Worksheet 1-1: Water System Profile

A	SERVICE CHARACTERISTICS	Number		
1	Estimated service population			
2	Estimated service area (square miles)			
3	Miles of mains			
4	Number of treatment plants			
5	Number of separate water systems			
6	Interconnection with other systems			

B	ANNUAL WATER SUPPLY	Annual volume	Number of intakes or source points	Percent metered
7	Groundwater			%
8	Surface water			%
9	Purchases: raw			%
10	Purchases: treated			%
11	Total annual water supply			%

C	SERVICE CONNECTIONS	Connections	Water sales	Percent metered
12	Residential, single-family			%
13	Residential, multi-family			%
14	Commercial			%
15	Industrial			%
16	Public or governmental			%
17	Wholesale			%
18	Other			%
19	Total connections			%

D	WATER DEMAND	Annual volume	Percent of total	Per connection
20	Residential sales			
21	Nonresidential sales			
22	Wholesale sales			
23	Other sales			
24	Nonaccount water: authorized uses			
25	Nonaccount water: unauthorized uses			
26	Total system demand (total use)			

E	AVERAGE & PEAK DEMAND	Volume	Total supply capacity	Percent of total capacity
27	Average-day demand			%
28	Maximum-day demand			%
29	Maximum-hour demand			%

F	PLANNING	Prepared a plan P	Date	Filed with state P
30	Capital, facility, or supply plan			
31	Drought or emergency plan			
32	Water conservation plan			

Worksheet 1-2: Summary of System Conditions

PLANNING QUESTIONS	Yes	No	Comment
Is the system in a designated critical water supply area?			
Does the system experience frequency shortages or supply emergencies?			
Does the system have substantial unaccounted-for and lost water?			
Is the system experiencing a high rate of population and/or demand growth?			
Is the system planning substantial improvements or additions?			
Are increases to wastewater system capacity anticipated within the planning horizon?			

Worksheet 1-3: Summary of Current Conservation Activities

Water conservation measures and programs	*Approximate annual water savings implementation* [if known]	Implemented since (date)	Is continued planned?

Worksheet 2-1: Preliminary Water Demand Forecast [a]

Line	Item	Current year	5-year forecast	10-year forecast	20-year forecast
A	**RESIDENTIAL DEMAND**				
1	Current annual water residential sales (total gallons)		▨	▨	▨
2	Current population served [b]		▨	▨	▨
3	Residential sales per capita (line 1 divided by line 2) [b]		▨	▨	▨
4	Projected population [b]	▨			
5	Projected annual residential water demand (line 3 multiplied by line 4)	▨			
B	**NONRESIDENTIAL DEMAND [C]**				
6	Current annual water nonresidential sales (total gallons)		▨	▨	▨
7	Current number of employees or jobs [c]		▨	▨	▨
8	Water use per employee or job (line 6 divided by line 7)		▨	▨	▨
9	Projected number of employees or jobs	▨			
10	Projected annual nonresidential water demand (line 8 multiplied by line 9)	▨			
C	**NONACCOUNT WATER (WATER NOT SOLD TO CUSTOMERS)**				
11	Current and forecast amount [d]				
D	**WATER SYSTEM TOTAL DEMAND**				
12	Current total annual water demand (add lines 1, 6, and 11)		▨	▨	▨
13	Projected total annual water demand (add lines 5, 10, and 11)	▨			
14	Adjustments to forecast (+ or -)	▨			
15	Current (line 12) and adjusted total annual water demand forecast (add lines 13 and 14) [e]				
16	Current and projected annual supply capacity [f]				
17	Difference between total use and total supply capacity (+ or -) (subtract line 12 from line 15)				
E	**AVERAGE-DAY AND MAXIMUM-DAY DEMAND**				
18	Average-day demand (line 15 divided by 365)				
19	Current maximum-day demand		▨	▨	▨
20	Maximum-day to average-day demand ratio (line 20 divided by line 19)		▨	▨	▨
21	Projected maximum-day demand (line 18 multiplied by line 20 for all forecast years)	▨			
22	Adjustment to maximum-day demand forecast [e]	▨			
23	Current (line 19) and adjusted maximum-day demand forecast (add lines 21 and 22)				
24	Daily supply capacity (divide line 16 by 365)				
25	Ratio of maximum-day demand to daily supply capacity (divide line 23 by line 24)				

[a] Note: separate forecasts should be prepared for large-volume users.

