Section 6
Conclusions and Recommendations

Phase I of the IWRP project concludes with recommendations of alternatives to carry into Phase II. The recommendations are made by the steering committee through the input and support of the stakeholder advisory group.

6.1 Stakeholder Recommended Alternatives

The scorecard results of the alternatives analysis were discussed with stakeholders during Workshop 4. Based on the performance of individual options, preliminary results of hybrid alternatives, and interactive analysis of hybrid alternatives, the stakeholders selected four alternatives which they recommended to carry forward. These four hybrid alternatives are defined in Table 5-2, and may be compared with Table 3-3 containing the initial alternatives.

Table 6-1 is the performance measure scorecard of the recommended hybrid alternatives, and **Figure 6-1** shows the standardized scores for each objective and hybrid alternative (as well as the do-nothing alternative). The following is a summary of the four alternatives recommended to be studied further in Phase II. Each of the four recommended alternatives has a different water supply option, and a focus of Phase II will be to study those options in greater detail to refine assumptions and make more educated comparisons. **Table 6-2** lists the key features of each recommended alternative.

- **Efficiency + Safety and Security –** This alternative includes all stormwater, distribution system, collection system, conservation, reclaimed water, and ecological restoration options (except addressing the dump site, which is not included in any alternative due to lack of information defining the project, namely cost, at this time). Water supply options include repairing the raw water reservoir, upgrading the existing WTP to 4 mgd, and purchasing the remaining water needed to meet demands from HVUD. Wastewater will be accepted from other small communities and a new WWTP will be constructed at Goose Creek. Biosolids handling will be improved by upgrading the facility for biogas to energy and processing biosolids for land application.

- **Water Quality –** This alternative includes all stormwater, distribution system, collection system, conservation, reclaimed water, and ecological restoration options. All of the water supply for the City will be purchased from HVUD. No water will be withdrawn from the Harpeth River. The existing WWTP will be upgraded to sufficient capacity to treat Franklin's and neighboring small communities' wastewater and to treat effluent in the summer months to a higher

standard. Biosolids handling includes upgrading to produce Class A solids, biogas to energy, and sending Class A solids to Franklin's composting facility.

- **Low Cost –** This alternative includes all conservation options. No stormwater options are included. Select, low cost options for the distribution and collection systems are included. Only the removal of the low-head dam (which is not considered to be funded by the City) is included from ecological restoration options. Reclaimed water options that do not involve building new lines or converting tanks are included. The water supply option is to update the existing 2.1 mgd plant, repair the reservoir, and purchase the remaining water needed from HVUD. The wastewater option is to upgrade and rerate the existing plant only. Biosolids handling will include upgrading to biogas for energy (to recover energy costs) and transport the solids to Metro Nashville for disposal and processing.

- **Reliability –** This alternative includes all conservation options, stormwater options that focus on reuse, collection and distribution system options that aim to provide customers with a more reliable service, and no ecological restoration options. The water supply option is to build a new transmission line from the Cumberland River and upgrade the Franklin WTP to treat all of the City's water. The existing WWTP will be upgraded and rerated and a new plant will be constructed at Goose Creek. Several, though not all, reclaimed water options are included. Biosolids handling will be improved by upgrading both to produce Class A solids and ash disposal.

