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EXECUTIVE SUMMARY

The Austin – San Antonio Intermunicipal Commuter Rail District recently commissioned Jacobs Carter Burgess to conduct a fatal flaw analysis that would consider the possibility of building and operating commuter rail within the SH 130 highway corridor between Georgetown and San Antonio.

SH 130 is being constructed by the Texas Department of Transportation (TxDOT) as a highway corridor that bypasses the City of Austin on the east and is primarily intended to relieve vehicular congestion that occurs along the I-35 corridor between Austin and San Antonio. The SH 130 corridor connects to I-35 north of Georgetown, proceeds to run southward along the east side of Austin, and continues southward until it connects to Interstate 10 near Seguin. The SH 130 corridor is 89 miles long.

The SH 130 corridor has been broken into six separate design segments and two separate construction projects. The first construction project included Segments 1 through 4 and involved the northern 49 miles of the corridor. The second construction package involving the southern 40 miles of corridor includes Segments 5 and 6. The first project, Segments 1-4, has already been constructed and is open to traffic. The second project, Segments 5 and 6, is still in the preconstruction phase, and has an estimated completion date of 2012.

Originally conceived as a multimodal corridor, the northern 49 miles (Segments 1-4) were designed to accommodate a double track rail line running within the center median. In order to verify that such a rail line could be accommodated, Segment 1-4 designers prepared Rail Compatibility Reports to demonstrate that freight rail could actually be constructed within the corridor. While the primary focus of the design was on freight rail, that same space might also facilitate construction of commuter rail facilities. Similar rail compatibility requirements are not, however, a current requirement for the Segment 5-6 construction project; in fact, that Developer is not even required to consider the potential for future rail construction.

Since the SH 130 corridor does not provide a complete connection between Austin and San Antonio, any rail corridor attempting to duplicate the original ASA commuter rail line would also need to continue from the terminus of SH 130 near Seguin to San Antonio. The most expedient way of completing the connection, without incurring the cost of acquiring new right of way, would be to utilize an existing Union Pacific freight rail corridor (the Flatonia Subdivision) which runs from San Antonio to Houston, passing through Seguin and intersecting the SH 130 corridor. For the purpose of this analysis it is assumed that any improvements required to accommodate commuter rail within the UP rail corridor from Seguin to San Antonio would be acceptable to Union Pacific.

With regard to constructing a rail line within the SH 130 corridor, three potential alignment options were considered. Option 1 would place commuter rail within the center highway median, as designed by the Segment 1-4 design engineers; Option 2 would run between the frontage road and right-of-way line; and Option 3 would run between the mainlanes and the frontage road. The intent of this study was to review each of those options and to assess whether there were any impediments within the various construction segments, as they are currently constructed (1-4), or as they are currently designed (5-6) (i.e. failing to meet design standards, insufficient physical space to locate construction elements, etc.), that could be considered “fatal flaws” for that given option, and that would thus prevent the implementation of that option.
Of the three options considered, two were quickly eliminated from further consideration. Option 2, which would place the commuter rail line outside the frontage road, faces severe right-of-way constraints and creates conflicts with crossing streets and driveway connections found throughout the corridor. Option 3, which would place the rail between the mainlanes and frontage road, would require extremely long structures to grade separate at ramp crossings. Option 3 also poses conflicts to bridge and retaining wall structures as well as to toll facilities.

The only viable option remaining to be considered was Option 1, which would place the commuter rail alignment within the SH 130 median. The benefits to utilizing the center median include:

- All ROW that would be required for track construction already has, or will be, obtained as part of one of the two SH 130 projects.
- With the SH 130 project already having been through the environmental review process, no complications related to permitting are anticipated for this alignment.
- The commuter rail equipment in use today is able to negotiate the same horizontal curves and profile grades that high speed highway facilities are designed to. As such, it is possible to construct a commuter rail line in the center median which can mimic the geometry of the adjoining mainlanes.

HOWEVER, while Segments 1-4 were required by TxDOT to be rail compatible, and they could accept a commuter rail in the median, TxDOT eliminated those design requirements for Segments 5 & 6. As a result, those two segments contain features that make use of the overall SH 130 corridor for rail virtually impossible:

- The SH 45 SE interchange contains bridge piers that directly obstruct any median-running rail alignment.
- Serious vertical and horizontal clearance restrictions exist at all overpass and interchange locations.

Design of Segments 5 and 6 are currently at the 30%-60% level and unless those critical issues are addressed immediately, use of the SH 130 corridor for rail is FATALLY FLAWED.

If the corridor could be used, potential station locations were identified from which various central business districts could be served, based on proximity to CBD’s, traffic volumes, availability of ROW, and simplicity of travel path for connections. The station locations identified are:

- Georgetown: SH 130 / SH 29 intersection
- Round Rock (2 locations): SH 130 / US 79 Interchange; SH 130 / SH 45 N Interchange
- Austin (2 locations): SH 130 / US 290 Interchange; SH 130 / SH 71 Interchange
- San Marcos: SH 130 / SH 80 intersection
- New Braunfels: SH 46 / FM 78 intersection (outside SH 130 corridor)
- San Antonio: Kelly-USA station as per LPA

In order to complete the commuter rail connection between Austin and San Antonio an existing UP rail corridor that passes through Seguin, which is known as the Flatonia Subdivision, could be utilized. Even though this rail line is a heavily traveled freight rail corridor, this report assumes that an agreement could be reached with the UP that will allow ASAICRD to share use of that alignment.
As part of this study an “order of magnitude” cost estimate was developed to address costs for track construction, structures, six stations, vehicles (rolling stock), a maintenance facility, maintenance equipment, and right-of-way (for stations and maintenance facility; none required for track). The total cost for these elements would be approximately $2.7 billion dollars.

Even if the “Fatal Flaws” mentioned above can be mitigated, other critical factors that the ASAICRD must consider include:

- Construction and operational factors that result from an alignment placed in a highway median
- Location of stations relative to CBD’s and the impacts of those locations on patronage
- Cost
SECTION 1.0 - INTRODUCTION

In 2004, the Austin-San Antonio Inter City Commuter Rail District (ASAICRD) completed a conceptual planning study that defined a project that would provide commuter rail service between the cities of Austin and San Antonio, Texas. The project would utilize an existing freight rail corridor that is currently occupied by Union Pacific Railroad (UP) tracks. Operation of the commuter rail system would require the District and UP to share that right of way, which they would accomplish via agreements that would define times of operation when each of those two entities could occupy those tracks.