[b] Planners can chose to use service connections or households instead of population and per-connection water use instead of per-capita water use.

[c] Explanatory variables other than employees or jobs can be used as appropriate. The forecast should be disaggregated by sector of water use to the greatest extent possible (for example, commercial and industrial water use and nonaccount water) and a qualitative sensitivity analysis ("what if") should be performed for each sector's forecast.

[d] Please provide an explanation of the forecast of nonaccount water, including all relevant assumptions.

[e] Please provide an explanation of adjustments to your forecasts, including all relevant assumptions.

[f] Supply capacity should take into account available supplies (permits), treatment capacity, and distribution system capacity and reflect the practical total supply capacity of the system, including purchased water.

Worksheet 3-1: Anticipated Improvements and Additions

Type(s) of Project(s) [a]	Improve-ment	New Capacity	Start date	End date
Source of supply	❏	❏	_____	
Water treatment facilities	❏	❏	_____	
Treated water storage	❏	❏	_____	
Major transmission lines	❏	❏	_____	
Other _____	❏	❏	_____	

Need(s) for Project(s) (Check all that apply)		Notes
Enhance compliance with regulations	❏	_____
Replace older equipment or facilities	❏	_____
Meet average-day demand	❏	_____
Meet maximum-day demand	❏	_____
Meet future growth needs	❏	_____
Other _____	❏	_____

Funding

Project:_____

Project Cost: _____

Financing Cost: _____ (Assuming ___% annual project interest rate *or*
  ___% overall cost of capital)

Total Capital Cost: _____

Project:_____

Project Cost: _____

Financing Cost: _____ (Assuming ___% annual project interest rate *or*
  ___% overall cost of capital)

Total Capital Cost: _____

Project:_____

Project Cost: _____

Financing Cost: _____ (Assuming ___% annual project interest rate *or*
  ___% overall cost of capital)

Total Capital Cost: _____

Water purchases

Anticipated future water purchases	_____	(gallons per year)
Cost of water purchases	_____	(dollars per gallon)

[a] Plans can include wastewater facilities.

Worksheet 3-2: Cost of Supply-Side Facilities

Line	Item	Facilities for meeting average-day demand	Facilities for meeting maximum-day demand [a]			Water purchases needed to meet demand [b]	Estimate of simple incremental supply cost ($/gallon)
		Source of supply	Water treatment facilities	Treated water storage	Major transmis-sion lines		
A	**SUPPLY CAPACITY IN ANNUAL GALLONS [c]**						
1	Current installed capacity or water purchases						
2	Planned improvements and additions						
3	Planned retirements						
4	Future installed capacity or purchases (line 1 plus line 2 less line 3)						
B	**COST OF PLANNED IMPROVEMENTS AND ADDITIONS**						
5	Approximate total cost of planned improvements and additions identified in line 2 (including financing costs)						
6	Expected life of new facilities (years)						
7	Estimated annual capital costs (line 5 divided by line 6)						
8	Estimated annual operating costs [d]						
9	Estimated total annual costs (line 7 plus line 8) [e]						
10	Per unit cost of new facilities (line 9 divided by line 2)						
11	Simple incremental supply cost (add all entries from line 10)						

[a] Additional facilities or capital equipment can be included as appropriate.

[b] The plan should indicate whether purchases are needed to meet average-day or maximum-day demand or both.

[c] Planners should select a reasonable planning horizon for supply facilities and use the same time frame for all facilities.

[d] Annual variable operating cost (including energy, chemicals, and water purchases).

[e] This calculation of simplified value does not include a discount rate, an escalation rate, or an adjustment for inflation. Other methods that do, such as that in Worksheet 3-3, are available and recommended.

Note: This analysis also can be extended to include the incremental cost of wastewater collection and treatment.

