Northwest Louisiana
Council of Governments

Congestion Management System Summary

Shreveport/Bossier City TMA-MPO

In Cooperation With:

- Louisiana Department of Transportation and Development
- City of Bossier City Traffic Engineering Dept.
- City of Shreveport Traffic Engineering Dept.
- Shreveport Transit Management, Inc. (SPorTran)

December 1, 1997
Section I - CMS Development

CMS Development Summary

Section I describes the development of a rational process that will assist transportation professionals in pinpointing the location of congestion, as well as, evaluating its impacts. Next, Section II presents the results of the CMS’s Monitoring Plan. The most congested network sections, in need of improvement, are listed in this section. Section III suggests the most cost-effective strategies that will alleviate congestion along identified deficient sections.

Study Area / Corridor Extents

CMS study area boundaries mirror the ones that were established for the US Census designated twenty-year urban growth area... otherwise known as the planning study area boundary or MPO boundary. Initially, all transportation infrastructures, contained within the study area, are considered through the CMS. Since it is impractical to provide performance analysis for all transportation systems, a prioritization process is undertaken.

The regional travel demand forecasting model (TRANPLAN) is utilized to identify the most congested transportation facilities. A 0.70 v/c ratio is used as the initial performance threshold level. All model links (segments) operating above the threshold are flagged. Combined with ADT count and growth trend information, the flagged segments are joined together to form corridors. Figure 1, illustrates the physical extent of the ten highest volume corridors. The ten corridors are presented to the Technical Coordinating Committee (TCC - which comprises most of the region’s transportation stakeholders) for consideration.
In this region, ten identified corridors are included in the CMS analysis. The total one-way length of the corridors is 84.35 miles. Two of the corridors, I-20 West and I-20 East, are classified as interstate (limited access) facilities while the remaining eight are functionally classified as principal arterials. Table 1, describes the physical extent of each individual corridor. The corridor is but one component of the performance analysis. A more detailed examination takes place at the corridor’s section and segment levels.

Table 1

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Start/End Point</th>
<th>Start/End Point</th>
<th>Length (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-20 West</td>
<td>Pines Rd. Exit</td>
<td>Lake St. Signal</td>
<td>8.96</td>
</tr>
<tr>
<td>I-20 East</td>
<td>I-220 Exit</td>
<td>Lake St. Signal</td>
<td>7.94</td>
</tr>
<tr>
<td>Airline Dr.</td>
<td>Kingston Rd.</td>
<td>Barksdale Blvd.</td>
<td>8.90</td>
</tr>
<tr>
<td>Benton Rd.</td>
<td>Kingston Rd.</td>
<td>Old Minden Rd.</td>
<td>8.03</td>
</tr>
<tr>
<td>Barksdale Blvd.</td>
<td>Airline Dr.</td>
<td>Curtis-Sligo Rd.</td>
<td>5.56</td>
</tr>
<tr>
<td>Kings Hwy.</td>
<td>Barksdale Blvd.</td>
<td>Hearne Ave.</td>
<td>5.76</td>
</tr>
<tr>
<td>B. K. Industrial Loop</td>
<td>Barksdale Blvd.</td>
<td>Walker Rd.</td>
<td>11.24</td>
</tr>
<tr>
<td>Mansfield Rd.</td>
<td>N. Market St.</td>
<td>Williamson Way</td>
<td>11.58</td>
</tr>
<tr>
<td>US 71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N. Market St.</td>
<td>US 71/La 1 Split</td>
<td>I-20 Entrance Ramp</td>
<td>6.84</td>
</tr>
<tr>
<td>Youree Dr.</td>
<td>N. Market/Spring Signal</td>
<td>Flourney-Lucas Rd.</td>
<td>9.65</td>
</tr>
</tbody>
</table>

Notes:
1 Kings Hwy. - Includes Shreveport-Barksdale Hwy and West Gate Dr. within the corridor
2 Bert Kouns Industrial Loop - Includes E. 70th St. and J. Davis Hwy
3 Mansfield Rd. - Includes Hearne Ave.
4 N. Market St. - Includes Market St.
5 Youree Dr. - Includes Spring St.
Base Performance Indices

