GALVESTON-PORT BOLIVAR FERRY SYSTEM
JUSTIFICATION ANALYSIS FOR SYSTEM MODERNIZATION

Technical Report

Prepared for
Texas Department of Transportation
Houston District

Texas Transportation Institute
The Texas A&M University System
701 North Post Oak, Suite 430
Houston, Texas 77024

April 1996
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BACKGROUND

The Houston District of the Texas Department of Transportation (TxDOT) presently operates free ferry service between Galveston Island and the Bolivar Peninsula (Figure 1). In the mid 1930s, the State of Texas began operating the ferry system, charging a nominal toll until 1950. Presently, five ferry boats are used for the 24-hour service. Two boat landings are available for loading/unloading operations on either side. The two newest vessels (the Robert C. Lanier and the Dewitt C. Greer) were commissioned in the 1990s. These boats have a unique propulsion system which allows the vessels to complete a 360 degree turn or move sideways without any forward advance. An additional boat (the Ray Stoker, Jr.) is presently under construction to replace one of the older vessels which began operating in the 1950s. In addition to the present TxDOT contract of vessel construction, TxDOT is currently constructing a fixed dock along the Galveston side ($3.3 million) for replacement of the maintenance/storm mooring dock. The public rest areas on both sides are also being completely rehabilitated at a cost of $340,000. Photographs of selected aspects of ferry operations are presented in Appendix A.

In order to better assure uninterrupted ferry service, reduce traffic delays, and to better serve the public, TxDOT is considering additional improvements to modernize the facilities. These proposed improvements are designed to improve marine navigation and public safety, provide for more efficient service, and to incorporate provisions of the Americans With Disabilities Act of 1992. Generally, the proposed improvements include modifications to breakwaters, navigational and general lighting improvements, traffic signal/barricade upgrades, administrative office expansion, additional ferry vessels, and the construction of an additional landing at the TxDOT facilities on the Galveston and Port Bolivar sides.

The Texas Department of Transportation (TxDOT) has requested that the Texas Transportation Institute (TTI) provide assistance in preparing a long-range plan for continuous improvement of the Galveston-Port Bolivar Ferry system. This document represents a portion of the effort by TTI by providing background and operational information on the system. The
Figure 1. Ferry Service Area
need for a third landing at both ends is also examined. Information on additional funding options and marine design considerations were also prepared and submitted as separate documents. The funding options were examined by the TTI Ports and Waterways Division. Goldston Engineering, Inc. (GEI) completed studies concerning the breakwaters, landings, fender, and dolphin systems. All cost estimates relating to the long-range plan were prepared by GEI.

**NEED FOR FERRY OPERATIONS**

The Galveston-Port Bolivar Ferry system provides a critical link in access to Port Bolivar and the eastern portion of Galveston county. The ferry operates 24-hours each day in all types of weather conditions. Considered as part of S.H. 87, the 2.7 mile (4.3 kilometer) one-way trip takes approximately 15 minutes to complete under ideal conditions. In addition to each vessel capable of carrying approximately 70 vehicles each trip, a lighted parking area is available at both sides for those wishing to walk aboard.

There is no practical route available for use as an alternate route should ferry service be unavailable. TTI completed a travel time and delay study to estimate the time required to make similar trips with and without the ferry. The trip from the intersection of Seawall Boulevard at Ferry Road (Galveston Island) to the intersection of S.H. 87 at Crystal Beach required 43 minutes and 26 seconds. This travel time includes travel on the surface street system, ferry loading and unloading time, and the 15-minute trip time on the ferry. Considering that the study was completed on a weekday in November 1995, this trip would be typical for tourists and/or for workers using the ferry for daily work trips. The travel time study then progressed to complete the alternate routing to simulate a return trip without the ferry system in operation. The return trip took 2 hours, 21 minutes, and 28 seconds; this trip required travel of approximately 118 miles (190 kilometers). This additional travel represents an increase in total travel time of approximately 225% as compared to travel via the ferry. Clearly, this additional travel time and travel distance justifies the continued operation of the ferry system.
FERRY TRAFFIC GROWTH TRENDS

TxDOT provided records of summarized ferry operations since March 1942. With the exception of 1952 (for which data summaries could not be located), the total number of vehicles and passengers served by the Galveston-Port Bolivar Ferry System are available as monthly summaries. Figures 2 and 3 present graphical representation of total yearly vehicle and passengers served by the ferry system since 1942. Based upon the available TxDOT traffic records, over 59 million vehicles and 198 million passengers through December 1995 have used the system. Specific milestones are as follows:

- 1947—served over 1 million passengers;
- 1965—served over 1 million vehicles;
- 1967—served over 4 million passengers;
- 1981—served over 5 million passengers;
- 1992—served over 6 million passengers;
- 1993—served over 2 million vehicles; and
- 1993—over 50,000 crossing completed by ferry vessels

As expected, this past year (1995) has experienced the heaviest travel to date; serving over 2.14 million vehicles and in excess of 6.79 million passengers. Although the usage of the ferry on occasion may have declined from one year to the next, the general trend has been for increasing usage each year. Table 1 presents general growth rate information for three specific time periods. Of particular interest is that for the six-year time period beginning in 1989. As presented by Figures 2 and 3, the rate of increase in both vehicle and passenger traffic has been somewhat consistent during these six years. Therefore, it is recommended that growth rates of 3.43% per year for vehicles and 3.31% per year for passengers are used for future projections of ferry usage demands; a base year of 1989 should also be assumed.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Growth Per Year Percent</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vehicles</td>
<td>Passengers</td>
</tr>
<tr>
<td>1943-1995</td>
<td>4.88</td>
<td>4.44</td>
</tr>
<tr>
<td>1980-1995</td>
<td>2.56</td>
<td>2.34</td>
</tr>
<tr>
<td>1989-1995</td>
<td>3.43</td>
<td>3.31</td>
</tr>
</tbody>
</table>
Figure 2. Vehicles Served Per Year

NOTE: Based upon TxDOT Traffic Report Records
Data not available for Jan - Feb 1942 and Jan - Dec 1952
NOTE: Based upon TxDOT Traffic Report Records
Data not available for Jan - Feb 1942 and Jan - Dec 1952

Figure 3. Passengers Served Per Year
Since 1964, TxDOT has been summarizing total crossing trips as completed by the ferry vessels. The highest number of crossings to date was completed in 1994, with 51,096 completed for the twelve month period. Figure 4 presents a representation of total ferry boat crossings completed each year. In this case, a crossing is defined as a complete round trip between the landings on the Galveston and Port Bolivar sides. Although somewhat dependent upon vehicle demands, the total number of yearly crossings has not developed as consistent trend lines as the vehicle and passenger demands have indicated. This trend is likely an indication of changes in operational procedures or in the available number of vessels. However, the time period from 1980 to 1995 does exhibit an increasing trend similar to that for vehicles and passengers. The growth rates for the past fifteen years is estimated at 1.53% per year and at 3.09% per year since 1989. Although the total number of crossings has leveled off during the past three years, it is recommended that a rate of 3.09% per year, with a base year of 1989, be used for estimation of future crossings needed for the Galveston-Port Bolivar Ferry System. This would be consistent with the increasing trend as experienced for both vehicle and passenger demands.