The line would generally extend south from Georgetown, through west Austin, and continue south, passing through several smaller cities, to San Antonio. Stations were planned near the city centers of Georgetown, Round Rock, Austin, Buda/Kyle, San Marcos, New Braunfels and San Antonio. Additional stations were located in Austin and San Antonio. This locally preferred alternative (LPA) alignment is illustrated in the graphic below.

While the District was completing that study, TxDOT was moving forward with the construction of a multi-modal highway corridor that would generally parallel the UP corridor, but would be located several miles to the east of Austin and those other communities. To be multimodal, the highway project was charged with setting aside sufficient space within its right of way to
accommodate construction of some type of rail line (whether it be freight or passenger) at some future date.

In the interest of providing the most comprehensive passenger rail system possible, i.e. maximizing the proposed commuter rail system’s connectivity to all of those communities, the ASAICRD asked Jacobs Carter & Burgess (JCB) to investigate whether or not that SH 130 rail corridor might serve as a viable supplement to the UP alignment which had already been identified as the LPA in earlier studies.

For this assignment, working at a conceptual level, Jacobs Carter Burgess would review design plans and existing conditions along the SH-130 corridor, and identify any major impediments (fatal flaws) that would prevent the corridor from being used for passenger service. This report summarizes the result of that “fatal flaw analysis”.
SECTION 2.0 - DESCRIPTION OF SH 130 CORRIDOR

The SH 130 Corridor stretches 89 miles and generally parallels the I-35 alignment between Austin and San Antonio. The northern terminus of SH 130 is located just north of Georgetown, in Williamson County. From this northern terminus, the SH 130 alignment diverges from I-35 and proceeds to parallel I-35 along a path skirting the eastern limits of the Georgetown-Round Rock-Austin metropolitan area. After passing just east of Austin Bergstrom International Airport, the SH 130 alignment intersects with US 183, just north of Mustang Ridge. From this point the SH 130 alignment runs coincident with the US 183 alignment until it reaches the town of Lockhart. At Lockhart, SH 130 separates from US 183 and proceeds in a generally southwest direction until it intersects I-10 just east of Seguin. This point represents the southern terminus of SH 130.

With the exception of the portion along US 183 from Mustang Ridge to Lockhart, the SH 130 corridor is new greenfield alignment. Because the majority of the SH 130 corridor is a new highway corridor, many of the obstacles that frequently complicate the addition of passenger rail service along an existing, built-up highway corridor are not present. However, recent development activity along the north end of the corridor indicates that the “rural” setting that now exists may change dramatically in a short time.

The figure below shows the SH 130 corridor in relation to the LPA alignment.
2.1 PROJECT DESCRIPTION

The 89 mile length of SH 130 is divided into six separate design segments and two separate construction projects. The first project involved Segments 1 through 4, which make up the northern 49 miles of the corridor. Construction on Segments 1 through 4 began in late 2003. Segments 1 and 2 were opened to traffic in late 2006, Segment 3 followed in September 2007 and Segment 4 opened in April 2008.

Segments 5 and 6 make up the second phase of the SH 130 project. As of the writing of this report Segments 5 and 6 are still in the pre-construction phase, and actual construction of those segments is not expected to begin until some time in 2009. Construction is projected to take 3 years, with project completion scheduled for 2012.

The overall SH 130 facility includes tolled mainlanes, frontage roads, tolling facilities, ramps connecting mainlanes to frontage roads, grade-separated cross street intersections, major highway interchanges and associated construction related to drainage, earthwork and utilities. The SH 130 mainlanes are high speed, access-controlled, and designed to interstate highway standards. Frontage roads, where present, are neither tolled nor access-controlled and are designed for lower travel speeds.

Tolling facilities within the SH 130 corridor include large mainlane plazas and smaller ramp-style plazas located at various entrances and exits to the mainlane facilities. Tolling facilities along
SH 130 typically include separate lanes for both cash and change, and all facilities are equipped for electronic toll collection via the TxTag system.

There are 8 major highway interchanges located throughout the SH 130 corridor, including:
- I 35 near Georgetown, Segment 1
- US 79 near Round Rock, Segment 2
- SH 45N near Round Rock, Segment 2
- US 290 near Austin, Segment 2
- SH 71 near Austin, Segment 3
- US 183 / SH 45 SE near Austin, Segment 4
- US 183 near Lockhart, Segment 5
- I 10 near Seguin, Segment 6

In addition to these major highway intersections there are also 33 smaller intersections with local and county roads, smaller state highways and farm to market (FM) roads. All those smaller roads are grade separated from the SH 130 mainlanes where they intersect the alignment.

SH 130 also crosses five rail lines along the 89 mile alignment. Those rail lines include:
- Georgetown Railroad, Segment 1
- Union Pacific, Segment 2
- Capital Metro Transit Authority, Segment 2
- Union Pacific, Segment 6
- Union Pacific, Segment 6

A provision has been made whereby the existing UP single track (which intersects the SH 130 corridor near the beginning of Segment 2, at the US 79 / SH 130 interchange) could be connected to a future rail line that would be built within the SH 130 median. No other direct connections have been provided to date, and any future connections to those lines would require construction of “flyovers” or comparable bridge elements to connect any of those lines.

2.1.1 Design Configurations

The plans for both SH 130 projects involve two different facility configurations, referred to as the Interim Condition and the Ultimate Condition. The Interim Condition reflects those elements to be constructed immediately; the Ultimate Condition incorporates TxDOT’s plans for future expansion of the facility. As of the writing of this report, TxDOT has not announced a specific timetable as to when expansion from the Interim Condition to the Ultimate Condition would occur. It is generally believed that Ultimate Condition expansion will occur when traffic demand demonstrates a need for such expansion.

Generally speaking, the Ultimate Condition expansion involves the addition of one or more lanes to mainlanes and frontage roads. There are also instances where frontage roads not present in the Interim Condition will be added for the Ultimate Condition. TxDOT has indicated that Ultimate Condition expansion may take the form of several individual, smaller projects completed over an extended time period as opposed to a single massive expansion project on a corridor-wide basis.

For the purposes of this SH 130 Fatal Flaw Analysis it is assumed that the Ultimate Condition is in place and any commuter rail system would need to be compatible with those facilities.
2.1.2 Requirements for Rail Compatibility

The SH 130 corridor was originally envisioned as a multi-modal transportation corridor. In order to accomplish that multi-modal classification, TxDOT placed certain requirements on the Developer of Segments 1-4 to provide a “rail compatible” corridor. Those segments were to be designed to accommodate the possible addition of a freight rail line down the center median of SH 130.