The data requirements of a CMS are significant. In cooperation with Louisiana's Dept. Of Transportation and Development (LaDOTD), base performance measures were established statewide in order to evaluate levels of congestion in a consistent manner. The three base measures are:

1. Average Travel Speed
2. Level-Of-Service (LOS)
3. v/c Ratio

They are primarily used to evaluate the following physical categories 1) Travel Speed/Rates (corridor-segment level analysis; calculate a “Speed Deficit” measure); 2) LOS (all levels - primarily intersection operations); and 3) v/c ratio (segment level analysis - if needed). Additionally, secondary measures will be utilized such as: vehicle classification, occurrence of incidents and transit performance indices. These performance indicators will provide the basis for CMS evaluation and monitoring activities.

Data Inventory

Existing Data:

Identifying existing sources of data is essential to eliminating additional or redundant data collection efforts. Currently, there are a number of sources available to pull relevant travel data from. These sources and activities are summarized in Appendix 1 “Summary of Existing CMS Data”.

Avg. Travel Speed - Data Collection Effort:

The precise collection of travel speed data is critical to accurately determining facility performance levels. For this reason, GPS technology is utilized to collect raw position and temporal data along the ten CMS corridors. Raw GPS position files are transformed into useable average travel speed (rate) data and assigned to individual corridor segments for further analysis (i.e. MPH calculations). Travel time study parameters are described in Appendix 2.

Data Needs:

After the above inventory is completed, it is apparent where the data shortfalls exist. At this time, deficiencies are found in the following areas:

- Traffic Signal Inventories (TSI’s)
- Turning Movement Counts
- Shreveport: Accident Data/Summarized by Location and/or Intersection
The preceding needs are all intersection based data requirements. This data is critical to prioritizing (i.e. ranking) the identified congested sections for further improvement analysis.

### Determining Existing Performance Levels

**MPH Calculation:**

Congestion is measured by calculating the difference between posted speed and peak hour average travel speeds, expressed in miles per hour (mph), for sections within the CMS network.

*The greater the difference between the two speed measures, the more serious the congestion.*

Therefore, a difference of 0-mph means a facility is operating at free-flow conditions during the peak period, while a 30-mph difference indicates congested conditions. A section is defined as a portion of the CMS network between intersecting corridors within the network. MPH calculations provide an initial determination of the region’s most congested network sections.

### Performance Monitoring Plan

**Purpose:**

A Performance Monitoring Plan will provide decision-makers with an instrument that facilitates identification and prioritization of the most congested facilities in a systematic manner. Information, derived from the monitoring plan, is used to target available resources toward improving the area’s worst traffic problems. Further, the monitoring plan will automatically monitor implemented improvements to determine their effectiveness. Automatically monitoring the CMS network means that additional data collection efforts are scheduled into the plan (i.e. a two-year cycle). Therefore, the monitoring plan is an ongoing function of the CMS.

**Structure:**

First, raw travel data is formatted into useable performance indices (e.g. avg. travel speed) for further analysis. Following the methodology described in “Determining Existing Performance Levels”, MPH (posted speed - peak period travel speed) calculations are carried out. This performance designation is assigned to all CMS corridor segments. What emerges is a list of the region’s most congested sections.
**Section Prioritization:**

The congested sections are ranked in ascending order. However, the ranked list is reviewed to determine if any improvement projects are currently under construction or are planned for those poorly performing locations. Sections that are slated for improvement are prioritized lower and the next highest-ranking section(s) added.

Also, performance data such as: Average Daily Traffic (ADT) counts and transit performance indicators are incorporated into the prioritization process. Locally, additional performance data is critical to identifying the locations (sections) where improvement strategies are most needed. This process produces a list of the most congested sections in need of improvement.

**Monitoring Plan Cycle:**

A two year cycle is adequate to detect emerging congestion locations and monitor the effectiveness of recently implemented improvements. In essence, data collection activities, such as those found in the data inventory, are initiated every two years.

**Future Corridors:**

During the next monitoring cycle, the scope of data collection is expanded to include the corridors listed in Table 2.

