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I. INTRODUCTION

The County of El Dorado, Department of Transportation (DOT) desires to review their Traffic Impact Mitigation (TIM) Fee Program in order to better assess the cost of infrastructure improvements needed to mitigate the increasing traffic volumes within the County. The County currently utilizes three Fee Program Lists to categorize County road projects:

- 2004 General Plan List
- Reimbursement Agreements List
- Reimbursement Commitments List

The County developed a fourth list, called the “Writ” list, and has since dropped this list given the adoption of the 2004 General Plan.

The fee program project lists were developed in response to Implementing Measure TC-B of the 2004 General Plan and direction from the Board of Supervisors. DOT staff identified road improvements for construction by year 2015 from the County’s Travel Demand Forecast Model (TDF), various engineering reports, and currently planned projects. These lists indicate projects needed to satisfy the County’s Level of Service (LOS) standards to the year 2015. Additionally, the County recently implemented further studies to update the 2015 project lists and to identify projects to be constructed prior to 2025.

The purpose of this report is to summarize the latest studies and list the 2015 and 2025 projects and to determine likely project costs. This report will be a basis for determining fees necessary to mitigate forecasted traffic impacts, and to assess fees for obtaining funds to finance these infrastructure improvement projects.

URS conducted field reviews of each project site in the aforementioned lists in order to gain general knowledge for determining appropriate planning cost estimates. Specific US 50 interchange project costs are also included in this report, with the costs for the El Dorado Hills Boulevard, Silva Valley and Missouri Flat interchange provided by the County; the El Dorado Road interchange costs obtained from the 2000 Project Study Report updated cost estimate (prepared by URS); and the Bass Lake Road, Cambridge Road, Cameron Park Drive, and Ponderosa Road interchange costs obtained from the revised Planning Level Cost Study for US 50 interchange, dated March 2006 (prepared by URS).

Two separate traffic analyses were performed to define and verify the traffic deficiencies and need for specific improvements. The first report was prepared by Fehr and Peers for the 2004 General Plan Traffic Impact Fee Program, September 14, 2005, which was used to initially determine projects for the 2015 horizon year. This report was later verified by



a second report prepared by Dowling Associates, Traffic Impact Mitigation Fee Update, 2005, February 14, 2006 with the exception to the widen El Dorado Hills Boulevard between St. Andrews Drive and Francisco Drive, the exclusion of the Serrano Parkway Extension, and the inclusion of Suncastr Lane Extension. Dowling’s report also identified new projects for a 2025 horizon year.

Additionally, the results of the two aforementioned separate analyses – one performed by Fehr And Peers, the other by Dowling Associates – identified varying specific needs for auxiliary lanes between the interchanges on US 50. As such, the latest independent US 50 focused analyses, performed by Dowling Associates, was used as the basis for auxiliary lane determination. For project cost analyses, these auxiliary lanes were split between the interchanges – prorated as 50% toward each interchange, with one exception being a 30%/70% split of the westbound auxiliary lane between Silva Valley and Bass Lake Road.

II. 2015 PROJECT IDENTIFICATION

Initial traffic analyses were performed by Fehr and Peers to define traffic deficiencies and the need for specific improvements. These analyses looked at the projected peak hour volumes for the year 2015. This information is documented in their technical memorandum – “El Dorado County Traffic Impact Fee Program – Travel Demand Forecasts and Roadway Segment Traffic Analysis Technical Support Documentation, March 18, 2005”. These analyses were verified by Dowling Associates with one exception as noted above – no widening of El Dorado Hills Boulevard.

III. 2025 PROJECT IDENTIFICATION

Additional traffic studies were performed by Dowling Associates to verify the 2015 projects as well as determine 2025 projects needed to satisfy the 2004 General Plan LOS requirements. The County’s General Plan Traffic Model was run for 2015 and 2025 to determine future AM and PM peak hour volumes on county roads and state highways in the County. The PM peak hour volumes were used to determine deficient county road and state highway segments. The results of this study can be found in the Dowling report, “Traffic Impact Mitigation Fee Update, 2005, February 14, 2006”. This report also includes US 50 and identified major interchange improvements.

Dowling Associates prepared a separate report – “US 50 Strategic Corridor Operations Study, January 2006” – to evaluate freeway mainline operations for 2015 and 2025, which summarizes identified mainline operational improvements.