Worksheet 3-3: Cost of Supply-Side Facilities (Alternative Approach With Cost Escalation and Discounting)

Year [b]	Annual incremental capacity from improve- ments/ additions [c]	Annualized incremental capital cost [d]	Annual operating cost [e]	Un- discounted total annualized incremental cost [f]	Escalated value of supply cost in nominal dollars [g]	Present value of supply cost in nominal dollars [h]	Present value of supply cost Per gallon in nominal dollars [i]
	gallons	$	$	$	$	$	$/gallon
0							
1							
2							
3							
4							
5							
6							
7							
8							
9							
10...							
20							
Total							

Source: Adapted from Pekelney, Chesnutt, and Hanemann (1996). See Glossary (Appendix A) for definitions.

[a] = This analysis should be calculated separately for (1) improvements and additions needed to meet **average** demand, and (2) improvements and additions needed to meet **peak** demand so that the results can be compared to corresponding conservation measures. The analysis also can be expanded to include the incremental cost of wastewater collection and treatment.

[b] = The number of years should correspond to the anticipated useful life of the project(s).

[c] = Total gallons of capacity made available through the project(s).

[d] = Annualized incremental capital cost (K):

$$K = \frac{C \times i \times (1+i)^n}{(1+i)^n - 1}$$ where: K = annualized capital costs
C = total expenditures required
n = the useful service life of the capital expenditure

(see [b])

i = the appropriate interest or financing rate

[e] = Annual variable operating cost (including energy, chemicals, and water purchases).

[f] = [d] + [e]

[g] = [f] $\times (1+s)^t$ where s is the selected annual escalation rate and t is the year. The escalation rate can be tailored to the nature of capital expenditures.

[h] = [g]$/(1+r)^t$ where r is the selected annual discount rate and t is the year. The escalation rate can be tailored to the nature of capital expenditures.

[i] = [h]/[c]

Worksheet 3-4: Preliminary Supply-Capacity Forecast

Year	Additions (+)	Retirements (-)	Total supply capacity for the system (annual or daily)
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Worksheet 5-1: Conservation Measures Identified in the Planning Process

Measure [a]	Already Implemented?	Evaluated in this Plan (Step 6)?	Comments [b]
DEMAND-SIDE MEASURES			
Water-efficient fixtures and appliances			
Toilets			
Urinals			
Showerheads			
Faucets			
Washing machines			
Other [specify]			
Landscape efficiency			
Low water use landscapes			
Drought-resistant vegetation			
Efficient irrigation			
Equipment			
Scheduling			
Other [specify]			
Industrial and commercial efficiency			
Water-efficient processes			
Cooling equipment efficiency			
Other [specify]			
SUPPLY-SIDE MEASURES			
Water reuse systems			
[Specify]			
Distribution system efficiency			
Leak repair			
Removal of phreatophytes			
Other [specify]			
Temporary transfers from agriculture			
Dry year leasing			
Rotational fallowing			
Water salvage			
Other [specify]			
Source optimization			
Conjunctive use			
System integration with other utilities			
Other [specify]			

[a] To meet the requirements of §37-60-126, C.R.S., measures in shaded rows must be considered.

[b] Use this column to indicate the chief reason(s) a listed measure is not given further evaluation (Planning Step 6) in this plan. Include other comments as appropriate to the planning process.

Worksheet 5-2: Conservation Programs Identified in the Planning Process

Program [a]	Already Implemented?	Evaluated in this Plan (Step 6)?	Comments [b]
DEMAND-SIDE PROGRAMS			
Education/information dissemination			
Public education			
Water-saving demonstrations			
School programs			
Informative & understandable water bill			
Water bill inserts			
Other [specify]			
Technical Assistance			
Customer water use audits			
Targeted at large users			
Targeted at large landscapes			
Water conservation expert available			
Other [specify]			
Rate structures & billing systems designed to encourage efficiency			
Volume billing			
Conservation (tiered) rate structure			
Increased (monthly) billing frequency			
Other [specify]			
Regulations/Ordinances			
Addressing fixtures & appliances			
Standards for fixtures & appliances			
Time of sale upgrades			
Other [specify]			
Addressing landscapes			
Turf restrictions			
Landscape design/layout			
Soil preparation			
Irrigation equipment			
Water waste prohibition			
Other [specify]			
Incentives			
Rebates			
Give-aways			
Other [specify]			
SUPPLY-SIDE PROGRAMS			
Distribution system efficiency			
Leak identification			
Meter source water			
Meter service connections			
Meter testing and replacement			
Improved water accounting			
Analysis of non-account water			
Other [specify]			

[a] To meet the requirements of §37-60-126, C.R.S., programs in shaded rows must be considered.