Each ferry vessel is capable of carrying approximately 70 vehicles on each leg of its crossing. The actual number of vehicles on each load varies depending upon the number of heavy trucks, vehicles with trailers, and other classification of vehicles loaded onto the boat. As traffic demands increase throughout the day, vehicles may be left behind as reported by TxDOT as a vessel is loaded to capacity. These motorists incur delay as they must wait for the next boat to arrive, dock, and begin to unload vehicles prior to boarding. The Captain of each vessel records the total number of vehicles left behind prior to departing the landing. Figure 5 presents yearly trends in vehicles left behind since 1942. The gap on the plot from 1979 to 1993 is a reflection of a format change in TxDOT’s yearly ferry traffic reports. Although the vehicles left behind are recorded on a daily basis, these numbers are no longer summarized in the yearly totals. Values for 1994 and 1995 were obtained from daily records. The dashed line was included on the graph only to highlight the increasing trend since 1979. The drop in vehicles left behind after 1976 is likely a result of the implementation of additional landing on each side.
NOTE: Based upon TxDOT Traffic Report Records
Data available for Jan 1964 - present

Figure 4. Ferry Boat Crossings Per Year
Figure 5.  Total Number of Vehicles Left Behind Per Year

NOTE: Based upon TxDOT Traffic Report Records
No data available for 1979 – 1993
Considering the gap in available information, any estimate in expected growth rates of vehicles left behind would not likely be accurate. The number of vehicles remaining is a function of traffic demands and the number of boats and landings that are being used at any given time. Vehicles may be included in the count of those left behind more than once if they remain queued beyond the loading of any additional boat(s). TxDOT officials have indicated that during peak periods of demand in summer months, the queue on the Galveston Island side extends to near Seawall Boulevard. TxDOT would need surveillance equipment to determine the back of the queue in these instances. A similar problem is noted to occur along S.H. 87 on the Bolivar Peninsula with the queue beyond the view of the ferry boat captain. Although the estimates of vehicles left behind are a good measure of level-of-service of the ferry system, the numbers may be somewhat misleading and may underestimate the number of delayed vehicles as recorded for each boat departure.

Prior to the availability of the second landing on each side, the highest number of vehicles left behind was observed in 1975. A total of 387,797 vehicles of the total served of 1.275 million vehicles represents 30.4% of all vehicles using the ferry that year. In 1995, an estimated 433,918 vehicles were delayed by being left by a full boat. This is 20.2% of the total of 2.148 million vehicles crossing that year. This concludes that an estimated one of every five vehicles desiring to use the ferry is delayed by at least one additional boat.

**PROJECTED FUTURE TRAFFIC DEMANDS**

The Houston-Galveston Area Council (H-GAC), the local MPO, was contacted regarding any information available from their computer planning model to determine future traffic demands for the Galveston-Port Bolivar Ferry System. H-GAC staff stated that it is unlikely that their model would provide indications of traffic growth for the ferry due to the low capacity assigned to the link. TTI also requested TxDOT to provide traffic projections for the ferry and surface streets near the landings. At such time that TTI receives traffic projection information from either agency, this draft document will be modified to include that information.
In the absence of traffic projections available from regional planning computer models, initial projections will be based upon the growth rates are determined in a previous section of the report. Table 2 presents expected vehicle, passenger, boat crossing, and vehicle left behind projections for the next fifteen years. These estimates are based upon assumed yearly growth rates as follows: vehicles—3.43%, passengers—3.31%, and crossings—3.09%. It was also assumed that the vehicles will continue to be left behind at an assumed rate of 20.2% of the total yearly vehicle demand.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Number of Trips</th>
<th>Number Vehicles Left Ashore</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vehicles</td>
<td>Passengers</td>
</tr>
<tr>
<td>1995 (Existing)</td>
<td>2,148,406</td>
<td>6,793,202</td>
</tr>
<tr>
<td>2000</td>
<td>2,544,000</td>
<td>7,995,000</td>
</tr>
<tr>
<td>2005</td>
<td>3,011,000</td>
<td>9,409,000</td>
</tr>
<tr>
<td>2010</td>
<td>3,564,000</td>
<td>11,072,000</td>
</tr>
</tbody>
</table>

The projections presented in Table 2 do not account for any increase in operational capacity of the ferry system. These projections are only estimated demands assuming constant growth rates from a base year of 1989 for each of the three trip categories. The projected growth represents an average increase of approximately 79,000 vehicle trips and 240,000 passenger trips each year for the next five years. As a result of the increase in demands, the number of vehicles left ashore is expected to increase by approximately 16,000 vehicles each year.

OPERATIONAL ANALYSIS

TTI obtained the most recent traffic report summaries as compiled daily by TxDOT. These reports include detailed operational information such as vehicle demands, passenger totals, trips completed by each ferry vessel, and the number of boats operating during each hour. Additional remarks such as holidays, special events, presence of boats at shipyards, and other information are also noted for each day. This section of the report will summarize this operational data for the two year period beginning in January 1994.
Figure 6 presents a representation of total daily vehicle trips for the ferry system. The graph clearly indicates the heavier usage of the system during the summer months. The individual peaking characteristics result from daily fluctuations in traffic demands. Table 3 presents the ten lowest and ten highest days of vehicular traffic using the ferry for each of the last two years. This table indicates that the ferry is the busiest during what could be considered as the three busiest holiday periods of the year for vacationers in the Gulf Coast area. These periods are the Memorial Day, Independence Day, and Labor Day holidays and the corresponding weekends. During these time periods, the ferry system is operating at capacity with all five boats operating for several hours each day. The winter months of December through February account for periods of lower demand. TxDOT records indicated that, with the exception of holiday weekends and special events, the maximum number of boats used each day does typically not exceed three. It is during this time period that the vessels are rotated into the shipyard for extensive scheduled annual maintenance and/or major repairs as needed.

