International
Orientation & Mobility
Online Symposium

7:00-8:30PM EST (World Clock)

Title: Analyzing Street Crossings, Part 2

Facilitator: Dona Sauerburger, Certified Orientation and Mobility Specialist, United States

Presenters:

Dr. Gene Bourquin, Orientation and Mobility Specialist

Vickie Anderson, Client Services (Metro) Team Leader, O&M Specialist, Guide Dogs Queensland

Description: This is Part 2 of this two part presentation. Join a panel of hosts as we analyze intersections from all over the world! After a short introduction to standard street-crossing strategies, we will discuss as a group how effective those strategies would be at each intersection with its unique challenges, and how students could reduce the risks of crossing there.

This part of the two part series will focus on signalized intersections from the following locations:

- Thailand
- Australia

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Dona Sauerburger, United States – Part 2

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International On-Line Symposium January 25, 2018

Signalized Crossings - – Part 2

Around the World

Moderator: Dona Sauerburger, USA

Vickie Anderson, Australia

Dr. Gene Bourquin, Thailand

Slide 2

Signalized Crossings – what's up?

c. Features and considerations? Dona Sauerburger
d. Modern traffic patterns
e. Actuation
f. Crossings – get your passport ready!
g. Chiang Mai, THAILAND - Dr. Gene Bourquin
h. Aspley, Queensland AUSTRALIA - Vickie Anderson
i. Questions / comments for Signals & Uncontrolled

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Modern Traffic Signals

PROFOUND features that change how we cross!

- Actuation: timing and patterns VARIES, depending on detection of vehicles and pedestrians
- Traffic patterns:
    - Protected left/right turns (protected against opposing traffic)
    - Split phases (both directions take turns)

Slide 4

Traffic Patterns

How does this affect us?

As I show you the traditional and modern traffic patterns, watch what happens with pedestrians!

j. When are they allowed to cross?

Slide 5

Traffic Patterns

Traditional traffic pattern

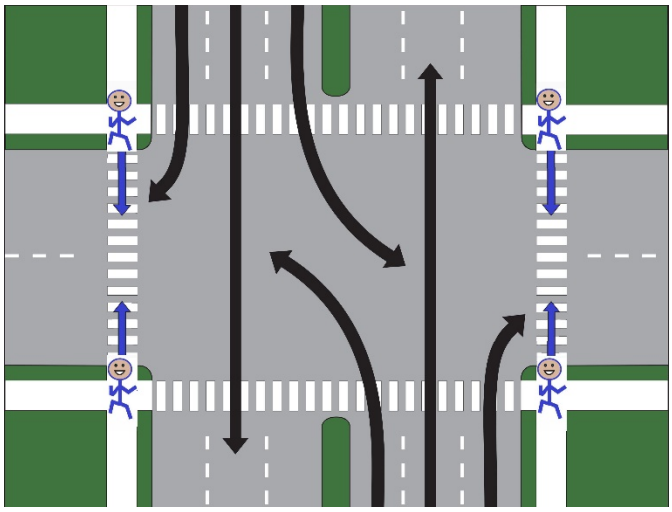

Figure 1 Intersection with traffic and pedestrians traveling along the major street. Arrows indicate vehicles from the north and the south can all go straight, turn left (if they yield to vehicles coming straight from across the street) or right (if they yield to pedestrians), and pedestrians on both sides of the major street can cross the minor street going either direction.

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Traffic Patterns

k. Traditional traffic pattern

l. Pedestrians?

m. Can cross with traffic in the parallel street (ANY traffic!)

n. How do they know they can cross?

Figure 2 Graphic shows a traffic signal with a green light.

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Traffic Patterns

o. Traditional traffic pattern

p. How do BLIND people know that pedestrians can cross?
Accessible Pedestrian Signal (APS)

If not . . .

q. Use sound of traffic in parallel street (ANY traffic!)

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Traffic Patterns

r. Split Phases

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Traffic Patterns

Split phases – phase 1

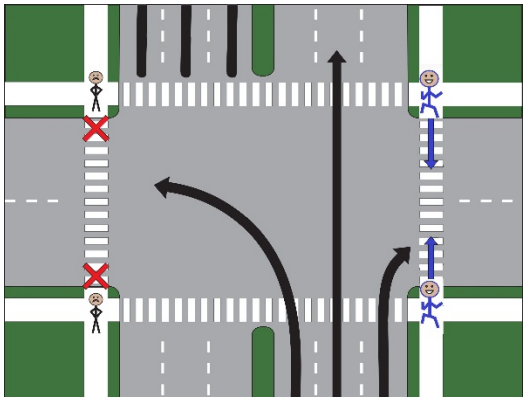

Figure 3 Intersection with traffic and pedestrians traveling along the major street. Arrows indicate vehicles from the south (traveling along the east side of the street) can go straight, turn left (without having to yield to any vehicles or pedestrians) or turn right (if they yield to pedestrians). Pedestrians on the east side of the major street can cross the minor street going either direction, but pedestrians on the west side of the street cannot cross.

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Traffic Patterns

Split phases – phase 2

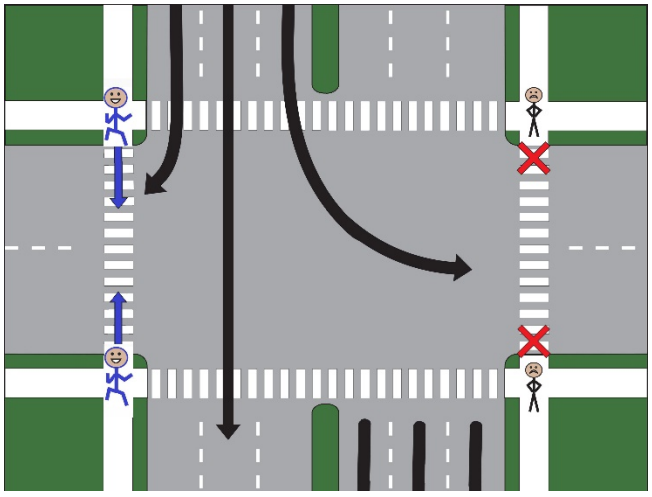

Figure 4 Intersection with traffic and pedestrians traveling along the major street. Arrows indicate vehicles from the north (traveling along the west side of the street) can go straight, turn left (without having to yield to any vehicles or pedestrians) or turn right (if they yield to pedestrians). Pedestrians on the west side of the major street can cross the minor street going either direction, but pedestrians on the east side of the street cannot cross.

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Traffic Patterns

s. Split phases

t. Pedestrians?

u. Can cross with traffic in nearest half of the parallel street

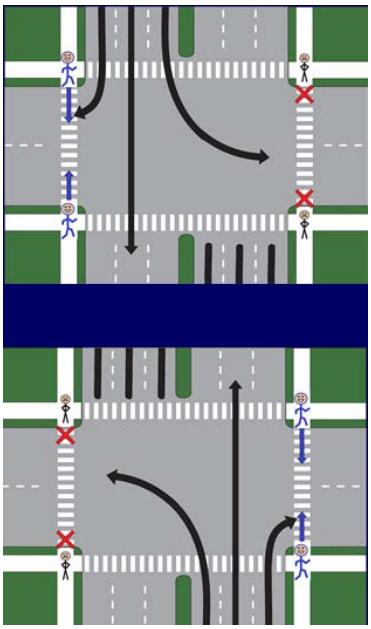

Figure 5 Top graphic shows the split phase with traffic from the north allowed to go straight, turn right (if they yield to pedestrians) or left, while pedestrians on the west side of the major street are allowed to cross the minor street, but not pedestrians on the east side of the major street. Bottom graphic shows the split phase with traffic from the south allowed to go straight, turn right (if they yield to pedestrians) or left, while pedestrians on the east side of the major street are allowed to cross the minor street, but not pedestrians on the west side of the major street.

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Traffic Patterns

v. Split phases

w. Pedestrians?

x. How do they know they can cross?

Figure 6 Graphic shows a WALK / DON'T WALK sign with a white silhouette of a walking person an orange silhouette of a hand indicating "stop."

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Traffic Patterns

Split phases

How do BLIND people know that pedestrians can cross?

Accessible Pedestrian Signal (APS)

If not . . .

Use sound of traffic in parallel street

IN THE NEAREST HALF OF THE STREET!

