Appendix F – Recommended Methodology for Conducting Socioeconomic Impact Analysis

Introduction

As discussed in Section 3.4 of this report, one of the data gaps identified by the Project Team while conducting the literature review is that historical socioeconomic analyses tend to vary with regards to the methodologies and assumptions used, as well as the overall focus of the studies. In an effort to overcome this data gap, the Project Team has developed an initial outline of a potential methodology to be used for conducting socioeconomic impact analyses as part of Phase II of this study.

It should be noted that the following discusses the methodology in general; however, as each water supply alternative is different, the proposed methodology may require slight variation(s) to take into account the unique circumstances of each supply alternative.

Key Assumptions

The methodology developed by the Project Team relies on the following key assumptions:

- **Population Levels** – All population figures utilized are those developed during Regional Water Planning and published by the Texas Water Development Board. As this data is presented in ten year intervals (i.e., 2000, 2010, 2020, etc.), the effective annual increase was calculated to determine population levels in each year of the given ten-year period. For purposes of this analysis, it was assumed that, in the event water was available to support a certain level of population, that population level would be realized.

- **Water Demand** – As in the case of population, water demand was assumed to be the same as that developed during Regional Water Planning and published by the Texas Water Development Board and calculated annually based on the effective annual increase over the published ten-year periods.

- **Water Availability** – For purposes of this analysis, it was assumed that for each Water Management Strategy, sufficient water existed to meet the designated demand of the water management strategy target water user group ("WUG") without comprising water availability to existing WUGs. For example, with regards to the Toledo Bend Reservoir, it is assumed that sufficient water exists to meet the water needs of the Sabine River Basin while at the same time providing sufficient water for the Dallas-Ft. Worth Metroplex per the specifics of the recommended water management strategy. Further, it is assumed that there are no competing claims for a water source as a result of implementing a water management strategy. In other words, there are no opportunity costs associated with the implementation of an adopted water supply alternative. Finally, the assumptions regarding water availability are made on a "snap-shot" basis. Water availability is considered under known conditions and uses, based on the modeling efforts of the regional water

planning groups. No effort is taken to account for unknown future water demands in the Basin of Origin.

- **Sufficient Compensation / Incremental Cost Recovery** – This analysis assumes that, in the event that compensation is required for water supply alternative implementation, the level of compensation is sufficient to create a net zero economic impact. For example, in the event that a reservoir must be constructed, and a landowner receives compensation for his or her land to be flooded by the reservoir, that the compensation is economically sufficient to cover the costs associated with the impact to that landowner. Further, this analysis assumes that the incremental cost associated with the implementation of a water management strategy is covered by the WUG utilizing the water source. For example, should a water management strategy create infrastructure needs for an entity who does not need the water supply, then the cost associated with this infrastructure would be fully compensated by the entity utilizing the supply alternative. In sum, this analysis assumes that all payments made from the receiving WUG to the Basin of Origin result in a net zero economic impact and all those impacted are made economically whole.

- **Employment Levels** – It is assumed that any time population is added, jobs will be available to support the additional population levels.

- **Household Income** – Household income is assumed to be the value provided in IMPLAN, by county, for the base data year.

- **Base IMPLAN Data Year** – The base IMPLAN data year utilized for any study should be the most recently available. At the present time, data from 2007 is the most recent economic database available from MIG, Inc.

- **Inflation** – Inflation is generally considered to be a measurement of economic pressures on the purchasing power of money over time. A generally accepted measurement of price inflation is the Consumer Price Index ("CPI"). Because the measurement of socioeconomic impacts does not limit analysis to a specific good or service, the use of the general CPI is reasonable. However, it is the opinion of the Project Team that the potential changes in the CPI should be incorporated.

  The proposed methodology utilizes a single inflation factor for household income, so as to make a conservative estimate of future household income values; the assumption being that labor income will not always necessarily keep up with inflation. This single inflation factor will be the change in the CPI index for the last, most recent known period, unless that value is abnormally higher or lower than inflation for the last thirty years.

