Signal Timing & Coordination

In the Spring of 2008, the Public Works Department formed the Transportation Management Program under the umbrella of the Traffic Engineering Division. The program is comprised of a team that is dedicated full-time to signal timing, signal coordination, and transportation planning.

The responsibilities of the program's team are as follows:

- Coordination Planning & Implementation
- Traffic Signal Timing, Delay, and Queuing Studies
- Traffic Signal Warrant & Lane Configuration Studies
- Speed & Traffic Calming Studies
- Traffic Impact Analysis (TIA) Assessments
- Traffic Monitoring
- Addressing Questions & Concerns of the Public
- Transportation Management for Special Events & Emergency Situations

To coordinate a network of signalized intersections, the team performs corridor-wide traffic volume studies and uses the results to create a computer-based model and microsimulation of traffic flow. Traffic counts are typically performed using magnetic traffic analyzers (Figure 1). Each of these devices is capable of performing length-based classifications, which provides the data necessary to create a breakdown of the percentage of each type of vehicle traveling a particular roadway.

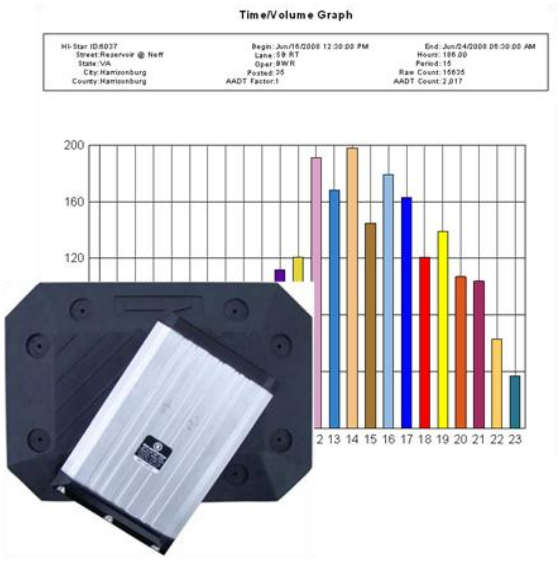

Figure 1. Magnetic traffic analyzer and example graph for a traffic volume report

Once collected, the traffic studies are transferred to a computer and assessed to outline off-peak, mid-day, and peak-hour volumes for each day of the study. These volumes not only provide data for computer modeling, but they can also be used to create "time of day plans" for the coordinated set of signals. These plans are used to adjust signal timing and coordination plans for varying conditions throughout each week. For instance, signals are typically told to go into coordination at a particular time in the morning, which can be different for a weekday versus a weekend day.

To develop signal timings and coordination plans, traffic volumes are fed into a computer program called Syncho (Figure 2). Synchro is used to model the roadway using aerial imagery as a guide to obtain correct distances for vehicle queue length and intersection separation. Timing detail is then entered for each signal and the model run to

see how well the signal and the coordinated system function. The delay for each movement at a signal can be measured and optimized to improve traffic flow. These simulations are especially useful for determining when the major movement at each intersection will receive a green light while in coordination.

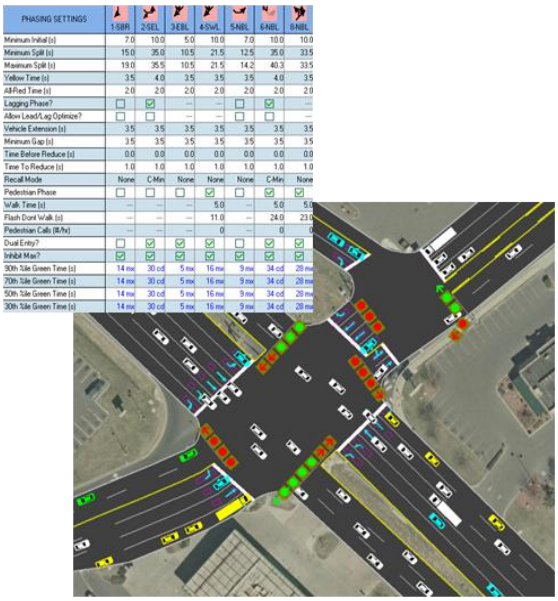

Figure 2. Synchro simulation zoomed to E Market St & Burgess Rd/Linda Ln

Since its inception, the City's Transportation Management Program has modeled and coordinated several major corridors and select adjacent intersections, including (but not limited to):

- Port Republic Rd between Forest Hill Dr and Bluestone Dr
- S. Main St between Pleasant Hill Rd and Cantrell Ave
- S. Main St between I-81 and Pleasant Valley Rd
- High St between Garber's Crossing Shopping Center and 3rd St
- East Market St between Vine St and Chestnut Ridge Dr
- University Ave between Evelyn Byrd Ave and East Market St
- Reservoir St between Neff Ave and Evelyn Byrd Ave

To learn more about how signals function and how they are coordinated, please take a look at our Traffic Signal Primer.