[b] Use this column to indicate chief reason(s) a listed program is not given further evaluation (Planning Step 6) in this plan. Include other comments as appropriate to the planning process.

Worksheet 6-1: Analysis of Each Conservation Measure or Group of Measures & Programs

Describe conservation measure(s):

_____
_____
_____

Describe program(s), if applicable:

_____
_____
_____

Typical measure/program water savings: _____ per _____
Number of planned installations: _____
Anticipated life span of the savings _____ years

The measure(s)/program(s) is(are) designed to reduce: ❑ Average-day demand
              ❑ Maximum-day demand
              ❑ Both average-day and maximum-day
demand

Line	Item	Amount	Amount
A	**COST OF THE MEASURE(S)/PROGRAM(S) [a]**	**Per unit [b]**	**Total cost of the measure/program**
1	Materials	$	$
2	Labor		
3	Rebates or other payments		
4	Marketing and advertising	/////	
5	Administration	/////	
6	Consulting or contracting	/////	
7	Other		
8	Total program costs for the life of the measure/program (add lines 1 through 7) [c]	/////	$
B	**ESTIMATED SAVINGS**		
9	Number of units to be installed [d]		
10	Estimated annual water savings per unit in gallons [e]		
11	Total estimated annual savings for the measure/program in gallons (multiply line 9 by line 10)		
12	Expected life span for the savings in years		
13	Total life span estimated savings for the measure/program in gallons (multiply line 11 by line 12)		
C	**ANALYSIS OF COST EFFECTIVENESS**		**Amount**
14	Cost of water saved by the measure (line 8 divided by line 13)		/gallon
15	Simple incremental cost of water supply [f]		/gallon
16	Cost comparison (line 15 less line 14)		/gallon
D	**NET BENEFIT OF CONSERVATION**		**Amount**
17	Estimated value of water saved by the measure based on incremental supply cost (line 13 multiplied by line 15)		$
18	Net value of water saved by the measure/program (line 17 less line 8)		$

[a] This analysis is used to aid the comparison and selection of measures. Planners will estimate actual effects of conservation on planned capital facilities in Section 8. A separate analysis should be performed for each conservation measure or program, but measures/programs can be combined if they jointly produce water savings.

[b] Examples of a unit are a toilet, a retrofit kit, and an audit. A unit estimate may not be appropriate for each measure/program, in which case total measure/program water savings and costs can be used.

[c] Include all recurring operation and maintenance costs over the life of the measure/program.

[d] Units can be individual product units (such as toilets) or groups of products (such as household retrofits), as long as the analysis is consistent. Leave blank if unit values do not apply.

[e] For example, water savings per retrofit. Leave blank if unit values do not apply.

[f] From Worksheet 3-2, line 11.

Worksheet 6-2: Comparison of Benefits and Costs of the Conservation Measures and Programs

Line	Conservation measure/program [a]	Total cost for the measure/ program [b]	Anticipated annual water savings in gallons [c]	Cost of water saved by the measure ($/gallon) [d]	Net benefit of implementing the measure/ program [e]
1		$		$	$
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20...					

[a] = Combined measures and programs that produce joint conservation savings should be treated as one measure/program to avoid duplicate counting.

[b] = From Worksheet 6-1, line 8.

[c] = From Worksheet 6-1, line 11.

[d] = From Worksheet 6-1, line 14.

[e] = From Worksheet 6-1, line 18. Note: This estimate of net benefit does not consider societal benefits and costs. Net monetary benefit is not the only legitimate criterion for ranking and selection of measures/programs. See the text.

Note: Approaches that address cost escalation and natural cost profiles over disparate project lifespans are available. These methods incorporate discounting to account for the time value of money. Planners are encouraged to use such approaches.

Worksheet 6-3: Selection of Conservation Measures/Programs and Estimate of Water Savings

Line	Measure/Program	Selected P	Primary criteria for selecting or rejecting the conservation measure/program for implementation	Estimated reduction in demand for selected measures/programs (gallons per day) [a]	
				Average-day demand	Maximum-day demand
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20…					
Total					

[a] Based on Worksheet 6-1, line 11. Planners will need to convert estimates of annual water savings to estimates of reductions in average-day and maximum-day demand for each measure or group of measures/programs.