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Start/End Point</th>
<th>Start/End Point</th>
<th>Length (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-49</td>
<td>I-20</td>
<td>B.K. Industrial Loop</td>
<td>7.02</td>
</tr>
<tr>
<td>I-220/La 3132</td>
<td>I-20 East</td>
<td>B.K. Industrial Loop</td>
<td>26.97</td>
</tr>
<tr>
<td>B.K. Industrial Loop¹</td>
<td>Walker Rd.</td>
<td>US 79/80</td>
<td>7.43</td>
</tr>
<tr>
<td>La. 173¹</td>
<td>I-220</td>
<td>M.L.K. Jr. Dr.</td>
<td>2.40</td>
</tr>
<tr>
<td>Jewella Ave.¹</td>
<td>I-20</td>
<td>Mansfield Rd.</td>
<td>4.30</td>
</tr>
<tr>
<td>70th St.¹</td>
<td>B.K. Industrial Loop</td>
<td>I-49</td>
<td>8.98</td>
</tr>
</tbody>
</table>

Notes:

¹ Intermodal Connectors (IMS)

These corridors are incorporated into the CMS in order to account for substantial growth and development along the identified Interstate facilities, as well as, to measure performance along the region’s major intermodal connectors.
Section II - Performance Evaluations

Speed Deficit Calculation

A Speed Deficit calculation produces an easily understood measure of facility congestion. A large discrepancy between the posted speed and average peak period travel speed indicates the presence of congestion. What is considered a "large" difference between off-peak and peak travel speeds? Locally, congestion "significantly" impedes travel when there is a difference of approximately 15 mph along primary surface streets or as little as a 7 mph reduction on limited access facilities.

Peak to posted speed and peak to off-peak travel speed differences are calculated for all CMS network segments. Segments are attributed to corridor sections for further analysis. Sections represent portions of the corridor bounded by critical signalized intersections (principal arterials) or interchanges (interstates/freeways). Locally, there are a total of 200 identified sections within the CMS network (Please refer to Appendix 3). Table 3, presents the 50 network sections having the greatest speed deficits. Please note, the absence of limited access facilities (I-20 East and I-20 West) among the highest ranked sections. Table 4, exclusively ranks the network's freeway sections. Specifically, Table 3 provides an acceptable "first cut" at identifying the region's most congested network sections. However, it does not account for local conditions, such as traffic volumes or transit service, which influence the priority (i.e. ranking) of sections in need of improvement.

Section Prioritization

Following the "Speed Deficit" calculations, network sections are prioritized based upon local needs. In this region, sections in need of improvement are defined using the criteria listed below.

- Existing improvements are scheduled in the Transportation Improvement Plan (TIP)
- Section Average Daily Traffic (ADT)
- Section's impact upon regional transit service

Existing TIP Projects

Congested sections that are currently scheduled for improvements, through the TIP, are prioritized lower than sections that are left unimproved. The scope of the improvement will be taken into account during the formulation of recommended alleviation strategies.
**Average Daily Traffic (ADT)**

Sections are prioritized by the volume levels they handle on a daily basis. Higher ADT sections are given priority over the less traveled network sections.

*By utilizing ADT as a prioritization criterion, the sections with the highest travel demand are recommended for improvement before less traveled sections.*

ADT data is obtained through LaDOTD's Data Collection and Analysis Section. However, most network sections do not contain LaDOTD ADT data. In these cases, locally collected, unadjusted 24-hour volume counts provide a reasonable estimate of daily traffic.

**Transit Impact Rating**

Congestion significantly degrades transit's ability to provide efficient and economical service to its patrons. Heavily congested sections reduce fuel efficiency, and increase both vehicle emissions and patron delay. The function of a Transit Impact Rating is to identify sections that are crucial to transit service. Further, sections which are experiencing high levels of congestion and directly impact transit service are prioritized higher than those sections which do not handle transit operations. The rating consists of the calculations denoted below:

\[
\text{[Route Usage Component]} + \text{[Physical-Network Component]}
\]

- **[Route Usage Component]**
  - number of passengers/route/month
  - total SPorTran passengers/month

- **[Physical-Network Component]**
  - route mileage on the CMS corridor
  - total CMS network mileage

Theoretically, the highest impact rating any section can receive is 200% (2.0). A route usage of 100% (1.0) means that all of SPorTran's monthly passengers ride only one route (not very likely). Route usage compares the significance of one route to another using ridership data. If the entire transit route traverses the CMS network, then the physical-network component calculates to 100% (1.0). Percentages are additive if more than one transit route occupies a section. Sections that do not have transit service traversing over them have a 0% (0.0) impact rating. Locally, nearly all the sections have a Transit Impact Rating of between 0% and 20%. A high section impact rating (15% - 20%) indicates the presence of a significant influence upon transit service. Improvements made to these sections will invariably affect transit operations.