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Traffic Patterns

y. Protected left / right turns

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Traffic Patterns

Protected left / right turns – phase 1

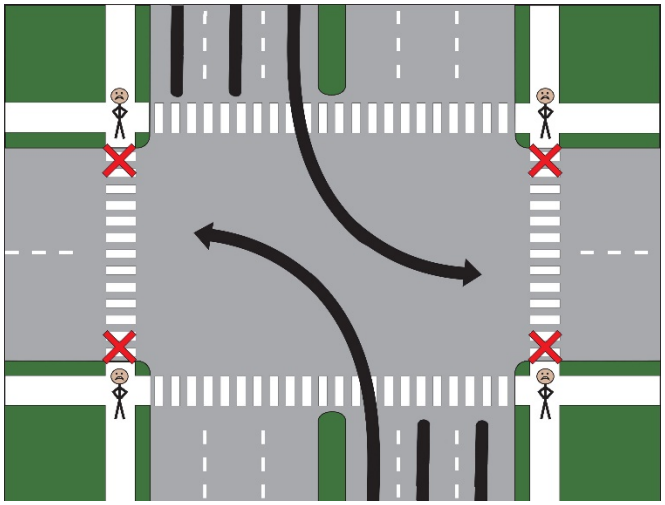

Figure 7 Intersection with traffic and pedestrians traveling along the major street. Arrows indicate that the only vehicles allowed to move are those that are coming from the north and the south and turning to their left. No other vehicles or pedestrians can cross.

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Traffic Patterns

Protected left / right turns – phase 2

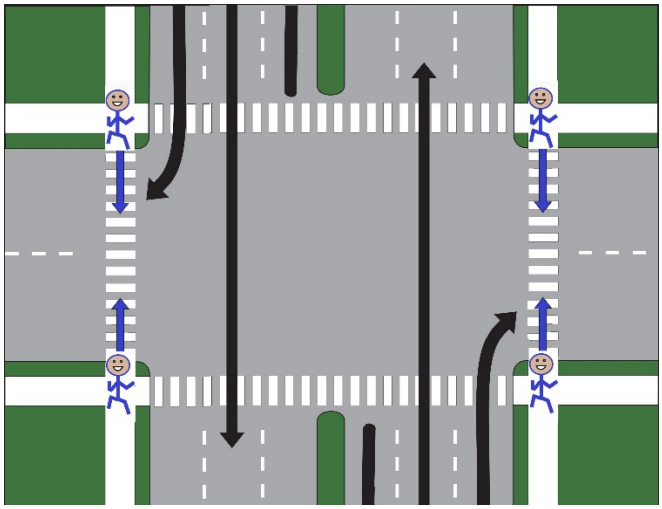

Figure 8 We are looking at an intersection with traffic and pedestrians traveling along the major street. Arrows indicate vehicles from the north and the south can all go straight or turn right (if they yield to pedestrians), and pedestrians on both sides of the major street can cross the minor street going either direction.

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Traffic Patterns

Protected left / right turns

Pedestrians? Can cross with traffic in the parallel street going straight through (not turning left)

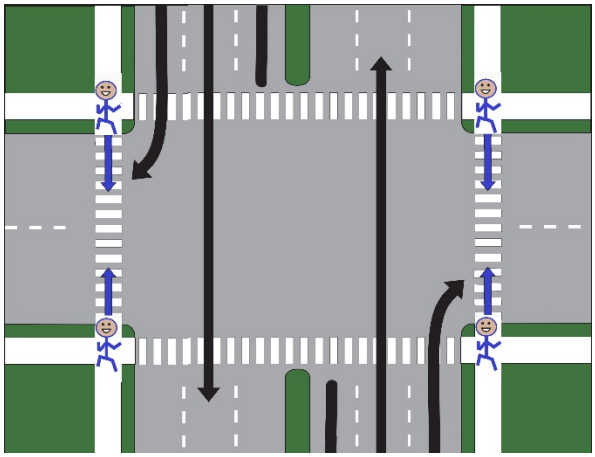

Figure 9 We are looking at an intersection with traffic and pedestrians traveling along the major street. Arrows indicate vehicles from the north and the south can all go straight or turn right (if they yield to pedestrians), and pedestrians on both sides of the major street can cross the minor street going either direction.

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Traffic Patterns

Protected left / right turns

Pedestrians?

How do they know they can cross?

Figure 10 Graphic shows a WALK / DON'T WALK sign with a white silhouette of a walking person an orange silhouette of a hand indicating "stop."

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Traffic Patterns

Protected left / right turns

How do BLIND people know that pedestrians can cross?

Accessible Pedestrian Signal (APS)

If not . . .

Use sound of traffic in parallel street

GOING STRAIGHT THROUGH!

Slide 20

Modern Signals Traditional, protected left, and split phase

How can pedestrians know when it's their turn?

Slide 21

Modern Signals Traditional, protected left, and split phase

How can pedestrians know when it's their turn?

Figure 11 Graphic shows a WALK / DON'T WALK sign with a white silhouette of a walking person an orange silhouette of a hand indicating "stop."

Slide 22

Modern Signals Traditional, protected left, and split phase

Figure 12 Graphic shows a WALK / DON'T WALK sign with a white silhouette of a walking person an orange silhouette of a hand indicating "stop."

Figure 13 Graphic shows a drawing of emoji face with a frown and wide eyes with drops of sweat or tears.

NOTE: Some modern signals do not provide pedestrian signals!

And many pedestrian signals are not accessible.

Slide 23

Modern Signals Traditional, protected left, and split phase

(Both graphics from the previous slide appear.)

NOTE: Some modern signals do not provide pedestrian signals!

And many pedestrian signals are not accessible.

Pedestrians have to guess when it's their turn!

Slide 24

Modern Signals Traditional, protected left, and split phase

How can pedestrians know when it's their turn if the pedestrian signal isn't available & accessible?

Figure 14 Graphic shows a WALK / DON'T WALK sign with a white silhouette of a walking person an orange silhouette of a hand indicating "stop."

Slide 25

Modern Signals Traditional, protected left, and split phase

How can pedestrians know when it's their turn if the pedestrian signal isn't available & accessible?

With some exceptions, cross when traffic

1. in the nearest half of parallel street is

2. going straight through.

Called "near-lane parallel traffic."

(Graphic from the previous slide appears.)

Slide 26

Actuation

Slide 27

Actuation

Signal timing and pattern CHANGE, depending on how many vehicles and pedestrians the signal computer detects!

Slide 28

Actuation

Signal timing and pattern CHANGE, depending on how many vehicles and pedestrians

the signal computer detects!

So what?

Pedestrians who are

not detected and cross with a green light

MAY NOT HAVE TIME TO CROSS!

Slide 29

Actuation

Signal timing and pattern CHANGE, depending on how many vehicles and pedestrians the signal computer detects!

So what?

Pedestrians who are not detected and cross with a green light MAY NOT HAVE TIME TO CROSS!

Figure 15 Picture of the boy from the movie "Home Alone" looking shocked or horrified.

Slide 30

Actuation

How does the computer detect vehicles?

z. Induction loops

aa. Cameras

bb. Radar

Figure 16 A series of three images (left to right) induction loop shows lines in the pavement of the street, camera mounted on signal, and radar mounted on a street pole.

Slide 31

Actuation

How does the computer detect PEDESTRIANS?

“Pedestrian detectors”!!

Huh??? What are they?

What do they look/feel like?

Slide 32

Actuation

How does the computer detect PEDESTRIANS?

“Pedestrian detectors”!!

PEDESTRIAN PUSHBUTTONS!

Figure 17 Picture shows a pole with pushbuttons mounted on it under a sign explaining how to use the sign (white silhouette of walking person means “Start crossing, watch for vehicles”; flashing orange hand means “don’t start, finish crossing if started”; steady orange hand means “don’t cross.” An arrow pointing to the left says “to cross, push button.”

Slide33

Actuation

So how can we as pedestrians know the computer is giving us enough time to walk across the street?

See if you can guess . . .

Slide 34

Actuation

So how can we as pedestrians know the computer is giving us enough time to walk across the street?

Did you guess right?

It's our new best friend, the pedestrian signal.

Figure 18 Graphic shows a WALK / DON'T WALK sign with a white silhouette of a walking person an orange silhouette of a hand indicating "stop."

Slide 35

Actuation

And how do we let the computer know we want to walk across?

Slide 36

Actuation

And how do we let the computer know we want to walk across?

WE PUSH THE PEDESTRIAN PUSHBUTTON!

Figure 19 Picture shows a pole with pushbuttons mounted on it under a sign explaining how to use the sign (white silhouette of walking person means "Start crossing, watch for vehicles"; flashing orange hand means "don't start, finish crossing if started"; steady orange hand means "don't cross." An arrow pointing to the left says "to cross, push button."

