

1.0 EXECUTIVE SUMMARY

1.1 Project Authorization

Lockwood, Andrews, & Newnam, Inc. has been retained by the Tax Increment Reinvestment Zone No. 17 (TIRZ 17) to provide professional engineering services to perform a Preliminary Engineering Study for Kimberley Lane, between the Beltway 8 Northbound Frontage Road and West Bough Lane. The project is identified in the City of Houston (COH) Comprehensive Drainage Plan which identifies existing drainage systems within the City classified with insufficient capacity and/or deficiencies. The Comprehensive Drainage Plan (CDP) is a component of the COH Storm Drainage Facilities Improvement Program which is part of the City of Houston's overall Capital Improvement Program (CIP).

The Kimberley Lane Storm Sewer Project is also identified in the TIRZ 17 Drainage Action Plan as an existing system with capacity deficiencies. The TIRZ 17 Drainage Action Plan summarized available drainage studies and reports for the region and identified potential drainage improvement projects. A thorough investigation of the Kimberley Lane storm sewer system was previously performed in the report titled *Kimberley Lane Drainage Improvements Preliminary Engineering Report*, dated May 2009. The investigation concluded that while the existing storm sewer system meets the City of Houston criteria for the 2-year design event, overall deficiencies exist regarding extreme event sheetflow and excessive roadway ponding.

Several improvement alternatives were considered and analyzed in the *Kimberley Lane Drainage Improvements Preliminary Engineering Report* in order to provide the optimal solution in terms of drainage benefit, cost, construction time and construction impact. Multiple variations of each option were also evaluated to assess varying levels of service to improve the drainage system. The TIRZ 17 Board approved the report recommendation proposing the complete reconstruction of Kimberley Lane between the Beltway 8 Northbound Frontage Road and West Bough Lane. This recommendation provides the most economical long term solution to remedy the roadway profile and drainage deficiencies, while also replacing the existing deteriorating pavement and infrastructure.

1.2 Project Location

Kimberley Lane is generally located in west Houston approximately one-half mile south of the intersection of Interstate 10 and the Beltway 8 near the western TIRZ 17 boundary. The limits of this study include approximately 1,600-feet of Kimberley Lane, between the Beltway 8 Northbound Frontage Road and West Bough Lane. See **Figure 1.1** for general project location and vicinity map.

components associated with the roadway reconstruction. The Kimberley Lane PER purpose and need is to perform an initial existing conditions assessment, evaluation and develop recommended solutions for improving the roadway conditions of Kimberley Lane between the Beltway 8 Northbound Frontage Road and West Bough Lane.

1.4 Existing Conditions

Existing conditions pertaining to the project have been reviewed and are further described in Section 2.4 of this report. Existing roadway and drainage conditions, public and private utilities, environmental impacts, geotechnical studies, existing right-of-way and a tree inventory are the major areas covered in detail within the report.

Kimberley Lane, originally constructed in the early 1960's, is an existing 40-foot concrete curb and gutter roadway which has exceeded the typical useful service life of 40-years. The existing right-of-way width is 60-feet. The existing pavement consists of an undivided 40-foot roadway section striped for two 10-foot lanes in each direction at the Beltway 8 and West Bough Lane intersections with intermediate sections striped with two 20-foot lanes. The existing storm sewer along Kimberley Lane consists of approximately 1,300 linear feet of 24- to 36-inch reinforced concrete pipe (RCP), constructed in the 1960's and also approaching the limit of its useful service life. The existing sidewalks are discontinuous within the project limits, with segments located outside the roadway right-of-way. Careful consideration will be given to sidewalk alignment during final design to minimize impacts to existing trees.

