

4.0 ROADWAY ASSESSMENT AND RECOMMENDATIONS

4.1 Design Criteria

The following publications were referenced for determining key design criteria in developing improvement alternatives to Kimberley Lane.

- City of Houston Department of Public Works and Engineering *Infrastructure Design Manual*, July 2009.
- City of Houston department of Public Works and Engineering *Standard Construction Details for Wastewater Collections Systems, Water Lines, Storm Drainage and Street Paving*.
- City of Houston Department of Public Works and Engineering *Standard Construction Specifications for Wastewater Collections Systems, Water Lines, Storm Drainage and Street Paving*, dated 2009.
- American Association of State Highway and Transportation Officials (AASHTO): *AASHTO Guide for Design of Pavement Structures*.
- American Association of State Highway and Transportation Officials (AASHTO): *A Policy on Geometric Design of Highways and Streets*, 2004 (Green Book).
- *Texas Manual on Uniform Traffic Control Devices*, 2006.

Geometric design criteria was established based upon the *City Infrastructure Design Manual*. The following is a summary of the geometric design parameters that will be incorporated in this project:

- Design Speed – 35 mph; Posted Speed – 30 mph
- Vertical curves will be used when the algebraic difference in grades exceeds 1 percent
- Crest and sag vertical curves will be designed according to the guidelines in *A Policy on Geometric Design of Highways and Streets* by AASHTO
- Minimum grade along the outside gutter will be 0.30 percent.
- Minimum gradient around intersection turnouts will be 1 percent.
- Pavement headers will be used at the end of all concrete pavements.
- Horizontal dowel bars shall be used when meeting existing concrete pavement that has no exposed steel.
- Minimum cross slope of pavement will be ¼ inch per foot.
- Sidewalks will conform to the latest requirements of the American with Disabilities Act.
- Expansion joints will be placed at a maximum of 80-feet.
- Construction joints will be used when pavement is wider than 24-feet in accordance with City requirements.

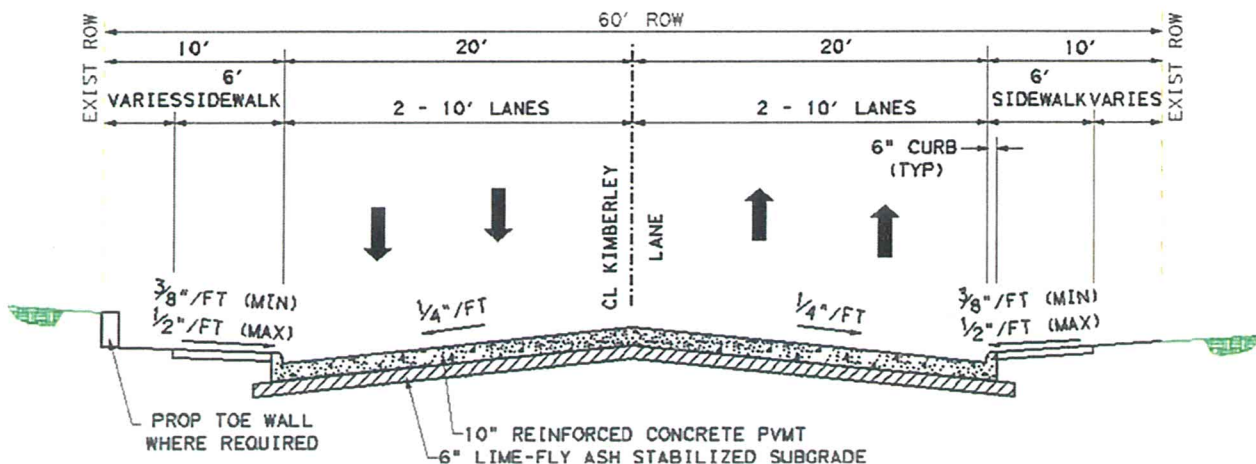
4.2 Potential Improvement Alternatives

Various roadway alternatives for Kimberley Lane have been developed based on the findings determined in this study, as well as the previous recommendations from the *Kimberley Lane Drainage Improvements Preliminary Engineering Report*, dated May 2009. The drainage analysis recommends the Kimberley Lane pavement be raised approximately 6-inches to mitigate excessive roadway ponding, thus, requiring complete pavement reconstruction to improve existing drainage conditions. Recommendations from the previously completed *East-West Mobility Improvement Study*, dated October 2006, were also reviewed. The East-West Study evaluated Kimberley Lane at the Beltway 8 intersection using Syncro 6, to provide recommendations to improve operating conditions. While PM operating deficiencies were identified for both westbound and northbound thru movements, no recommendations were made to improve the intersection due to the existing right-of-way constraints and existing development impacts. Right-of-way acquisition would prove to be cost prohibitive due to the negative impacts to adjacent businesses and large mature trees; therefore, no operating or capacity improvement alternatives were considered in this study. The following provides a description of the recommended feasible roadway alternatives. Preliminary construction cost estimates for each alternative can be found in **Appendix A**.