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Actuation in ACTION!

Video “Sauerburger signal” 5:40 minutes

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Actuation

If the pedestrian signal is NOT ACCESSIBLE, blind people need to learn exactly when and how to press the pushbutton to predict when the pedestrian signal will say WALK.

Graphic of the pedestrian activation buttons on a pole shown above appears.

Slide 39

Actuation

The three graphics shown previously appear (pedestrian signal, buttons to activate the pedestrian signal and the emoji face that is sweating).

NOTE: Some modern signals do not provide pedestrian buttons!

Pedestrians have no way to ensure signal will stay green long enough to cross!

Need to assess risk of being hit.

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Modern Traffic Signals

www.sauerburger.org/dona/signal

Self-Study Guide

Explains all this (Graphics of the pedestrian signal and buttons to activate appear again.)

AND

Strategies blind pedestrians need to know!

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Many signalized intersections have separate (“channelized”) right- / left-turning lanes

Drivers do NOT respond to signal or stop sign!

Assess and cross same as uncontrolled, with/without pedestrian crosswalks.

Figure 20 Photo shows a man crossing a lane of right-turning traffic, starting from an island and going to the curb. A car in the lane is passing him -- on the other side of the island is a 6-lane street with traffic signals.

Dr. Gene Bourquin, Orientation and Mobility Specialist – Thailand

Slide 1

Figure 21 A sign reads Chiagmal Traffic Police

Slide 2

Figure 22 Banner for the Bangkok Post, "The world's window on Thailand, 16 December 2017, 04:20 GMT+7"

Figure 23 A policeman looks at a car that has been wrapped around a pole. The headline above the photo reads, "Thailand tops road death ranking list".

December 29, 2016: 524 road accidents claimed 42 lives and wounded 526 people

Slide 3

Chiang Mai, Thailand the largest city in northern Thailand.

City: 160,000

District 1,000,000

Figure 24 Three images show, Chiang Mai on the map of the Thailand, an image of a river, and an image of a city road map.

Slide 4

Figure 25 Image of a man posing for a photo in a paper lantern shop; other customers are seen in the background along with thousands of paper lanterns.

Slide 5

The Major Intersections

- use split-phase signals,
- protected right turn signals (arrows),
- protected forward (arrows),
- along with free-flow channelized left turn lanes on all corners

Slide 6

Figure 26 A satellite image of an intersection in Chaing Mai.

Slide 7

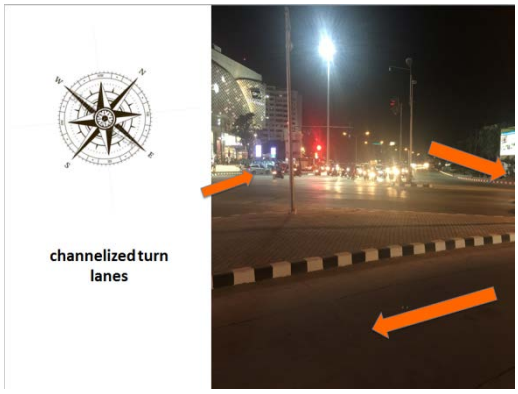

Figure 27 Image of channelized turn lanes at the intersection. A compass to the left of the photo provides the orientation and arrows point to indicate traffic flow.

Slide 8

Rinkham Intersection

- shared by two parties: the Chiang Mai municipality and Department of Highways.
- adaptive or actuated control
- traffic data is collected by GridSmart Cameras
- no corridor coordination - control does not consider neighboring intersections
- data collected seem to support that the time-of-day consistently affects the signal cycle, perhaps because GridSmart collects long-term data
- Almost always during daytime hours traffic seemed to be a capacity or greater

Slide 9

Figure 28 - Traffic signals at the intersection; this slide shows traffic flow with various arrows.

Slide 10

The Intersection

- four leg right-angled,
- connecting the end of a highway,
- and two major commercial and domestic roads,
- at a major shopping mall.

Slide 11

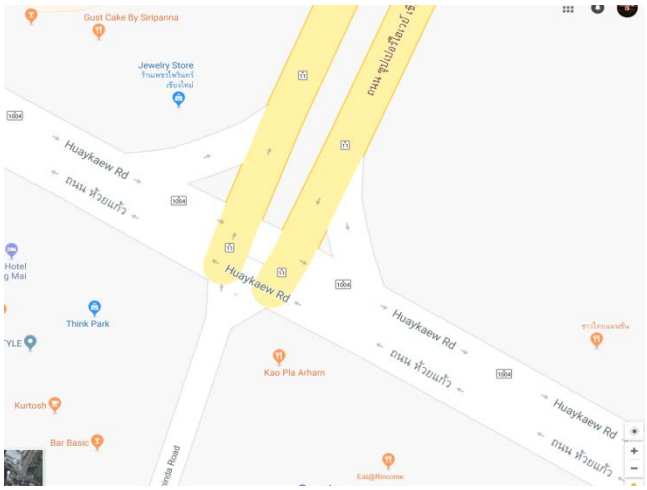

Figure 29 Google map showing intersection at Huaykaew Road with arrows indicating traffic flow.

Slide 12

let's take a look at a video of the traffic movement

Video

Slide 13

VEHICLE CIRCULAR GREEN + CHANGE INTERSECTION - Eastbound leg

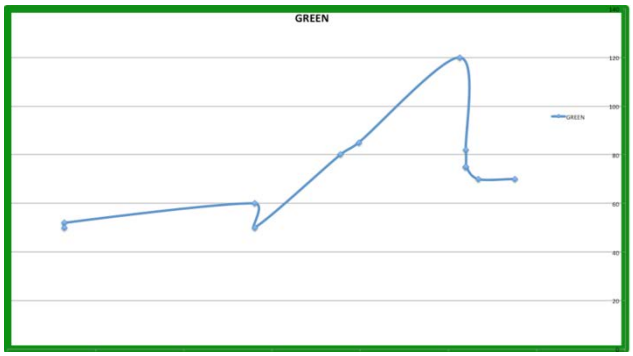

Figure 30 Graph showing vehicle circular green plus change interval times.

8:45 AM TO 9 PM RANGE OF 50 TO 120 SECONDS

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INTERSECTION SIGNAL CYCLE

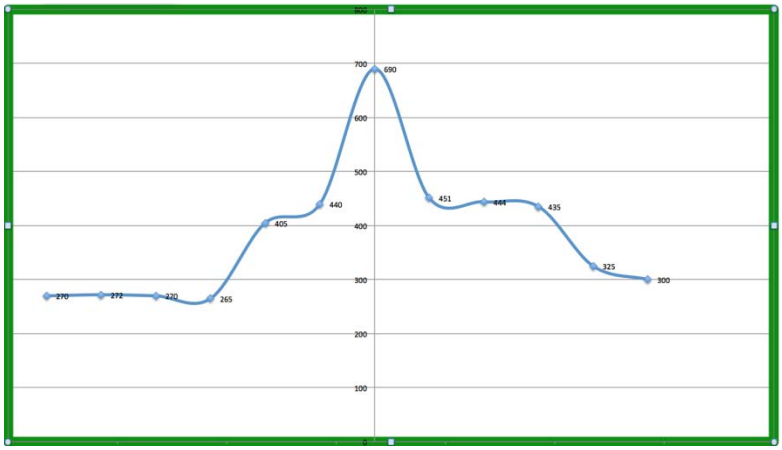

Figure 31 Graph showing intersection signal cycle.

8:45 AM TO 9 PM RANGE OF 265 TO 690 SECONDS

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EAST BOUND GREEN SIGNAL PORTION (percent) OF CYCLE

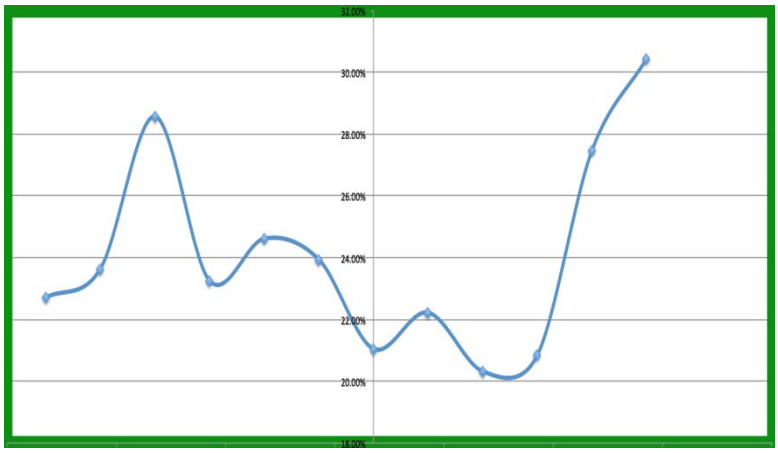

Figure 32 Graph showing east bound signal portion (percent) of cycle.