In order to demonstrate the feasibility of that potential freight rail line, the Developer was required to prepare a separate “Rail Compatibility Report” for each segment. Such reports included the establishment of a basic geometric alignment for a potential rail line and development of design cross sections at 1,000 foot intervals.

It should be noted that the requirement placed on the Segment 1-4 Developer was only to demonstrate that the proposed SH 130 design could accommodate a railroad alignment in the center median without requiring demolition and reconstruction of roadway elements. Since the actual construction project only involved building roadway-related facilities, priority was given to the roadway over the railway during the design process. This precedence took the form of designing the roadway for maximum efficiency, either in terms of minimizing construction costs or operational aspects, while simply verifying that a freight rail line could be constructed around that roadway alignment. Considerations relative to construction costs or operational aspects of the potential rail line were not a contractual requirement.

The Developer of Segments 5 and 6 is not under a similar contractual requirement to provide a rail compatible corridor. And while TxDOT has indicated that they are currently negotiating with that Developer to modify part of their design to accommodate rail through part of the SH 130 / SH 4S SE interchange, TxDOT does not plan to renegotiate other terms of their Segment 5 & 6 contract to make it rail compatible.

2.2 SOURCE DOCUMENTS

With construction on Segments 1 through 4 having already been completed, and Segments 5 and 6 still in the pre-construction phase, there is a vast difference in the amount of available information for the north and south ends of the corridor. Given the discrepancy in the amount of reliable information available at the time of writing, the bulk of the analysis contained within this report is based on information available for Segments 1 through 4.

The primary source of information for Segments 1 through 4 are certified Ultimate Condition Schematics. These schematics have been updated to reflect any design changes that occurred during construction and they represent an up-to-date view of the ultimate SH 130 build out. These schematics contain roadway geometric alignment data, profiles, right of way limits and structures. They do not contain detailed information regarding bridges or other structural elements that were constructed.

For Segments 5 and 6, the available information is limited to conceptual schematic drawings that are at an approximated 30%-60% level of development. These drawings provide lane configuration details and a graphical illustration of what the facility will look like, including geometric alignment data, R.O.W. information and profile grades. They do not include any bridge or other structural details. Since the project is still in development, information shown on these drawings is subject to change, however, as they proceed to the 90% and 100% stages, design features will become fixed.
As mentioned previously, the Segment 1-4 Developer was required to prepare rail compatibility reports. Copies of these reports were obtained and reviewed for preparation of this report. All state that “the corridor has been designed to accommodate freight rail in the median of SH 130”. No such reports exist for Segments 5 and 6 as rail compatibility is not a specific contract requirement of the Segment 5-6 Developer. In fact, whereas design criteria for Segments 1-4 included extensive detail of how future rail construction was to be accommodated, Section 14 of the Design Criteria for “Rail Design” for Segments 5 & 6 simply states “NOT USED”.

All documents relative to SH 130 were obtained from TxDOT.
SECTION 3.0 - DESIGN CRITERIA

3.1 HIGHWAY

The governing roadway design criteria on both SH 130 projects are based on applicable TxDOT design standards. The primary source of design guidance is the TxDOT Roadway Design Manual (RDM).

The design elements deemed critical to the evaluation as to the feasibility of adding commuter rail to the SH 130 corridor include alignment geometry, bridge clearances and clear zone requirements. The table below summarizes the design criteria utilized for Segments 1 through 4.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Mainlanes</th>
<th>Frontage Roads</th>
<th>Ramps</th>
<th>Direct Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Desirable Horizontal Degree of Curvature</td>
<td>3°</td>
<td>10°</td>
<td>4°</td>
<td>4°</td>
</tr>
<tr>
<td>Maximum Desirable Profile Grade</td>
<td>3%</td>
<td>7%</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>Clear Zone</td>
<td>30 feet</td>
<td>16 feet</td>
<td>16 feet</td>
<td>30 feet</td>
</tr>
<tr>
<td>Vertical Clearance Over Roadway</td>
<td>16 feet 6 inches</td>
<td>16 feet 6 inches</td>
<td>16 feet 6 inches</td>
<td>16 feet 6 inches</td>
</tr>
<tr>
<td>Vertical Clearance Over Railroad</td>
<td>23 feet</td>
<td>23 feet</td>
<td>23 feet</td>
<td>23 feet</td>
</tr>
</tbody>
</table>

While design criteria for Segments 5 & 6 were similar, the category of “Vertical Clearance OVER Roadway”, as defined for Segments 1-4, was revised to read “Vertical Clearance OVER/UNDER Roadway” for Segments 5 & 6. This subtle change decreased the amount of vertical clearance the Developer must provide under overpasses, and effectively eliminates the clear envelop for rail construction that Segments 1-4 had provided.

3.2 COMMUTER RAIL

Separate commuter rail design criteria was not developed that would apply to a line constructed in the SH-130 corridor. Rather, it was assumed that such a line would utilize equipment similar to the type used for the original A-SA commuter line study.

It should be noted that the original design criteria is typical of commuter rail design and operations based on AREMA guidelines. Typically, most commuter railroads run on track often acquired from, or shared with, operating freight railroads. While AREMA criteria goes into great detail regarding track gradients, curvature, operating speeds, super-elevation allowances, etc., it is typically limited to criteria required for freight operations when joint use is being considered.

Whereas most freight rail operations limit profile grades to between 1-2% and minimum curve radii to approximately 1,300 feet, equipment designed specifically for commuter rail operations is typically capable of negotiating vertical grades as high as 6 or 7 percent, and horizontal curves with minimum radii of 250 to 300 feet in extreme cases. For example, equipment that is being procured for the Austin Commuter Rail operation by Capitol Metro is provided by Stadler. While that system will run on freight railroad tracks, the equipment itself is capable of negotiating vertical grades of 6-8 % and curves with radii as little as 300 feet..
Given that the SH 130 mainlanes have a maximum 3% vertical grade and a 3° minimum horizontal curvature, it is concluded that the corridor as designed for all six segments will accommodate commuter rail operations with minimal physical modifications to the base alignment relative to profile grade and horizontal curve layout.

Segments 1-4 criteria required clearances of 23'-0" over railroads and 26'-6" over electrified light rail. Criteria for Segments 5 & 6 do require a clearance of 23'-0" over railroads, but since the requirement for “rail compatibility” in Segments 5 & 6 was eliminated, those clearances were only applied at locations where new roadways passed over existing railroads. There was no consideration given to construction of a new railroad underneath structures that are being built over highway lanes constructed as part of those Segments.

