Memo

Stantec

To:	Garth Oksol	From:	Joseph A. Mactutis
	RTC		Stantec Consulting Inc.
File:	180101098	Date:	January 19, 2009

DESIGN MEMORANDUM: PLAN LINE STUDY FOR THE SE CONNECTOR OPINION OF PROBABLE COST ANALYSIS

Stantec Consulting was retained by the RTC to perform a plan line study of the SE Connector extending from the intersection of South Meadows Parkway and Veterans Parkway to the intersection of Greg Street and Sparks Boulevard. This plan line study is limited to the previously established Valley Corridor.

The results of the various investigations performed within this plan line study have identified costs associated with construction of a SE Connector roadway. This design memorandum is prepared in support of all of these tasks to summarize and combine these costs into a single discussion.

In general, the costs are categorized as follows:

- Right-of-Way costs
- Construction costs
- Mitigation costs
- Golf Course costs
- Contingency
- Engineering costs

A brief discussion of each is provided below, followed by a spreadsheet summarizing the total costs for the preferred alignment.

A. RIGHT-OF-WAY COSTS

Right-of-way unit costs were provided to Stantec by the RTC, as shown in Table A1.

TABLE A1 – RIGHT-OF-WAY COSTS

Land Use Description	Cost per Acre
Agriculture	$350,000
Undeveloped	$350,000
Developed	$650,000

All right-of-way was assumed to be purchased at the rates within Table A1, regardless of who the existing owner is. No assumptions were made regarding any property owners donating/trading right-of-way. The right-of-way quantities are based on areas

required for the roadway itself and all cut/fill slopes to the match point at the existing ground. No assumptions were made regarding allowance for these slopes to be paid for as permanent slope easements.

B. CONSTRUCTION COSTS

Construction unit costs for major items of work were developed by Stantec, as shown in Table B1. For the purposes of this study, major items of work include those items that can be determined by the level of the investigative studies performed for this plan line study. Examples of items not included are: traffic signals, signage and striping, median paving, curb and gutter, catch basins, storm drain pipe, etc.

TABLE B1 – CONSTRUCTION COSTS (MAJOR ITEMS OF WORK)

Description	Cost
Clearing and grubbing	$5000/acre
Overexcavation	$25/cubic yard
Roadway excavation and embankment	$15/cubic yard
Pavement section	$85/cubic yard
Median Curb	$20/linear foot
Shared Use Path	$20/square yard
Equalization Culverts	$1500/linear foot
Truckee River Bridge	$1875/square yard*
Pembroke Crossing	$1500/linear foot
Mira Loma Crossing	$1750/linear foot
Boynton Slough Crossing	$1500/linear foot
Volumetric Mitigation	$15/cubic yard

Unit costs for the major items of work were developed by analyzing bid tabulations from recent roadway projects and discussions with local contractors. The unit costs and quantities for identical or similar items of work were compared to determine typical unit costs for comparable quantities of work. In cases where bid tabulations with comparable quantities of work could not be found, engineering judgment was utilized to determine adjustments for economy of scale.

Reference: Plan Line Study for the SE Connector
Opinion of Probable Cost Analysis

C. MITIGATION COSTS

For the purposes of this discussion, mitigation costs are presumed to be limited to mitigation for wetlands and for sites of historic/cultural interest. Costs for wetlands mitigation was provided by Gibson and Skordal, LLC, subconsultant to Stantec. Estimated cost for wetlands mitigation was $70,000 per acre with a recommended compensation ratio of 2:1. Therefore, a mitigation cost of $150,000 per acre was applied to the quantity of acres disturbed for this plan line study.

Costs for mitigation of sites of historic/cultural interest identified thus far were provided by Kautz Environmental Consultants, subconsultant to Stantec. Mitigation costs varied by the nature of the site disturbed. Estimated costs varied from $20,000 to $200,000. Note that mitigation costs for some sites were not provided as these sites were strictly classified as not to be disturbed.

D. GOLF COURSE COSTS

Costs for construction of an 18 hole golf course were provided by Kyle Phillips Golf Course Design, subconsultant to Stantec Consulting. Estimated cost for construction of an 18-hole golf course was $8-10 million. Given that the City of Reno has not expressed a preference with regard to Rosewood Lakes Golf Course, costs were applied to the alternative alignments and preferred alignment on a per hole basis at the rate of $500,000 per hole.

E. CONTINGENCY

For the purpose of the plan line study, contingency costs represent costs for minor items of work. Minor items of work include those items that cannot be determined by the level of the investigative studies performed for this plan line study. Examples of minor items of work are: traffic signals, signage and striping, curb and gutter, catch basins, storm drain pipe, etc. The contingency does not include costs for items which cannot be predicted. Examples of these costs are remediation of environmental hazards, mitigation of archeological/sites discovered during construction, relocation of unknown utilities, etc. For the purpose of this level of analysis, the contingency has been established at 20-35% of the sum of the construction, mitigation, and golf course costs previously calculated.

