



March 27, 2000

Ms. Toby Futrel  
Assistant City Manager  
City of Austin  
P.O. Box 1088  
Austin, Texas 78767

Dear Ms. Futrel:

This letter is the report of a peer review of traffic signal operations in Austin performed on March 10, 2000 by Gerry de Camp, P.E. and Gilmer Gaston, P.E. at the request of the Austin City Transportation Department. The Department exhibited a pro-active approach in bringing in an outside peer group to review and comment on the City's traffic signal operations.

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The City of Austin's traffic signal engineering staff demonstrates an impressive track record for dealing with signal operations issues with direct field observations. In our opinion, City staff uses a progressive approach to optimizing signal operations by creating opportunities for virtually seamless integration between subsystem boundaries.

Most sizable traffic signal systems have boundaries between different sections of the system that result in breaks of coordinated flow between the sections when different cycle lengths are deployed. The approach used by the City staff to minimize the number of changes in cycle lengths and the use of "double cycles" to maximize the coordination opportunities between subsystem boundaries should be applauded. The peer team was impressed with the consolidation of systems to minimize stops or interruptions in coordination between system boundaries.

Your staff deploys innovative technologies to deal with time-of-day fluctuations in traffic demand. This includes the use of changeable lane assignment signs that provide double turn lanes during periods when traffic demand is extremely heavy and reverting to single lanes when left-turn demand is relatively light and through traffic is extremely heavy. Changeable lane assignment signs were observed at the intersection of Parmer and Metric. These changeable lane assignment signs maximize the efficient use of green time and lane capacity.

We observed some problems with oversaturation that cannot be solved with modification to the signal timing. For example, the intersection of Barton Springs Road at Lamar experiences oversaturation during the am peak period. The observed oversaturation was the result of a lack of lane capacity that can only be improved by increasing the number of lanes. Overall, when queuing was observed, it seemed to be well balanced with delay being evenly distributed to all vehicles on the different approaches. This is an indication that the traffic signal timing has been optimized to the maximum extent practical.

Lack of available lane capacity is a problem in Austin and many other cities across the nation. This is equivalent to rush hour delays that occur on the freeways. Basically, vehicle demand exceeds the available lane capacity. When this occurs, queues and delay occur.

It is our combined experience that the public, in general, does not fully understand the basic laws of physics that govern traffic signal operations. It is obvious that two objects cannot occupy the same space at the same time. However, a common misperception is that signal timing can be improved, or optimized, to completely eliminate stops and/or vehicle delay that are caused by oversaturation. Basically, congestion that occurs on freeways is an excellent example of the results of oversaturation. Recurrent congestion that occurs on our freeways is a result of too many cars and not enough lane capacity. Street networks in major metropolitan areas suffer from the same problems that occur on freeways. These problems are compounded by the fact that the access and circulation afforded by the street network further hampers traffic flow with periodic interruptions caused by traffic signals that are used to share the lane capacity at the intersections.

We believe that it is important to note that while vehicle progression and coordination cannot be maintained through oversaturated intersections, it is highly desirable to maintain coordinated timing, even during these peak periods, as progression and coordination can often be maintained to the downstream intersection(s). Fortunately, peak hour traffic volumes and oversaturated conditions occur for only a limited portion of the peak hour.

It was noted during our review that the City has deployed Opticom<sup>TM</sup> Emergency Vehicle Preemption equipment within the Central Business District grid. Frequent activation of this equipment by emergency vehicles can disrupt traffic signal timing within the downtown grid. We recommend that steps be taken to document and log the number of preemption events within this system to deal with public perception of poor traffic signal operations in the wake of these preemption events.

Overall, our observations, which included Lamar Boulevard, Barton Springs Road, Anderson Lane, Anderson Road, Burnet, Parmer Lane, First Street, 45<sup>th</sup> Street and various streets within the Central Business District grid.

