5</u></p>  <p>Source: COTO (2014)</p>	<p>L5 consists of two approaching lanes: one full lane with shared traffic movements, and one short lane with exclusive right-turning traffic movement. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of full-length nearside lane with shared traffic movement. • Presence of space for upgrades on the approach

Approach/Exit Layout	Key Geometric and Traffic Elements Present/Absent
<p><u>L6</u></p>  <p>Source: NDoT (2015)</p>	<p>L6 consists of four approaching lanes: one short lane with exclusive left turning traffic, two full lanes with straight movement traffic, and one short lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of short auxiliary nearside lane with LT traffic movement. • Presence of full length inside lane with straight traffic movement on the approach • Presence of space for upgrades on the approach
<p><u>L7</u></p>  <p>Source: NDoT (2015)</p>	<p>L7 consists of three approaching lanes and two receiving lanes: one short lane with exclusive left turning traffic, one full lane with straight movement traffic, and one short lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of auxiliary nearside lane with LT traffic movement. • Presence of receiving lane for nearside lane present • Presence of space for upgrades on the approach • Presence of space for upgrades on the exit
<p><u>L8</u></p>  <p>Source: NDoT (2015)</p>	<p>L8 consists of four approaching lanes: one short lane with exclusive left turning traffic, two full lanes with straight movement traffic, and one short lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of auxiliary nearside lane with LT traffic movement. • Absence of receiving lane for nearside lane • Presence of full length inside lane with straight traffic movement on the approach • Presence of space for upgrades on the approach
<p><u>L9</u></p>  <p>Source: COTO (2014)</p>	<p>L9 consists of three approaching lanes: one full lane with exclusive left turning traffic, one full lane with straight movement traffic, and one full lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of auxiliary nearside lane with LT traffic movement. • Absence of receiving lane present for the nearside lane • Presence of space for upgrades on the approach

Approach/Exit Layout	Key Geometric and Traffic Elements Present/Absent
<p>L10</p>  <p>Source: COTO (2014)</p>	<p>L10 consists of two approaching lanes: one full lane with shared traffic, one full lane with straight movement traffic, and one full lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of full length shared nearside lane. • Presence of receiving lane present for nearside lane • Presence of space for upgrades on the approach
<p>L11</p>  <p>Source: JRA (2015)</p>	<p>L11 consists of four approaching lanes: one full lane with shared traffic, two full lanes with straight movement traffic, and one short lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of full-length nearside lane with shared traffic movement. • Presence of full length inside lane with straight traffic movement. • Absence of space for upgrades on the approach
<p>L12</p>  <p>Source: JRA (2015)</p>	<p>L12 consists of four approaching lanes: one short lane with exclusive left turning lane, two full lanes with straight movement traffic, and one short lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of auxiliary nearside LT lane. • Presence of receiving lane for nearside auxiliary lane. • Presence of space on both approach and exit for upgrades. • Presence of full length inside lane with straight traffic movement on the approach available • Absence of bus/minibus-taxi stop
<p>L13</p>  <p>Source: DoTPW (2019)</p>	<p>L13 consists of three approaching lanes: one full lane with shared traffic movements, one full lane with straight movement traffic, and one short lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of full length nearside shared traffic lane. • Presence of receiving lane for nearside auxiliary lane. • Presence of space available on both approach and exit for upgrades. • Absence of bus/minibus-taxi stop

Approach/Exit Layout	Key Geometric and Traffic Elements Present/Absent
<p>L14</p>  <p>Source: DoTPW (2019)</p>	<p>L14 consists of three approaching lanes: one short lane with left turning traffic movements, one full lane with straight movement traffic, and one short lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Absence of receiving lane for nearside auxiliary lane • Availability of space on the exit side for upgrades • Presence of bus/minibus-taxi stop on the far side exit end
<p>L15</p>  <p>Source: COTO (2014)</p>	<p>L15 consists of three approaching lanes: one auxiliary lane with left and straight traffic movement, one full lane with straight movement traffic, and one short lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of auxiliary lane with combined left and straight traffic movements • Availability of space for upgrades on the approach and exit. • Absence of bus/minibus-taxi stop on the far side exit end
<p>L16</p>  <p>Source: COTO (2014)</p>	<p>L16 consists of four approaching lanes: one auxiliary lane with left turning traffic movement, two full lane with straight movement traffic, and one short lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of auxiliary lane with left traffic movement • Presence of auxiliary lane with through traffic movement • Availability of space for upgrades on the approach and exit. • Absence of bus/minibus-taxi stop on the far side exit end
<p>L17</p>  <p>Source: COTO (2014)</p>	<p>L17 consists of four approaching lanes: one auxiliary lane with left turning slip lane, two full lane with straight movement traffic, and one short lane with exclusive right-turning traffic. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of auxiliary lanes with straight (ALL) traffic movement. • Receiving lanes for through traffic • Availability of space for upgrades on the approach and exit. • Absence of bus/minibus-taxi stop on the far side exit end

Approach/Exit Layout	Key Geometric and Traffic Elements Present/Absent
<p>L18</p>  <p>Source: COTO (2014)</p>	<p>L18 consists of single approaching lane left through and right turning movements. Possible geometric themes associated with this layout therefore include:</p> <ul style="list-style-type: none"> • Presence of single approaching lane with LT/T/RT (ALL) traffic movement. • Receiving lanes for through traffic • Availability of space for upgrades on the approach and exit. • Absence of bus/minibus-taxi stop on the far side exit end