**Section Priority Table**

Local prioritization of identified congested sections adds another level of complexity to the CMS. By integrating the three ranking criteria (TIP projects, ADT, Transit Impact Rating) into a local prioritization scheme, a well-balanced and equitable approach is achieved. Table 5, presents the results of this process. Congestion alleviation strategies are based upon the findings of the prioritization process. In this region, it is the sections identified in Table 5 (i.e. top 25 congested sections) which are in urgent need of improvement.
Section III - Recommendations

<table>
<thead>
<tr>
<th>Section Priority - Justification for Improvement Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based upon the findings of the “Section Prioritization” process (Table 5), the highest priority sections are considered candidates for transportation improvements. However, questions arise regarding the prioritization criteria.</td>
</tr>
</tbody>
</table>

For example, during the prioritization process, sections that are scheduled to have TIP improvements are prioritized lower than other sections with identical speed deficits. Does this mean that the TIP improvement will substantially reduce congestion?… not in all cases. Sometimes it requires bundled TSM and TDM improvements to significantly relieve congestion along a high priority section. Further, other extraneous factors may contribute to a section’s high priority (i.e. high Speed Deficit). Examples such as, delay caused by school crosswalks or local improvements to the section after a data collection (i.e. travel time study) cycle need to be accounted for.

A subjective evaluation of the highest priority sections is performed in order to determine the factors that likely cause its congestion, as well as, its corresponding need for improvement.