4.2.1 Roadway Alternative 1 – Full Width Pavement Reconstruction

Alternative 1 proposes complete roadway reconstruction. The roadway will be replaced to its existing geometric condition of 40-foot width, striped for two 10-foot lanes in each direction. The pavement will also be elevated by 6-inches as recommended in the drainage portion of this report. **Figure 4.1** shows the proposed typical section on Kimberley Lane for Alternative 1.

Figure 4.1 - Roadway Alternative 1: Proposed Typical Section



Kimberley Lane will tie into the Beltway 8 Northbound Frontage Road and Town and Country Boulevard matching the existing geometric conditions. The intersection approach at West Bough Lane will be widened to 40-feet to accommodate for the planned future improvements along West Bough. Special construction methods must be used on West Bough due to the close

proximity of the adjacent parking garage and office building located along the eastern right-of-way. An exhibit which illustrates the proposed improvements on West Bough is located in **Appendix D.4** and **Appendix D.5**. Asphalt pavement will be used to transition the proposed 40-foot approach pavement on West Bough to its existing configuration of 20-feet.

Driveways along the project alignment will be removed and replaced at their existing locations with standard City of Houston driveway radii. In some locations, the existing driveways must be replaced past the right-of-way limits to provide a smooth transition and mitigate drainage impacts resulting from the change in grade. This includes the Town & Country Blvd intersection driveway, which requires regrading approximately 50-feet beyond the existing right-of-way line.

Existing pedestrian facilities will be added and/or replaced to meet ADA requirements along the entire project limits. This will require the construction of small toe walls at many locations to meet existing elevations along the right-of-way and minimize impacts to existing trees. Several existing hardscape improvements have recently been constructed including brick paver sidewalks and concrete retaining walls along Kimberley Lane. Every effort will be made to preserve and minimize reconstruction of these improvements during Phase II Design. Several large mature trees exist in close proximity to the existing curb line along Bendwood Elementary School and Pines Presbyterian Church. In order to preserve these trees, it is recommended that the existing sidewalks which are located outside of the right-of-way limits be replaced at their existing location, which will require a sidewalk easement. Additional right-of-way or roadway easements will be required for this alternative at 6 intersection corners to accommodate pedestrian facility improvements. A preliminary Proposed Right-of-way/Roadway Easement exhibit can be found in **Appendix D.3**.