F. ENGINEERING COSTS

Stantec has utilized general costs for engineering design and engineering construction services. Engineering costs for design services including civil design, hydrology, surveying, geotechnical investigation, golf course design, and wetlands mitigation design were applied at a rate of 10% of the total of the construction, mitigation, golf

course, contingency, and right-of-way costs. These costs do not include costs for an Environmental Impact Study or preparation of USACE 404 permit application. Engineering costs for construction services including surveying stakeout, quality assurance, and construction administration were applied at a rate of 12% of the total of the construction, mitigation, golf course, contingency, and right-of-way costs.

G. TOTAL COSTS

Table G1 contains the total of the costs for right-of-way, construction, mitigation, golf course, contingency and engineering for the alternative alignments and the preferred alignment. These costs represent a single constructed roadway, beginning to end, with no allowance for additional costs associated with multiple construction phases.

TABLE G1 – CONSTRUCTION COST ANALYSIS

Description	RTC 34 ($ millions)	RTC 7-25-37 ($ millions)	RTC 40 ($ millions)	RTC 34-40 ($ millions) (Preferred)
Construction Costs (Major Items of Work)	$89	$87	$103	$92
Golf Course	$5	$4	$5	$5
Wetlands Mitigation	$1.5	$1.0	$1.5	$1.5
Archeological Mitigation	$0.2	$0.2	$0.2	$0.2
Contingency	$19-$33	$18-$32	$22-$38	$20-$34
Subtotal	**$115-$129**	**$110-$124**	**$131-$147**	**$118-$133**
Right-of-Way	$43	$46	$59	$48
Subtotal	**$158-$172**	**$157-170**	**$190-$207**	**$167-$181**
Engineering - Design	$16-$17	$16-$17	$19-$21	$17-$18
Engineering - Construction	$19-$21	$19-$20	$23-$25	$20-$22
Total	**$193-$210**	**$191-$208**	**$232-$252**	**$203-$221**

NOTES:

1) All costs represent FY 2009 dollars. No inflation factor is provided.
2) Right-of-way costs were provided by the RTC.
3) In providing opinions of probable cost, it is recognized that neither the Client nor Stantec has control over the costs of labor, equipment or materials, or over the

Contractor's methods of determining prices or bidding. The opinion of probable costs is based on Stantec's reasonable professional judgment and experience and does not constitute a warranty, express or implied, that the Contractor's bids or the negotiated price of the Work will not vary from the Client's budget or from any opinion of probable cost prepared by Stantec.

H. ADDITIONAL ANALYSIS 1 – COSTS WITHOUT FLOOD REQUIREMENTS, MITIGATION, ETC.

As an exercise, the RTC requested Stantec to perform a cost analysis with the following assumptions:

- Horizontal alignment avoiding homes and critical sites of historical interest
- Vertical alignment "at grade", i.e. without flood requirement for one clear lane in each direction during design flood event. (This is a condition of the City of Reno Public Works Design Manual).
- No mitigation costs for wetlands or sites of historical interest.
- No volumetric mitigation for flood events.

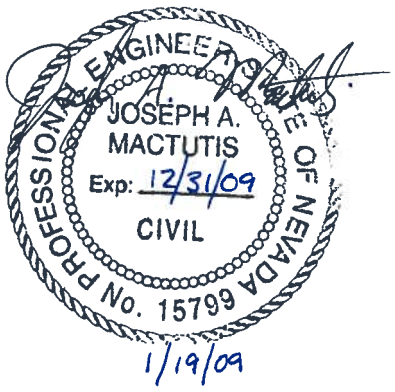
The purpose of this exercise was to get a general idea of the costs associated with construction of a road only in this area, and thereby getting a general idea of the costs associated with addressing the other design conditions, impacts, and constraints applicable to this project. Table H1 provides the results of this analysis for a single constructed roadway with no allowance for additional costs associated with construction phasing.

Reference: Plan Line Study for the SE Connector
Opinion of Probable Cost Analysis

TABLE H1 – ADDITIONAL ANALYSIS 1	
Description	**RTC 34 ($ millions)**
Construction Costs (Major Items of Work)	$33
Golf Course	$0
Wetlands Mitigation	$0.0
Archeological Mitigation	$0.0
Contingency	$7-$12
Subtotal	**$39-$44**
Right-of-Way	$37
Subtotal	**$76-$81**
Engineering – Design	$8
Engineering - Construction	$9-$10
Total	**$93-$99**

Right-of-way costs, construction costs, contingency costs, and engineering costs are included in this estimate. Golf course costs and mitigation costs are not included. Note that there is a reduction in right-of-way costs due to the reduction in area required for slopes with the vertical alignment "at grade". Note also, the "at grade" vertical alignment affects construction costs as well, primarily through a reduction of earthwork.

STANTEC CONSULTING, INC.



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