8:45 AM TO 9 PM RANGE OF 20.3% TO 30.4%

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signal head and cameras

Figure 33 Photo of traffic signal head and camera

Figure 34 Close-up photo or traffic camera

Slide 17

controller boxes and signal heads

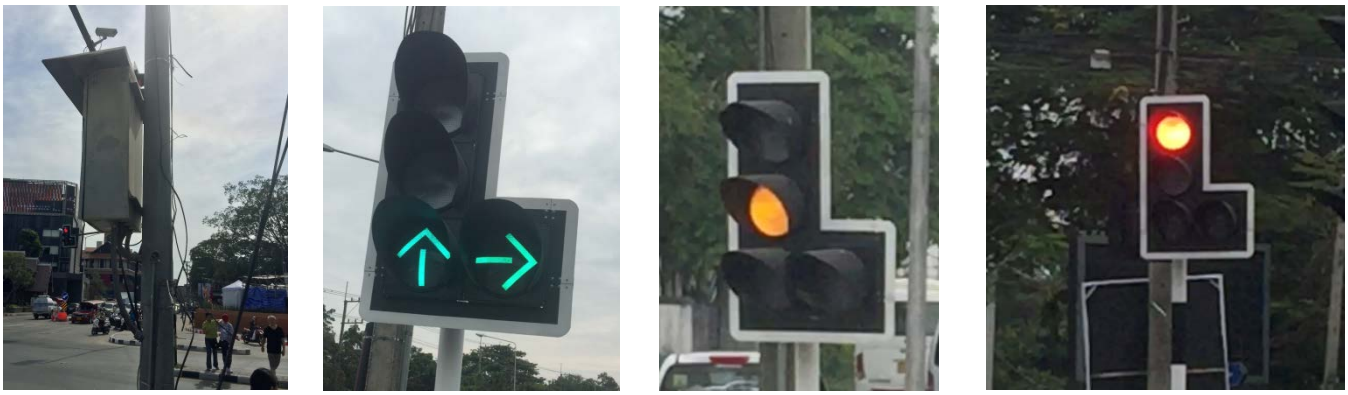

Figure 35 A series of four photos (from left to right): a controller box, signal head showing proceed straight ahead and right turn, a signal head showing

Slide 18

Rinkham Intersection

- there are no pedestrian signals
- and so, no pedestrian buttons to push
- and no accessible pedestrian signals
- there are faded painted crosswalks (some recently re-painted)
- Left turn are all free-flow
- no permissive right turns, always red ball or green arrow

Figure 36 The intersection with a motorcyclist stopped and a pedistrian beginning to cross the street. The curb is painted with red and white stripes.

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Intersection BENEFITS

- At least in theory, there is likely always a green interval long enough to cross when using the near-lane parallel surge (minimum time for crossing 28 seconds; shortest green interval 50 seconds)
- Traffic movements are isolated to reduce vehicle-vehicle conflicts
- Except for the CTL crossings, pedestrians using the near-lane parallel will not encounter vehicle-pedestrian conflicts
- There are always many pedestrians present at the crosswalks

Slide 20

Intersection NEGATIVES

- There are no detectable warning surfaces. There are very large curb radii
- Pedestrian typically wait for more than 4 minutes in the morning, up to more than 7 minutes in the afternoon, and up to 11 and a half minutes in mid-evening to cross with a near-lane parallel traffic surge
- Waits for drivers are equally long (the benefits of phases above 120 seconds for throughput is negligible)
- At most times it appears impossible considering the ambient noise and the design of the CTLs to determine a crossable gap

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let’s take a look at a video of pedestrians crossing

Video

Slide 22

Pedestrian Crossings

- Ambient noise levels are high
- Pedestrians must cross within or near two free-flow channelized turn lanes at each crosswalk
- Four segments/conditions at each crosswalk: CTL, near perpendicular and far perpendicular traffic, CTL
- No pedestrian refuge, a 3-4 foot deep median, or a pork-chop refuge on 4 to 7 lane roadways
- It may be possible to create a detectable yielding to cross the CTL and use the N-LPS for the middle sections of the crossing
- Getting assistance would be easy and fast

Slide 23

Risks

Is there enough warning of approaching vehicles to be confident that it is clear to cross?

- Not in the free flow lanes. Some vehicles can be heard from approximately 100 feet from the crosswalk; many cannot.
- Motorcycles, estimated at 40% of the traffic, could be heard 1-2 seconds from the crosswalk, and often not at all. It is not possible to create a DETECTABLE YIELD from the motorcycles.

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Risks

How likely will there be a conflict?

- There are no conflicts from the drivers at the signal controlled sections of the crosswalk when the near-lane parallel surge is used.
- There is a conflict for both free-flow lanes at the ends of the crosswalk; most vehicles in the CTL are going from 10-30 mph.
- If there is a conflict, how likely will you be hit? There is constant traffic flow of cars, trucks, and motorcycles; the possibility of being hit if you cannot identify a sufficient gap is high.

Slide 25

Risks - Cars

If you are hit, how likely will you be severely injured or killed?

The following is for automobiles.25 MPH = 36% chance fatal or incapacitated

	Travel speed (officers' estimate)	
Injury severity	**1-20 mph** ***0-32 kmh***	**21-25 mph** ***33-40 kmh***
Fatal	1.1%	3.7%
Incapacitating	19.4%	32.0%
Fatal or incapacitating	***20.5%***	***35.7%***
Non-incapacitating	43.8%	41.2%
Possible / no injury	35.6%	23.0%

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Risks - Motorcycles

If you are hit, how likely will you be severely injured or killed? The following is for motorcycles.

25 mph=27% chance-fatal or hospitalized >24 hours

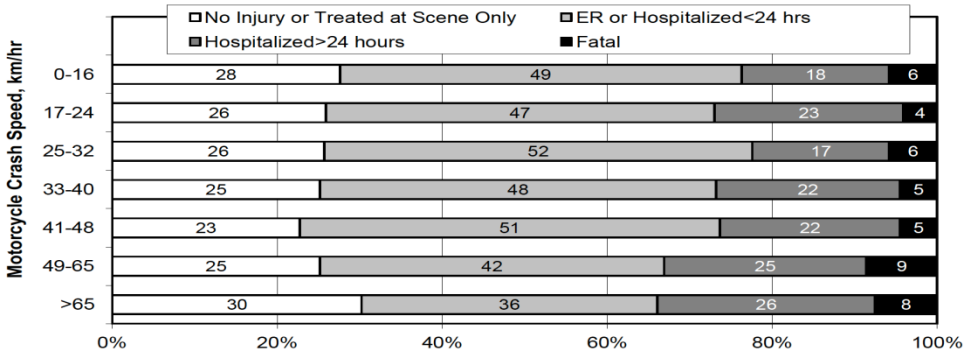


Figure 37 Graph showing statistics for Thailand, rider post-crash medical status as a function of crash speed.

Slide 27

Risks

Risk: not acceptable to me

Alternatives:

- Seek assistance
- Use public transport
- Use a different route; nearest crosswalks which may be crossable involve distances of up to 0.25+ miles

DEFINITIONS

Vickie Anderson, Client Services (Metro) Team Leader, O&M Specialist, Guide Dogs Queensland

Let's make sure we're all travelling in the same direction.

1. Give Way – Give way means to slow down and, if necessary, stop in order to prevent a crash from happening. You must always give way at a Give Way sign and check it's safe to continue. Give Way signs are placed at intersections and other places where other vehicles have priority.

Figure 38 Illustration of a Give Way sign.

2. Zebra Crossing – A zebra crossing is a type of pedestrian crossing used in many places around the world. Its distinguishing feature is alternating dark and light stripes on the road surface, resembling the coat of a zebra. A zebra crossing typically gives priority or right of way to pedestrians.

Figure Photograph of a zebra crossing.

3. Motorway – Highway

4. Slip Lane - A slip lane is a road traffic lane provided at an intersection to allow vehicles to turn at the intersection without actually entering it and interfering with through traffic. It therefore is not controlled by any traffic signals at that intersection.