It is important to note that original design studies for the ASA commuter rail project anticipated the use of bi-level coaches having approximate heights of 18 feet. While clearance requirements imposed on Segments 1-4 (23'-0") would accommodate such cars, the 16'-6" clearances used under bridges in Segments 5 & 6 would not do so.

The SH 130 Rail Compatibility Reports assumed a double track configuration with a desirable section width of 56 feet, 50 feet as a minimum. These assumptions are considered to be reasonable and appropriate for commuter rail use, therefore this report uses the 56 foot desirable section width in the evaluations of the alignment alternatives described above. The graphic below, taken from the SH 130 Rail Compatibility Reports, provides an illustration of the typical section for a double track alignment.
SECTION 4.0 - COMMUTER RAIL ALIGNMENT ALTERNATIVES

The SH-130 corridor consists of an interstate-quality, divided highway facility, with intermittent frontage roads on either side of the mainline pavements. SH 130 is a tollway project, thus toll ramps and major toll plazas are also found intermittently throughout the corridor. Project right-of-way limits are beyond the frontage roads. There are free-flow interchanges at intersections where the corridor crosses major highways.

Originally conceived as a multimodal corridor, the highway cross section purposely provided a median wide enough that could be used as a rail corridor. In addition to building commuter rail in the median, this study also considered two other alternate locations where a commuter rail alignment might be constructed within the SH-130 corridor: since the corridor is relatively wide, consideration was given to locating tracks between the frontage road and the right-of-way limit; a third alternative considered placing tracks between the mainlane pavement and the frontage road.

4.1 OPTION 1 – MEDIAN

The simplest approach would be to build tracks directly in the median, in accordance with the concept for a rail compatible corridor required of the Segment 1-4 Developer. In the Ultimate Condition a center median width of 103 feet is provided throughout the entire length of Segments 1-4, and also in Segments 5 & 6. This median width is sufficient to accommodate the double track commuter rail alignment discussed in Section 3.2. The graphic below shows a cross section of a double track alignment in the center median.

As mentioned previously in this report, the Segment 5-6 Developer is not under a similar requirement to provide a rail compatible corridor down the center median. However, the conceptual schematic drawings available as of the writing of this report indicate that a center median width of 103 feet, or greater, will be provided throughout Segments 5 and 6. Assuming the design concept does not change significantly from what is shown on the conceptual schematic drawings, the width provided in the Segments 5 and 6 median still has the potential to be a viable commuter rail corridor.

With the Option 1 alignment matching the concept that SH 130 designers used in preparing the Rail Compatibility Reports for Segments 1-4, it is obviously a viable candidate alternative. A more detailed evaluation as to the potential constraints associated with this median alignment option as they relate specifically to commuter rail can be found in the next chapter.
4.2 OPTION 2 – OUTSIDE FRONTAGE ROAD

The second possible alignment alternative considered would involve placing the commuter rail tracks outside of one of the frontage roads, while still inside the SH 130 ROW.

It should be noted that while frontage roads are present along the majority of the SH 130 corridor, there are some locations along the corridor where there will be no frontage roads. In locations where frontage roads are not present, the commuter rail alignment under this Option 2 would continue to run in between the ROW line and the outer-most pavement. Depending on the specific location, that outer-most pavement could be a mainlane, a ramp or a toll plaza. The type of pavement adjacent to a potential commuter rail line is not a factor in this study.

Placement of a commuter rail line in this location presents several obstacles. The most important obstacle is the availability of sufficient right-of-way throughout the corridor. During the development of SH 130, both TxDOT and the Developer had strong incentive, both financial and political, to minimize the amount of private land taken for the project. With the center median already having been identified as the location for a potential rail line, the incentive to reduce ROW limits resulted in the ROW line being pulled in as close to the frontage roads as possible. TxDOT design criteria identifies a desirable 48 foot distance between the ROW line and the outer-most travel lane. For large sections of the corridor this minimum distance is maintained, although there are isolated instances where ROW constraints reduce that distance to less than 48 feet. The frontage road clear zone renders 16 of the 48 feet unavailable for commuter rail use. The remaining 32 feet does not allow sufficient width for a double track commuter rail
alignment, especially considering that roadside ditches also need to be located in that remaining space.

Another severe complication to the Option 2 alignment is the number of driveways and minor intersecting streets which connect to the frontage roads. Every individual driveway and minor intersecting street presents an at-grade crossing that would need to be dealt with. To avoid at-grade crossings, a bridge would need to be constructed at each interchange and roadway intersection in order to carry the commuter rail line over such features. The result would be a “roller coaster” rail profile and extensive structure costs.

As mentioned in Section 3.1 of this report regarding roadway design criteria, the vertical frontage road profile grades are also allowed to reach 7%. While 7% frontage road profile grades are not common in the corridor, and the anticipated commuter rail equipment would be capable of handling such grades where they do exist, the steeper grades do present one more operational condition that would be less favorable than the Option 1 Median Alignment.

At major interchange locations, i.e. SH 130 @ US 290, the configuration of connector ramps would effectively block construction of a rail line at this location. Bridge piers, support columns, and retaining walls that carry those connector ramps were built in such locations that they disregarded construction of a rail corridor, and there is no corridor available for a rail line.

When examined in total the constraints described in the paragraphs above represent a “fatal flaw” condition. As such, Option 2 can be removed from consideration and further discussion is not required.

4.3 OPTION 3 – BETWEEN SH 130 MAINLINE AND FRONTAGE ROAD

A third alignment option considered placement of the commuter rail alignment between the mainlane pavement and the adjacent frontage road. In most tangent sections of the corridor, there is significant space in which tracks could be constructed. Overall, however, the constraints facing this alignment option are even more severe than the constraints facing the Option 2 alignment.

TxDOT and AASHTO design criteria specifically prohibit at-grade rail crossings along ramps, thus the commuter rail line would need to be grade separated at every ramp location encountered. Unlike traditional grade separations where an angle of intersection close to 90° keeps structure lengths to a minimum, the angle of intersection between the commuter rail alignment and the entrance/exit ramp would be closer to 5°. This low angle of intersection would add literally thousands of feet to each bridge structure required to grade separate the commuter rail line and individual entrance and exit ramps. These lengthy, and heavily skewed, bridge structures present significant design challenges since bridge columns or other structural members would have to be placed in or around roadway clear zones and driver lines of sight. Complicating matters even more, several ramps within the corridor are tolled. These tolled ramps are equipped with booths and gantries which can require upwards of 20 feet of additional vertical clearance that bridges would have to go over.