On the following page, Table 6 justifies or dismisses the section’s need for improvement.
<table>
<thead>
<tr>
<th>Priority</th>
<th>Corridor</th>
<th>Dir.</th>
<th>Peak</th>
<th>Section: From/To</th>
<th>Justify/Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Benton Rd.</td>
<td>SB</td>
<td>AM</td>
<td>I-220 WB Ent Ramp to Viking</td>
<td>TIP project 4 will significantly reduce delay through this section; <strong>Lower this section’s priority</strong></td>
</tr>
<tr>
<td>2</td>
<td>Kings Hwy.</td>
<td>WB</td>
<td>PM</td>
<td>Dee to Knight</td>
<td>Local signal timing improvements have reduced section delay - next travel time study will prove this out; <strong>Lower this section’s priority</strong></td>
</tr>
<tr>
<td>3</td>
<td>Industrial Loop</td>
<td>EB</td>
<td>AM</td>
<td>Walker to Mansfield</td>
<td>AM delay - school crosswalk; <strong>Lower this section’s priority</strong></td>
</tr>
<tr>
<td>4</td>
<td>Kings Hwy.</td>
<td>WB</td>
<td>Noon</td>
<td>Dee to Knight</td>
<td>Same section as priority #2 - ☁️</td>
</tr>
<tr>
<td>5</td>
<td>Mansfield Rd.</td>
<td>SB</td>
<td>AM</td>
<td>Inner Loop EB Exit Ramp to Jewella</td>
<td>Justified signal timings for direction/period; <strong>Lower this section’s priority</strong></td>
</tr>
<tr>
<td>6</td>
<td>Mansfield Rd.</td>
<td>SB</td>
<td>AM</td>
<td>Kings Hwy to I-20 EB Exit Ramp</td>
<td>No scheduled improvements; <strong>Legitimate high priority section in need of improvement</strong></td>
</tr>
<tr>
<td>7</td>
<td>Mansfield Rd.</td>
<td>SB</td>
<td>PM</td>
<td>Kings Hwy to I-20 EB Exit Ramp</td>
<td>Same section as priority #6</td>
</tr>
<tr>
<td>8</td>
<td>Airline Dr.</td>
<td>SB</td>
<td>AM</td>
<td>I-220 WB Ent Ramp to Viking</td>
<td>TIP project 4 will <strong>not</strong> resolve all the factors contributing to its congestion; <strong>Legitimate high priority section in need of improvement</strong></td>
</tr>
<tr>
<td>9</td>
<td>Industrial Loop</td>
<td>WB</td>
<td>AM</td>
<td>E Kings Hwy to Youree</td>
<td><strong>Legitimate high priority section in need of improvement</strong></td>
</tr>
<tr>
<td>10</td>
<td>Mansfield Rd.</td>
<td>SB</td>
<td>PM</td>
<td>Greenwood to Kings Hwy</td>
<td><strong>Legitimate high priority section in need of improvement</strong></td>
</tr>
<tr>
<td>11</td>
<td>Industrial Loop</td>
<td>WB</td>
<td>AM</td>
<td>Barksdale to East Foot Jimmie Davis Bridge</td>
<td>TIP project 2 will <strong>not</strong> resolve all the factors contributing to its congestion; <strong>Legitimate high priority section in need of improvement</strong></td>
</tr>
<tr>
<td>12</td>
<td>Industrial Loop</td>
<td>EB</td>
<td>PM</td>
<td>Millicent Way to Youree</td>
<td><strong>Legitimate high priority section in need of improvement</strong></td>
</tr>
<tr>
<td>13</td>
<td>Airline Dr.</td>
<td>SB</td>
<td>AM</td>
<td>Douglas to Shed</td>
<td>TIP project 4 will <strong>not</strong> resolve all the factors contributing to its congestion; <strong>Legitimate high priority section in need of improvement</strong></td>
</tr>
<tr>
<td>14</td>
<td>Industrial Loop</td>
<td>WB</td>
<td>PM</td>
<td>Barksdale to East Foot Jimmie Davis Bridge</td>
<td>Same Section as priority #11</td>
</tr>
<tr>
<td>15</td>
<td>Industrial Loop</td>
<td>EB</td>
<td>AM</td>
<td>Business Park to Millicent Way</td>
<td><strong>Legitimate high priority section in need of improvement</strong></td>
</tr>
<tr>
<td>16</td>
<td>Industrial Loop</td>
<td>EB</td>
<td>AM</td>
<td>Kingston to Linwood</td>
<td>Local signal timing improvements have reduced section delay - next travel time study will prove this out; <strong>Lower this section’s priority</strong></td>
</tr>
<tr>
<td>17</td>
<td>Kings Hwy.</td>
<td>EB</td>
<td>Noon</td>
<td>Youree to E Kings Hwy</td>
<td>TIP project 6 will significantly reduce delay through this section; <strong>Lower this section’s priority</strong></td>
</tr>
<tr>
<td>18</td>
<td>Mansfield Rd.</td>
<td>SB</td>
<td>AM</td>
<td>Greenwood to Kings Hwy</td>
<td>Same Section as priority #10</td>
</tr>
<tr>
<td>19</td>
<td>N. Market St.</td>
<td>SB</td>
<td>AM</td>
<td>MLK Jr to I-220 WB Ramp</td>
<td><strong>Legitimate high priority section in need of improvement</strong></td>
</tr>
<tr>
<td>20</td>
<td>Industrial Loop</td>
<td>WB</td>
<td>AM</td>
<td>Mansfield to Walker</td>
<td>AM delay - school crosswalk; <strong>Lower this section’s priority</strong></td>
</tr>
<tr>
<td>21</td>
<td>Industrial Loop</td>
<td>EB</td>
<td>PM</td>
<td>Walker to Mansfield</td>
<td><strong>Legitimate high priority section in need of improvement</strong></td>
</tr>
</tbody>
</table>

Note: ☁️ suggests a lowering of the section's priority
**Recommended Improvements**

Table 7 presents CMS network sections that are the best candidates for transportation improvement projects.