Worksheet 7-1: Modified Demand Forecast

Line	Item	Current year	Year 5	Year 10	Year 20
1	Average-day demand before conservation [a]				
2	Average-day demand after conservation [b]	▨			
3	Reduction in average-day demand (line 1 less line 2)	▨			
4	Maximum-day demand before conservation [a]				
5	Maximum-day demand after conservation [b]	▨			
6	Reduction in maximum-day demand (line 4 less line 5)	▨			
7	Ratio maximum-day to average-day demand before conservation (line 4 divided by line 1)				
8	Ratio maximum-day to average-day demand after conservation (line 5 divided by line 2)	▨			

[a] From Worksheet 2-1.
[b] Based on Worksheet 6-3.

Worksheet 7-2: Project-Specific Savings

DESCRIPTION OF PROJECT [a]

Describe the project: _____

_____

Project was scheduled to begin: _____

Purpose of the project: ❐ Improvement   ❐ Addition

The project is designed to meet: ❐ Average-day demand   ❐ Maximum-day demand

Type of project: ❐ Source of supply
                         ❐ Water treatment facilities
                         ❐ Treated water storage
                         ❐ Major transmission lines
                         ❐ Purchased water
                         ❐ Wastewater facility
                         ❐ Other _____

CHANGES TO PROJECT [b]

Line	Item	Project capacity (daily)	Project Costs — Total capital costs ($)	Project Costs — Annual operating costs ($)
A	**CAPITAL PROJECT IS ELIMINATED**			
1	Original project			
2	Savings from elimination (equals line 1)			
B	**CAPITAL PROJECT IS DOWNSIZED**			
3	Original project			
4	Downsized project			
5	Savings from downsizing (line 3 less line 4)			
C	**CAPITAL PROJECT IS POSTPONED**			
6	Present value of original project	▨		
7	Present value of postponed project	▨		
8	Savings from postponement (line 6 less line 7)	▨		
D	**NEED FOR PURCHASED WATER IS REDUCED [c]**			
9	Original estimate of purchases		▨	
10	Revised estimate of purchases (can be "0")		▨	
11	Savings from reduced purchases (line 9 less line 10)		▨	

[a] Comprehensive plans can include wastewater facilities.
[b] Based on Worksheet 7-1 estimates of reductions in demand.
[c] For purchased water, report only annual operating costs and include costs associated with take-or-pay contract provisions. Transmission facilities needed to transport purchased water should include capital and operating costs associated with such facilities and reported as a capital project.

Worksheet 7-3: Modified Supply Forecast and Estimated Total Savings

MODIFIED SUPPLY FORECAST

Line	Item	Current Year	Year 5	Year 10	Year 20
A	**Forecast Supply Capacity (Daily)**				
1	Supply capacity before conservation program [a]				
2	Planned reduction in supply capacity [b]	▨			
3	Supply capacity after conservation (line 1 less line 2)	▨			
B	**Capacity Reserve**				
4	Supply capacity less demand (line 3 less line 2 on Worksheet 7-1)				

ESTIMATED TOTAL SAVINGS

Line	Item	Supply capacity (daily)	Project Costs — Total capital costs ($)	Project Costs — Annual operating costs ($)
C	**Total Estimated Savings from Changes to Supply Projects [c]**			
1	Cost of supply projects before conservation			
2	Cost of supply projects after conservation			
3	Savings (line 1 less line 2)			
D	**Total Estimated Savings from Reduced Operating Costs at Existing Facilities [d]**			
4	Operating costs before conservation		▨	
5	Operating costs after conservation		▨	
6	Savings (line 4 less line 5)		▨	
E	**Conservation Program Costs**			Total program costs ($)
7	Total cost of implementing selected conservation measures [e]	▨	▨	

[a] From Worksheet 2-4.
[b] Based on Worksheet(s) 7-2.
[c] Based on Worksheet(s) 7-2.
[d] Based on annual variable operating cost (including energy, chemicals, and water purchases).
[e] Based on Worksheet 6-2.

Worksheet 8-1: Implementation Schedule for Measures and Programs

Line	Measure/Program	Required action	Beginning date	Completion date	Notes
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					