The major multi-level freeway interchanges found within the corridor present serious conflicts between the Option 3 alignment and elevated direct connectors where no provision has been made to allow a rail corridor to fit between existing bridge columns. One such interchange is
the SH 130 / US 290 interchange. As can be seen from the illustration below, the Option 3 alignment faces numerous conflicts with various elements of that interchange, i.e. piers, columns, etc., similar to Option 2. Retaining walls present another major obstacle. At virtually every underpass where SH 130 passes below a crossing street retaining walls are present at the bridge abutments. With the mainlanes passing beneath the crossing road and the frontage roads being at a higher elevation where the crossing road intersects, these retaining walls would be directly in the path of the Option 3 alignment.

The Option 3 alignment can be considered “fatally flawed” as a result of the conflicts that would be created between the commuter rail alignment and the entrance and exit ramps connecting the mainlanes and frontage roads, and the structural conflicts at major intersections.
SECTION 5.0 - CONSTRAINTS

This section discusses in further detail the various constraints that apply if Option 1, the median alignment, were to be implemented. If significant enough to cause major operational or construction cost limitations, such constraints might be considered “Fatal Flaws” that would effectively eliminate the Option 1 alignment from consideration as a viable alignment. Although any one constraint might not be significant enough to eliminate the alignment option, that constraint, when combined with others that might also apply, could be considered “fatal”.

5.1 GEOMETRY

As mentioned earlier, the SH-130 project was originally conceived as a multi-modal corridor that could ultimately be available both for roadway and for freight rail alignments. The rail compatibility studies prepared for Segments 1-4 presumed that typical freight rail design criteria would apply to the potential rail line and, that adjacent roadway facilities would follow typical roadway design criteria. With two separate sets of design criteria being used to design two separate transportation modal facilities within the same corridor, complications between the roadway and railway were frequently encountered.

For Segments 1-4, virtually all of the complications between the two sets of design criteria are related to vertical profiles. Mainlane profile grades were allowed to approach 3%, whereas the maximum accompanying freight railroad grades could not exceed 1.5%. This meant that the two profiles would not run parallel to each other, often resulting in significant elevation differences between the rail line and the mainlanes. Because a significant portion of the terrain within the SH 130 corridor consists of rolling hills common to the central Texas area, there are several instances where the elevation difference between the freight rail alignment (as identified in the rail compatibility reports) and the adjacent mainlanes approaches 40 to 50 feet. While detailed designs were not performed for those reports, designers presumed that the rail trackbed would be either built up on earth embankments, placed between retaining walls, or on elevated structures. Where the rail profile fell significantly below the adjacent mainlane profiles the track cross section would be built as a depressed section between retaining walls.

An example of one such location where the difference between the roadway profile and the railway profile result in a significant elevation difference is found in the graphic below. This graphic has been copied from the Segment 4 Rail Compatibility Report.
Fortunately, the design criteria for commuter rail, allows a much steeper vertical grade than for freight rail. As detailed in Section 3.2 of this report, the commuter rail equipment in use today can negotiate 3% profile grades with ease. This will allow the commuter rail profile to closely parallel the adjacent mainlane profiles, which will significantly reduce the drastic grade and elevation differentials shown in the Segments 1-4 Rail Compatibility Reports.

The center median must also be free from obstructions for a commuter rail line to be feasible along this alignment option. In order to comply with the rail compatibility requirements, the design engineers for Segments 1-4 adjusted the span lengths of overpassing bridges so as to maintain adequate horizontal clearance within the median by keeping bridge columns out of conflict. The graphic below, taken from the Segment 1 Ultimate Schematic, illustrates a typical example of such a structure.
Tolling facilities are present throughout the SH 130 corridor. Whereas the ramp toll plazas which presented a huge complication for the Option 2 alignment, making it fatally flawed, the ramp toll plazas are not a concern to the Option 1 median alignment. There are six mainlane toll plazas located throughout the corridor, one per segment. In accordance with the rail compatibility requirements, the mainlane toll plazas were designed so as to not place any obstructions within the center median. The mainlane toll plaza found in Segment 2 is illustrated below. As can be seen from the illustration the center median remains free and clear of any obstructions.
This median section construction was thought to be workable, even in such instances where Toll Road features could potentially cause conflicts. For example, in Segment 3, at Station 2220+00, where a service center was projected to be located inside the median area at some point in the future, that section of highway was designed to allow construction of the service center without preventing track construction in the future. The median was simply widened in that area, as shown in the graphic below.

SH-130 intersects several other major highways within Segments 1-4. At US 79, SH 45 N, US 290 and SH 71 the multi-level interchanges were designed to allow the rail corridor to pass over or beneath multiple levels of highway mainlanes, frontage roads and elevated direct connectors without interference from bridge columns supporting elevated structures. However the two
interchanges at the northern and southern ends of the Segment 1-4 project have certain complications which could present a fatal flaw to the median alignment.

The SH 130 / I-35 Interchange is located approximately three miles north of Georgetown and is the northern terminus of Segment 1 and of SH 130. Here, elevated direct connectors tie the SH 130 mainlanes to the I-35 mainlanes. I-35 does not contain a median suitable for use by commuter rail. Because of the way the roadway grades are configured at this interchange, it is impossible to continue the median alignment out of the SH 130 corridor, through the interchange, and into the I-35 corridor without incurring massive construction costs. The rail corridor effectively “dead ends” at this interchange. The absence of any kind of defined rail corridor within the I-35 corridor prompted TxDOT to exclude this interchange from the rail compatibility requirements.

Since Georgetown is the northernmost community to be serviced by the proposed ASAICRD commuter line, the difficulties associated with continuing commuter rail through the SH 130 / I-35 Interchange do not represent a fatal flaw to those current plans for commuter rail service. As stated earlier, however, it is important to note that the northern end of SH 130 is, for all practical purposes, a “dead end” should ASAICRD ever decide to use the SH 130 corridor for commuter rail service AND have future plans to extend service to communities further north. Continuation of the commuter rail line north from this point would require extensive bridging to carry the rail alignment out of the SH 130 corridor onto new right-of-way that would need to be acquired at that time.

At the south end of Segment 4, there is an intersection with SH 45 S, a separate design-build project just nearing completion of design. SH 45 S will effectively run east-west, and would connect the SH-130 corridor with I-35 south of Austin. The segment boundary between SH 130 Segments 4 and 5 is located just south of this interchange and that point also represents the boundary of the two separate SH 130 projects. Similar to SH 130 Segments 1-4, the SH 45 S corridor has been designed to accommodate a rail line within the center median. This is noted for information purposes only as the SH 45 S corridor does not achieve the purpose of a commuter rail line between Austin and San Antonio. Additionally, current design has made no provision to connect the SH 45 S corridor to the existing UP corridor that is located east of I-35.