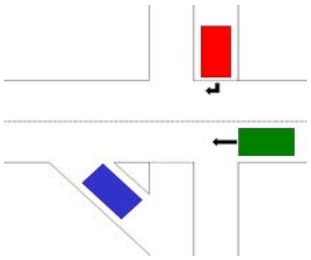


Figure 39 Illustration of a slip lane.

Overview of Robinson Rd West (minor road) and Gympie Rd (major road) in Aspley, QLD

Vickie Anderson, Client Services (Metro) Team Leader, O&M Specialist, Guide Dogs Queensland

1. What is the Traffic Pattern? There is a protected phase for right turners using a "variation". This means that "the vehicles waiting to turn right may not all turn at the same time". (Dona Sauerburger. Self Study Guide: Crossing at Modern Traffic Signals. [ONLINE] Available at: http://www.sauerburger.org. [Accessed 21 January 2018].)

   For this intersection, the major road heading south gets the right turn signal at the start of the light cycle. After this green arrow disappears, all traffic heading north and south is then allowed to go. Finally, the south bound traffic is stopped while the north bound traffic continues - getting a green arrow for the right turners. If there is no one waiting at either of these right turning lanes, the green arrow will not come up.
2. Is the signal actuated? Yes! According to the wonderful Traffic Engineer, Alan, 99% of signals in Brisbane have a turn actuation, side street actuation or pedestrian actuation. This happens at all times of day and night. Each intersection has a 'Personality Time' which determines the Actuation pattern at that intersection. You can see a screen shot from this intersection on page 5 in the 'Straight from the Traffic Engineer' handout included in this presentation.
3. Is there a walk signal? Yes!! All of the walk signals in Queensland are accessible by people with no or low vision as well as the Deaf Community. They are called Audio Tactile Signals. Each button beeps softly to help with locating and is marked with an arrow pointing towards the road that the button is corresponding to. This arrow can also be used to help with alignment for someone who cannot use the sound of traffic to align.

Upon pushing the button, the audible beeping gets louder and then rings loudly when it is time to cross the road. If the pedestrian cannot hear the ringing, they simply rest their hand on the device and it will vibrate when it is time to cross. This will all be shown in the videos.

4. Do pedestrians have to hit the walk button to get the WALK symbol? Yes.
5. Are there any Risks at this intersection? Yes.
    a) Slip Lanes can be a risk. One slip lane at this intersection is viewed as a Situation of Uncertainty during the day. This will be discussed further in the Risk Analysis later in the presentation.
    b) Veering. As this is such a heavily travelled road, if a person with low or no vision were to veer into traffic, there are several outcomes that could happen… some not too pleasant!

Straight from the Traffic Engineer

Vickie Anderson, Client Services (Metro) Team Leader, O&M Specialist, Guide Dogs Queensland

A HUGE Thank You to Alan Graham

Program Delivery & Operations | Department of Transport and Main Roads

Gympie Rd Coordination Schedule

Note:- Ticked boxes indicate plan will operate as scheduled (locked in)

Unticked boxes indicate that the plan can be chosen automatically by the Streams system according to the real time route occupancy data. This is called “Dynamic Plan Selection”. If the route occupancy thresholds are not surpassed then the scheduled plan will run.

If any of the intersections along the corridor lose communication, the Dynamic Plan Selection will not run and the coordination will default to the schedule.

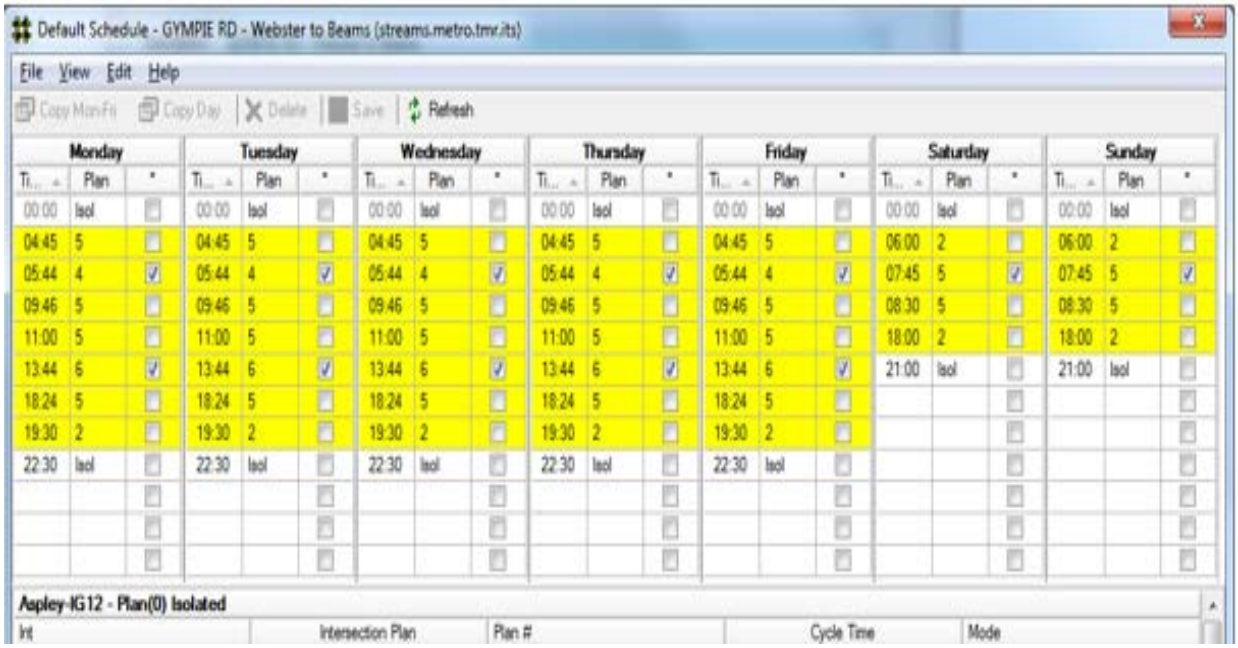


Figure 40 Default Schedule - Gympie Rd. - Webster to Beams (http://streams.metro.tmr.its)

All intersections throughout Brisbane are operated and controlled by one of two companies. The first is the Brisbane City Council (BCC). The second is the Department of Transport and Main Roads (TMR). These two organizations run and plan their traffic lights slightly different. They also use completely different technology to program the lights. TMR uses "The Streams System" while BCC uses The SCATS system. SCATS is solely used in all Australian capital and regional cities except in Queensland. Brisbane is unique with the two systems operating on the same road network.

Some fun facts on these two traffic systems:

1. TMR have around 480 intersections controlled by Streams in Brisbane; while BCC have around 900 intersections controlled by SCATS in Brisbane.
2. Throughout Queensland, TMR have over 1,500 signals on Streams.
3. Streams is NOT an acronym. According to Alan, "they were unable to come up with one that made sense!"
4. Streams REAL strength is it controls motorways:
    a) Variable Message Signs (VMS)
    b) Lane Use Management Signs (LUMS)
    c) Variable Speed Limit Signs (VSL)
    d) Ramp Signaling
    e) Just about everything else on motorways!

Upon arriving at an intersection, you will not notice a difference. Most people, including myself, will not even know there are 2 different organizations involved in traffic lights. (This explains why my students and I were getting bounced from person to person when we call to talk about specific intersections!!!) If someone is having an issue with an intersection, the best way to find out who controls that specific intersection is to go to the Signal Box that is located at every intersection. Alan has advised that there will be a large print M for TMR or a B for BCC. There will also be a phone number on that box that can

be called for help or to provide information. This writing is not accessible for totally blind individuals.