The project abstracts contained in Attachment 2 and 3 generally describe each project, the general area of which the project exists and impact magnitude assessments and planning level cost estimates for each project including construction costs, right-of-way and project delivery costs.



IV. PROJECT SUMMARY

The various project planning level estimates are summarized in the Program Project Lists in Attachment 1. The estimate values in Attachment 1 are rounded up to the nearest \$10,000. This report also includes general detailed costs estimating backup for each project, accompanied by a general project description, noted area observations (which influenced the project estimating), and a planning cost estimate for each project identified for 2015 and 2025. The 2015 projects are included in Attachment 2 and the 2025 projects are included in Attachment 3.

V. PROJECT ESTIMATING APPROACH

For projects identified as needing improvements in 2015 and 2025, the estimate for 2025 assumes the 2015 project has been constructed and that the 2015 project is being improved to 2025.

Given the unknown nature at this time for improved medians or unimproved medians, the estimated costs of such are assumed to be equal to a standard lane with uniform structural section. This approach will likely be conservative for most projects depending upon the type of median treatment actually implemented.

The cost estimate methodology described below was implemented on most projects identified in the TIM Fee Program. Where certain projects were currently being developed either in more detailed planning documents, or by design, and had accompanying cost estimates, these more detailed estimates were used in this TIM Fee Report. These projects include US 50 interchange projects, and the Missouri Flat Connector Project. These more detailed cost estimates provided a great opportunity to check the cost analysis methodology used herein for other county projects. As such, the TIM Fee methodology was performed for several interchange projects and the Missouri Flat Connector Project. The result of these analyses compared closely at around 2% deviation. The TIM Fee cost analysis methodology is thus validated as a reasonable project general planning cost estimate procedure.

For roadway projects – non-interchange projects – the “length” is equal to the limits of the project, which accounts for lanes and shoulders in both directions. For interchange projects, the “length” is measured in terms of miles of total lanes and shoulders. For roadway projects – non-interchange projects – the “length” is equal to the limits of the project, which accounts for lanes and shoulders in both directions. For interchange projects, the “length” is linear, which includes lanes and shoulders in one direction.



VI. COST ANALYSIS METHODOLOGY

Unit Costs

In order to determine appropriate project cost estimates, a comparative analysis was performed of construction material unit costs derived from three sources spanning from 2002 to 2005 – recent bids from Caltrans projects within northern California; recent bids for El Dorado County projects; and recent bids from projects designed and/or managed by URS. The recent trend for some construction materials has been measurably driving up the cost of constructing projects. Some construction materials have increased as much as 100% or even 200%, resulting in increased project costs of up to 20% relative to projects from a couple of years ago.

A check of this analysis was then made against the Construction Industry Research Board's (CIRB) study of the California construction trends and forecasts for the category of Streets, Highways and Bridges. CIRB uses Engineering News Record, Caltrans' cost data, and specific industry conditions and trends to summarize and forecast construction costs. The CIRB's Non-building (Heavy) Construction Summary report, dated January 10, 2006 reports inflation factors from 1980 to 2004, and forecasts inflation factors to 2005 and 2006. This CIRB report forecasts an inflation factor of 7.0% from 2005 to 2006, and reports inflation factors of 8.5% from 2004 to 2005, 16.3% from 2003 to 2005, and 20.5% from 2002 to 2005. This reported trend illustrates that current project costs are averaging around a 20% increase from projects that were constructed in 2002, which validates the results of our analysis.

Our unit price analysis and the aforementioned check of this cost analysis have resulted in the following unit costs used for project cost estimating in this report. These are the basic roadway construction item unit prices used:

- AC = \$95/ton
- AB = \$55/cy
- Roadway Excavation = \$38/cy
- PCC Sidewalk = \$10/sf
- PCC Curb & Gutter = \$25/lf

These costs reflect prices current as of October 2005 and are the basis for determining other minor roadway items and miscellaneous items of work.

Roadway Items

Each estimate of costs for the roadway portion of the project was measured per 12-foot wide lane mile in two different classifications – Highway/Arterial (Minor Roadway) and Expressway/Freeway (Major Roadway). County roads of less than four lanes are considered a “Minor Roadway” for this report and were calculated with a structural section of 5 inches of AC over 20 inches of AB (Table 1). Any U.S. highway, state highway, or County road of four lanes or more are considered a “Major Roadway” for this report and were calculated with a structural section of 8 inches of AC over 23 inches



of AB (Table 2). These roads are shown in the estimate as Roadway (Grade 1) and Roadway (Grade 2), respectively.