As mentioned previously in this report, Segments 5 and 6 do not have the same rail compatibility requirements that were enforced for the Segment 1-4 project. As a result, the SH 130 – SH 45 S interchange design does not continue the median running rail corridor through that interchange southward along the continuation of SH-130. There is no requirement placed upon the Segment 5-6 Developer to insure that the first intersection in Segment 5 be constructed in a manner that insures an unobstructed continuation of the rail corridor through the SH 45 S interchange, i.e. the developer is not prevented from placing piers in that interchange that would obstruct the rail corridor from passing through. As a result, according to 30% level design plans, direct connector bridges effectively block rail corridors that would connect SH 130 from the north to SH 45 to the west, or SH 130 from the north to SH 130 to the south.
According to staff, TxDOT is currently re-negotiating that Developer’s segment contract to insure the rail corridor in SH 130 can continue through that interchange to SH 45. And the changes being negotiated will only require the redesign/reconfiguration of certain bridge piers to
create a horizontal clear space to allow rail to pass through. There are no similar negotiations or redesign efforts underway that would enable rail to flow through that interchange along the SH 130 centerline.

The rail corridor that would result would connect the UP tracks at US 79, run south in the median of SH 130, and reconnect to the UP tracks that were part of the LPA. While that corridor would provide a freight bypass of Austin, it would not provide a viable commuter rail corridor. It is unclear whether or not TxDOT has created this US 79 to SH 130 to SH 45 S freight rail corridor with input and support from the UP; or if TxDOT was acting unilaterally in deciding to create this “East Austin Freight Rail Bypass” at the urging of political bodies simply to reduce the number of freight rail incidents that occur in heavily populated areas (see headline below).
It should be noted though that the conceptual schematic drawings obtained from TxDOT for preparation of this report do show a continuous 103 foot wide median, identical to the ultimate condition median width present in Segments 1-4. This fact, combined with the commuter rail design criteria which allows a commuter rail profile to “mimic” a highway mainlane profile, does suggest that it is possible that the Option 1 median alignment might be feasible through Segments 5 and 6 from a perspective of width.

Because rail compatibility is not contractually required for Segments 5 & 6, vertical clearance requirements under bridges are less than were required in Segments 1-4. It is practical to presume that rail profiles would nearly parallel the highway profile, and therefore, the clearance for rail would be near that same 16'-6”.

Conceptual design studies for the commuter rail project assumed the use of double deck rail cars with heights in the range of 18 feet. Thus clearances under bridges in Segments 5 & 6, as they are currently designed, may be inadequate. While at some locations (i.e. at bridges carrying side roads over SH 130), it may be possible to simply lower the grade of the rail line, at locations where there are highways both above and below the potential rail line, (i.e. at complex interchanges such as with SH 45 S and US 183), it may be impossible to lower the rail grade due to the impacts that would have on roadways underneath.
The combination of bridge obstructions in the SH 45 S interchange (and perhaps the US 183 interchange), coupled with potential inadequate vertical clearances under bridges in Segments 5 & 6, make the design of a commuter rail line in SH 130 fatally flawed.

5.2 RIGHT OF WAY

With the Option 1 alignment running within the SH 130 center median alignment, all ROW required for the construction of the commuter rail line itself has been, or will be, acquired as part of the SH 130 construction projects. The 103’ center median is wide enough to accommodate a double track alignment as well as a station platform in between the two lines. However, it is important to note that it will be necessary to acquire ROW at the individual station locations in order to provide space for parking areas, bus stops, buildings and any other station-related facilities that will not fit within the center median of SH 130. Any maintenance or yard facilities will also require additional ROW to be obtained from somewhere outside the SH 130 ROW.

While the need to obtain ROW for station, maintenance and yard facilities does present a potential complication, especially in areas where development is already occurring rapidly, this concern is not felt to represent a “fatal flaw” at this time. Currently, development is occurring most rapidly in Segment 2. However as traffic volumes on SH 130 continue to rise, development along the entire length of the corridor will increase, making the locating of stations more difficult and more expensive.

5.3 COMPATIBILITY AND/OR CONFLICT WITH OTHER RAILROADS

The SH 130 corridor intersects five separate rail lines along the 89 mile alignment. A brief description of each rail line intersecting the corridor is found below.

Georgetown Railroad: The Georgetown Railroad is a shortline freight rail carrier offering connecting service to Union Pacific. The Georgetown RR intersects the SH 130 Corridor in Segment 1, approximately ¼ mile south of the SH 130 / FM 971 intersection.

Union Pacific, Austin Subdivision: The UP Austin Subdivision runs parallel, and directly adjacent to, US 79 intersecting Segment 2 of the SH 130 corridor just west of Hutto. As part of the Segment 2 Rail Compatibility Report, TxDOT included a rail spur connection between the Austin Subdivision and the conceptual freight rail alignment running in the SH 130 median. This is the only rail crossing within the corridor where such a connection was included. That particular connection would allow trains running northbound through the SH 130 corridor to access the Austin Subdivision heading eastbound. With Round Rock, I-35 and the LPA
alignment all to the west of the SH 130 corridor, it does not appear this connection would provide any benefit to the commuter rail alignment. It would, however, provide a location where the commuter rail track could exit the SH 130 median without the need to construct an extensive elevated structure. Coupled with the rail corridor that SH 45 will include, the combined trackage would provide a freight bypass of the Austin area.

Capital Metro Transit Authority: The CMTA owns an inactive rail line that crosses the SH 130 corridor approximately ½ mile south of the SH 130 / US 290 interchange. This location is within Segment 2 of SH 130.

Union Pacific, Lockhart Subdivision: The UP Lockhart Subdivision is found in Segment 6. This line crosses the SH 130 corridor approximately ¼ mile north of the intersection between SH 130 and SH 142.

Union Pacific, Flatonia Subdivision: The UP Flatonia Subdivision intersects the SH 130 corridor approximately ¾ mile north of the intersection of SH 130 and US 90. This intersection occurs in SH 130 Segment 6.

Of the railroads above, only the Union Pacific Flatonia Subdivision, found in Segment 6, requires a connection in order to facilitate the commuter rail alignment. This connection is at the south end of the corridor, near the terminus of SH 130. Such a connection would be required in order to complete the commuter rail connection to San Antonio, since the SH 130 corridor terminates at I-10 near Seguin. This connection will be discussed in greater detail later in this report.