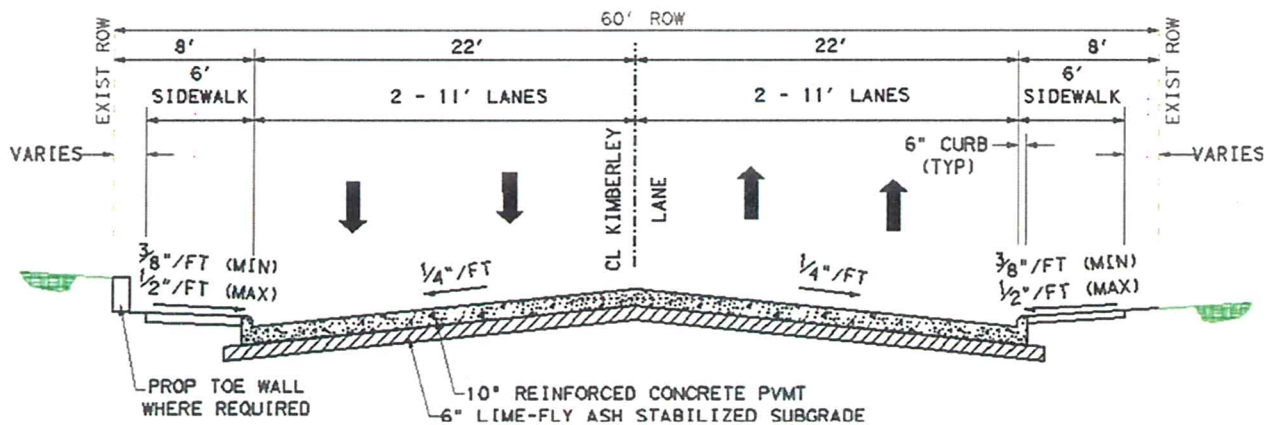
The traffic control plan and construction sequencing will require multiple phases during construction to reduce impacts to adjacent properties and minimize construction time. The conceptual construction phasing and detour plans can be found in **Appendix D.6** and **D.7**. Phase I will begin at the Beltway 8 Northbound Frontage Road intersection and end at Town & Country Boulevard. To expedite construction time, lanes will be blocked for both eastbound and westbound traffic on Kimberley Lane. Eastbound traffic on Kimberley will be temporarily detoured north to Queensbury and south on Town & Country Boulevard to Kimberley Lane. Kimberley westbound traffic will be temporarily detoured south on West Bough, west on Memorial Drive and north on Beltway 8 Frontage Road to Kimberley Lane. Phase II will construct the western half of the Town and Country Boulevard intersection. The detours for Phase I will remain in place; however traffic on Town & Country Boulevard will be reduced to one lane in each direction at the Kimberley intersection. Phase III includes two steps to construct the eastern half of the Kimberley and Town & Country intersection. The westbound detour will remain in place to allow one eastbound traffic lane during construction. Phases IV and V will construct Kimberley Lane between Town & Country and West Bough. During this phase, one 14-foot lane will remain open for eastbound traffic and the detour for westbound traffic on Kimberley Lane from Phase I will remain in place. Phase VI includes the construction on Kimberley Lane at West Bough and will complete the construction activities. This phase will have 3 steps. One eastbound traffic lane will remain open, while westbound traffic will be detoured south on Hallie Drive, east on Old Oaks Drive, west on Memorial Drive and North on Beltway 8 Frontage Road to Kimberley Lane. Phases IV thru VI are scheduled to be completed

in the summer months to reduce impacts to school traffic. Coordination with adjacent property owners, Spring Branch Independent School District, and Pines Presbyterian Church will be conducted to minimize impacts during construction.

4.2.2 Roadway Alternative 2 – Full Width Pavement Reconstruction and Widening

Alternative 2 also proposes complete roadway reconstruction with minimal widening to provide four 11-foot lanes. A design variance from the City of Houston City Engineer to allow for a nonstandard 8-foot border distance between the curb and right-of-way line is recommended versus right-of-way acquisition to accommodate the additional lane widths while minimizing impacts to the existing trees and adjacent development. The intersection of Kimberley Lane and Beltway 8 Northbound Frontage Road will be enhanced due to the widening by providing two striped lanes in each direction, matching the existing four lane configuration along Kimberley Lane west of the frontage road. The intersection of Kimberley Lane and Town and Country Boulevard, as well as bus access to Bendwood Elementary School will also be improved with two striped thru lanes in each direction. This alternative does impact some additional trees due to the widening. **Appendix G** provides a more detailed inventory of the existing trees and the potential impacts associated with each proposed alternative. Pedestrian facilities and traffic control plans will be designed as described in Alternative 1. **Figure 4.2** shows the proposed typical section on Kimberley Lane for Alternative 2.

Figure 4.2 - Roadway Alternative 2: Proposed Typical Section



4.3 Recommended Roadway Improvements

Roadway recommendations are based on roadway geometrics, pedestrian facilities and construction cost, as well as the recommendation from the *Kimberley Lane Drainage Improvements Preliminary Engineering Report*, dated May 2009. The impacts to right-of-way, trees, and underground utilities have all been considered for each option. Roadway Alternative 2 is the most reasonable and feasible alternative for Kimberley Lane between Beltway 8 Northbound Frontage Road to 400-foot east of Town and Country Blvd. This alternative will provide improved mobility and safety along Kimberley Lane while minimizing impacts to adjacent property and trees. Due to the presence of large mature trees in the Bendwood



Elementary School and Pines Presbyterian Church vicinity, it is recommended that the pavement transition to Roadway Alternative 1 at the second driveway of Bendwood Elementary School. The 40-foot pavement section is proposed to continue east to match the existing pavement section on Kimberley Lane at the eastern termini preserving the existing trees in this area. Due to the age of the underground utilities, all existing water lines will be replaced as part of the reconstruction and sanitary sewers will be adjusted or rehabilitated as required.