Table 6-1
Performance Measure Scores for Recommended Hybrid Alternatives

Objectives		Weight	Performance Measures	Units	Efficiency + Safety & Security	Water Quality Plus	Revised Low Cost	Revised Reliability	Do Nothing
1	Reliability	31.1	% time all demands met	% time (all days)	56.1	58.1	33.2	53	24.7
			Avg magnitude of deficits (all uses)	MG	8.82	7.27	6.87	9.23	7.84
			Vol of WW capacity surplus or shortfall	MGD	3.56	4.56	5.83	7.56	0.29
			Supply redundancy	% volume	36.1	0	20.3	46.3	19.3
2	Efficiency	15.5	Volume of stormwater put to beneficial use	MGD (all days)	0.50	0.50	0.00	0.50	0.00
			% total reuse demand satisfied	% volume	60.7	70.3	52.4	55.3	37.3
			% demand reduction	% volume	5	5	5	5	0
			Reduction in inflow and infiltration	qualitative	5	5	4	4	2
			% reduction in unaccounted for water	% volume	50	50	50	0	0
3	Water Quality & Ecological Restoration	13.5	Frequency of low flow < September median	% time (all days)	0.81	7.37	9.11	0.92	9.11
			Average summer BOD load	LB/day (summer only)	960	910	1,030	1,020	1,130
			Average summer nitrogen load	LB/day (summer only)	260	170	250	270	380
			Ecological indicators	qualitative	4.5	4.5	4	3.5	3
			Negative impacts of stormwater reduced	qualitative	3.5	3.5	3	3	3
4	Service at a Reasonable Cost	13.2	Life-cycle cost of projects and policies	million $	631	645	404	804	360
			Combined change in water and sewer rates	qualitative	2	2.5	2.2	1.8	3
			Meet secondary drinking water standards	qualitative	5	2.5	3.5	4	3.5
5	Safety & Security	8.3	% of total wastewater on septic	% volume	0	0	4	0	4
			Change in 100 year flood elevation	qualitative	5	4	3	3	3
			Vulnerability of infrastructure & facilities	qualitative	4	1.5	4	4	1.5
			Emerging water quality concerns	qualitative	3	4	3.5	4	4
6	Achieve Regional Acceptance	5.7	Extent of regional focus	qualitative	3.5	4.5	3	3	3
			Likelihood of public acceptance	qualitative	2	3	4	2.5	1
7	Sustainable Biosolids Mgmt	4.7	Biosolids handled sustainably	qualitative	5	5	4	2	1
8	Improved Access & Aesthetics	4.5	% of streamflow that is WWTP effluent	% volume (Sept. only)	22.1	0.0	4.7	21.5	35
			Extent of bank stabilization	qualitative	5	5	1	1	1
			Erosion potential	qualitative	4	4.5	3	3	3
			Public accessibility	qualitative	3	3	3	3	3
9	Carbon Footprint	3.5	Average energy requirements	average kWh/day	30,500	90,800	35,000	112,100	72,600

Raw scores are planning-level estimates based on existing information and used only for initial comparison – they are subject to revision with more detailed evaluation in Phase II.

Table 6-2
Key Features of Final Four Alternatives

	Key Features				
Recommended Alternatives	**Water Supply**	**Wastewater**	**Stormwater**	**Reclaimed Water**	**Harpeth River**
Efficiency + Safety and Security	Upgrade Franklin WTP to 4 mgd, purchase remaining water from HVUD	Goose Creek plant and WW from other communities	All major projects	All major projects	All ecological restoration options
Water Quality	Shut down Franklin WTP and purchase all water from HVUD	Upgrade existing WWTP, accept WW from other communities, treat effluent to higher standard in summer	All major projects	All major projects	All ecological restoration options
Low Cost	Maintain 2.1 MGD at Franklin WTP, purchase remaining water from HVUD	Upgrade existing WWTP	None	Options that do not include new lines or tanks	Remove low head dam
Reliability	Upgrade Franklin WTP to supply all City demand, transport raw water form Cumberland River	Upgrade existing WWTP and build Goose Creek	Options that focus on reuse	Some major, all minor projects	None

Figure 6-2 shows the aggregated weighted scores for each alternative described above. The efficiency + safety and security hybrid alternative has the highest composite score, though all four recommended alternatives scored comparably in the most heavily weighted objectives. While tradeoffs were observed, especially in regards to cost performance measures, generally alternatives that included more options scored higher based on the objectives and weights developed by the stakeholders. **Figure 6-3** shows a comparison of the composite scores without the cost scores included, versus the estimated cost of each alternative. This comparison, while based on preliminary cost data and estimations that need to be refined, shows that there may be a value of expenditure at which stakeholder-defined benefits level off. Phase II will include further analysis of this type of observation, so that the final IWRP is a logical group of projects that is designed to meet the City's objectives for water resource management, while recognizing constraints such as cost and permitting.