Multiple public utilities are located within the Kimberley Lane right-of-way limits. The major utilities include an existing water line that is located along the north side of Kimberley Lane within the existing roadway pavement. The line consists of a portion of 6-inch pipe with an unknown age and condition transitioning to an 8-inch pipe approximately 760-feet east of the intersection of Kimberley Lane and the Beltway 8 Northbound Frontage Road. The 8-inch portion of the line was constructed in 1962, which exceeds the typical useful service life of 40-years. In addition, a 54-inch monolithically reinforced concrete sanitary sewer pipe exists within the Kimberley Lane right-of-way, approximately 3-feet behind the southern back of curb for the entire project length. This line was installed in 1966 and also exceeds the typical 40-year service life.

CenterPoint Energy (CPE) and AT&T have private utilities located within the project limits. An existing 4-inch gas line is located in the south right-of-way of Kimberley Lane for the entire length of the project, along with multiple gas line crossings. Several AT&T duct banks and crossings are also located within the right-of-way of Kimberley Lane. Overhead electric lines are located along the entire project length behind the curb along the south right-of-way of Kimberley Lane. Additional coordination during detailed design will be conducted to confirm potential utility conflicts and coordination of necessary utility adjustments.

1.5 Findings from Phase I Preliminary Engineering and Analysis

1.5.1 Existing Tree Impacts

Over 60 existing trees are located within the right-of-way of Kimberley Lane, as well as within the median of Town and Country Boulevard. Landscaping plans and tree protection plans will be necessary in Phase II to comply with the City Tree Ordinance. Per the preliminary tree inventory findings, it is anticipated that additional retaining walls behind the curb may be necessary to protect the adjacent existing trees. The limits of the retaining walls will be further defined in Phase II. For additional information, a detailed tree inventory was performed by C.N. Koehl Urban Forestry and can be found in **Appendix G**.

1.5.2 Geotechnical Study

Tolunay-Wong Engineers, Inc. performed the geotechnical investigation for the project. The findings and recommendations are presented in the report entitled *Geotechnical Study Kimberley Lane Improvements Project*. A copy of this report can be found in **Appendix H**. Tolunay-Wong drilled 3 soil core borings at the project site, each 25-feet in depth. Soils are classified as "Type C" (medium to high plasticity lean and fat clays) within the study area. The report recommends a reinforced concrete pavement thickness of 10-inches with a 6-inch lime-fly ash stabilized subgrade consisting of 4% lime content and 8% fly ash by dry weight.

1.5.3 Environmental Site Assessment

Lockwood, Andrews & Newnam, Inc. conducted a Phase I Environmental Site Assessment (ESA) for the project area. The findings are presented in the report entitled *Phase I Environmental Site Assessment Kimberley Lane Roadway Reconstruction and Drainage Improvements from West Sam Houston Tollway to West Bough Lane*. A copy of the report is available under separate cover. Based on the Phase I ESA for the proposed roadway improvements along Kimberley Lane, there are two (2) potential Recognized Environmental Conditions (RECs) present. Phase II sampling to quantify possible contamination from the two RECs in the vicinity of the subject alignment is recommended.

Tolunay-Wong Engineers, Inc. was subsequently retained by Lockwood, Andrews & Newnam, Inc. per the Phase I recommendations to conduct a Phase II Environmental Site Assessment (Phase II ESA) for Kimberley Lane. Four soil borings were drilled and eight soil samples were selected for chemical testing. A detectable concentration of methyl tert-butyl ether (MTBE) was found in one sample that exceeds the Texas Commission on Environmental Quality's (TCEQ) Petroleum Storage Tank (PST) Program action level. Based on the single occurrence of MTBE at a depth that is expected to exceed the depth of excavation during construction activities, Tolunay-Wong concluded the exposure potential to be minimal and therefore made no recommendations for additional testing or study.

1.5.4 Evaluation of Drainage Improvement Alternatives

A thorough investigation of the storm sewer system was performed in the report entitled *Kimberley Lane Drainage Improvements Preliminary Engineering Report*, dated May 2009. The investigation concluded that the existing storm sewer system meets the City of Houston criteria for the 2-year design event, but is deficient for the extreme event due to excessive roadway ponding. The majority of Kimberley Lane is lower than the surrounding topography, creating roadway ponding to a depth that exceeds the minimum City of Houston criteria.