Gympie & Robinson Signal Operations

Vickie Anderson, Client Services (Metro) Team Leader, O&M Specialist, Guide Dogs Queensland

Gympie & Robinson Signal Operations - Log 8.06am to 8.11am 12 January 2018

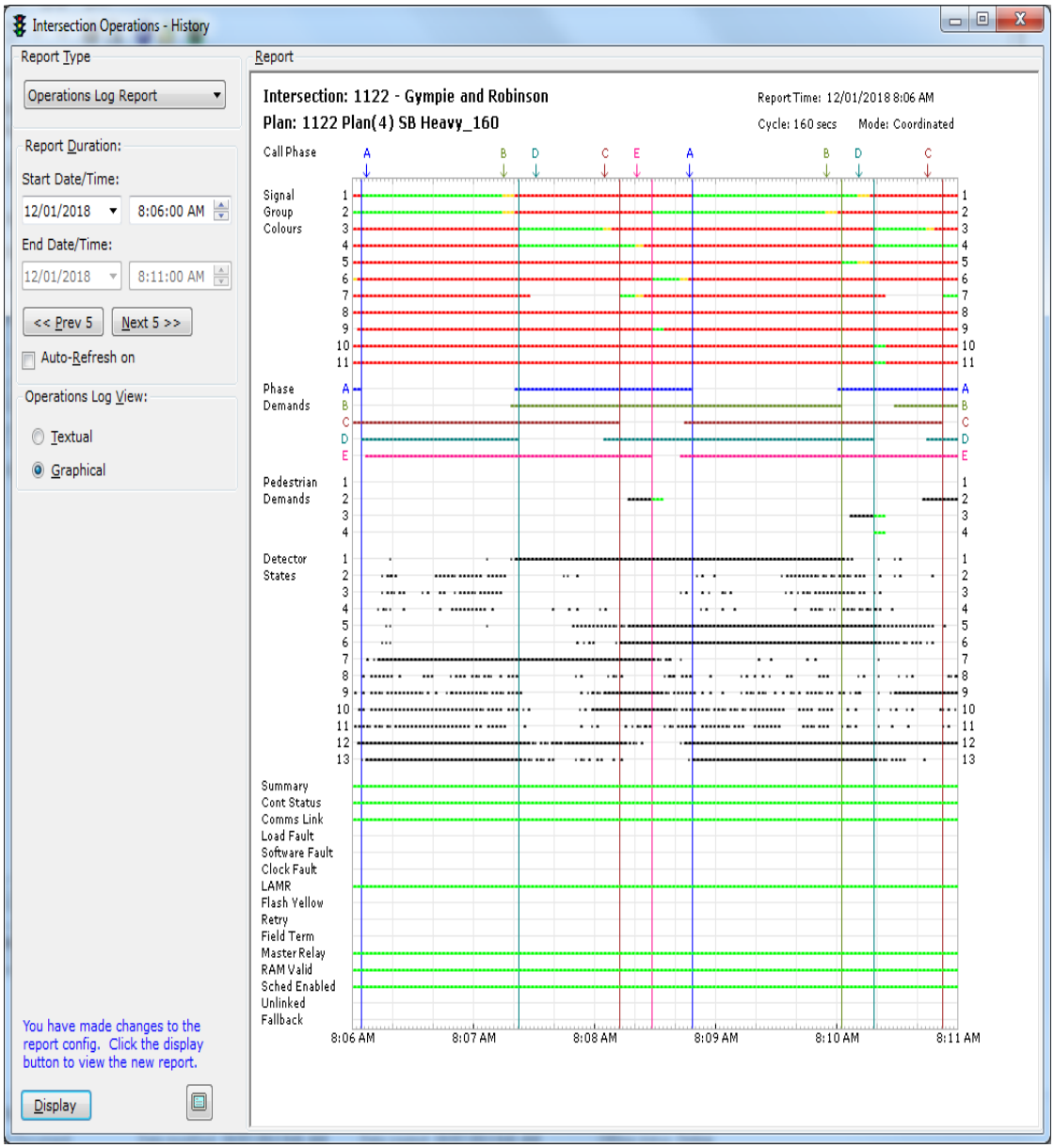


Figure 41 The above shows morning coordinated operation with heavy traffic. The morning's peak traffic is the only time of day when the east bound traffic gets a longer cycle (on the minor road). Due to the Personality Times, it was found that there is more heading east at this time. For the rest of the day, there is more traffic heading west.

Gympie & Robinson Signal Operations - Log 1.55am to 2.00am 12 January 2018

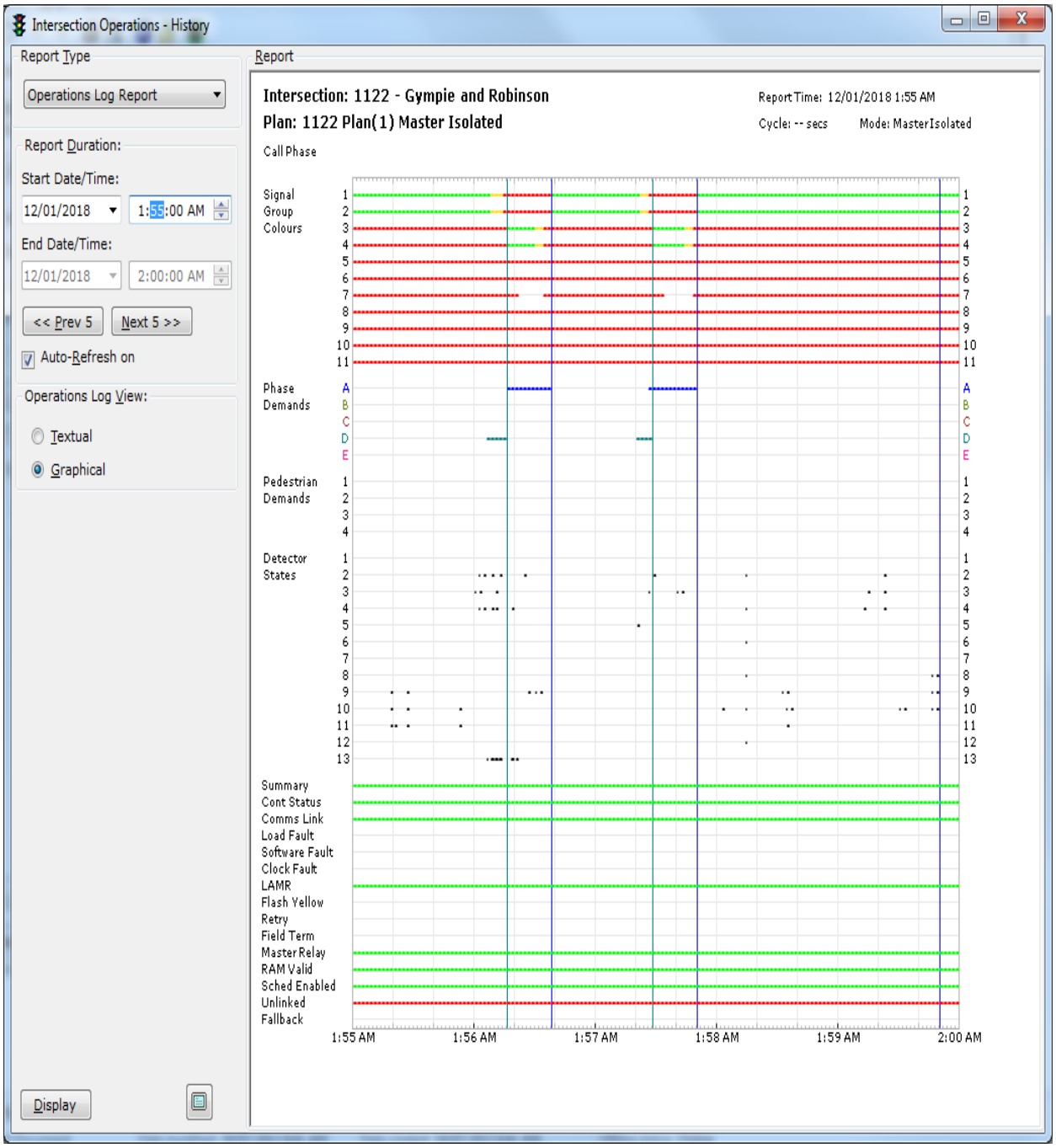
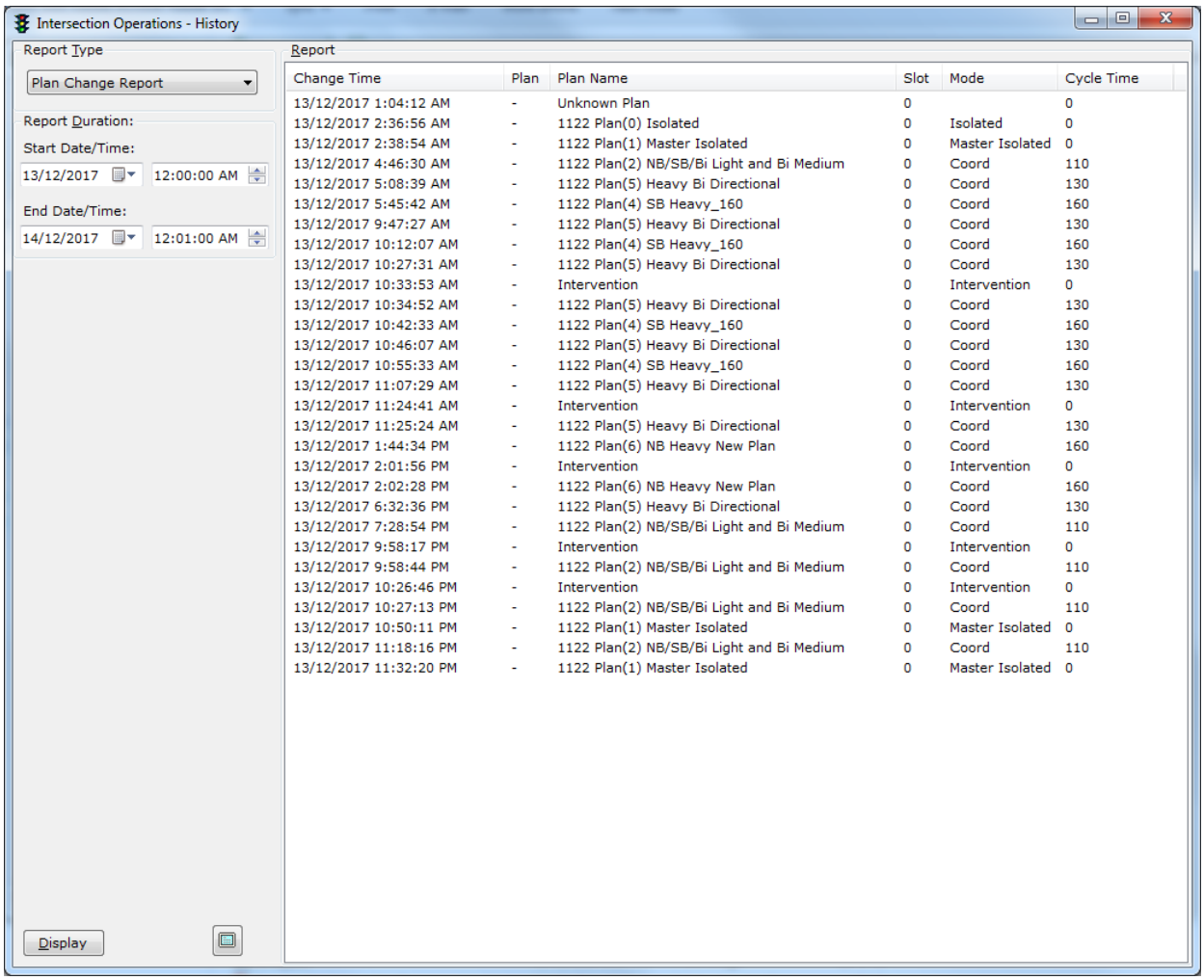


