REGIONAL TRANSPORTATION COMMISSION

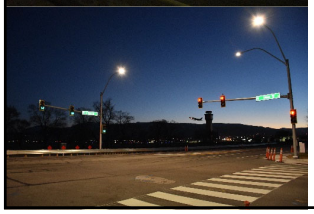
Metropolitan Planning • Public Transportation & Operations • Engineering & Construction

Metropolitan Planning Organization of Washoe County, Nevada

RTC Washoe Traffic Signal Timing Program

April 16th, 2021

What to be Covered



- Program History
  - Quick Facts/What has been happening in the program
- The Traffic Signal Program
  - Why Traffic Signal Synchronization?
  - Signal Timing Process
  - Major Achievements
  - Impacts from Synchronization
  - Time, Cost, and CO_2 Reductions
  - Public and Agency Feedback
  - Signal Hotline

Program History

- 410 Traffic Signals in the Region
  - 278 in the City of Reno jurisdiction
  - 114 in the City of Sparks jurisdiction
  - 19 Washoe County jurisdiction
- Federal guidelines recommends traffic signals to be retimed and reevaluated on a three to five year basis.
  - In the Truckee Meadows, we are doing all signals in the three year basis.

Program History

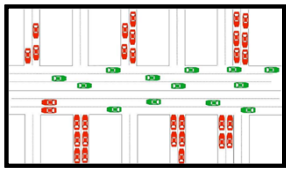
- The Signal Timing Program started in 2005.
  - What happened through the years:
    - Signal Timing Phase 1 - 3: (2005 – 2014) - Poor Consultant Performance
    - Engaged UNR back in 2014
    - Signal Timing Phase 4 - 6: (2014 – Current) – In-house/UNR – Program Success
- How the program has been successful
  - Lower cost per signal re-timed per capita.
  - Students benefit from doing signal retiming.
  - Students and staff are local – can respond to traffic issues and troubleshoot them quickly.
  - Students and staff knowledge of the signal system continues to grow.
  - No other agencies can match the effort and skills the staff and students have put in to the program.

Why Traffic Synchronization?

- Fuel Costs
  - Fuel consumption is reduced by fewer vehicles idling, decelerating, and accelerating.
- Air Pollution
  - As a result of lower fuel consumption, emissions, and pollutants are also reduced.
- Safety
  - With decreased travel times and delays, drivers can reach their destination sooner, which will decrease the likeliness of them taking risks and improve overall traffic safety!

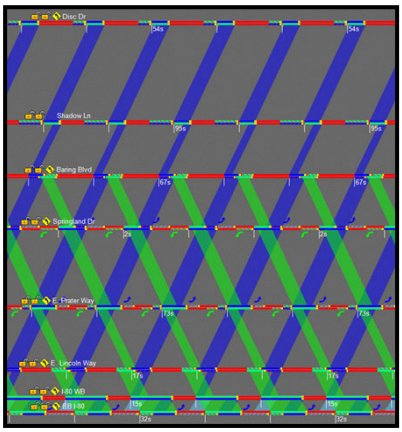
How Does the Signal Timing Process Work?

- How Timing is Developed
  - Amount of timing for each movement based on traffic demand.
  - Sum of the timing of all movements is the Cycle of the signal.
  - Repeat this for all intersections in the corridor with the same cycle.
- Line up the greens between intersections.
  - This is where we create the "Green Wave".
    - Line up the greens in both directions of traffic.

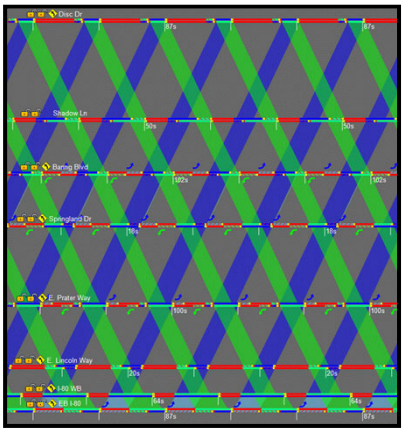


How Does the Signal Timing Process Work?

Before Optimization



After Optimization



Pyramid Hwy Traffic Progression

- Purpose of this Video:
  - Show Traffic Signal Cycle Length and Sequence.
  - Show Traffic Progression through Disc Dr. and N. Los Altos Pkwy.

