Source:

Water & Light
Tad A. Johnsen

Agenda Item No. _____

FISCAL and VISION NOTES:

City Fiscal Impact Enter all that apply:	
$500,000	City's current net FY cost.
$3,650,000	Amount of Funds Already appropriated
$0	Amount of budget amendment needed
$0 $0	Estimated 2 yr net costs: One-time Operating / On-going
Program Impact:	
N	New program/ agency (Y/N)
N	Duplicates/expands an existing program (Y/N)
N	Fiscal impact on any local political subdivision (Y/N)
Resources Required:	
N	Requires add'l FTE personnel? (Y/N)
N	Requires additional facilities? (Y/N)
N	Requires additional capital equipment? (Y/N)
Mandates:	
N	Federal or state mandated? (Y/N)
Vision Implementation Impact Enter Below All That Applies: :	
Y	Vision Impact? (Y/N or if N, go no further)
Item 5.1	Primary Vision Statement, Goal, and/or Strategy Item#
Item #	Secondary Vision Statement, Goal, and/or Strategy Item#
Task #	FY10/FY11 Implementation Task#

TO: **City Council**
FROM: **City Manager and Staff**
DATE: **March 25, 2011**
RE: **Mill Creek Substation Transmission Study**

EXECUTIVE SUMMARY:

Staff has prepared for Council consideration a report concerning recommendations made in a route study of electric transmission improvements needed to supply power to the proposed Mill Creek Substation located on Peach Court. This route study was conducted by SEGA Engineering of Overland Park, Kansas. The results of this study identify three recommended alignments for 161kV transmission circuits to serve the proposed Mill Creek Substation from the existing Perche, Grindstone, and McBaine 161kV substations.

The route study analyzed several potential alternatives for providing power from the three existing 161kV substations to the proposed Mill Creek substation. This was accomplished through the utilization of a "decision matrix" developed by SEGA Engineering. In October of 2010, three open house meetings were conducted to share information with the public. Public feedback was solicited after these meetings. The feedback was used to identify public concerns associated with the proposed line routes and assign weighted factors to be included in a "decision matrix". This decision matrix has been used to identify the best routes for the transmission lines for the proposed Mill Creek substation. The routes selected through the matrix analysis, to serve the proposed Mill Creek substation, typically follow the existing road right of ways along Grindstone Parkway from the Grindstone substation, along Route K from the McBaine substation, and along Scott Boulevard and Nifong Boulevard from the Perche substation as shown on the attached Diagrams "A" thru "C".

The estimated probable cost of the three 161kV transmission lines along the identified preferred routes serving the proposed Mill Creek substation are $24,325,000. This estimate is based on the approximate footage of overhead line segments, line angles, and other factors identified from the past experience with similar projects from SEGA Engineering. More refined estimates will be established after alignments have been approved by Council and detailed engineering work has been performed.

DISCUSSION:

The need for this project was identified during a 2007 electric reliability assessment required as part of Columbia Water and Light's participation in the Southeast Electric Reliability Corporation's (SERC) Long Term Study Group (LTSG). This assessment identified two contingencies that could cause cascading outages of Columbia's 69kV transmission system. Several solutions to the identified contingencies were studied including re-conductoring segments of the existing 69kV system, adding internal generation directly attached to the Perche Creek Substation, and the extension of the 161kV transmission system to the proposed Mill Creek substation. It was determined at that time the best long term solution was to extend the 161kV transmission system to a new substation (Mill Creek) to serve as a common terminal from which additional 13.8kV distribution load growth in the south part of the City could be served. The Mill Creek substation site on Peach Court, shown in Diagram "D", was purchased in July of 2010, and SEGA Engineering was contracted to begin route studies to provide 161kV power to the proposed Mill Creek substation from three existing 161kV substations; Grindstone, Perche, and McBaine. The routes analyzed in SEGA's study are shown in Diagrams "E" thru "G".

In October of 2010, three open house meetings were held for public presentation of routing options that SEGA Engineering had developed to provide power to the proposed Mill Creek substation from the three existing 161kV substations. Public feedback solicited at these meetings was used to identify public concerns associated with the proposed line routes and assign weighted factors to be included in a "decision matrix" to ensure concerns identified by residents, during these meetings, were properly addressed in the selection of route options. Factors most commonly cited as being important to residents included the potential loss of property value, health and safety concerns, and environmental impacts.

SEGA Engineering utilized the decision matrix as a tool to rank alignment alternatives and select the final route recommendations. The decision matrix is a routine that incorporates as many route "decision factors" as possible and assigns them a score to weight them, according to their importance and select the most ideal route for a line to follow. Public feedback obtained from the open houses held in October was the primary input used by Water and Light to weight and rank the route decision factors. The decision matrix was analyzed in two ways: one that included the cost as a major decision factor; and one that excluded cost as a decision factor.

All the decision factors are grouped into categories that are weighted to define their influence in the final decision matrix results. The categories are as follows:

Transmission line characteristics – includes decision factors of: total length of line, length along public and private rights-of-ways, length along railroads, length parallel to existing lines, length double circuited with 69 kV, length double circuited with 161 kV, lineal feet of overbuilt distribution, length underground, and number of heavy angle structures.