  Selection of inflation factor(s) for the costs of goods and services should reflect changes in economic cycles over time. This is due to the fact that review of water supply alternatives typically requires analyses that span several decades. Assuming

that the economy will continue to cycle as it has historically, inflation factors can be computed based on changes in the CPI for every two to ten year period during the last 30 years depending on the historical shifts in the CPI indices.

- **Discount Rate** – The selection and use of a discount rate allows each of the water supply alternatives to be expressed in net present value. In the opinion of the Project Team, one of the best proxies to be used as a discount rate in an analysis that spans several decades is the interest rate on the 30-Year Treasury Bill. These financial instruments are typically thought to reflect the average future long-term interest rate. The question becomes whether or not to use a recent interest rate or one that reflects an average interest rate for a longer period of time. For the proposed methodology, the Project Team recommends the use of a 30-year average of the interest rates on the 30-Year Treasury Bills. It is the Project Team's opinion that the longer period average takes into account the current uncertain economic environment. During periods of less economic uncertainty, a recent interest may be more desirable.

- **Timing** – With regards to the timing of supply alternatives, all economic impacts are calculated as if the water supply alternative would begin design and/or construction, if required, or delivering water on January 1, 2009 and projected through 2060. For those supply alternatives that have not been constructed, the Project Team will evaluate each supply alternative and determine the appropriate construction timing which should be recognized in the analysis.

Proposed Methodology

The methodology developed by the Project Team is handled in five distinct steps as discussed below. Please note that the methodology outlined below is based on Phase I of the Scope of Services and is subject to amendment and/or modification based on comments received by the Region C & D Study Commission and/or additional findings that may occur in the proposed Phases II and III of the Project.

Step 1: Identification and Quantification of Impacts

Based on the scope of services, the methodology developed by the Project Team should consider the socioeconomic impact on landowners, agricultural and natural resources, commercial business, industrial facilities, and taxing entities where possible. As each reservoir is different, the impacts also vary and will be discussed individually as each reservoir is analyzed. However, the following provides a general discussion of the some of the key assumptions which have guided the Project Team's impact analysis.

Impact on Landowners

When considering the impact to landowners of the water supply reservoirs, it was assumed that the existence or non-existence of the reservoir would not directly alter the economic circumstances of the landowner. If the reservoir does not exist, then the taking of land to construct the reservoir represents a negative impact to the landowner. However, it is assumed for purposes of this study that

the landowner will be fully compensated to reflect the negative economic impact. As such, the payment to the landowner offsets the negative economic impact, resulting in a net zero impact. While other negative social impacts may exist with the taking of land, assuming appropriate compensation occurs, the economic impact of this taking is zero and is assumed as much within this study.

In the event that the landowner derives income from the land (e.g., agriculture, mineral extraction, etc.), the negative economic impact of the loss of this industry production is considered in this methodology under industry or commercial impacts. In the calculation of the industry impact, the induced effect (i.e., changes in household spending based on income changes) accounts for the loss of income to the landowner.

Given the above discussion, it is the opinion of the Project Team that direct economic impacts of reservoirs as a water supply alternative are not evident and distinguishable at the landowner level. To the extent that social impacts are evident, they will be quantitatively or qualitatively identified.

Impact on Agricultural and Natural Resources

The impact of water supply alternatives on agricultural and natural resources can occur in a variety of ways. These include, but are not limited to, the taking of land to establish a reservoir or the taking of land for environmental mitigation efforts. Agricultural and natural resources may be impacted by a decrease in available water supply based on the use of that supply by other entities; however, as discussed earlier in this report, it is assumed that water availability modeling has been properly applied per Texas Water Development Board Regional Water Planning Guidelines and that a water management strategy for one WUG does not create a deficit in water availability for another WUG.

In each case, the economic impact of the change in production, or the change in industry production inputs, can be modeled in IMPLAN, along with the multiplicative effect. This multiplicative effect accounts for the further impact of the changed production level to industrial and/or commercial industries and households. Within the Project Team's methodology, these impacts will be directly identified and quantified.

