



# **Making the Right Choices for Your Utility Worksheets:**

Using Community Priorities and Sustainability Criteria for Water Infrastructure Decision-Making

December 2022

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# Introduction

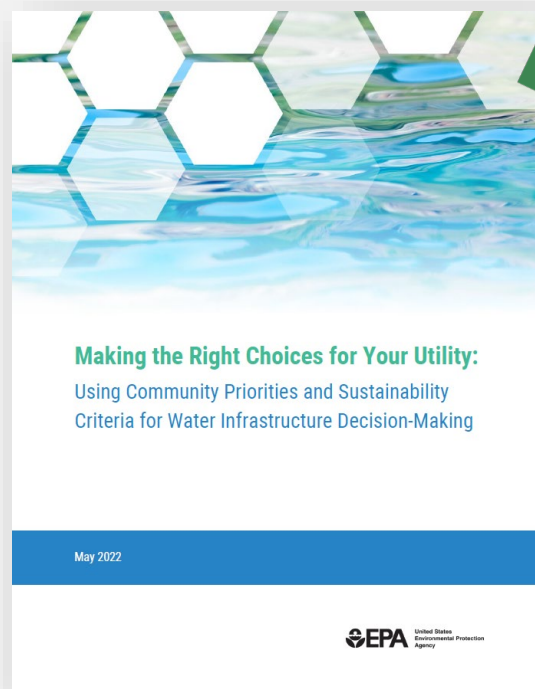
This workbook provides ten worksheets for you to complete that track with each step in the United States Environmental Protection Agency’s (EPA) guide document: *Making the Right Choices for Your Utility* (2022), which we will refer to as “The Guide.” The decision-making process outlined in the Guide helps utilities evaluate the full range of social, environmental, and economic benefits that investments can create while also establishing a common ground on which utilities and their communities can communicate with each other in a clear and accessible way to find affordable and effective solutions. Using this process will help your utility incorporate community priorities appropriately into your decision-making process.

There are a variety of reasons that a utility may need to plan significant capital investments. A few of the most common drivers for utility capital investments include actual (or anticipated) environmental and/or safety regulations, aging infrastructure, operational optimization, and increased resiliency/reliability in the event of weather-related events or other natural disasters (e.g., earthquakes, flooding, drought, etc.). More often than not, capital investments may have multiple drivers, which can make the project decision-making more complex. A decision-making process that allows utilities to prioritize (and weigh) multiple decision-making criteria helps ensure the best use of often limited financial resources.

EPA strongly encourages you to *first* read the Guide, which provides an in-depth explanation and example of each step, and to have the Guide readily available to reference as you fill out these worksheets.