Major Achievements

- Pedestrian Crossing Timing
  - All 408 signalized intersection's pedestrian crossing timing have been updated to meet current standards (3.5ft/sec). Ref. MUTCD Sec 4E.06
    - Pedestrian "Walk" and "Flashing Don't Walk" times.

- Vehicular Clearance Timing
  - All 408 signalized intersection's vehicular clearance timing have been updated to meet current standards. Ref. NCHRP 731 Report.
    - Vehicle "Yellow" and "All-Red" times

- Approximately 250 traffic signals with new synchronized coordination plans.

South Meadows Pkwy Re-Timing

- South Meadows Pkwy in Reno, Nevada
  - PM Peak – 135sec cycle – SB I-580 off-ramp to Double R Blvd.

Impacts of Traffic Signal Synchronization

- Delay to Minor Street Movements
  - Purpose of synchronization is to progress a platoon of vehicles through a corridor.
- Delay Caused by Long Pedestrian Timing
  - Bringing pedestrian crossing times up to standard increases the overall timing.
- Minor incremental improvements to signal timing going forward.
  - First round of retiming can get up to 30% improvement.
    - Subsequent timing can gain 2% - 5% improvment.
- Signal timing must be maintained!
  - Signal timing degrades over time due to changes in traffic volumes.

Sample Emissions/Cost Savings

- Vista Blvd Case Study – AM & PM Plan
  - $1,858,029 – Estimated Overall Cost Savings per year.
    - Estimated: 8.2tons CO, 1,398.9tons CO_2, 0.82tons NOx eliminated per year.
    - 406,150gallons of fuel saved per year ($3 per gallon estimate)
    - 31,243 hours of time savings per year. ($13/hr time value estimate)
- Rock Blvd Case Study – AM & PM Plan
  - $910,236 – Estimated Overall Cost Savings per year.
    - Estimated: 2.3tons CO, 496.43tons CO_2, 0.3tons NOx eliminated per year.
    - 48,616gallons of fuel saved per year ($3 per gallon estimate)
    - 16,417 hours of time savings per year. ($13/hr time value estimate)

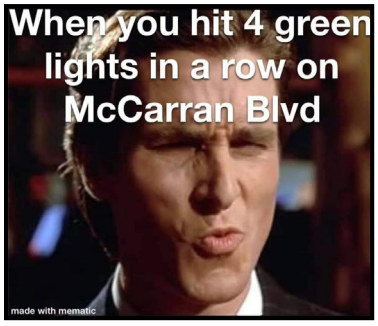
How many Greens per Red?

- How are we doing?
  - Orange County allocates $5,000,000 budget per year on signal timing.
  - RTC allocates $333,333.33 budget per year on signal timing.
    - Orange County gets roughly 1.7greens per red.
    - Truckee Meadows gets 4.3 greens per red. (2.5x less spent per capita)

Green/Red Ratio Comparison - Reno vs. Orange County					
Reno	AM	PM			
W McCarran	5.7	3.8			
Vista	3.6	4.6			
Rock	4.8	3.2			
Keystone	4.7	4.5			
Avg	4.7	4.0	Year		
Orange County	1.7	1.5	-2019		
	1.7	1.7	-2017		
	1.8	1.6	-2015		

Public and Agency Feedback

- Decline in complaints to the traffic hotline regarding signal timing, and mostly on maintenance issues.
- Positive feedback and collaboration from local agencies.
- Positive feedback from the public via social media!
  - Meme was posted on "Reno Cars and Coffee" Facebook page on January 4th, 2021.
  - Over 1,000 shares!
  - Over 500 likes!



UNR Experience – Professor Zong Tian

UNR Experience – Former Student

- Former Student Logan Williams recently graduated with his Masters from UNR.
- Now is employed with the City of Cedar Park in Texas as their Traffic Engineer. Leading the city's traffic signal group.
- Position originally offered at a Senior Engineer level, but made an exception based on the experience Logan obtained from UNR/RTC.

We are here to Help!

- We have a Hotline!
  (775) 335-ROAD (7623)
  - Please call us with concerns regarding…
    - Signal Timing
    - Signal Detection
    - Any other traffic signal related issues

THANK YOU

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