<table>
<thead>
<tr>
<th>Table 3. Highest and Lowest Ferry Daily Vehicle Trips, 1994-1995</th>
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<tbody>
<tr>
<td><strong>Highest Demand</strong></td>
</tr>
<tr>
<td><strong>1994</strong></td>
</tr>
<tr>
<td>Sunday, July 3</td>
</tr>
<tr>
<td>Sunday, May 29</td>
</tr>
<tr>
<td>Monday, July 4</td>
</tr>
<tr>
<td>Monday, May 30</td>
</tr>
<tr>
<td>Saturday, May 28</td>
</tr>
<tr>
<td>Sunday, September 4</td>
</tr>
<tr>
<td>Saturday, July 2</td>
</tr>
<tr>
<td>Monday, September 5</td>
</tr>
<tr>
<td>Saturday, July 30</td>
</tr>
<tr>
<td>Saturday, May 21</td>
</tr>
</tbody>
</table>

| **Lowest Demand**                                              |
| **1994** | **Vehicles** | **1995** | **Vehicles** |
| Sunday, January 30 | 2,925 | Sunday, December 17 | 2,381 |
| Saturday, December 24 | 2,997 | Sunday, December 10 | 2,834 |
| Sunday, December 11 | 3,008 | Sunday, December 24 | 2,893 |
| Sunday, January 9 | 3,027 | Monday, December 25 | 3,333 |
| Saturday, January 29 | 3,115 | Tuesday, March 7 | 3,544 |
| Sunday, January 16 | 3,252 | Monday, February 13 | 3,578 |
| Thursday, February 10 | 3,307 | Saturday, December 9 | 3,600 |
| Wednesday, January 19 | 3,335 | Tuesday, February 14 | 3,642 |
| Wednesday, January 12 | 3,425 | Thursday, January 5 | 3,676 |
| Thursday, January 27 | 3,444 | Sunday, January 29 | 3,720 |
Figure 6. Vehicle Trips Via Ferry Per Day
Another important consideration that impacts the vehicle carrying capacity of each ferry boat is reduced by the number of large trucks on each load. A typical 18-wheeler tractor-trailer rig may take as much physical space as four automobiles; this essentially reduced the per load actual vehicle capacity of the service. Considering the two-year evaluation period, truck percentage averages 2.3%. This percentage is lower than the typical 3% to 5% observed on typical urban freeways within the Houston area. The total truck usage represents about one truck per crossing.

Throughout this two-year time period, six different boats were utilized by the Galveston-Port Bolivar Ferry System. Table 4 presents a summary of the number of trips made by each boat. It should be noted that the new boats were used more frequently than the older vessels which were purchased by TxDOT in the 1950s. This usage is likely a result of the increased maintenance activities needed on the older boats to keep them in working condition. As the new vessels are more maneuverable, they are also more likely to be used during periods of inclement weather and heavy seas.

<table>
<thead>
<tr>
<th>Boat</th>
<th>Year Entered Service</th>
<th>1994 Trips</th>
<th>1994 %</th>
<th>1995 Trips</th>
<th>1995 %</th>
<th>Total Trips</th>
<th>Total %</th>
</tr>
</thead>
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<tr>
<td>Cone Johnson</td>
<td>1950</td>
<td>3,970</td>
<td>15.6</td>
<td>394</td>
<td>1.6</td>
<td>4,364</td>
<td>8.6</td>
</tr>
<tr>
<td>R. S. Sterling</td>
<td>1950</td>
<td>4,731</td>
<td>18.6</td>
<td>3,195</td>
<td>12.7</td>
<td>7,926</td>
<td>15.6</td>
</tr>
<tr>
<td>E. H. Thornton</td>
<td>1959</td>
<td>4,449</td>
<td>17.5</td>
<td>3,117</td>
<td>12.3</td>
<td>7,566</td>
<td>14.9</td>
</tr>
<tr>
<td>Gibb Gilchrest</td>
<td>1977</td>
<td>3,152</td>
<td>12.4</td>
<td>5,197</td>
<td>20.6</td>
<td>8,349</td>
<td>16.5</td>
</tr>
<tr>
<td>Robert C. Lanier</td>
<td>1991</td>
<td>9,147</td>
<td>35.9</td>
<td>5,754</td>
<td>22.8</td>
<td>14,901</td>
<td>29.4</td>
</tr>
<tr>
<td>Dewitt C. Greer</td>
<td>1995</td>
<td>-</td>
<td>-</td>
<td>7,595</td>
<td>30.1</td>
<td>7,595</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Note: Dewitt C. Greer dedicated January 27, 1995; Cone Johnson retired after February 2, 1995.

As the vehicular traffic demand desiring to cross via the ferry increases, additional boats are pressed into service. During hours of low usage (12:00 midnight to 5:00 a.m.), only one boat is in operation, leaving each dock at specific times. In the summer months, there are several occasions that require TxDOT to utilize all five available vessels to meet traffic demand. A measure of system demand is the percentage of time that TxDOT has the various levels of boats operating each hour of the day. Table 5 presents a summary of the total number of boats operating.
operating each hour for January 1994 to December 1995. The data indicates that three boats are operating the majority of the time (40.2%), especially during the daytime hours. The facility was only operating at capacity (all five boats in operation simultaneously) for 1.3% of the time during the past two years. These occurrences were likely on the busy holiday weekends during the summer months.