<table>
<thead>
<tr>
<th>Priority</th>
<th>Facility</th>
<th>Direction</th>
<th>Peak Period</th>
<th>Section: From/To</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hearne Ave.</td>
<td>Southbound</td>
<td>AM</td>
<td>Kings Hwy to I-20 EB Exit Ramp</td>
</tr>
<tr>
<td>2</td>
<td>Airline Dr.</td>
<td>Southbound</td>
<td>AM</td>
<td>I-220 WB Entrance Ramp to Viking</td>
</tr>
<tr>
<td>3</td>
<td>Industrial Loop</td>
<td>Westbound</td>
<td>AM</td>
<td>E Kings Hwy to Youree</td>
</tr>
<tr>
<td>4</td>
<td>Hearne Ave.</td>
<td>Southbound</td>
<td>PM</td>
<td>Greenwood to Kings Hwy</td>
</tr>
<tr>
<td>5</td>
<td>J. Davis Hwy.</td>
<td>Westbound</td>
<td>AM</td>
<td>Barksdale to East Foot J. Davis Bridge</td>
</tr>
<tr>
<td>6</td>
<td>Industrial Loop</td>
<td>Eastbound</td>
<td>PM</td>
<td>Millicent Way to Youree</td>
</tr>
<tr>
<td>7</td>
<td>Airline Dr.</td>
<td>Southbound</td>
<td>AM</td>
<td>Douglas to Shed</td>
</tr>
<tr>
<td>8</td>
<td>Industrial Loop</td>
<td>Eastbound</td>
<td>AM</td>
<td>Business Park to Millicent Way</td>
</tr>
<tr>
<td>9</td>
<td>N. Market St.</td>
<td>Southbound</td>
<td>AM</td>
<td>MLK Jr Dr to I-220 WB Entrance Ramp</td>
</tr>
<tr>
<td>10</td>
<td>Industrial Loop</td>
<td>Eastbound</td>
<td>PM</td>
<td>Walker to Mansfield</td>
</tr>
</tbody>
</table>

The intent of the recommended alleviation strategies is to supply decision-makers with cost-effective improvements aimed at reducing congestion. Improvements are not only developed to improve performance along a specific high priority section; they must benefit the entire network. Below, are the proposed reduction strategies based upon the section’s source(s) of congestion.

**Hearne Ave. – Kings Hwy. To I-20 EB Exit Ramp**

**Source(s) of Congestion:**

- **Physical Deficiencies** – Inadequate signalized intersection spacing; low speed turning path onto I-20 WB entrance ramp; narrow lane widths; inadequate turning bay lengths at some signalized intersections; skewed intersection at Kings Hwy.

- **Demand** – High right turn volumes onto I-20 WB entrance ramp; LA. State Fairgrounds is a special generator adjacent to this section

- **Land Use Factors** – Above average amount of private property access located along section

**Recommended Improvement(s):**

Construction of an additional Southbound travel lane, from Greenwood Rd. to the I-20 Westbound entrance ramp, will reduce turning movement delay. To facilitate higher entrance ramp speeds, the added lane will transition to a dedicated right-turn lane near the I-20 interchange. This improvement will allow for the expansion of lane widths and turning bays. The improvement will ease non-recurring (i.e. special generator) congestion caused by activities originating from the Louisiana State Fairgrounds.
Airline Dr. – I-220 WB Entrance Ramp To Viking Dr.

Source(s) of Congestion:

Physical Deficiencies – Inadequate signalized intersection spacing and LT bay length; “Spillback” problems

Demand – This is one of the fastest developing areas in the region – substantial increases in ADT’s per year (over 3%) are anticipated;

Land Use Factors – Large commercial and institutional attractors are located to the North and South of this section; private property access (i.e. curb cuts) onto Airline Dr is increasing with each new development; intense residential development, to the North, utilizes Airline Dr. as its primary link to Bossier City’s major activity centers

Recommended Improvement(s):

Even with the implementation of a coordinated signal system (TIP project 4 – Appendix 4), this section will experience ever increasing delay due to the above mentioned land use and demand factors. It is recommended that additional improvements be made to maintain current performance levels.

“Spillback” into the through travel lanes is a major source of delay during the peak periods. Turning movements are expected to increase as I-220 and Viking Dr. are fully utilized by motorists. A needed physical improvement is to increase turning bay lengths before the noted negative impacts are realized. This improvement in conjunction with the coordinated signal system project will preserve current performance levels.

Industrial Loop – E. Kings Hwy. To Youree Dr.