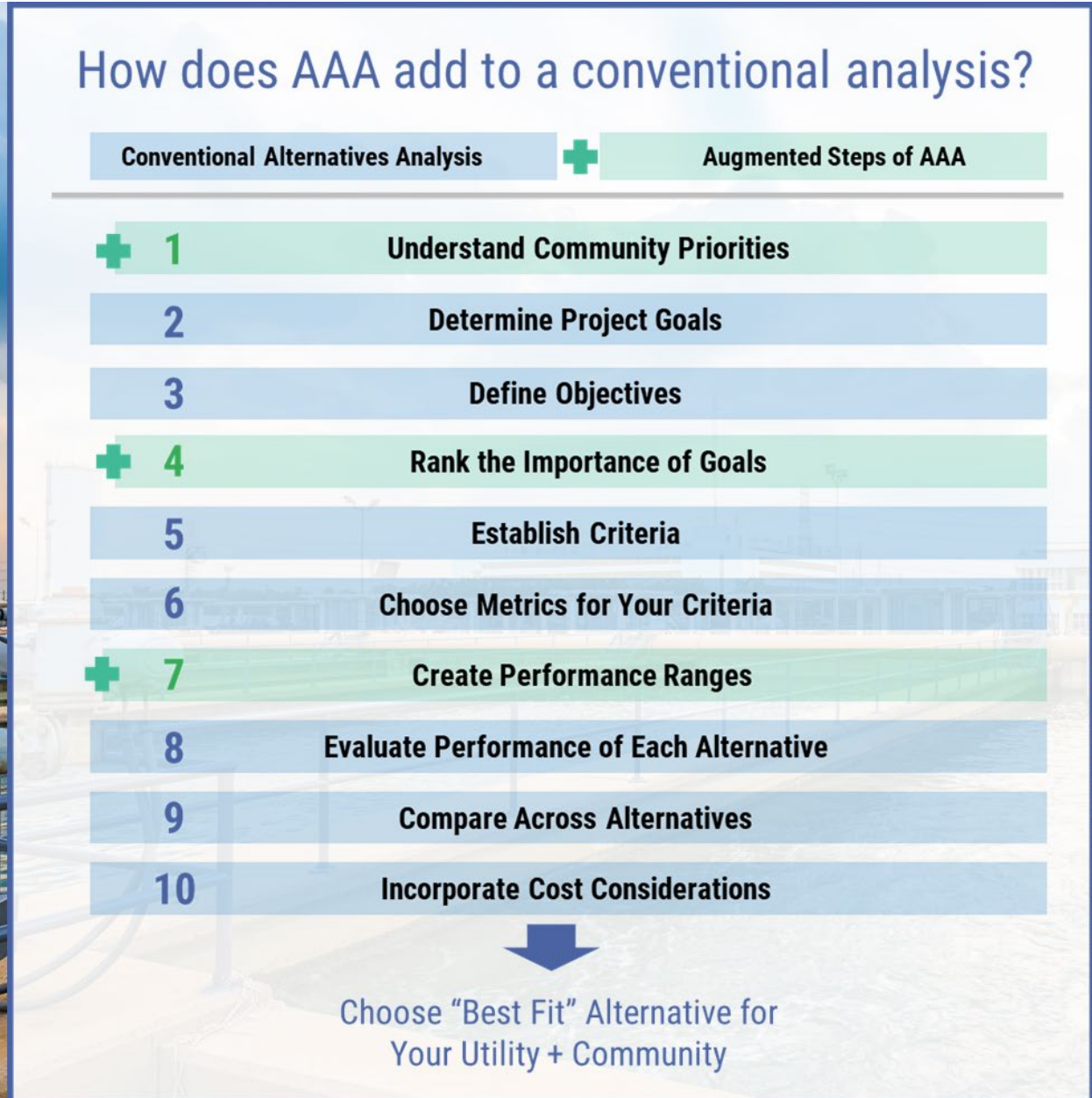
The Augmented Alternatives Analysis process is not meant to replace a conventional alternatives analysis process, but instead provides steps for utilities to identify and consider other goals, such as economic, social, or environmental, that may be important for the community. Once those goals have been identified, the worksheets help create a framework for your utility to consider the benefits each project alternative may provide alongside the traditional evaluation criteria (e.g., cost, performance, reliability).

## Before using this workbook Check out the Guide



## Overview of the Augmented Alternatives Analysis Process

There are ten steps in the Augmented Alternatives Analysis (AAA) process that will help you move from the big picture goals you'd like to achieve with an investment to the specific units of measurement you will use to evaluate the performance of the potential alternatives. The image below represents the ten steps of AAA, and each step is explored in more detail in the Guide.



## How to Use These Worksheets

The worksheets in this workbook are provided to help utilities complete a streamlined, slightly simplified version of the steps outlined in the Guide. You may choose to complete the steps in the process using two different options: an Excel workbook or the PDF version. You are currently using the PDF version and the content you generate in earlier steps will pre-populate certain areas of the next steps. For example, the information you write down in Step 6 will automatically show up in the table on Step 7. For this reason, the number of options is limited to one or two choices at each step. If you find that your utility will need to consider a wider range of goals or objectives, criteria, and metrics than this interactive PDF version allows, you will need to **download the Excel version** of the worksheets, which will allow you to add additional rows and tables. You may choose to complete this process on your computer, or you may choose to print out this document and complete the worksheets manually (pen or pencil). There are ten steps in the Augmented Alternatives Analysis process and, correspondingly, ten worksheets in this workbook.



### Example: Maplebrook Service Authority

In the Guide and in these worksheets, we will use Maplebrook Service Authority (MSA) as a hypothetical example to illustrate how a utility can work through and implement each of the ten steps to incorporate alternatives analysis into planning processes. MSA is referenced throughout these worksheets, and a more complete explanation of their utility can be found throughout the steps in the Guide.

# Step 1: Engage Your Community

For this Step, reference pages 6-7 in the Guide.

A central component of the AAA process is to establish a clear and transparent way for a utility to incorporate community priorities into major capital projects. AAA provides an effective way to convey the decision-making process used to help ensure public support on often costly but necessary infrastructure projects.

As a first step in your process, consider who in your community may have an important role in the success of your project. These individuals may include those who are regularly engaged in topics relevant to water resources and utility planning, but it may benefit your project to also engage with individuals representing groups or organizations that have historically not engaged in these topics. The list of individuals you'd like to engage may include those that live near and would be impacted by potential future projects, board or council members that may play a role in approving your project plans, local civic or non-profit organizations, or environmental justice groups. Note, examples of stakeholder type are Impacted Community Member, Environmental Group, Regulators, Business, Manufacturing, Civic Organization, Environmental Justice, Public Health. The AAA process is most robust when it draws priorities and input from a wide range of diverse community voices.