<table>
<thead>
<tr>
<th>Hour</th>
<th>1</th>
<th>2</th>
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<td>98</td>
<td>23</td>
<td>5</td>
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<td>44</td>
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<td>35</td>
<td>3</td>
<td>2</td>
<td>-</td>
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<tr>
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<td>32</td>
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<td>-</td>
<td>354</td>
<td>373</td>
<td>3</td>
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<tr>
<td>7:00 a.m.</td>
<td>-</td>
<td>226</td>
<td>498</td>
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<td>-</td>
<td>218</td>
<td>508</td>
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<td>74</td>
<td>652</td>
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</tr>
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<td>-</td>
<td>19</td>
<td>671</td>
<td>40</td>
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</tr>
<tr>
<td>11:00 a.m.</td>
<td>-</td>
<td>11</td>
<td>663</td>
<td>55</td>
<td>1</td>
</tr>
<tr>
<td>12 Noon</td>
<td>-</td>
<td>6</td>
<td>479</td>
<td>231</td>
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<tr>
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<td>415</td>
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</tr>
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<td>393</td>
<td>305</td>
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<td>3:00 p.m.</td>
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<td>352</td>
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<td>357</td>
<td>345</td>
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<td>533</td>
<td>56</td>
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<tr>
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<td>140</td>
<td>517</td>
<td>50</td>
<td>19</td>
<td>4</td>
</tr>
</tbody>
</table>

Average %    20.7 22.5 40.2 15.3 1.3

**FERRY SYSTEM OPERATIONAL CAPACITY**

The previous section adequately addressed the usage of existing Galveston-Port Bolivar Ferry System fleet; however, the actual capacity of the system is a function of the availability of boats as well as crew members as required to operate the vessel. The standard 40-hour work
week does not apply this 7-day a week, 24-hour per day operation. This section of this report addresses the actual capacity of the ferry system considering these two constraints. The basis for this analysis is information prepared by TxDOT as presented in Appendix B.

Each of the present fleet of five ferries requires an estimated 1,488 total hours (62 days) of maintenance each year. This is a combination of scheduled shipyard, scheduled dockside, and unscheduled miscellaneous maintenance activities. Therefore, the actual capacity of the system is estimated at 36,360 ferry hours or approximately 83% of the maximum capability of all five boats available for 24 hours each day. TxDOT indicated that during 1995, the Galveston-Port Bolivar Ferry System operated for 22,748 ferry-hours; this represents 63.6% of the actual system capacity. However, the operation at this level does not match desired time of service totaling an estimated 25,112 ferry-hours. This represents an increase of 10.4% above the actual operating hours as determined for 1995. Table 6 summarizes this information as provided by TxDOT.

<table>
<thead>
<tr>
<th>Table 6. Actual and Desired Ferry Operational Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual (1995)</td>
</tr>
<tr>
<td>Hours/Day</td>
</tr>
<tr>
<td>24</td>
</tr>
<tr>
<td>16</td>
</tr>
<tr>
<td>17</td>
</tr>
<tr>
<td>16</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>8</td>
</tr>
</tbody>
</table>

NOTES:  
1. Source: TxDOT.  
2. Values represent that for a fleet of five boats.  
3. Each area separated by a line represents the operation of an additional ferry.

Considering the number of boats operating on an hourly basis yields the results presented in Table 7. This indicates the desirability of TxDOT to increase the efficiency of the ferry system by increasing the hours per day and number of days that the second and fifth boats
operate throughout the year. This will benefit the delays to motorists as the total number of available operating hours are decreased. The proposal charge would provide for two boats operating 24 hours per day during 215 days each year; most likely during the summer months. Operating the fifth ferry for 92 days each year as opposed to the current (1995) 16 days will significantly improve operations. This will provide for maximum coverage during the peak summer months. The usage of the current fleet of five boats is limited by the available staffing designated for ferry operations.

<table>
<thead>
<tr>
<th>Number of Ferries</th>
<th>Percent of Time</th>
<th>Quantity of Ferries Operating</th>
<th>Percent Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual (1995)</td>
<td>Desirable</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>100.0</td>
<td>100.0</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>66.7</td>
<td>86.3</td>
<td>+ 29.4</td>
</tr>
<tr>
<td>3</td>
<td>69.6</td>
<td>69.6</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>21.9</td>
<td>22.4</td>
<td>+ 2.3</td>
</tr>
<tr>
<td>5</td>
<td>1.5</td>
<td>8.4</td>
<td>+460.0</td>
</tr>
</tbody>
</table>

Increasing the operational hours will require additional staffing above the current allocation. The U.S. Coast Guard requires six fully qualified and licensed/documented crew members on board each ferry vessel at all times. These positions are as follows: Master, Able Bodied Seaman (Limited), Able Bodied Seaman (Special), Ordinary Seaman, Chief Marine Engineer, and Oiler. Each is required and mismatch of qualifications is not allowed. In addition, a minimum of 8-hour turnaround time between an 8-hour watch and 12-hour turnaround between 12-hour watches is also required by the U.S. Coast Guard. The policy set by the TxDOT Ferry Operations Manager limits consecutive work days to a maximum of six days. Although the current TxDOT policy is a 40-hour work week, a reasonable amount of overtime is usually allowed. The Galveston-Port Bolivar Ferry System presently operates 12 six-man crews for a total of 72 crew members.

As the ferry operates 24 hours per day, 365 days a year, and the mandated requirement for ship crew members, the standard work week may not apply. In a typical job position, if an employee is absent from work (e.g., for vacation, sick time, holidays, training, etc.), the
completion of their work is typically delayed until he or she returns. In the case of ferry operations, a boat may not depart unless it is fully staffed with the required classifications of crew members. TxDOT does not have a formal policy for operating time for the ferries nor does TxDOT have a policy for manning of the ferries to meet an established standard operating time. Therefore, alternate methods are needed to determine the number of full-time equivalent (FTE’s) necessary to provide optimum service to the public. Table 8 presents a summarized history of staffing as allocated for ferry operations since 1985. Of particular importance is to consider that a fifth ferry began operating in 1991 without any increase in FTE’s or funding. Within the past three years, the total number of seasonal employees has been reduced by almost one-half. Although the FTE’s allocated for ferry operations have increased during the past two years, these positions are administrative and do not provide for additional authorized crew members.

