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**MEMORANDUM**

**To:**        **Technical Advisory Council Members**

**From:**    **Trevor Clements, Jon Butcher, Kimberly Brewer, and John Zastrow**

**Cc:**        **Leslie Shoemaker**

**Date:**     **10/05/2005**

**Subject:**  **September 30, 2005 Conference Call Summary**

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A conference call for the Lake Maumelle Technical Advisory Council (TAC) was convened September 30, 2005 at 2:00 pm CST. Nine of fourteen members were in attendance, along with two substitutes and three Policy Advisory Council members (see attached attendance record). Trevor Clements moderated the call, which included technical presentations and discussion by Dr. Jon Butcher, Kimberly Brewer, and John Zastrow on behalf of Tetra Tech, Inc.

Trevor Clements took roll call, and then reminded TAC members of the context of the call. The Policy Advisory Council has adopted goals and objectives for the Lake Maumelle Watershed Management Plan. Our technical approach is to establish indicators for the objectives, and then assessment methods for those indicators that will support evaluation of various management alternatives. The charge to Tetra Tech with the help of the Technical Advisory Council is to bring to the PAC at their October 20 meeting, recommended indicators, assessment methods, and preliminary information on targets. During the TAC's first two meetings, Tetra Tech and the Council reviewed and established a set of indicators. During the call last week, the TAC began reviewing the assessment methods for the environmental indicators. Tetra Tech proposed a three-scale linked modeling framework that evaluates impacts at the site-scale, links sites to the subwatershed-scale, that links to the lake at the whole-watershed scale and simulates lake response.

The first item on the agenda was to follow up on issues that the TAC brought up during the previous conference call (9/23) regarding candidate lake models. Using the meeting handout titled "Supplement to 9/23/05 Candidate Lake Model Information," Dr. Butcher summarized the advantages and limitations of the two strongest candidate models, CE-QUAL-W2 and EFDC. Each has advantages and limitations. CE-QUAL-W2 has important advantages because there is an existing model application available for update, and efficient run times will aid calibration and scenario evaluation. It's main limitation is that it does not include lateral variations in water quality, which may be important for the assessment of the movement of spills or evaluation of effects of nearshore property development. EFDC provides full lateral resolution; however, model development would need to begin from scratch, and run times would be longer, particularly with full water quality simulation. In addition, the available monitoring data are primarily along the central axis of the lake, and thus do not support the calibration of lateral variability

provided by this model. Both models are sufficient to address a majority of the in-lake study questions. Dr. Butcher therefore proposed a compromise, involving the implementation of both the full CE-QUAL-W2 model and the hydrodynamic portion of EFDC. CE-QUAL-W2 will enable rapid development of a nutrient response model, as well as providing an analysis of risks of watershed loads of sediment, toxics, and pathogens relative to the water intake. EFDC hydrodynamics can be developed in parallel, and much more quickly than the full EFDC water quality model. This will allow evaluation of the significance of lateral variations in transport patterns, including a detailed evaluation of potential spill movements. It will also provide a basis for future development of a full three-dimensional water quality model, supported by additional data collection, if warranted by decision needs. The development of these paired components should be sufficient to address all of the key study questions relative to in-lake water quality while allowing adherence to an aggressive schedule.

## Q&A

*Is there sufficient depth stratified data to support model calibration and validation?*

Vertical data have been collected over many years by USGS. These data appear sufficient to support model calibration and validation of the laterally averaged CE-QUAL-W2 model. However, data from off the central axis of the lake are sparse, and are not sufficient at this time to support implementation of a fully three-dimensional model.

Joel Galloway (attending on behalf of USGS in Reed Green's absence) stated that the new sampling plan has added another lake station so that water quality can be evaluated both upstream and downstream of the Hwy 10 crossing, along with more stream stations, more stream gages, and more rain gages.

*How long would it take to develop the EFDC model?*

The EFDC model is implemented in two phases, beginning with hydrodynamics and proceeding to water quality. The hydrodynamic portion can be implemented relatively quickly, probably within two months and in parallel with the CE-QUAL-W2 effort. Full development and calibration of the water quality components of EFDC would take longer and should be supported by additional data collection.

*Is there current monitoring going on and is it set-up to support additional model validation?*

Yes. Joel Galloway discussed ongoing monitoring efforts by USGS. Data collection in the lake follows the historic monitoring locations and protocols. This appears well suited to support validation for the CE-QUAL-W2 model; however, additional types of monitoring may be needed for calibration if a three-dimensional model is used. Tetra Tech will provide recommendations on appropriate changes and augmentation in the monitoring strategy to support model validation following finalization of the modeling strategy.