**Sample Observations:**

Lamar: Southbound along Lamar Boulevard, 29 traffic signals, 9.3 miles, we recorded 5 stops, all of relatively brief duration for a total of approximately 60 seconds of stopped delay and recorded an average speed of 32 mph for the entire route. For comparison, the Highway Capacity Manual, Special Report 209, 1994, Table 11-1 Arterial Levels of Service, indicates that this arterial, which is a Class II Arterial, is operating at Level of Service A.

Level of Service A describes primarily free-flow operations at average travel speeds, usually about 90 percent of the free-flow speed for the arterial classification. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Stopped delay at signalized intersections is minimal.

Lamar NB, AM offpeak, beginning at Barton Springs Road: 1 stop at 38<sup>th</sup> for 20 seconds, and 1 35 second stop at US 183, 7.2 miles in 12 minutes 45 seconds, or an average speed of 34 mph. Subsequently, it was operating at Level-of-Service A, which is an indicator of good progressive signal timing.

Anderson Lane, NB, beginning at Burch, 1 stop at Burnet for 16 seconds, no additional stops.

Anderson Lane Southbound, begin at Loop 1, one stop at Burnett for 25 seconds.

Serious congestion was observed on US 183 between US 290 and Airport Boulevard, this congestion stemmed from a lack of lane capacity and not a result of any apparent traffic signal timing deficiencies.

Additional travel time runs and speed analyses were not performed. In light of the high quality of traffic signal progression we observed, we did not believe that a complete series of travel time studies were required. City staff has apparently documented the results of before and after travel time studies. Based upon our observations we are confident that those studies document an improvement in overall traffic signal operations within the City of Austin.


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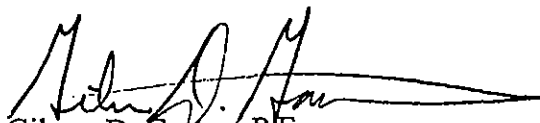
The City could hire an outside consultant to perform additional travel time studies for all routes within the City; however, we do not believe that this would be a worthwhile expenditure of funds. Except during the periods of oversaturation discussed above, we observed very good progression on all of the streets we reviewed. Accordingly, we believe that complaints of inferior coordination or neglect will not be substantiated by further data collection and numerical analysis. Any criticism of Austin's present traffic signal operations can only stem from a misconception that traffic signals can be timed to eliminate congestion regardless of the traffic volume and available lane capacity.

We trust that this letter adequately addresses the evaluation we were asked to perform. If we can answer any questions or otherwise be of further assistance, please don't hesitate to let us know.

Sincerely,



Gerry de Camp, P.E.  
Manager, Las Vegas Area  
Computer Traffic System



Gilmer D. Gaston, P.E.  
Manager, Traffic Signal Engineering  
City of Houston

cc: Matthew Kite  
Peter Reed  
Dave Gerard

## Spending on Roadway Added Capacity Projects

<b>1984 Bonds</b>	<b>\$121 million</b>	<b>198 lane-miles</b>
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Barton Springs Road/Lamar-Robert E. Lee  
 Loyola Lane/US 183-Decker Lane  
 Parmer Lane/FM1325-City Limits  
 Spicewood Springs Road/Mesa-Loop 360  
 Stassney Lane/Congress-IH35  
 Stassney Lane/Nuckols Crossing-Burleson  
 US 183 ROW & Utility Relocation  
 US 290/71 ROW & Utility Relocation  
 William Cannon Drive/McCarty-US 290

<b>1998 Bonds</b>	<b>\$27 million</b>	<b>17 lane-miles</b>
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Dittmar Road/ S. 1st to Manchaca  
 Escarpment Boulevard/Aden-SH45

<b>2000 Bonds</b>	<b>\$80 million</b>	<b>88 lane-miles</b>
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SH45 ROW & Utility Relocation  
 SH130 Participation