All the other rail lines listed can be bypassed with grade separations, thus avoiding any construction or operational conflicts between those railroads and the commuter rail line. With no such conflicts to be dealt with, there are no fatal flaws relative to this issue. However, other than the UP tracks at US 79, connecting to any of these lines would require the construction of significant bridge structures to carry the SH 130 rail line out of the median toward any of those tracks.

5.4 DRAINAGE

Ditches located within the median serve as the primary drainage features for the SH 130 corridor. The construction of a commuter rail alignment within the median would require some of these ditches to be filled in with subgrade and ballast. This would require additional earthwork to reconstruct these ditches between the rail line and the mainlanes. Additional drainage structures beneath the commuter rail line would also be required at certain locations. In Segments 5 & 6, drainage culverts extend well into the SH 130 median; therefore, construction of a track at those locations would require those culverts to be modified extensively. These drainage and structure related issues would add to the construction cost of the commuter rail project, but the issues are not considered to be “fatal”.

SH 130 Fatal Flaw Analysis
SECTION 6.0 - ENVIRONMENTAL CONCERNS

This report presumes that the environmental documentation that was prepared for the SH-130 project was sufficient to address any rail-related construction that would occur, as long as it was contained within the right-of-way limits already addressed for that project. If, however, such construction were to occur outside those limits, it is possible that additional environmental clearances would need to be obtained.

Such occurrences would potentially include:

- Station locations, where parking and station access facilities would be outside existing SH-130 ROW
- Potential yard or maintenance shop facilities
- Along the existing UP freight rail corridor, which provides the south end connection between Seguin and San Antonio
- At major highway intersections along SH-130, if a rail line were to be constructed outside the frontage road, requiring the purchase of additional right of way in order to accomplish that construction.

While an in-depth analysis of potential environmental concerns has not been performed, given the preliminary nature of this report, experience on similar commuter rail projects has been referred to. It is the opinion of this report that any environmental concerns can either be eliminated or mitigated. Accordingly, environmental issues are not perceived to represent a “fatal flaw” that would affect the feasibility of placing commuter rail within the SH 130 corridor.
SECTION 7.0 - STATION LOCATIONS

The station locations established for the original Austin-San Antonio LPA were based on significant input from the various stakeholders along the original alignment. The I-35 corridor is heavily developed between San Antonio and Georgetown, and given the proximity of the LPA alignment to that development, 15 separate station locations are currently called for along the LPA alignment. Conversely, the SH 130 corridor is primarily rural in nature and free from development. Thus, with far less development than the I-35 corridor, fewer stations would likely be required to serve a potential SH 130 alignment.

ASAICRD has requested that this report identify and examine potential station locations for the following towns and cities; Georgetown, Round Rock, Austin, San Marcos, New Braunfels and San Antonio. Each of these six municipalities has at least one station along the LPA alignment and is also to have at least one station, or connection thereto, under an SH 130 scenario.

Given that the SH-130 corridor is located several miles east of the LPA and I-35, and away from the downtown areas, some stations will have to be located outside of the city limits of the cities they are meant to serve. Connections between the station locations and the downtown areas will require either connecting bus service, or access via personal vehicle.

7.1 CRITERIA FOR LOCATING

As with any typical highway bypass, the SH 130 alignment is located outside of the city centers found along I-35. While vehicular traffic can easily divert itself to SH 130 with relative ease, a passenger rail line through the SH 130 corridor must contend with the issue of rail stations not being located in close proximity to the central business districts of the towns which the line is to serve.

The effort to identify station locations along the SH 130 corridor involved the evaluation of several factors, including:

Proximity to central business district: A shorter driving distance between the potential station location and the central business district is more desirable.

Major thoroughfares: Potential station locations at intersections of SH 130 and high traffic thoroughfares are desirable.

Simplicity of travel path between station and CBD: Simple and easy to follow driving routes are desirable for vehicular traffic traveling between the station and CBD.

Additional features in proximity to station: Features such as airports, parks, schools, shopping areas and other towns that have potential to generate passenger rail traffic are identified.

Land availability/suitability: Availability and suitability of the land around the potential station location is desirable for purposes of passenger parking areas and bus stops.

Potential station locations are discussed in the following subparagraphs under Section 7.2. Maps showing those prospective station locations are provided for general orientation purposes only. No inference should be made as to which particular quadrant of an interchange that a
station would be located. Such details would only be determined following exhaustive contact with stakeholders, and a public involvement process that would solicit citizen input.

7.2 CBD CONNECTIONS

7.2.1 Georgetown

The intersection of SH 130 and SH 29 is one potential location for the Georgetown station. SH 29 is a 4-lane major thoroughfare passing through Georgetown. The proposed station location is approximately three miles from the CBD.

At the time of writing of this report, the land surrounding the intersection has not yet been developed and no significant obstacles have been noted that would prohibit placement of parking areas.

This proposed location lies within Segment 1 of SH 130.

7.2.2 Round Rock

Two potential station locations were identified for Round Rock, and both locations provide access to the central business district. The first location is at the intersection of SH 130 and US 79, a major thoroughfare passing directly through Round Rock. The distance between the proposed station location and the CBD along US 79 is approximately 9 miles.

Features of interest in close proximity to this location are the Dell Diamond minor league baseball stadium, the City of Hutto, and a Union Pacific Railroad line that runs along US 79.
The Dell Diamond is approximately 4 miles west of this location and the City of Hutto is approximately 2 miles to the east.

The second potential station location is at the intersection of SH 130 and SH 45N. Like SH 130, SH 45 N is a major access-controlled tollway facility. SH 45 passes along the south end of Round Rock and while it does not pass directly through the CBD, it is a high traffic facility with a direct connection to I-35. The I-35 / SH 45 interchange is approximately 5 miles west of this location. The City of Pflugerville, a rapidly growing suburban community, is approximately 2 miles from this location. Hendrickson High School is also located nearby.

Both potential station locations are located within SH 130’s Segment 2, which is the most “urban” portion of SH 130. While at the time of writing there is still undeveloped land at both locations, development in the vicinity is significant, and is occurring rapidly.