PCC Sidewalk is measured by the square foot, and PCC Curb & Gutter is measured by the linear foot.

Shoulders are generally assumed to be 8 feet generally in urbanized (developed) areas, 4 feet in rural areas, and 10 feet on US 50 interchange ramps and auxiliary lanes. In some cases, urbanized projects were estimated to only incorporate 4-foot shoulders where topographical or other physical constraints would severely increase project costs. These shoulders are also estimated per mile and the widths are measured in increments of 4 feet – i.e. a 4-foot shoulder is one 4-foot increment; an 8-foot shoulder is two 4-foot increments; and a 10-foot shoulder is two and one half 4-foot increments.

Left turn pockets are assumed to be 500 feet long. Two-way left turn lanes and medians are accounted for as a continuous lane with a structural section of AC and AB equal to a travel lane.

All non US 50 projects are measured in terms of project length and width which includes bidirectional improvements. US 50 mainline and interchange projects are measured in terms of project length and unidirectional (linear) improvements. This approach was exercised since non US 50 project improvements are generally symmetric, while US 50 projects are not. Tables 1 and 2 show a cost breakdown used to create the per lane mile cost for the projects.

TABLE 1 – Minor Roadway (Less than 4 Lanes) – GRADE 1

ITEM	UNIT OF MEASURE	QUANTITY	UNIT COST	TOTAL UNIT COST/MILE
ASPHALT CONCRETE	TON	1980	\$95	\$188,100
AGGREGATE BASE	CY	3911	\$55	\$215,111
ROADWAY EXCAVATION	CY	4889	\$38	\$185,778
TOTAL COST PER LANE MILE				\$588,989

TABLE 2 – Major Roadway (4 Lanes and More) – GRADE 2

ITEM	UNIT OF MEASURE	QUANTITY	UNIT COST	TOTAL UNIT COST/MILE
ASPHALT CONCRETE	TON	3168	\$95	\$300,960
AGGREGATE BASE	CY	4498	\$55	\$247,378
ROADWAY EXCAVATION	CY	6062	\$38	\$230,364
TOTAL COST PER LANE MILE				\$778,702

Where projects require only turn pockets, a length of 500 feet per turn pocket was assumed.



Earthwork

Quantifying earthwork in the planning level stage can be difficult due to the lack of survey mapping. After observing the terrain at each site, a grading system was developed as a basis of applying a magnitude approach for the earthwork likely to be involved. The magnitude of earthwork applied is an estimated average of the overall effort assumed for each project. These grades are applied as a percentage of earthwork involved relative to constructing the structural section that is a percentage of roadway excavation. This earthwork includes cut slope excavation, ditch excavation, benching, and embankment construction.

The following grading scale was used for the projects, with one exception for one segment of the HOV/Truck Operation Lane project – Project 27A, from Empire Ranch to bottom of Bass Lake grade, 2015 – and the interchange projects. This HOV/Truck Operation Lane project utilized a balance of Grade 1 and 2, given the long length of the project, which based on field observations, warranted this balance. The values for the interchange projects are rounded values based on more detailed quantities obtained from other studies – Planning Level Cost Study for US 50 Interchange Improvements, March, 2006 by URS, and County provided values for other interchanges.

The magnitude grades are as follows:

- Grade 1 - No additional earthwork needed = 0% of Roadway Excavation
- Grade 2 - Minor additional earthwork needed = 50% of Roadway Excavation
- Grade 3 - Moderate additional earthwork needed = 100% of Roadway Excavation
- Grade 4 - Major additional earthwork needed = 250% of Roadway Excavation
- Grade 5 - Extensive additional earthwork needed = 500% of Roadway Excavation

Traffic Control

A similar grading system was created for measuring the amount of traffic control needed for each project during construction of each project. Three levels were used to estimate each site.

		Roadway	Interchange	HOV Lane
• Grade 1 –	Minor traffic control needed =	\$20,000	\$150,000	\$250,000
• Grade 2 –	Moderate traffic control needed =	\$60,000	\$250,000	\$450,000
• Grade 3 –	Extensive traffic control needed =	\$150,000	\$400,000	\$650,000

This item includes construction area signs, temporary delineation, Transportation Management Plan, Portable Changeable Message Signs, temporary rail (Type K), etc.