Several improvement alternatives were considered and analyzed in the *Kimberley Lane Drainage Improvements Preliminary Engineering Report* in order to provide the optimal solution in terms of drainage benefit, cost, construction time, and construction impact. The TIRZ 17 Board approved recommendation includes the complete reconstruction of Kimberley Lane to improve roadway grading, reduce ponding and provide additional storm sewer trunkline capacity. The *Kimberley Lane Drainage Improvements Preliminary Engineering Report* is included as **Appendix F** in this report. In addition to roadway reconstruction to improve roadway drainage and recommended added capacity, a condition assessment of the existing storm sewer is also recommended in Phase II due to the age of the existing infrastructure.

1.5.5 Evaluation of Roadway 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**.

- *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. Existing pedestrian facilities will be added and/or replaced to meet ADA requirements. This will require small toe walls at many locations to meet existing elevations at the right-of-way and minimize impacts to existing trees.

- *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.

1.5.6 Traffic Control Plan

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 and II will require detours for eastbound and westbound traffic. In Phases III, IV, V, and VI, one 14 foot lane will remain open for eastbound traffic and westbound traffic will be detoured. Coordination with adjacent property owners, Spring Branch Independent School District, Fonn Villas Subdivision and Pines Presbyterian Church will be conducted to minimize impacts during construction.

1.5.7 Agency Coordination

Contact with different entities will be required throughout the final design phase prior to the final design submittal. Coordination meetings will be scheduled with the City of Houston as needed throughout the design phase to coordinate design, as well as public utility design issues. Upon 90% completion, drawings will be submitted to the City Engineer's Office for review and approval. A TxDOT permit will be required to tie-in at the Beltway 8 Northbound Frontage Road. Coordination with adjacent businesses and Spring Branch Independent School District will be conducted throughout the project development to minimize access impacts to the existing adjacent development. Early coordination with private utility entities will also be conducted in design.

1.6 Recommended Project

Complete pavement reconstruction and raising of the roadway profile approximately 6-inches higher than the existing roadway top of curb elevation is recommended based upon the findings from the *Kimberly Lane Drainage Improvements Preliminary Engineering Report*, dated May 2009, as well as findings concluded in this report. To mitigate the storage lost by raising the roadway, approximately 1,100-feet of 5' x 3' box culvert is also proposed to provide additional storage (in-line detention). This proposes to significantly decrease the Kimberley Lane flooding frequency and increase the capacity of the Kimberley Lane storm sewer system. The existing storm sewer along Kimberley Lane is anticipated to remain in place and interconnect to the proposed additional storage box culverts via lateral pipes. A condition assessment is recommended to be conducted in Phase II to confirm the existing storm sewer condition. The proposed improvements will provide a 10-year to 25-year level of service.



Roadway recommendations are based on roadway geometrics, pedestrian facilities and construction costs, as well as the drainage analysis. 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 the Beltway 8 Northbound Frontage Road to 400-feet 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.

1.7 Estimated Construction Costs

The total estimated construction cost for the recommended improvements is estimated \$2.9 Million (cost excludes any right-of-way acquisition, private utility relocation and landscape/hardscape improvement costs). The recommended proposed improvements will increase storm level protection, reduce roadway ponding and improve mobility, safety and access along the existing roadway facility.

2.0 INTRODUCTION

2.1 Project Authorization

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The project is located within a high traffic commercial development with dense existing adjacent businesses with potential existing right-of-way encroachments. The existing adjacent development along Kimberley Lane is classified mixed-use comprised of commercial development, a church, a Spring Branch ISD Elementary School, as well as service to Fonn Villas Subdivision. Kimberley Lane is a major local roadway providing access to and from the