7.2.3 Austin

As with Round Rock, two separate potential station locations have also been identified for Austin. The first location is at the intersection of SH 130 and US 290. Driving distance from this location to downtown Austin is approximately 13 miles. The US 290 / I-35 interchange is approximately 7 miles to the west. This northern location is accessible to the towns of Manor (2 miles away) and Elgin (13 miles away), both located along US 290 to the east. This location is within SH 130 Segment 2.
The second potential Austin station location is at the intersection of SH 130 and SH 71, and is also approximately 13 miles from downtown Austin. The SH 71 / I-35 Interchange is approximately 9 miles east of this potential station location. This location would provide access to Austin Bergstrom International Airport, which is approximately 3 miles to the west along SH 71. This location is within SH 130 Segment 3.
Both potential Austin Station locations appear to have land available for station facilities at the time of writing. However, given the proximity to Austin, and the significant traffic volumes at these two interchanges the surrounding area is expected to develop quickly, making it difficult to obtain right-of-way for station facilities should the SH 130 commuter rail line not be constructed in the immediate future.

### 7.2.4 San Marcos

The intersection of SH 130 and SH 80 is a potential location for the San Marcos station. This intersection is approximately 13 miles from downtown and can be accessed directly from SH 80 which runs through San Marcos. This intersection is located along a rural section of the SH 130 alignment and features of note in the immediate vicinity are limited to two small towns; Fentriss, is approximately 1 mile away; and Martindale approximately 7 miles away. Given the rural nature of this area ROW acquisition should not be particularly difficult.

This potential station location is within Segment 5 of SH 130.
7.2.5 New Braunfels

A New Braunfels station could be located at the intersection of SH 46 and FM 78, near Seguin. SH 46 is a major thoroughfare into New Braunfels and the proposed station location is approximately 11 miles from the CBD. Downtown Seguin is approximately 2 miles from this location.

This location is outside of the SH 130 corridor, but is along the existing UP rail line that would connect downtown San Antonio to the SH 130 corridor. Development around this intersection is limited and obtaining right-of-way would not appear to be a problem.
7.2.6 San Antonio

As mentioned previously in this report, the southern terminus of SH 130 is located near Seguin, approximately 30 miles from downtown San Antonio. This report assumes that a proposed SH 130 commuter rail would connect to San Antonio via existing rail lines. Inside San Antonio city limits, the alignment would rejoin the LPA and then proceed to the station at Kelly-USA. A new location for a San Antonio station was not identified for this report.

Additional details regarding the southern end rail connection to San Antonio can be found in the next section of this report.
SECTION 8.0 - SOUTH-END CONNECTION

The southern terminus of SH 130 is to be located at a future interchange that is to be constructed where the corridor intersects I-10, northeast of Seguin. In order to complete the path into San Antonio from there, the commuter rail could utilize an existing Union Pacific line which intersects the SH 130 corridor just north of that SH 130 / I-10 interchange. This UP line is known as the Flatonia Subdivision. By following the Flatonia Subdivision westward into San Antonio, the SH 130 commuter rail alignment option can rejoin the original LPA alignment in the vicinity of downtown.

The Flatonia Subdivision is a major east-west thoroughfare along the Union Pacific rail network. This rail segment connects San Antonio and Houston, and is also part of the major transcontinental route between Los Angeles and New Orleans. This rail line sees significant freight rail traffic passing through, as well as significant switching operations in and around the Kirby Yard, through which the commuter rail line would need to pass. The operational interaction between freight traffic and commuter rail traffic would need to be studied in detail if the possibility of adding commuter rail to the SH 130 corridor is to be examined further. Since this report is intended only to serve as a preliminary analysis as to the feasibility of the concept, such detailed rail operational modeling has not been performed. For purposes of this report it is assumed that any operational concerns related to use of UP track between San Antonio and Seguin can be resolved and do not present a fatal flaw.
SECTION 9.0 - CONSTRUCTION COST ESTIMATES

Costs to build a commuter rail line along the SH 130 corridor from near Georgetown, south to Seguin, and from there continuing along existing rail lines to Kelly USA southwest of San Antonio, were developed at an “order of magnitude” level. Costs shown do not address any modifications that would need to be made to the SH 130 / SH 45 S interchange, or to any elements of Segments 5 & 6 as they are currently designed, in order to ensure they would support construction of a commuter rail system. Design documents that are currently available do not contain sufficient data to make such an analysis at this time.

Seven elements of cost were tabulated:

Track: (including rail, ties, ballast, subgrade, and drainage) = $ 1,900 million
Structures: (along the US 130 corridor and the UP Flatonia Subdivision) = $ 450 million
Stations: (six along US 130, one at Kelly USA) = $ 85 million
Vehicles: (rolling stock) = $ 140 million
Maintenance Facility: = $ 75 million
Maintenance Equipment: = $ 20 million
Right – of – Way: (stations, layover yard, maintenance facility) = $ 25 million

Total Project Cost = $ 2,695 million
SECTION 10.0 - CONCLUSIONS

Based upon the analysis described in the preceding chapters, it is the conclusion of this report that the SH 130 Corridor as it is currently designed could not support construction of a commuter rail line connecting the Austin and San Antonio metropolitan areas. This conclusion is based on the placement of a commuter rail line within the center median of SH 130 and the fact that, while Segments 1-4 are thought to be rail compatible, obstructions at the SH 45 S interchange, and inadequate vertical clearances at various locations throughout Segments 5 & 6 would prevent construction of such a rail system. If TxDOT is legally and financially capable of modifying the design now being advanced for Segments 5 & 6, then a rail line in the SH 130 corridor might be accomplished.

It should once again be noted that this report has only provided analysis as to the physical constraints related to the construction of a commuter rail line within the SH 130 corridor. Other than providing a preliminary construction cost estimate, no aspects related to the potential financial viability of the project have been examined.

Should ASAICRD wish to examine the concept of commuter rail line within the SH 130 corridor in greater detail, the following issues would need further examination:

- ASAICRD should coordinate with TxDOT as soon as possible to request that TxDOT take steps to ensure that the Developer for SH 130 Segments 5 and 6 take whatever steps are necessary to protect the center median for commuter rail use, including the SH 130 / SH 45 S interchange.
- A detailed analysis of the potential interaction between commuter rail traffic and freight rail traffic between Seguin and San Antonio should be performed, including some form of rail traffic modeling.
- Property needed to construct stations and other support facilities should be acquired as early as possible to ensure its availability before development occurs.
- Impacts affecting construction of a rail line inside the median of an operating toll road would need to be examined.
- The impact on ridership that placement of stations in the median would cause.
- Connectability of stations to CBD’s would require the creation of shuttle services.
- Shared use of the Flatonia Subdivision would require extensive negotiations with the operating railroad.
- Cost and potential funding sources.