Source(s) of Congestion:

Physical Deficiencies – None; It is a 5 lane, modern design facility with current traffic control equipment

Demand – This is one of the highest volume throughput intersections in the region (6/95 24 hour count – 63504)

Land Use Factors – Existing commercial attractors are located adjacent (North) to the section; A substantial institutional development is being constructed along the section’s South side; Because of these large developments, private property access (i.e. curb cuts), as well as, traffic signals have proliferated along Industrial Loop

Recommended Improvement(s):
In this case, physical improvements alone will have a minimal impact upon congestion. Over the long run, significant reductions in congestion are achieved if physical improvements are tied to land use policy and demand management approaches. For example, limiting direct access (i.e. curb cuts) onto principal arterial-corridors will stabilize flow interruptions originating from adjacent land uses. Additionally, policy that requires large, high volume development to provide access to adjacent land uses through shared driveways will reduce the demand for direct arterial access points.

Congested sections along Industrial Loop will benefit the most from demand management approaches since its physical deficiencies are nearly nonexistent. The continued development of the Industrial Loop corridor will bring with it added pressure to provide direct access onto this corridor. An established policy of limiting private access points will go along way to minimize these negative traffic flow impacts.

### Hearne Ave. – Greenwood To Kings Hwy.

**Source(s) of Congestion:**

Physical Deficiencies – Narrow lane widths along the entire length of the section; Hearne at Kings Hwy. Intersection is skewed

Demand – Observed peak period volumes have an unusually short duration (4:30 – 5:00 PM); LA. State Fairgrounds is a special generator adjacent to this section

Land Use Factors – Much of the commercial development has little setback from Hearne Ave.’s travel lanes; A substantial institutional land use is located along the section’s East side; Excessive private property access (i.e. curb cuts – driveways the length of the property’s frontage onto Hearne)

**Recommended Improvement(s):**

Here again, a coordinated improvement project which entails the addition of a Southbound travel lane, from Greenwood Rd. to the I-20 Westbound entrance ramp, will reduce turning movement delay. Additionally, it will facilitate higher entrance ramp speeds downstream and reduce spillback onto through travel lanes, This improvement will allow for the expansion of lane widths/turning bays and a possible realignment of the Kings Hwy. intersection. The improvement will ease non-recurring (i.e. special generator) congestion caused by activities originating from the Louisiana State Fairgrounds.

### J. Davis Hwy. – Barksdale Blvd. To East Foot of J. Davis Bridge
**Source(s) of Congestion:**

Physical Deficiencies – After TIP project #2 is completed, the physical deficiencies along this section are negligible; However, with a lane drop at the foot of the bridge, a source of recurrent congestion (“bottleneck”) is created on both sides of the river.

Demand – This section provides links to both Clyde Fant and A.R. Teague Parkways for residents of South Bossier City. This is the southern most river crossing in the MPO area. Therefore, it is a crucial transportation corridor for residents and businesses located in the southern half of the MPO. Also, continued expansion of Teague Parkway will bring additional volumes to Woodmont Blvd.

Land Use Factors – With the addition of a 2WLTL throughout the section, private property access has a negligible negative impact upon travel flow.

**Recommended Improvement(s):**

In the long run, an additional bridge is needed to eliminate the “bottlenecks” that exist in the current approach configuration. However, this type of improvement requires a substantial capital outlay. It remains to be seen,

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**Appendix 2**

Travel Time/Delay Study Conditions Utilizing
GPS Data Collection Technology
**General Conditions:**

- A travel time "Run" consists of a test vehicle, outfitted with GPS collection equipment, traversing an identified CMS corridor in one direction (e.g. Eastbound) during one time period (e.g. AM peak period).

- Runs are performed on normal, non-holiday weekdays (Tuesday - Thursday). It is acceptable to collect data on a Monday, if the collection schedule becomes constrained.

- Travel time runs are performed during the peak period of travel, by direction, for that particular corridor. Off-peak runs are conducted to determine average travel speed under free flow conditions. Locally, peak period travel times occur during the following time periods: AM = 7:30 - 8:30 and PM = 4:45 - 5:45. Off-peak runs are performed during any weekday night (Monday - Thursday) after 10:00 PM. Note concerning Off-peak runs: If the recorded speeds are higher than the posted speeds, the posted speed is utilized for average travel speed calculations.