<table>
<thead>
<tr>
<th>Year</th>
<th>FTE’s</th>
<th>Summer/Seasonal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>Reduced from 122 to 110</td>
<td>Authorized 10 for June 1 to August 31</td>
</tr>
<tr>
<td>1990</td>
<td>Reduced to 108</td>
<td>Authorized 10 for May 15 to after Labor Day</td>
</tr>
<tr>
<td>1991</td>
<td>No change</td>
<td>Authorized 16 for May 15 to after Labor Day</td>
</tr>
<tr>
<td>1993</td>
<td>No change</td>
<td>Authorized 18 for May 15 to October 15</td>
</tr>
<tr>
<td>1995</td>
<td>Increased from 108 to 109 (Administrative Technician)</td>
<td>Cut to 12</td>
</tr>
<tr>
<td>1996</td>
<td>Increased to 110 (Assistant Manager)</td>
<td>Cut to 8</td>
</tr>
</tbody>
</table>

Source: TxDOT

The TxDOT standard work week provides for a total of 2,080 work hours each year. This includes time allowed for vacation, sick leave, holidays, training, and other leave as necessary. However, this does not apply directly for ferry operations with boat staffing required by the U.S. Coast Guard. In this case, the actual available work hours should be used in the calculation of FTE’s for staffing requirements. The Ferry Operations Manager for the Galveston-Port Bolivar Ferry System has determined that each ferry crew member is reasonably available for 1,776 work hours each year (see Appendix). To provide the desired level of service as presented in Table 6, two additional crews of six men are required. Therefore, the
FTE's allocated to ferry operations should be increased by 12 to provide optimum service to the public.

DELAY ANALYSIS

A delay study should be completed to provide insight as to delays encountered by those desiring to use the ferry system. Most delay studies are performed by counting the number of vehicles stopped in specific time intervals (usually 15-seconds). The total delay is then estimated by multiplying the number of queued vehicles by the time interval each is delayed. Because of the seasonal nature of the ferry operation, a valid delay study would need to be completed at various times during a consecutive 12-month time period. Unfortunately, this evaluation does not allow for such flexibility to complete these detailed evaluations. Therefore, several scenarios are assumed; delay calculations are then completed as described.

A better understanding of the delays may be realized if an actual dollar value is placed on the estimated delays by multiplying the delay value by the value of time. Currently, the basis for determining the value of time is a TTI report "The Value of Travel Time: New Estimates Developed Using a Speed Choice Model," Research Report No. 396-2F. This study derived the value of time using a speed choice model assuming a rational driver chooses a speed so that the total driving costs are minimized. Total driving costs include value of time and vehicle operating costs, accident costs, and traffic violation costs. The study recommends the following values of time (in 1985 dollars):

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drivers</td>
<td>$ 8.03 per person-hour</td>
</tr>
<tr>
<td>Passenger Cars</td>
<td>$10.04 per vehicle-hour (assumes 1.25 persons per vehicle)</td>
</tr>
</tbody>
</table>

The value of time may be adjusted using the current Consumer Price Index. Table 9 illustrates the CPI and value of time from 1985 through 1995. Current CPI values may be obtained from the Wall Street Journal or other economic publications.
Table 9. Value of Time, 1985—1995

<table>
<thead>
<tr>
<th>Year</th>
<th>CPI(^1)</th>
<th>Value of Time</th>
<th>Drivers(^2)</th>
<th>Passenger Cars(^3,4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>322.2</td>
<td>$8.03</td>
<td>$10.04</td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td>238.4</td>
<td>8.24</td>
<td>10.30</td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>240.4</td>
<td>8.48</td>
<td>10.60</td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td>118.2(^4)</td>
<td>8.82</td>
<td>11.03</td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>124.0(^4)</td>
<td>9.26</td>
<td>11.58</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>130.7(^4)</td>
<td>9.76</td>
<td>12.20</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>136.2(^4)</td>
<td>10.17</td>
<td>12.71</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>140.3(^4)</td>
<td>10.47</td>
<td>13.09</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>144.5(^4)</td>
<td>10.78</td>
<td>13.48</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>148.2(^4)</td>
<td>11.06</td>
<td>13.83</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>152.4</td>
<td>11.37</td>
<td>14.22</td>
<td></td>
</tr>
</tbody>
</table>

Notes:  
\(^1\)CPI values are annual percentages.  
\(^2\)Costs represent only value of time.  
\(^3\)Passenger car cost based on drivers value of time times vehicle occupancy rate of 1.25.  
\(^4\)CPI base was changed in 1988. A multiplication of 2.995566 must be used with CPI published after 1988.

The first area of concern is the delay incurred to vehicles that are left on shore as each ferry boat is loaded to capacity. In 1995, this delay was noted to impact 433,918 vehicles. The amount of time each is delayed could range from a few minutes to more than one hour. TxDOT staff have indicated that wait times in excess of one hour can be experienced during the peak summer traffic demand periods near the major holidays. However, this has not been confirmed by any field studies. Lacking this more detailed information, assumed average delays of 5, 7.5, 10, and 12.5 minutes per vehicle were assumed. Applying this to each of those left ashore yields the results presented in Table 10.

Table 10. Estimated Delays Incurred To Vehicles Left Ashore

<table>
<thead>
<tr>
<th>Assumed Delay for Next Boat (minutes)</th>
<th>Total Delay (vehicle-hours)</th>
<th>User Cost (dollars/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>36,160</td>
<td>$514,200</td>
</tr>
<tr>
<td>7.5</td>
<td>54,240</td>
<td>771,290</td>
</tr>
<tr>
<td>10.0</td>
<td>72,320</td>
<td>1,028,390</td>
</tr>
<tr>
<td>12.5</td>
<td>90,400</td>
<td>1,285,490</td>
</tr>
</tbody>
</table>
The second area of delay estimation concerns a catastrophic event in which one of the two available landings becomes damaged and is unusable for an extended period of time. This event could likely incur at least a ten-minute delay to all users of the ferry system. A worst case scenario would be the loss of a landing for a complete 12-month period. If this loss would have happened in 1995, vehicle delays would be estimated at 358,070 vehicle-hours. This estimation translates into approximately $5,091,800 in user delay costs. If this is applied to the ferry passengers instead of on the vehicles, delays are estimated at 1,132,200 person-hours and $12,873,100 in yearly user costs.

Finally, there is always the possibility that one of the boats could also be out of service outside of its normal scheduled shipyard maintenance time. If this possibility were to occur during the summer months, additional delays could be incurred as the system is operating near capacity for much of the day. However, since all five boats are operating during only 1.3% of the time, the additional delays would only be incurred on peak days. User costs were not calculated for this scenario.