Figure 42 The above shows a typical quiet overnight period with little traffic and only two demands triggered by vehicles on Robinson Rd. Signals are operating in "isolated" mode which allows quick response to service the minor phases when demanded.

Gympie & Robinson Plan Change Report – midnight to midnight - 13 December 2017



Change Time	Plan	Plan Name	Slot	Mode	Cycle Time
13/12/2017 1:04:12 AM	-	Unknown Plan	0		0
13/12/2017 2:36:56 AM	-	1122 Plan(0) Isolated	0	Isolated	0
13/12/2017 2:38:54 AM	-	1122 Plan(1) Master Isolated	0	Master Isolated	0
13/12/2017 4:46:30 AM	-	1122 Plan(2) NB/SB/Bi Light and Bi Medium	0	Coord	110
13/12/2017 5:08:39 AM	-	1122 Plan(5) Heavy Bi Directional	0	Coord	130
13/12/2017 5:45:42 AM	-	1122 Plan(4) SB Heavy_160	0	Coord	160
13/12/2017 9:47:27 AM	-	1122 Plan(5) Heavy Bi Directional	0	Coord	130
13/12/2017 10:12:07 AM	-	1122 Plan(4) SB Heavy_160	0	Coord	160
13/12/2017 10:27:31 AM	-	1122 Plan(5) Heavy Bi Directional	0	Coord	130
13/12/2017 10:33:53 AM	-	Intervention	0	Intervention	0
13/12/2017 10:34:52 AM	-	1122 Plan(5) Heavy Bi Directional	0	Coord	130
13/12/2017 10:42:33 AM	-	1122 Plan(4) SB Heavy_160	0	Coord	160
13/12/2017 10:46:07 AM	-	1122 Plan(5) Heavy Bi Directional	0	Coord	130
13/12/2017 10:55:33 AM	-	1122 Plan(4) SB Heavy_160	0	Coord	160
13/12/2017 11:07:29 AM	-	1122 Plan(5) Heavy Bi Directional	0	Coord	130
13/12/2017 11:24:41 AM	-	Intervention	0	Intervention	0
13/12/2017 11:25:24 AM	-	1122 Plan(5) Heavy Bi Directional	0	Coord	130
13/12/2017 1:44:34 PM	-	1122 Plan(6) NB Heavy New Plan	0	Coord	160
13/12/2017 2:01:56 PM	-	Intervention	0	Intervention	0
13/12/2017 2:02:28 PM	-	1122 Plan(6) NB Heavy New Plan	0	Coord	160
13/12/2017 6:32:36 PM	-	1122 Plan(5) Heavy Bi Directional	0	Coord	130
13/12/2017 7:28:54 PM	-	1122 Plan(2) NB/SB/Bi Light and Bi Medium	0	Coord	110
13/12/2017 9:58:17 PM	-	Intervention	0	Intervention	0
13/12/2017 9:58:44 PM	-	1122 Plan(2) NB/SB/Bi Light and Bi Medium	0	Coord	110
13/12/2017 10:26:46 PM	-	Intervention	0	Intervention	0
13/12/2017 10:27:13 PM	-	1122 Plan(2) NB/SB/Bi Light and Bi Medium	0	Coord	110
13/12/2017 10:50:11 PM	-	1122 Plan(1) Master Isolated	0	Master Isolated	0
13/12/2017 11:18:16 PM	-	1122 Plan(2) NB/SB/Bi Light and Bi Medium	0	Coord	110
13/12/2017 11:32:20 PM	-	1122 Plan(1) Master Isolated	0	Master Isolated	0

Figure 43 The above shows dynamic plan changes that occurred in a 24 hour block of time. It is interesting to see there are 29 different changes to the light cycle in this period of time.

It also shows when an “Intervention” was called by the emergency vehicles (fire or ambulances only) passing through. There were 5 of them throughout the day; the first one being at 10:33am and the last at 10:26pm. Alan stated that after an intervention passes, the cycle goes back to normal after about 2 cycles. Therefore, a pedestrian or car waiting may have to wait another full cycle before continuing on their journey.