- Runs will not be conducted under adverse weather conditions (heavy rain, sleet, etc.)

![Fig. 2a-1; Trimble's Pro/XL GPS Receiver](Image)

**Test Vehicle and Driving:**

The test vehicle is driven over the study corridor following the "Floating-car" technique as described in Chapter 4 of ITE’s *Manual Of Transportation Engineering Studies; 1976.*

**Data Collection:**

- A checkpoint is defined as the point where the test vehicle is perpendicular to either the far curb of an intersection or the apex of an exit ramp gore (limited access facilities). The rover is activated (i.e. log its x, y, and z position), by the driver, each time the study vehicle passes over a checkpoint. These checkpoints define the section boundaries.
- Within the normal flow of traffic, each study begins when the test vehicle passes over the designated start point. This is considered a running start to the study.

- To determine the appropriate number of study runs, a minimum of two test runs will be performed on each corridor. This is done to insure the statistical significance of the data collected. Following the equations in Chapter 4 of ITE's Manual Of Transportation Engineering Studies, the number of test runs, by corridor, are calculated (Please refer to “Travel Time - Study Requirements and Equations” - Sample-Size Requirements for additional data collection information).

**Equipment Setup:**

- Configure Base Station and Rover unit for this type of application. In order to perform post-processing differential correction correctly, the base station unit must also track every satellite that the rover uses to compute its position. To meet this requirement, it is recommended that the base station Elevation Mask and SNR Mask have lower settings than the rover unit. If any of the tracked satellites fall below the rover’s preset Elevation Mask or SNR, it is likely that signal interference and/or corruption will occur. Therefore, the rover will stop tracking these satellites before the base station does. This ensures that the data collected out in the field is valid.

From GPS Setup Software:

1. **Satellite Availability** - make sure there will be at least 4 satellites available during the entire study run.

2. **Acceptable PDOP** (Position Dilution of Precision - measure of satellite geometry) - A low PDOP indicates a viable satellite geometry. When the satellites are widely distributed across the sky there is a low PDOP measure (i.e. sat.’s give most accurate data). If they are grouped close together a high PDOP is indicated. The PDOP must be below 7 in order to obtain valid satellite data.

3. **SNR Mask** (Signal to Noise Ratio) - SNR is a measure of the satellite’s emitted signal strength. An acceptable minimum threshold is an SNR of 6 (base station = 4).

4. **Elevation Mask** - The inclination angle is set to between 10 -15 degrees (base station - 10 deg.). The elevation mask is the angle, in degrees, above the horizon that the satellite cannot fall below during the study. If it does fall below this preset, the receiving unit doesn’t accept the satellite’s signal (maintains signal integrity).

5. **Logging Interval** - To obtain the most accurate data, the logging interval for synchronized measurement data at the base station should be the same as that of the rover unit’s logging interval (i.e. both set for 1 sec. logging intervals). If the intervals are different, the accuracy degrades (> 1 meter from truth) because during differential correction interpolation is required to determine base station and rover positions.

Rover Unit Configuration:

1. Before each run, download the corridor’s data dictionary into the TDC1 datalogger (i.e. corridor major intersections = checkpoint)
2. Preset the rover to automatically log its position once every second.

3. Affix the antenna to the top of the test vehicle using the magnetic mount.

![Fig. 2a-2: Attaching the Dome Antenna to the Test Vehicle](image)

**Post-processing:**

With these defined test conditions, the data that is collected out in the field is consistent across all study runs. Therefore, the data collected from one study is comparable to the results of other runs that utilize these test parameters. Post-processing takes the “raw” data files and converts them into usable information for corridor analysis.

**Completed Travel Time Runs**

The following table summarizes the travel time runs that have been performed in order to meet the data requirements outlined in the CMS’s Performance Monitoring Plan. Please note, the “GPS ASCII File” field contains the names of corrected position files (ASCII format). “Required Runs/Facility” refers to the number of runs, as required by ITE, to maintain statistical integrity.

**Appendix 3**

**Section Identification / MPH Calculations (Speed Deficit)**