Trevor also brought up the correspondence regarding the site and watershed scale models that discussed the level of detail addressed by the models. The site-scale model will be detailed enough to look at changes to hydrology and water quality from both site design and management practices employed, answering the site-scale questions of concern. The subwatershed and watershed-scale models will be aimed at looking at impacts locally to tributaries as well as providing means for estimating delivery of runoff and contaminants to the lake. Supplemental geomorphic analysis will be used to help refine the watershed model setup and calibration. TAC members indicated that they understood the proposed methods and felt comfortable with the approach. No further questions were asked regarding the linked modeling framework.

The second item on the agenda was led by Kimberly Brewer, A.I.C.P. Ms. Brewer summarized the memorandum, *Proposed Tool and approach for Evaluating Development Cost of Stormwater Management*, emailed to TAC members prior to the meeting for their review. To address the management plan objective, “minimize impacts to watershed property owners and residents,” Tetra Tech is proposing to use the cost component of its Site Evaluation Tool (SET) to address the indicator related to stormwater BMP cost. This tool has been used in recent years to evaluate potential impacts to the development community in evaluating different management approaches, and has been conducted both at the site and the watershed scale.

The cost tool addresses construction, design, engineering, conveyance, and paving costs, as well as inspections and maintenance. To estimate costs, Tetra Tech enters the square feet of the surface area (e.g., for bioretention cell); cubic feet of storage volume (e.g., for wet pond), linear feet (e.g. for swale), or some other whole BMP site unit. The tool reports a range of cost as a measure of uncertainty. The unit costs are based on national literature values, including sources from the National R.S. Means Handbooks, North Carolina State University, the Low Impact Development Center, and the Center for Watershed Protection. The tool reports the cost range and median, evaluating total cost, cost effectiveness, and cost per acre of development.

To reduce uncertainty, the cost tool allows a number of user defined inputs to replace the default assumptions. This allows for a tailoring of cost estimates. To the extent possible, Tetra Tech will tailor the BMP cost to reflect costs in the Little Rock Region.

Ms. Brewer next reviewed how the tool would be used in the Lake Maumelle Watershed Management Plan Project. Tetra Tech will determine BMP needs based on the type of development, land uses/land cover, soils, hydrology, and proposed BMP techniques. To analyze the cost of implementing a management option, Tetra Tech will analyze different types of development envisioned in the watershed and their associated BMPs using the SET. This will generate cost per acre of a given type of development. Tetra Tech will then aggregate cost up to the watershed scale using a spreadsheet tabulation based on the number of acres planned for each type of development at buildout conditions. We will do this for each management scenario.

For a total cost comparison at buildout, Tetra Tech will use the % highest cost scenario as the unit of comparison. This is due to the high level of uncertainty in predicting the stormwater management technologies that will be used in the coming decades and their associated costs. Tetra Tech will also use cost per acre of development type as an indicator of potential cost to the development community. Ms. Brewer said more details are provided in the memo as well as technical appendices for those wanting more information.

For Forestry impacts, Ms. Brewer said Tetra Tech will be working with the IS Forest Service to determine the cost impacts of different Forestry Best Management Practices. Cost will also be evaluated regarding potential utility rate increases, looking at the implications of different management scenarios on treatment, operations, staffing, and land acquisition costs. We will look at these costing approaches in more detail in future TAC meetings.

#### Q & A

*Are offsite BMPs incorporated with the site evaluation tool (e.g., riparian buffer)?*

Yes. The pollutant loading and hydrology component of the Site Evaluation Tool evaluates land cover of the site, including areas preserved for open space, and its affect on water quality, infiltration capacity, etc. The tool explicitly has riparian buffers as a BMP to chose from on its menu of options. The cost component of the tool does address land cost of a given BMP. However if the BMP is in an

undevelopable area, according to local, state or federal regulations, such a floodplain area, then the cost of the land would be assumed to be 0. So the tool does address riparian buffers if they are in the development tract.

Note if the riparian buffer or other BMP is proposed to be on another tract of land, Tetra Tech develops off-site mitigation requirements that would provide equal watershed protection, and uses its watershed model to analyze the on-site and off-site package of mitigation techniques.

*Will Tetra Tech consider whether certain BMPs should not be used on specific sites because of site conditions (e.g., given local topography, soils, etc.)?*

Yes, this will be part of the upfront screening process to determine which BMPs are most promising given local conditions. Modeling will further determine whether the BMPs screened are able to meet the Plan's objectives. It is important to go through a screening process to hone in on the BMP scenarios that will be subject to cost analysis.