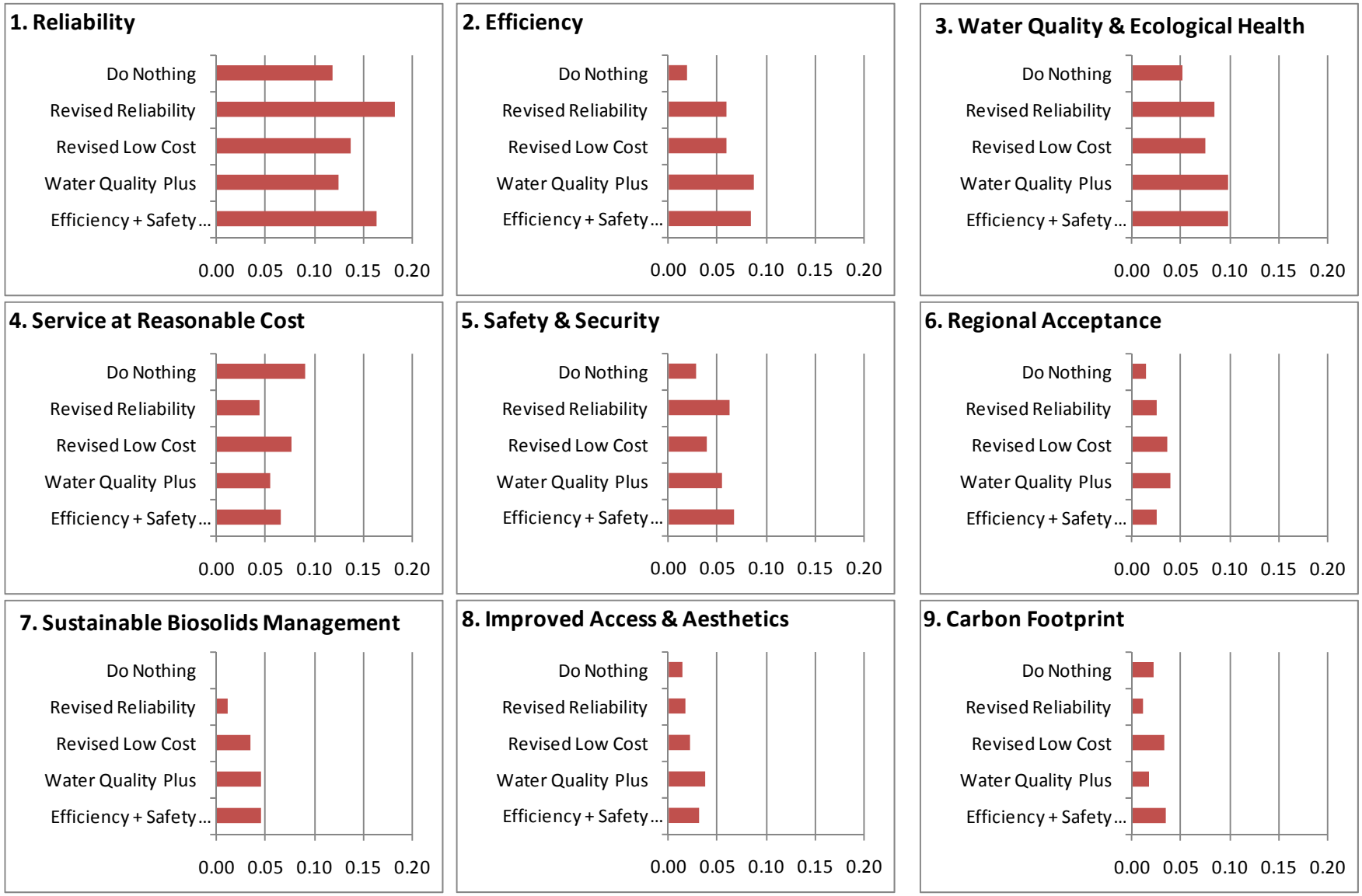

Figure 6-1
Weighted Objective Scores for Recommended Hybrid Alternatives

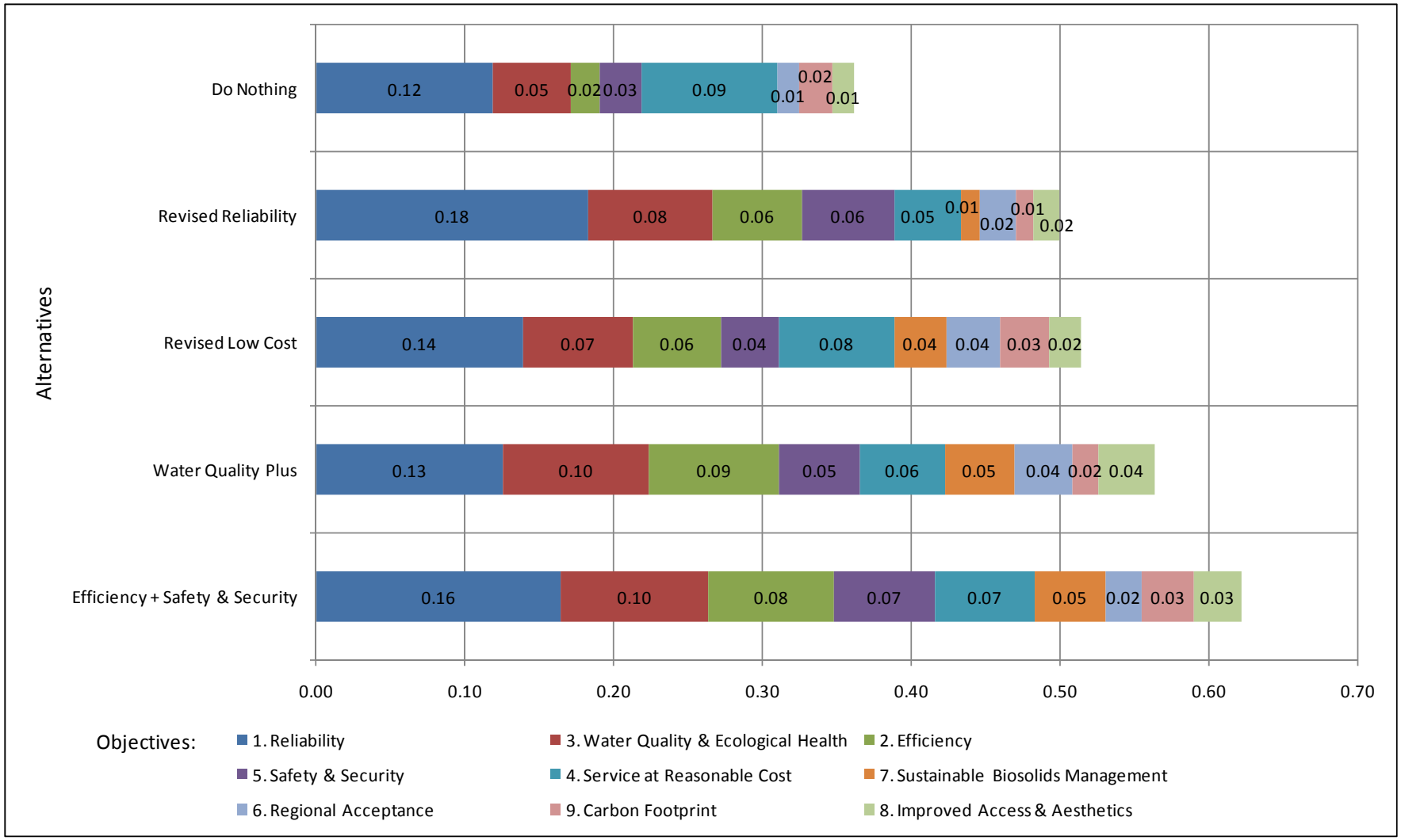

Figure 6-2
Composite Scores for Recommended Hybrid Alternatives

6.2 IWRP Phase II

This report is the culmination of Phase I activities and documents the stakeholder-driven process, as well as development of the integrated system model, technical data and assumptions, and other information used to screen alternatives that are carried into Phase II of the IWRP. The IWRP will be completed during Phase II of this planning process. As a result of the outcomes of Phase I of the IWRP, the Phase II process, at a minimum, will include the following:

- Detailed technical analysis of the recommended alternatives.
- Detailed cost analysis.
- Continued modeling and screening of the plans to compare and rank them.
- Continued interaction with stakeholders.
- Conceptual design as necessary to support cost and performance estimation (siting, sizing, performance, needs, etc.).
- Identification of a single preferred plan (the IWRP) from among the alternatives (a blend of the recommended alternatives.