STAGING AREA

The staging areas on each side are capable of storing more vehicles than can be accommodated on a single boat. The capacity of the ferry system is that of the loading/unloading of the vessels. Increasing the storage capacity of the staging areas will not, based upon the existing two landings on each side, reduce the delay to users. However, if a third landing is constructed, additional staging areas would be needed. Any increase in storage capacity within either staging areas would have a positive impact upon the roadways approaching the landings by reducing the length of the waiting queue. This impact is particularly important on the Galveston side due to the proximity of the residential areas to the landing. The Bolivar Peninsula side is currently less impacted by development along the north side of S.H. 87 and excessive queuing is of less concern. The existing capacity of the roadways for traffic exiting the ferry system is adequate to handle the traffic demands of the unloading of the ferry vessels.
TRAFFIC OPERATIONS IMPROVEMENTS

Another aspect for the long-range plan was to provide upgrades to the traffic control systems presently available at the Galveston and Port Bolivar sides. The majority of the existing equipment was installed in the late 1970s and is no longer functioning. Since the time at which TTI was requested to complete this study, TxDOT received notification of the award of $800,000 in ISTEA Ferry Boat Discretionary Funding for improvements to the ferry staging areas. TxDOT must provide $200,000 in matching funds for a total amount of $1,000,000 available for these traffic operation related improvements.

TTI staff identified several potential projects to utilize these ISTEA funds. Estimated costs were also developed. Any detail design by TxDOT for any of these recommended improvements should consider the expanded staging areas as described in the previous section. Appendix C presents the recommended potential usage of the ISTEA funding for traffic operations improvements.

CLOSURE

This initial draft report presents a summary of the general operations for the Galveston-Port Bolivar Ferry System operated by TxDOT. The ferry is a vital transportation link in Galveston County; the only alternative to the ferry by using the roadways is a trip in excess of two hours. Although the ferry operates below its maximum capacity for much of the year, traffic demand increases during the summer months due to the tourist attractions in the area. A recent ban on alcoholic beverages on many Galveston Island beaches may cause further increases in those destined to the beaches located on the Bolivar Peninsula. By providing service to over two million vehicles and in excess of six million passengers each year, modernization of the service is highly desirable.

The modernization process will likely be expensive. However, the improvements are considered a part of a commitment by TxDOT to provide a first-class transportation system for
residents as well as vacationers. The improvement alternatives as briefly described below should be implemented according to the recommended priorities.

(1) **Administrative Office Expansion**: The current administrative office located on the Galveston side does not have adequate space to house all the required TxDOT staff needed to maintain and operate the ferry system. This deficiency has resulted in a portion of the staff being officed within the existing warehouse. In order to consolidate the management and administrative staff, expansion of the existing building should be completed at the highest priority. The proposed expansion, as recommended by Goldston Engineering, would provide for an approximate 1,320 square feet (122.6 square-meters) expansion. This includes six or seven offices, expanded restroom and janitorial areas as well as an elevator providing access to the second floor and the control tower.

(2) **Additional Landings**: An additional landing should be constructed on each side of the TxDOT facilities in Galveston and Port Bolivar. In addition to providing for additional loading capacities during the peak traffic periods, it would allow for extensive maintenance and/or upgrades of the current docks without severely impacting the existing service with two landings. It would also provide for a "spare" landing should one become severely damaged. Each landing should also be upgraded to include the requirements of the Americans with Disabilities Act of 1992. This also should include the modernization of the breasting dolphins and breakwaters as needed. A more detailed report has been prepared by Goldston Engineering to address the marine related item.

(3) **Increase FTE's**: The total number of FTE's assigned to ferry operations should be increased by 12. This increase will allow for fourteen crews, thus providing for optimum service to the public. The proposed increase in crew member staffing of 16.7% (from 72 to 84) will result in a corresponding 10.4% (from 22,748 to 25,122) increase in ferry boat operating hours.

(4) **Staging Area Modifications**: Each staging area should be expanded to include two additional lanes of queue storage. The facilities should also be modernized with state of the art technology traffic control devices. This modernization should
include barriers, lane control signals, video detection equipment, video
surveillance cameras, changeable message signs, highway advisory radio, and the
corresponding communications and control hardware/software as needed. A
connection to the Houston TranStar facility should also be considered.

(5) Additional Ferry Vessel Construction: Under the current plans by TxDOT, the
R.S. Sterling, the oldest vessel in TxDOT's fleet, is scheduled to be replaced by
a new ferry. The Ray Stoker, Jr. is expected to be delivered by December 1996.
An additional ferry is planned for fiscal year 1997-98 to replace the aging E.H.
Thornton, Jr. This will result in a very modern fleet of five vessels with the
majority of less than 10 years old by the turn of the century. At that time, the
Gibb Gilchrest will have been in service for over 20 years. With the addition of
the third landing on each side, TxDOT will have the operational capacity to
operate seven boats simultaneously. Expansion of the fleet to six ferry vessels
would provide the District with the additional operational capacity to more
efficiently use the increased landing capabilities. In cases where one vessel is in
the shipyard for annual maintenance activities, a minimum of five ferries would
be available to meet the expected traffic demand as needed. Therefore, it is
recommended that the total fleet for the Galveston-Port Bolivar Ferry System be
expanded to six vessels by 2001.

(6) Warehouse Expansion: The existing warehouse space is adequate for the current
operations. It is not anticipated that any additional space will be required, even
in view of the additional landings and expansion of service. This should be
considered as the sixth priority.

TxDOT should consider implementing the modernization process in the order as
described above. This document only provides information on the system operation and attempts
to justify and prioritize the TxDOT proposed improvements. Additional documents will be
prepared by TTI and a private marine consultant for further development of the long-range plan
for the Galveston-Port Bolivar Ferry System. These documents will address marine design
considerations and will provide preliminary cost estimates for the proposed improvements. This
report may be revised as additional information is made available. Completion of each of these
six recommended improvement strategies would result in very efficient, modern, and dependable service as demanded by the traveling public.
APPENDIX A
Figure A-1. Departing View of Port Bolivar Landing

Figure A-2. Approaching Galveston Landing
Figure A-3. *Dewitt C. Greer* at Maintenance/Mooring Dock

Figure A-4. Loaded Ferry Traversing Entry to Galveston Bay
Figure A-5. Ferry Landing Ramp, Port Bolivar Side

Figure A-6. Port Bolivar Staging Area
Figure A-7. Galveston Side Staging Area

Figure A-8. Use of Ferry by Emergency Vehicles
Figure A-9. *E.J. Thornton Jr.* at Maintenance/Mooring Dock