*Will the method consider the different site features in the cost estimations?*

Yes, the pollutant loading and hydrology component of the Site Evaluation Tool is based on site features. For example, the design and construction requirements of a bioretention cell in sandy soil would be very different than that in a clayey soil. Representative site designs would be based on the characteristics of subwatersheds and BMP requirements would be determined for meeting the site's water quality and hydrology targets with the aid of the SET. For those BMP configurations that are able to meet targets, the SET cost tool uses the BMP type and sizing requirements to estimate BMP costs.

The final discussion item on the call was led by John Zastrow and focused on a proposed approach to view potential impacts of development on watershed views. John indicated that by using GIS software, along with available topography and tree cover information, 3-dimensional views of the watershed can be examined from multiple vantage points. Various buildout scenarios can be evaluated both from a modeling perspective and from the "viewshed" perspective. Visibility and aesthetics could be evaluated based on the frequency or percentage of visible structures.

## Q&A

*Can the proposed method look from different views (e.g., lake views versus ridge views)?*

Yes, the proposed method would allow viewpoints to be established with a great amount of flexibility and control. Viewing positions can be created anywhere in the scene to determine if trees or other natural obstructions will hide the structures. For example, the viewer can be positioned on the golf course at specific hole to look across the lake.

*Can the method address different seasons (e.g., summer versus winter, trees with leaves and after leaf-fall)?*

Yes, the proposed approach can simulate different seasons by creating separate scenes with leaf-on and leaf-off trees. The assessment team would be able demonstrate how much of a structure would be obstructed by leaf-on foliage and how much would be visible during the leaf-off periods.

Several members of the TAC pointed out how this could end up being a very important part of the project. If the planning level effort that Tetra Tech is proposing ends up providing interesting and useful results, then several members recommended that CAW be prepared to invest in a very high quality rendition ("Pixar" quality) as a part of the public presentation of the plan. It was their opinion that it will be important to have the predicted watershed views look as realistic as possible.

Discussion will continue at the next conference call, scheduled for Friday, October 7 at 2 PM CST. The call-in number, agenda and supplemental materials will be emailed by the end of Wednesday or early Thursday. The meeting was adjourned.

**Technical Advisory Council Member Attendance**

**Meeting Date: September 30, 2005**

**MEMBER NAME**

**REPRESENTING**

<u>NP</u>	Brazil, Ken	ARKANSAS NATURAL RESOURCES COMMISSION
<u>P</u>	Cassart, Dick	ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY
<u>P</u>	Clingenpeel, Alan	U.S. FOREST SERVICE
<u>P</u>	Cranmer, Morris	UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES
<u>SUB*</u>	Green, Reed	U.S. GEOLOGICAL SURVEY
<u>NP**</u>	Hymel, Stephanie	AUDUBON ARKANSAS
<u>P</u>	Kirsch, Bruno	CENTRAL ARKANSAS WATER
<u>P</u>	Malone, Walter	LITTLE ROCK DEPARTMENT OF PLANNING & DEVELOPMENT
<u>P</u>	Mckenzie, Jim	METROPLAN COUNCIL OF LOCAL GOVERNMENTS
<u>SUB*</u>	McPhillips, Munsell	DELTAIC TIMBER CORPORATION
<u>P</u>	Miller, Roger	ARKANSAS DEPARTMENT OF HEALTH
<u>P</u>	Pope, Ashley	PULASKI COUNTY DEPARTMENT PLANNING & DEVELOPMENT
<u>NP</u>	Shannon, John	ARKANSAS FORESTRY COMMISSION
<u>P</u>	Stapleton, Carl	UNIVERSITY OF ARKANSAS AT LITTLE ROCK, ENVIRONMENTAL HEALTH SCIENCES

**OTHERS**

	Crawford, Marie	CENTRAL ARKANSAS WATER
	Brewer, Kimberly	TETRA TECH, INC.
	Butcher, Jon	TETRA TECH, INC.
	Clements, Trevor	TETRA TECH, INC.
	Zastro, John	TETRA TECH, INC.
	Althoff, Kate	POLICY ADVISORY COUNCIL
	Dicker, Herb	POLICY ADVISORY COUNCIL
	Dicker, Pat	POLICY ADVISORY COUNCIL

\* Joel Galloway sat in for Reed Green due to Reed being called down to Louisiana to work on the Lake Ponchartrain problem; Robert Prager sat in on a portion of the call for Munsell McPhillips who had a meeting conflict.

\*\* emailed in advance that could not participate on the call