Miscellaneous Items

Miscellaneous Items are estimated as Grade 1, 2 or 3, which account for minor roadway items such as:

- removal of curb, gutter & sidewalk
- saw cutting paving
- remove base and surfacing
- clearing and grubbing
- water pollution control
- headwalls
- drainage systems
- striping and striping
- signals
- landscaping
- miscellaneous structures
- ramp metering for interchanges
- interchanges intersection signals
- minor utility impact costs

It is assumed that the majority of utility impact costs will be borne by the utility agencies. Minor support costs for utility impacts and relocations are part of the Miscellaneous Items.

This Miscellaneous Items of work also accounts for the possibility of unforeseen or non quantifiable items of work, which are of an uncertain nature or are difficult to quantify. Such items might include:

- Additional Asphalt Concrete
- Additional Imported Borrow
- Increased Paving Asphalt
- Remove Unsuitable Material
- Maintain Traffic
- Compensation Adjust. for Price Index Fluct. of Paving Asphalt
- Partnering
- Disputes Review Board

Magnitude grades given to each project are based on field observations. These grades, shown below, are applied as a percentage of the total cost of the quantified roadway items. Grades 2 and 3 with larger percentages (40% and 60% respectively) are typically applied to projects in existing developed areas given that the impact to existing facilities will likely be greater, thus a greater amount of minor work is involved. The following percentages are relative to the specific roadway items quantified.

- Grade 1 – Minor additional roadway items = 20%
- Grade 2 – Moderate additional roadway items = 40%
- Grade 3 – Extensive additional roadway items = 60%

Project Delivery

Project delivery includes activities from project initiation with studies, through any further project development studies, project design, and all project management through construction. Historically, project development has been measured to range from 20% for large, non-complex projects to 40% for small roadway projects. These values were



assigned for like projects. Additionally, a value of 25% was applied toward interchange projects as these projects are typically large and are somewhat complex.

Right-of-Way

Right-of-Way evaluation was not included in this study. Therefore, values were obtained from a previous study performed by the County, Department of Transportation, dated July 28, 2005. The County's assessment was based on recent appraisals and current market rates. The County's valuation included a 25% contingency to account for the acquisition process. A quick review of the County's established values revealed land costs of \$7 per square foot to \$32 per square foot. The lower value of \$7 appears to be a little low, but the higher value of \$32 appears quite conservative and thus, the median value could likely be reasonably conservative. It is for this reason that the values were then directly used in this report. The only exceptions occurred with General Plan Project 14 – Missouri Flat Connector, and General Plan Projects 33 through 41 – the interchange projects, which included right-of-way costs obtained in separate project specific reports. When projects are planned to be phased for 2015 and 2025, and right of way is required for 2015, right of way is assumed to be purchased in 2015 for the ultimate phased project of 2025. For phased projects requiring right of way in 2025 only, the right of way is assumed to be purchased in 2025.

VII. Interpretation of Results

The projects identified in this report and their costs are determined based on current traffic studies, resulting project definitions, and current construction cost indices and as such should be updated periodically. This periodic updating is consistent with County practices as is defined herein in General Plan Project No. 42 – Fee Program – which allocates funds for preparing, revising and updating the Fee Program on an ongoing basis so as to maintain current project identification and cost estimates. Additionally, this is a planning level document, and as such, each project herein is generally described and analyzed consistent with industry standard of care. It is recommended that further industry standard practices be performed to further develop, define and estimate each project in individual project study documents, such as in a Project Study Report or equivalent.

VIII. Conclusion

This report was prepared through a collaborative effort between Dowling Associates, Fehr and Peers Associates, EPS, URS Corporation, and County DOT staff utilizing previous traffic studies, previous County fee program documentation, current traffic studies, and project cost analyses. The following are the projects as identified through traffic analyses for mitigating traffic impacts. Some projects are identified as improvement needed by 2015. Other projects are identified as needing to be phased with both 2015 and 2025 projects, and other projects are identified as needed projects by 2025. These projects are categorized as 2004 General Plan projects, Reimbursement Agreement projects and Reimbursement Commitment projects.



ATTACHMENT 1



ATTACHMENT 2



ATTACHMENT 3