Figure A-10. *Gibb Gilcrest* at Galveston Landing while *Robert C. Lanier* departs for Port Bolivar
Figure A-11. Ferry Loading/Unloading Operations

Figure A-12. Passengers Await Boarding while Vehicles Unload/Load at Galveston Side
FERRY STANDARD OPERATING TIME

365 days per year
X 24 hours per day
---
= 8760 hours maximum operating capability per year for 1 ferry with NO maintenance
X 5 ferries
-----
=43800 hours maximum operating capability per year for 5 ferries with NO maintenance

- 744 hours (31 days) scheduled shipyard maintenance per ferry
- 168 hours (07 days) scheduled dockside maintenance per ferry
- 576 hours (02 days per month) miscellaneous maintenance per ferry
---
1488 hours maintenance per ferry per year
X 5 ferries
-----
= 7440 hours maintenance for 5 ferries per year

43800
- 7440
-----
=36360 hours reasonable operating capability per year utilizing 5 ferries (83.01 % of MAX capability)

Total operating time of 5 ferries in 1995 - 22748 hours

1 ferry 24 hours per day X 365 days per year = 8760 hours
1 ferry 16 hours per day X 365 days per year = 5840 hours
1 ferry 17 hours per day X 260 days per year = 4420 hours
16 hours per day X 105 days per year = 1680 hours
1 ferry 10 hours per day X 120 days per year = 1200 hours
08 hours per day X 090 days per year = 0720 hours
1 ferry 08 hours per day X 016 days per year = 0128 hours
-----
22748

Percentage of use of ferries 1995: 62.56 % (of MAX 83.01 %)

WHY? 36360 hours reasonable operating capability per year utilizing 5 ferries is available!

U.S. Coast Guard requires 6 fully qualified and licensed/documentated crewmembers on board each ferry crew at all times; Master, Able Bodied Seaman (Limited), Able Bodied Seaman (Special), Ordinary Seaman, Chief Marine Engineer and Oiler. NO mismatch of qualifications of crewmembers is authorized.
U.S. Coast Guard requires a minimum of 8 hour turnaround time between 8 hour watches and 12 hour turnaround time between 12 hour watches.

TxDOT policy for basic workweek is 40 hours per week, however, reasonable overtime is authorized.

Ferry Operation Manager policy limits consecutive work days to a maximum of 6.

12 crews on board
X 6 crewmembers per crew
--
72 total crewmembers

TxDOT FTE Formula:

52 weeks per year
X 40 hours work per week
--
= 2080 hours work per year per employee
X 12 crews
-----
= 24960 hours work per year for 72 crewmembers with NO overtime, NO vacation, NO compensatory time, NO sick leave and NO Other leave.

36360 hours available ferry time
24960 hours available crew time (with NO overtime, vacation, compensatory time, sick leave or other leave).

68.64 % (of MAX 83.01 %) MAXIMUM operating capability with 5 ferries and 72 crewmembers.

Ferry Operation Manager FTE Formula:

2080 work hours per year per ferry crewmember
- 96 hours vacation per year per ferry crewmember
- 96 hours sick leave per year per crewmember
- 24 hours other leave per year per crewmember
- 88 hours holiday time per year per crewmember
-----
= 1776 hours reasonably available work hours per ferry crewmember per year
1776 hours available crew time
X 12 crews (72 FTEs)
---
= 21312 hours available crew time - WITHOUT overtime

36360 hours available ferry time
21312 hours available crew time (without overtime)

58.6 % (of MAX 83.01 %) REASONABLE operating capability with 5 ferries and 72 crewmembers

Actual ferry and crew operating time - 1995 - 22748 hours

OVERTIME - 9.3 % (1436 hours)

SHOULD BE OPERATING - 25122 hours per year

1 ferry 24 hours per day X 365 days per year = 8760 hours
1 ferry 24 hours per day X 215 days per year = 5160 hours
   16 hours per day X 150 days per year = 2400 hours
1 ferry 17 hours per day X 260 days per year = 4420 hours
   16 hours per day X 105 days per year = 1680 hours
1 ferry 10 hours per day X 123 days per year = 1230 hours
   08 hours per day X 092 days per year = 0736 hours
1 ferry 08 hours per day X 092 days per year - 0736 hours
---
25122

36360 hours available ferry time
25122 hours should be operating time

69.09 % (of MAX 83.01 %) utilization time
25122 hours should be operating time
- 1776 hours available work time per FTE

------
= 14.1 crews
\times 6 FTE per crew

------
= 84.6 FTE needed
- 72.0 FTE on board

------
= 12.6 FTE short (2 crews)

NOTE: TxDOT IS MANDATED TO PROVIDE A FERRY SERVICE CONNECTING STATE HIGHWAY 87 AT GALVESTON, TEXAS, AND THE MAINLAND OF TEXAS AT PORT BOLIVAR, TEXAS. TxDOT DOES NOT HAVE A FORMAL POLICY FOR STANDARD OPERATING TIME FOR THE FERRIES NOR DOES TxDOT HAVE A POLICY FOR MANNING OF THE FERRIES (FTEs) TO MEET AN ESTABLISHED STANDARD OPERATING TIME.

TO DATE - THE POLICY HAS BEEN TO DO THE BEST YOU CAN WITH WHAT YOU'VE GOT. THIS PROVIDES FOR A PRETTY GOOD SHOW BUT DOES NOT PROVIDE OPTIMUM SERVICE TO THE PUBLIC.

1985 - FTEs reduced from 122 to 110 - 4 ferries - authorized 10 summers 6/1 to 8/31.

1990 - FTEs reduced from 110 to 108 - 10 summers authorized 5/15 to day after Labor Day weekend.

1991 - 5 ferries - NO increase in FTEs or funding - 16 summers authorized 5/15 to day after Labor Day weekend.

1993 - Summers changed to Seasonals - 18 authorized 5/15 to 10/15.


1996 - FTEs increased from 109 to 110 - ASST. MGR. Seasonals cut to 08.
APPENDIX C
MEMORANDUM

TO: J.R. Salinas, P.E.

FROM: Darrell W. Borchardt, P.E.

SUBJECT: Potential Usage of ISTEA Ferry Boat Discretionary Money

As per your recent request, TTI has prepared a list of potential usage of the $800,000 in funding available to the District for improvements to the Galveston-Port Bolivar Ferry System. It is our understanding that TxDOT will provide $200,000 in matching funding for a total amount available of $1,000,000.