## Stakeholder Type & Contact Information

<b>Stakeholder Type:</b>	
Name:	
Phone:	
Email:	
<b>Stakeholder Type:</b>	
Name:	
Phone:	
Email:	
<b>Stakeholder Type:</b>	
Name:	
Phone:	
Email:	

<b>Stakeholder Type:</b>	
Name:	
Phone:	
Email:	
<b>Stakeholder Type:</b>	
Name:	
Phone:	
Email:	

Once you’ve identified *who* would be helpful to engage, consider the best method for engagement. You may choose to host a workshop or webinar, establish a workgroup to engage throughout your process, or create a website. Once you have a method for engaging your community, you will want to explain the need for your future investment and invite the community to provide input on what their priorities are for the project.

Community Priorities
<b><i>(Example) More greenspace with room for community access</i></b>

## Step 2: Determine Goals

For this Step, reference pages 8-11 in the Guide.

Setting goals is a critically important step in your infrastructure planning process. Goals should be broad, high-level statements that provide a snapshot of the desired final results that your utility hopes to achieve (both within your utility and in your broader community). When choosing goals, your utility can use the community priorities you gathered during Step 1 of the process to help inform your project-specific goals. Your utility may choose to identify any number of goals to accomplish, and many utilities find that about five goals is comprehensive and manageable. The Guide provides 11 example goals (e.g., Ecological Improvement), along with example goal statements for each on page 8.

### Your Goals and Goal Statements

Goal	Goal Statement
<b><i>(Example) Public Health</i></b>	<i>Protect and improve human health and safety</i>



## Step 3: Define Objectives

For this Step, take a look at the example objectives included on pages 12-13 in the Guide.

Once you have determined the goals that are most important for your community and utility, you will need to define the objective(s) for each goal and list them in the tables below.

- Choose objectives for each of your goals and write them in the table below. The more objectives you choose, the more complex your evaluation will be. One to two objectives per goal can be a manageable number.
- (Optional): If the example objectives are not relevant to your alternatives, or you have custom goals from Step 1, you will need to create custom objectives. The most effective objectives follow **SMART** (***S**pecific, **M**easurable, **A**ttainable, **R**elevant, **T**ime-bound*) principles.

### Example Goal: Public Health - Protect and improve human health and safety

Example Objective 1: Reduce human contact with hazardous compounds or contaminants

Example Objective 2: Improve receiving water quality

<b>Goal 1:</b>	
<b>Objective 1.1:</b>	
<b>Objective 1.2 (if applicable):</b>	

<b>Goal 2:</b>	
<b>Objective 2.1:</b>	
<b>Objective 2.2 (if applicable):</b>	

<b>Goal 3:</b>	
<b>Objective 3.1:</b>	
<b>Objective 3.2 (if applicable):</b>	

<b>Goal 4:</b>	
<b>Objective 4.1:</b>	
<b>Objective 4.2 (if applicable):</b>	

<b>Goal 5:</b>	
<b>Objective 5.1:</b>	
<b>Objective 5.2 (if applicable):</b>	

## Step 4: Rank the Importance of Goals

For this Step, reference pages 14-16 in the Guide.

Once you have completed Steps 1-3, you will have a big picture idea of the ultimate outcomes your utility hopes to achieve with your infrastructure investment. This knowledge can help you consider which of your goals has a higher importance and thus carries more “weight” than others in your unique context and community. This goal becomes your highest priority goal.

- **Step 1:** Choose the most important goal for your utility and write it in the table next to “Goal 1.” Then give it a weight based on a scale of 1 to 10 (e.g., 1, 2, 3), where 10 is the most important. You may have more than one (perhaps two or even three) goals that are equally “most important” and receive a 10, but not all of your goals should receive a 10.
- **Step 2:** Choose the next goal (Goal 2) and decide how important it is after your first goal (e.g., if it is half as important, assign a 5 weight).
- **Step 3:** Continue until all goals have weights, which can range from 10 (very high) to 1 (very low importance). It may be helpful to list your goals from largest to smallest weight in the table below.

**Autofill PDF:** For the table below, you will need to copy and paste your goals and goal statements from Step 2 in the table below. It is recommended to arrange your goals from 10 (very high) to 1 (very low importance).