- Permitting plans for identified projects.
- Financing plan for the implementation of the IWRP.
- Phasing plan for project implementation.

The purpose of Phase I was to convene a stakeholder advisory group and steering committee, formulate a list of objectives that the IWRP would address, conduct a preliminary evaluation of potential projects to be included in the IWRP, and develop recommended groupings of projects based on a framework of weights and performance measures agreed upon by the stakeholders. An integrated system model and decision support methodology were used to assist the stakeholders in understanding how decisions made about one aspect of the water resources system would affect the system as a whole. Phase I concludes with a greater understanding of the City of Franklin's water resources systems, consensus amongst stakeholders on the objectives of the IWRP, and a refined list of alternatives to be studied further in Phase II.

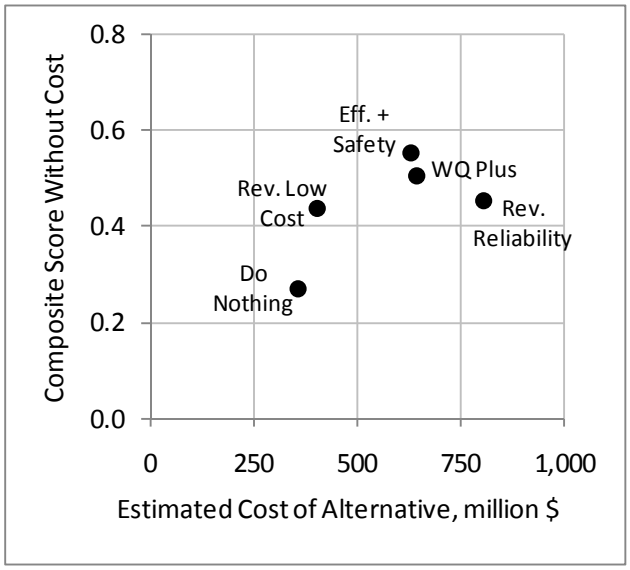

Figure 6-3
Preliminary Comparison of Possible Benefits and Costs of Recommended Alternatives