The attached table provides potential usage for these funds; with emphasis on traffic operations related improvements. The costs estimates provided are very preliminary and would likely be different as each alternative is examined in more detail in the design stage should any of these be selected. Note that the total costs as estimated exceed the total monies available. This will allow you and your staff the flexibility to select what you consider more appropriate for implementation at this time. Any of these items not selected for use out of these monies should be included for implementation in any long range plan for the ferry system. As final costs are likely to be different from those estimated on the following page, TxDOT should consider prioritizing the included items according to its current needs and desires. The items presented on the table are only purchase and installation cost estimates; no estimates for design, operation, and maintenance costs are provided.

If you have any questions, or require additional information, please contact me at (713) 686-2971.

DWB

xc: W.R. McCasland, P.E.
James Blankenship. P.E.
Potential Usage of ISTEA Funding for Ferry Improvements – Phase 1
(List below does not establish or recommend any priorities)

Item 1. Traffic Signal Upgrades

- Replace/upgrade signals at traffic crossovers on both sides
  
  2 @ $50k = $100,000

  TOTAL = $100,000

Item 2. Traveler Information Systems

- Permanent and portable equipment for providing traveler information during incidents and special events
  
  2 @ $30k = $60,000 portable changeable message sign
  2 @ $54k = $108,000 permanent highway advisory radio system

  TOTAL = $168,000

- Install small changeable message signs approaching both traffic staging areas; suggest using those equipped with cellular modem communications
  
  2 @ $75k = $150,000 (signs)
  1 @ $5k = $ 5,000 (personal computer)

  TOTAL = $155,000

Item 3. Lane Control Signals

- Install lane control signals for each inbound traffic lane at each staging area; suggest that the supporting structure be designed to accommodate any proposed expansion of the staging areas by two storage lanes on each side

  10 @ $4k = $40,000 (signals only)
  2 @ $10k = $20,000 (support structure)
  2 @ $10k = $20,000 (wiring and control unit)

  TOTAL = $80,000
Mr. Salinas
February 26, 1996
Page 4

4 @ $0.75k  =  $3,000 (cameras)
4 @ $6k     =  $24,000 (camera pole structures)
1 @ $5      =  $5,000 (video monitor/controller)
1 @ $10     =  $10,000 (sending video images to control tower)
TOTAL      =  $42,000

Item 8. Provide Video Images to Houston TranStar

• Install equipment to provide video images to the Houston TranStar facility; a low cost option is capable of sending images over normal telephone lines at a rate of 5 frames per second; real-time full frame video could be transmitted by using a more expensive fiber optic communications link

TOTAL      =  $10,000

Item 9. Install Video Image Processing Systems (VIDS)

• Install VIDS on either ends of the ferry approaches to provide TxDOT with accurate traffic volume and vehicle classification system; should be installed to measure vehicles accessing the ferry as well as the public parking areas; provides supplemental data to that as noted by the boat operators

2 @ $40k   =  $80,000

TOTAL      =  $80,000

Total estimated costs of all the items listed above is $1,016,000 and does not include that for the security guard buildings nor any operational and maintenance costs.
Item 4. Pavement Overlay

- Complete standard 50 mm thick overlay of asphalt concrete pavement within staging areas, traffic approaches to ferry landings, exit lanes, and public parking areas; includes pavement striping and raised pavement markers as needed

  Galveston Side -- $65,000 (staging areas and supporting roadways)
  Galveston Side -- $19,000 (public parking)
  Bolivar Side -- $65,000 (staging areas and supporting roadways)
  Bolivar Side -- $22,000 (public parking and approach roadway)

  TOTAL = $171,000

Item 5. Barricade Gates Arms/Controllers and Signal Equipment

- Install barricade gate arms, control equipment, and traffic signal heads at each of the traffic lanes approaching the landings

  10 @ $4k = $40,000 (gate arms/controller)
  2 @ $10k = $20,000 (wiring and control unit)
  10 @ $15k = $150,000 (traffic signal heads and controllers)

  TOTAL = $210,000

Item 6. Security Guard Buildings

- Install security guard buildings; these may be similar in design to those used by METRO within their park and ride lots

  2 @ ??? (Estimate not available at this time)

  (The Metropolitan Transit Authority of Harris County has been contacted regarding estimates on this item; a return call has yet to be received.)

Item 7. Video Surveillance Equipment

- Install video surveillance equipment on both sides to provide views of traffic staging area and roadways of approaching and departing traffic, also provides for added security; the technique of sending video images from the Bolivar Side to the control tower at Galveston will require more detailed investigations; the use of stationary cameras is much less costly than those equipped with pan, tilt, and zoom
MEMORANDUM

TO: J.R. Salinas, P.E.

FROM: Darrell W. Borchardt, P.E.

SUBJECT: Galveston-Port Bolivar Ferry System
          Additional Information Concerning ISTEA Funding

March 12, 1996

The attached are modifications to my memorandum of February 26 concerning potential usage of the Ferry Boat Discretionary Money which was recently awarded to the District. A revised copy of the preliminary draft report concerning justification for the improvements to the ferry system will be submitted to your office by March 13, 1996. If you have any questions or require additional information, please contact me at (713) 686-2971.

Attachment

xc: James Blankenship, P.E.
    William R. McCasland, P.E.

DWB
Item 4. Pavement Overlay

- Complete standard 50 mm thick overlay of asphalt concrete pavement within staging areas, traffic approaches to ferry landings, exit lanes, and public parking areas; includes pavement striping and raised pavement markers as needed for traffic control; this is intended to extend the life of the existing pavement structure until any proposed expansion would be completed (expansion would likely result in a complete replacement of existing roadways)

Galveston Side -- $65,000 (staging areas and supporting roadways)
Galveston Side -- $16,000 (public parking)
Port Bolivar Side -- $65,000 (staging areas and supporting roadways)
Prot Bolivar Side -- $22,000 (public parking and approach roadway)

TOTAL = $171,000

Item 6. Security Guard Buildings

- Install security guard buildings; these may be similar in design to that presently used by METRO within their park and ride and/or transit centers; intended use of the buildings as will likely be for traffic control functions

2 @ $25,000 (approximately 500 square feet (46.45 square meters))

TOTAL = $50,000

(this cost may vary considering connection to electrical, water, and sewer systems as well as installation of any traffic control equipment as may be desired by TxDOT)