### Weighting Your Goals

New Goal #	Goal	Goal Statement	Weight
Goal 1	(Example) Public health	Protect and improve human health and safety	10
Goal 1			
Goal 2			
Goal 3			
Goal 4			
Goal 5			

## Step 5: Establish Criteria

Pages 17-19 in the Guide provide example criteria that you may consider for your context.

Once you have selected objectives and weighted the importance of each goal, you will next establish criteria for each objective to evaluate program, project, and investment alternatives. The more criteria you choose, the more complex your evaluation will be. One to two criteria per objective can be a manageable number.

**Autofill PDF:** *If you choose to use more than one criterion per objective, you will not be able to use the autofill version of the PDF. The goals will autofill into the appropriate fields, but you will need to copy and paste your objectives under their respective goals.*

<b>Goal 1:</b>	
Objective 1.1:	
<b>Criteria:</b>	
Objective 1.2 (if applicable):	
<b>Criteria:</b>	

<b>Goal 2:</b>	
Objective 2.1:	
<b>Criteria:</b>	
Objective 2.2 (if applicable):	
<b>Criteria:</b>	

<b>Goal 3:</b>	
Objective 3.1:	
<b>Criteria:</b>	
Objective 3.2 (if applicable):	
<b>Criteria:</b>	

<b>Goal 4:</b>	
Objective 4.1:	
<b>Criteria:</b>	
Objective 4.2 (if applicable):	
<b>Criteria:</b>	

<b>Goal 5:</b>	
Objective 5.1:	
<b>Criteria:</b>	
Objective 5.2 (if applicable):	
<b>Criteria:</b>	

# Step 6: Choose Metrics for Your Criteria

For this Step, refer to pages 20-21 in the Guide.

In Step 6, you will establish a “metric” for each of your criteria. Metrics provide a way for you to measure the performance of each goal and objective and ultimately measure the performance of each project alternative. In the table below, record the most useful metrics for measuring the performance for each criterion of each goal and objective.

**Autofill PDF:** At each step there can be one, two, or even more ways to detail specifics, and this is also the case for metrics. For example, you can measure whether or not an alternative will reduce human contact with sewage by establishing both the number of street flooding events and the gallons of wastewater released during a flooding event. You may only have one criterion for each objective and one metric for each criterion, or you may choose to identify multiple criteria and measurements. *If you choose to use more than one metric, you will not be able to use the autofill version of the PDF.*

<b>Goal 1:</b>	
Objective 1.1:	
Criteria:	
<b>Metric:</b>	
Objective 1.2 (if applicable):	
Criteria:	
<b>Metric:</b>	

<b>Goal 2:</b>	
Objective 2.1:	
Criteria	
<b>Metric:</b>	
Objective 2.2 (if applicable):	
Criteria:	
<b>Metric:</b>	

<b>Goal 3:</b>	
Objective 3.1:	
Criteria:	
<b>Metric:</b>	
Objective 3.2 (if applicable):	
Criteria:	
<b>Metric:</b>	

<b>Goal 4:</b>	
Objective 4.1:	
Criteria:	
<b>Metric:</b>	
Objective 4.2 (if applicable):	
Criteria:	
<b>Metric:</b>	

<b>Goal 5:</b>	
Objective 5.1:	
Criteria:	
<b>Metric:</b>	
Objective 5.2 (if applicable):	
Criteria:	
<b>Metric:</b>	



## Step 7: Create Performance Ranges

For this Step, pages 22-26 of the Guide demonstrate an example of how to create a performance range for each metric.

Once you have identified project alternatives and refined each goal down to the metric level to evaluate the performance of your alternatives, you will need to assign common numerical values to each performance range to enable comparability between different types of measurements (e.g., acres and kWh). They are not directly comparable in their current form, such as trying to compare apples to oranges to bananas.

To measure and compare criteria, the following exercise will help you create a performance range for the metrics you have chosen, allowing you to next score each project alternative for that metric.

- **Step 1:** In the tables below, write your goal, objective, criterion, and metric.
- **Step 2:** To establish a baseline for your criterion, write down what it would mean if there was no change to the metric in the “0” box of the performance range.
- **Step 3:** Determine if a negative outcome (e.g., increased human contact with sewage) would be acceptable within the community. If any negative impact is unacceptable, then you will not consider any alternative that will produce such a result, and you will not use the negative side of the performance range.
- **Step 4:** Now create your end points for the performance range. Go to “5” and write down the maximum possible impact you anticipate your alternatives will have relative to this criterion. If needed, go to “-5” and do the same. To create a balanced range, use the largest possible impact and assign this value (positive and negative, respectively) to both ends of the range.
- **Step 5:** Now, work your way from “0” to “5” and then, if needed, work your way from “0” to “-5” keeping the following points in mind:
  - The range you use matches how precisely you can measure the alternatives’ performance.
  - The incremental change in performance represented by moving up or down the range is the same (or very similar) at each level of the range.
  - The complete range corresponds to the widest performance outcomes possible of the alternatives under consideration. The range should be symmetrical, if possible.
  - You may not need a range that contains all 10 possible sections, but if you skip on one side of the range, you must also skip on the reverse side (e.g., leave out both 3 and -3 on your range).