Buildings and other facilities near line – includes decision factors of proximity to: houses, commercial structures, churches, day cares, schools, hospitals, nursing homes, fire stations, out buildings and vacant buildings.

Crossings – includes decision factors of crossed: private land parcels, roads, interstate highways, federal and state numbered highways, other country roads, railroads, perennial streams, rivers or lakes, wetlands, city or county parks, state or federal parks (and conservation areas), and recreational areas (trails, etc.).

Right-of-Way Characteristics – includes decision factors of the right of ways being considered: residential, commercial, agricultural, wooded/forested, and existing right-of-way.

Costs – includes new line construction costs, clearing, and rights-of-way costs.

The decision matrix analysis, showing decision factors assigned scores and category weightings are shown in Diagram “H”.

Each line was studied with and without costs as a consideration. This was done as a check to determine if costs were the driving factor in the decision matrix analysis causing the matrix analysis to produce results that were less preferred by the public. This analysis showed that public opinion by itself and the analysis with costs factors heavily weighted produced the same “ideal” routes on each of the three lines studied.

The final decision matrix analysis resulted in line route selections that were also identified by the public as the most preferred routes for two of the three lines. The only route selected that did not match the public’s preferred route was on the Mill Creek to Grindstone route. This route analysis not favoring public opinion may have resulted due to the fact that many of the residents along the corridors considered in this area are renters and were unrepresented at the open house forums held in October. Because the same weights for each decision factor were used for all three lines, which heavily weighted the concerns of residential properties, the Grindstone line analysis resulted in a selection of a line route that affects the least number of residences while most of the concerns expressed during the open house meetings were those of the adjacent businesses.

At the Council work session held on February 21st, 2011, staff briefly presented an “Option B” alternative plan to the current project proposal being considered. This alternative plan included reducing the supply voltage to the proposed Mill Creek substation from 161kV to 69kV and constructing two 69kV transmission lines to serve the proposed Mill Creek substation from the Grindstone substation and another 69kV transmission line from the Hinkson Creek substation to the proposed Mill Creek substation. This 69 kV transmission line would require larger conductor (1192 ACSR) than is currently being used by both 69 kV and 161 kV lines (795 ACSR). This larger conductor would require larger structures to support the heavier conductor. The final element of this alternative plan would include the construction of a 161 kV line along the periphery of the city limits from McBaine substation to the Perche Creek substation as shown in Diagram “I”.

The alternative plan would successfully address the reliability issues with the current transmission system by providing a new 161 kV feed to Perche Creek substation, however, the alternative plan would not support load growth in the southern part of the city as effectively over the long term as the 161 kV options considered in the original route study. Because of the reduced residential impact, the alternative plan may result in a lesser degree of public opposition in the short term.

The alternative plan presented does not fully utilize the existing 161 kV resources in the city and presents some operational issues with parallel 161kV ties with Central Electric Power Company's interconnect at the McBaine substation and Ameren UE's interconnect at the Perche substation. This alternative would require that complicated relay protection schemes would have to be worked out with both power companies to ensure the existing critical 161 kV interconnections to the City, were protected from potential faults on the parallel power feeds.

The proposed 161 kV system could serve considerably more load than the 69 kV alternative and would avoid adding additional load to an already stressed 69 kV system. Ultimately, the alternative plan presented does not address load growth along the same planning horizon as the original 161 kV plan. It is anticipated that the alternative 69 kV option would supply loads on a 15 – 20 year planning horizon provided current load growth trends continue after which the problem of load growth will again need to be addressed and additional transmission lines in the same affected area will again need to be considered. If it is decided to pursue this alternative as an option, another route study will be conducted and additional interested parties will have to be identified for open house forums to gain public feedback. A "Transmission Line Routing Project Time Line" has been included with this report. Staff is working toward the goal of an ordinance to acquire easements before the Summer of 2012.

FISCAL IMPACT:

The total appropriations requested for this project, including the proposed Mill Creek Substation and three 161kV interconnections is $26,325,000 of which $3,650,000 has already been appropriated. This project has been broken up into multiple projects identified within the current Capital Improvement Program. The Mill Creek 161/13.8kV Substation is identified as project EL0121and currently has $2,000,000 already appropriated. The McBaine Substation to Mill Creek Substation 161kV transmission line identified as project EL0148 has $1,650,000 already appropriated with an additional $1,675,000 still needing appropriation. The Perche Substation to Mill Creek Substation 161kV transmission line identified as EL0150 has $8,600,000 in unappropriated funds. And, the Grindstone Substation to Mill Creek Substation, identified as project EL0149 has $12,400,000 in unappropriated funds. Funding sources for the unappropriated portions of this project are enterprise revenue or future bond issue.

VISION IMPACT:

This project represents a well planned, proactive growth strategy in which infrastructure is developed that provides coordination among all potential stakeholders.

SUGGESTED COUNCIL ACTIONS:

None, information only.

Cc: Water and Light Advisory Board
Water and Light Staff