M1122 Gympie & Robinson Programmed Personality Times

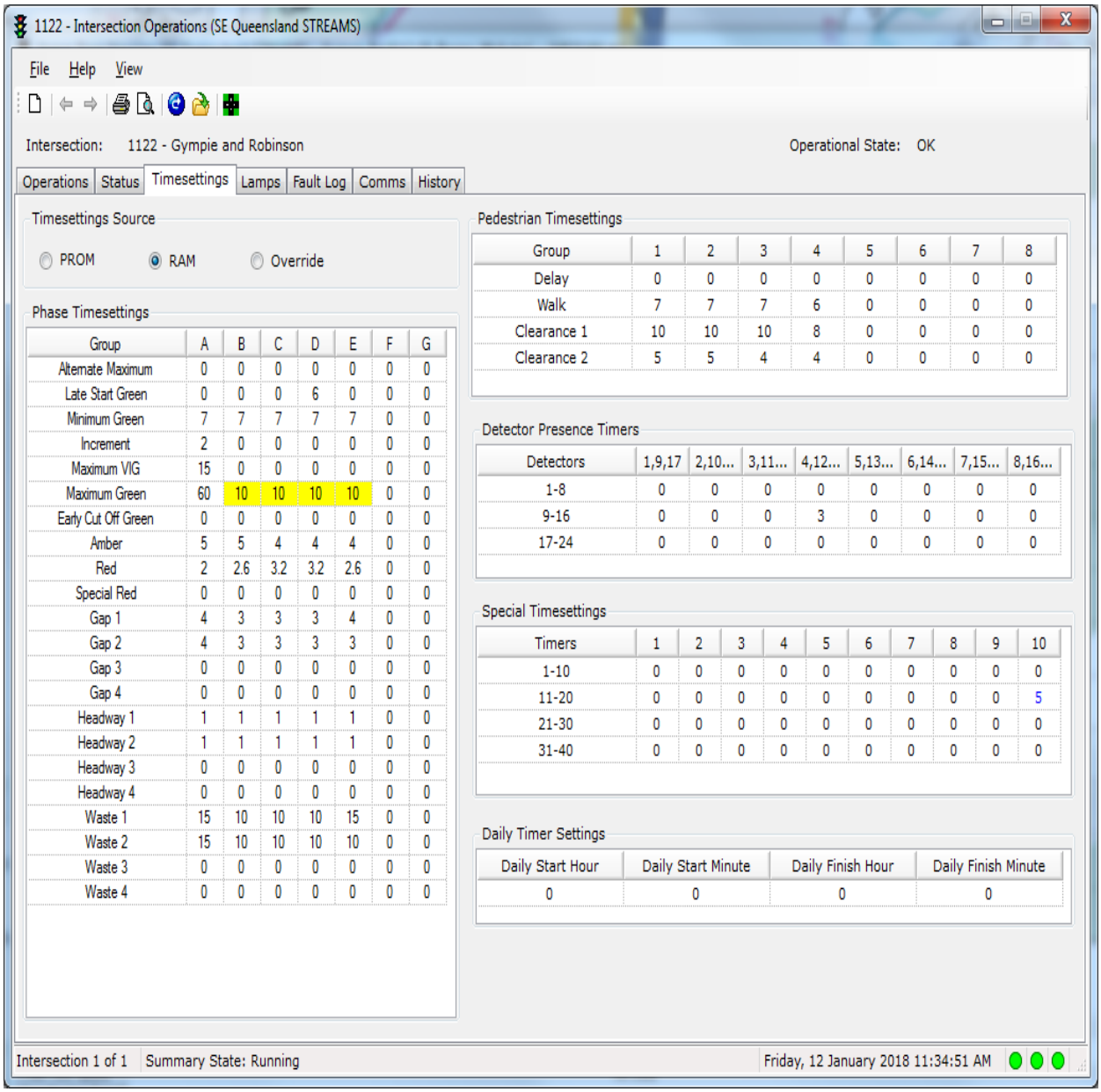


Figure 44 The above shows the times programmed into the traffic signal personality at Gympie & Robinson. The safety critical amber, red, and pedestrian times will always remain the same whether in isolated or coordinated mode. The pedestrian times, along with a selection of other times can be remotely altered if required.

More signal info at:- https://www.tmr.qld.gov.au/Travel-and-transport/Road-and-traffic-info/Traffic-Signals-Information.aspx

RISK ANALYSIS for Situations of Uncertainty

Crossing at 3 Pedestrian Crossing marked Slip Lanes

Corner of Robinson Rd West and Gympie Rd, Aspley Brisbane

Time Analyzed: 2:30pm – 3pm

1. Do you have the right of way to cross there? __X__ yes _____ no

2. What is the likelihood of being seriously injured or killed if you cross ***under these conditions*****?** _____

Use charts below to analyze likelihood of being surprised, then hit AND seriously injured or killed:

_____

_____

a. **SURPRISED:** Likelihood of being surprised by a vehicle that could reach you during your crossing?

Factor	Conditions
Traffic volume *(higher volume = higher risk of being surprised)*	High
Warning time of approaching vehicles *(longer warning time = lower risk of being surprised)*	2 out of 3 slip lanes have a longer warning time due to more visibility and auditory information; therefore are considered Situations of Confidence. 1 has a shorter amount of time due to bushes blocking a portion of the view/sound for both drivers and pedestrians.
LIKELIHOOD OF BEING SURPRISED *(high / moderate / low)*	Moderate for 1slip lane Low for other 2 slip lanes

b. HIT: If you are surprised by a vehicle that could reach you, what is the likelihood that it will hit you?

Continuing the analysis of the single Slip Lane crossing as this lane was identified as a moderate chance of being surprised. Heading north on Gympie Road.

Factor **Affecting likelihood of being hit**	**More likely**	**Likelihood moderate**	**Less likely**
MULTIPLE THREAT: More than one approaching lane *("yes" = drivers may pass another vehicle and hit you without seeing you)*			No
SPEED of drivers: *(slower = less likely to hit you)* *Cars are travelling straight at 70kilometers per hour/43.496 miles per hour. Yet, they will need to slow down to make the turn safely.*		Moderate	
EXPECTATION: Drivers expect pedestrians? *("yes"= less likely)* *As per Australian Driving Legislation,* ***(www.qld.gov.au/transport/safety/rules/other/pedestrians)*** *"When driving or riding in Queensland, you must:* - *Give way to pedestrians using children's pedestrian or marked foot crossings* - *Give way to pedestrian's crossing the road you are turning into* - *Give way to pedestrians in a shared zone or slip lane* - *Travel at a speed allowing you to stop safely at a crossing if needed* *You should also take care to:* - *Travel carefully in areas with children such as schools or playgrounds*		Moderate chance	

Factor **Affecting likelihood of being hit**	**More likely**	**Likelihood moderate**	**Less likely**
- *Allow more time for a person with a disability, or a senior pedestrian to cross the road* - *Reduce your speed at night around entertainment venues where people gather.*			
VISIBILITY: Good line of sight / visibility? *("yes" = less likely)*		Fair	
ROAD CONDITIONS? *("good" = less likely to hit you)*			Good
GROUP OF PEDESTRIANS crossing with you? *("yes" = less likely)*		Highly likely as it is a heavily pedestrian travelled area	
WAITING WITH FOOT IN THE STREET? *("yes" = less likely)*	No		
USING A CANE? *("yes" = less likely that drivers will hit you)*			Yes
DRIVERS: community/culture (inc. observations of yielding there)	**It has been observed that some drivers, (especially when traffic is going straight, either east or west, on Robinson Rd) will look the opposite direction of the slip lane at the oncoming traffic… before they look at the slip lane.**		

Factor **Affecting likelihood of being hit**	**More likely**	**Likelihood moderate**	**Less likely**
LIKELIHOOD OF BEING HIT *(high / moderate / low)*		**Moderate**	

c. **SERIOUSLY INJURED OR KILLED**? If you're hit, how likely will you be seriously injured/killed?

Vehicle travel speed and pedestrian injury severity *(Florida, 1993-1996; pedestrian in single-car crashes)*

	Travel speed (officers' estimate)						
Injury severity	1-20 mph *0-32 kmh*	21-25 mph *33-40 kmh*	26-30 mph *41-48 kmh*	31-35 mph *49-56 kmh*	36-45 mph *57-72 kmh*	46+ mph *73+ kmh*	*TOTAL*
Fatal	**1.1%**	**3.7%**	**6.1%**	**12.5%**	**22.4%**	**36.1%**	**6.5%**
Incapacitating	**19.4%**	**32.0%**	**35.9%**	**39.3%**	**40.2%**	**33.7%**	**27.0%**
Fatal or incapacitating	*20.5%*	*35.7%*	*42.0%*	*51.8%*	*62.6%*	*69.8%*	*33.5%*
Non-incapacitating	**43.8%**	**41.2%**	**36.8%**	**31.6%**	**24.7%**	**20.5%**	**38.8%**
Possible / no injury	**35.6%**	**23.0%**	**21.2%**	**16.6%**	**12.7%**	**9.7%**	**27.7%**

!!Additional Points of Interest!!

1) When I first learned the road rules for AU, I was shocked to see that the drivers are to Give Way to the pedestrian at any slip lane; regardless of having a marked zebra crossing or not. Because I was shocked and then curious, I started asking everyone I knew if they were aware of this road rule. I did not have ONE SINGLE PERSON know this road rule. Everyone thought they **only** needed to Give Way if the slip lane was marked with a zebra crossing.
2) The point above could be an additional reason why drivers do not take longer to look for pedestrians but turn their heads in the opposite direction, instead, looking for oncoming cars.
3) The original Risk Analysis of this slip lane was done during a busier time of day as there are several schools in the area who finish between 2:40 – 3pm. At this observation, the slip lane was considered a Situation of Uncertainty. The slip lane was then observed later in the evening at 7:30pm – 8pm. At this time of day, it was **so** much easier to hear the oncoming traffic so it was, (at this time of day only), considered a Situation of Certainty. This stressed to me the importance of analyzing the slip lane at the time it will be crossed by the client/student.

Texas School for the Blind & Visually Impaired

Outreach Programs

Figure 45 TSBVI logo

"This project is supported by the U.S. Department of Education, Special Education Programs (OSEP). Opinions expressed here the authors and do not necessarily represent the position of the Department of Education."

Figure 46 IDEAs that Work logo and US Dept. of Education OSEP disclaimer.