To see examples of the different ways you may consider filling out the range, look at pages 23-26 in the Guide.











# Step 8: Evaluate the Performance of Each Alternative

For this Step, pages 27-32 of the Guide provide an example of how to score each project alternative, goal by goal.

Each project alternative that you have chosen will have relative strengths and weaknesses. This next step will help you to score those strengths and weaknesses using the common scaling outlined in Step 7 and assign numerical “scores” by looking at the effect each of your alternatives will have on each metric.

This step should be familiar to utilities that have conducted comparative analysis of alternatives using conventional performance criteria such as reliability, maintainability, and technical performance. Essentially, you will be looking at the design and performance parameters of the alternatives to estimate the nature of the impacts that can be expected relative to the evaluation criteria. In the table below, list your metrics. If you are using the autofill PDF, this will already be listed. Next, referencing the performance ranges you developed in Step 7, score each of your project alternatives for each metric.

To aid in scoring each alternative, it may be helpful to first write important characteristics for each alternative in the table below. For this process, pages 40-42 of the Guide provide an example of how MSA describes their three alternatives.

## Alternative Descriptions

Alt 1 Description	Alt 2 Description	Alt 3 Description

## Unweighted Metric and Alternative Scores

Metrics	Alt 1 Score	Alt 2 Score	Alt 3 Score
<b>Unweighted Alternative Scores</b>			



## Step 9: Compare Across Alternatives

To demonstrate this concept, pages 33-34 in the Guide provide an example of how MSA compared alternatives.

Once you have evaluated how each alternative scores against your metrics, you are almost ready to compare across alternatives to decide which alternative is the best option for your utility and community. Step 9 will walk you through the process for determining the final score for each of the alternatives by incorporating the rank of each goal as explained in Step 4.

If care has been taken in the previous steps to establish a consistent basis for performance evaluation of each alternative across all selected criteria, this step becomes very straightforward. The “total benefit score” of each alternative is merely the sum of each of the individual criterion benefit scores multiplied by the weight of the overall goal.

### Weighted Metric and Alternative Scores

Metrics	Goal Weight	Alt 1 Score	Alt 2 Score	Alt 3 Score
<b>Weighted Alternative Scores</b>				

# Step 10: Incorporate Cost Considerations

To see an example of a benefit-cost exercise, see pages 35-36 in the Guide.

We have not yet addressed the incorporation of costs into the alternatives analysis process. This is the point at which you can decide to maintain the benefits scores as separate evaluation factors, or to combine the benefit scores with the cost of the alternatives to derive a cost/non-monetized benefit calculation. However, it is the reality that cost is oftentimes one of the most important considerations for your utility. By incorporating cost as a consideration, your utility will be able to determine the amount of benefit your utility can receive for the cost of the alternative. This is known as the cost-benefit ratio. The alternative with the highest benefit-cost ratio is likely your preferred alternative as it gives the most benefits relative to the cost.

- First, add the (Benefit) weighted alternative scores from Step 9
- Next, add the (Cost) Annualized Project Capital and O&M Cost for each alternative
- Finally, divide the Benefit by the Cost to get the total benefits ratio (Benefit/Cost = Benefit - Cost Ratio)

Metric	Alternative 1	Alternative 2	Alternative 3
<b>Benefit:</b> Weighted Alternative Scores			
<b>Cost:</b> Annualized Project Capital and O&M			
<b>Benefit - Cost Ratio</b>			

## Conclusion

The ten steps in this workbook allow water sector utilities to conduct a robust comparison of project alternatives by incorporating and standardizing the full range of benefits associated with those projects into their evaluation process. The methods outlined throughout this workbook provide a structure by which you can make sound and transparent infrastructure investment decisions, likely leading to greater overall benefits and community sustainability.

Having the capacity to compare a range of infrastructure alternatives objectively is critical to a water or wastewater utility’s long-term sustainability and its ability to serve the needs of its community. For additional resources and information on sustainable utility management for water and wastewater utilities, please visit EPA’s website: <http://water.epa.gov/infrastructure/sustain/watereum.cfm>.