Impact on Commercial Business

To the extent that a commercial business is directly impacted by a water supply alternative, this impact can and will be modeled by the Project Team using IMPLAN. However, to the extent that commercial business is impacted by a change in production by an agricultural or industrial entity, the impact on commercial business will be considered an indirect impact and accounted for in the multiplicative effect of the impact. For example, assuming the creation of a reservoir decreases available timber supply, the direct impact is modeled against the industry, with the indirect impact applicable to commercial business.

Impact on Industrial Facilities
Similar to Agricultural and Natural Resources and Commercial business, the impact of a water supply alternative on industrial facilities, that is the change in industry production inputs, will be modeled in IMPLAN.

Impact on Taxing Entities
The Project Team recognizes that in the event that a water supply alternative reduces the amount of taxable land or taxable land value, or reduces the number of taxpayers in the area, there will be a negative impact to the local taxing entity. However, in terms of adding economic value, it is the opinion of the Project Team that while government spending may stimulate the transfer of dollars in the economy, this spending does not increase the total amount of dollars in the economy. For example, when the government levies a tax, it is taking money from an industry, commercial business, or household, and is spending that money on other items such as materials and supplies, equipment, or employee compensation. No economic value is added by government in this transaction, it is simply moving the dollars from one entity to another. This transfer is substantiated in the IMPLAN model as a change in output has a direct effect on government (i.e., increase or decrease in tax dollars), but no additional indirect or induced impact. Given this circumstance, the Project Team has taken into account only the direct impact of an increase or decrease in spending by taxing entities, and has assumed no multiplicative effect on this impact (i.e., no indirect or induced impact).

Bays & Estuaries / Senior Water Rights
Recently, the impact of water supply alternatives on bays and estuaries has received greater attention throughout the State. However, it is the Project Team's opinion that, assuming firm reservoir yield and firm river diversion calculation requirements are properly captured in the TCEQ Water Availability Model by the Regional Water Planning groups, there should not be a negative impact on bays & estuaries. More specifically, Exhibit B of the Combination Guidelines for Regional Water Plan Development requires that in firm reservoir yield and firm diversion be calculated based on the drought of record and that "Bay and estuary instream flow requirements should be fully satisfied." Further, with regards to senior water rights, the guidelines require "the passage of sufficient water to satisfy all downstream senior water rights valued at their full-authorized amounts and conditions."

Given the above, in developing the analysis for a water supply alternative, it is assumed that all present downstream requirements are fulfilled. In the event that a water supply alternative is implemented, and a future downstream individual is economically impacted by upstream use, then a negative economic impact still does not exist, in the opinion of the Project Team, as the individual in question made their decision to rely on a water supply with full knowledge of potential

upstream impacts. Given these factors, the Project Team assumes that a negative economic impact to downstream concerns does not exist, assuming water availability is calculated per Texas Water Development Board guidelines. Social impacts may exist and will be qualitatively or quantitatively identified.

Step 2: Projected Annual Impact

Once the impacts are identified, the Project Team's methodology projects that impact through 2060. The projection includes inflation, as previously discussed, and the variation in the impact as may occur year to year due to variations in population and/or timing associated with the water supply alternative.

Step 3: Present Value Calculation

After quantifying the projected annual impact, the discount factor, as discussed above, was applied to derive the present value of each of the impacts identified and quantified.

Step 4: Net Impact

The final step in the Project Team's methodology is to total the present value of each of the positive and negative impacts identified and quantified to arrive at the net economic impact for the water supply alternative.

Step 5: Summary of Qualitative Impacts

To the extent that social impacts exist which cannot be quantified, the Project Team will summarize these impacts for inclusion in the analysis.

Based on the above discussion, the Project Team has applied the proposed methodology to analyze the estimated socioeconomic impact associated with the proposed transfer of water from the Toledo Bend Reservoir to Region C.