<b>Quarter Cent &amp; Build Greater Austin</b>	<b>\$80 million</b>	<b>7 lane-miles</b>
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Freidrich Lane/St. Elmo-Terri  
 Pleasant Valley Road/St. Elmo-Button Bend  
 Anderson Mill Road/183-Pond Springs  
 Tuscany/Ferguson Sprinkle Cutoff  
 Rundberg Lane/Metric-Burnet  
 E William Cannon Drive/Onion Creek-Dixie Dr (inc bridge)  
 Loop 1 North ROW & Utility Relocation

<b>Other Sources*</b>	<b>\$27 million</b>	<b>65 lane-miles</b>
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South 1st Street/Slaughter-FM1626  
 Giles Lane/US 290-Blue Goose  
 US290/SH71-US183 (ABIA)  
 Howard Lane/IH 35-Dessau

<b>Total</b>	<b>\$335 million</b>	<b>375 lane-miles</b>
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\* Includes General Fund Transfers, Certificates of Obligation, CTP Interest, Grants

**Proposition No. 1**

The issuance of \$152,000,000 in tax supported General Obligation Bonds for improving traffic signal synchronization and control systems, acquiring and installing traffic signals, improving and reconstructing roads and streets, and constructing, reconstructing and improving drainage facilities related to roads and streets; and acquiring land and interests in land and property necessary to do so; and the levy of a tax sufficient to pay the bonds.

Several key transportation projects make up Proposition One.

The City of Austin periodically has the opportunity to apply for Federal and/or State funding to implement projects such as new roadways, road expansions, sidewalks and bicycle facilities. Approving Proposition One will provide required matching funds as well as funding for City-sponsored projects to improve and install sidewalks and bicycle facilities. This category also includes rights-of-way funding for mandated projects, including LIS 183/290.

Street improvements that may be funded with approval of Proposition One include, but are not limited to: Loyola Lane from Johnny Morris Road to Decker Lane; Dittmar Road from South First Street to Manchaca Road; Manchaca Road from Matthews Lane to William Cannon Drive; Rutherford Lane from Interstate 35 to Cameron Road; South Congress Avenue; Barton Springs Road; and Dorsett Road. This proposition also would provide funding for the Great Streets program. This program includes projects to enhance the use and appearance of Austin's streets and sidewalks, including landscaping, irrigation, pedestrian and other mobility improvements.

Additionally, funding is proposed to upgrade and enhance intersections by adding right turn lanes, left turn lanes or through lanes; adding sidewalks and/or bicycle lanes where appropriate; and generally improving traffic flow in the travel corridor as part of Transportation System Management.

Traffic signal system enhancement and the installation of new signals also would be funded through approval of Proposition One.

Finally, Proposition One would provide for a number of street reconstruction projects which may include, but are not limited to: Woodhollow Drive from Far West Boulevard to Spicewood Springs Road; 34th Street from Guadalupe Street to Funston Street; Enfield Road from MoPac Boulevard to Exposition Boulevard; Convict Hill Road from Kandy Drive to Wagon Train Road; and Cesar Chavez Street from IH-35 to Pleasant Valley Road. Some industrial-area streets that would be targeted for reconstruction include: Todd Lane from Burleson Road to St. Elmo Road East; St. Elmo Road from IH-35 to Nuckols Crossing; St. Elmo Road East from IH-35 to Congress Avenue South; Terry-O Lane from St. Elmo Road East (S) to St. Elmo Road East (N); Freidrich Lane from St. Elmo Road to Teri Road; Industrial Boulevard from St. Elmo Road East to Congress Avenue; roads throughout the Central Business District; and other roads citywide.

**Proposition No. 2**

The issuance of \$75,925,000 in tax supported General Obligation Bonds for constructing, improving and equipping public parks, including the Colorado River Park, recreation centers, natural areas, and other related facilities, such as soccer fields, playgrounds, ballfields, and tennis courts; and acquiring land and interests in land and property necessary to do so; and the levy of a tax sufficient to pay the bonds.

Proposition Two would fund a number of parks, trails and recreation center projects.

Among these projects would be the development of recreational amenities in Colorado River Park in East Austin, which may include picnicking facilities, a basketball court, soccer fields, restrooms, a playscape, a park road, parking lots, utilities and trails.