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 Subject: **Final Evaluation Criteria**

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CITY OF GUELPH EVALUATION CRITERIA

C3 WATER INC.

17 December 2015

VERSION	DATE	DESCRIPTION OF REVISIONS	REVISED BY	REVIEWED BY
1	November 11, 2015	Draft Evaluation Criteria	Andrea Williams	Bill Gauley Tracy Patterson Sam Ziemann
2	November 27, 2015	Draft Evaluation Criteria	Andrea Williams	Sam Ziemann
3	December 17, 2015	Final Evaluation Criteria	Andrea Williams	Sam Ziemann

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1.0 BACKGROUND AND CONTEXT

This document defines the criteria that have been developed by the project team and explains the process for evaluating alternative water efficiency measures proposed by the Water Efficiency Strategy Update Team based on feedback from the residents of Guelph.

1.1 2009 Evaluation Process

The current project team reviewed the previous evaluation criteria used in the 2009 Water Conservation and Efficiency Strategy Update (Resource Management Strategies Inc., 2009), provided below in Figure 1 for reference. Subsequent to this review and through discussions with project team members, it was determined that the previous pass/fail criteria did not allow for measures for future application and further research and development (innovation opportunities) to be evaluated. Therefore it was determined that both a new set of criteria and evaluation methodology should be developed.

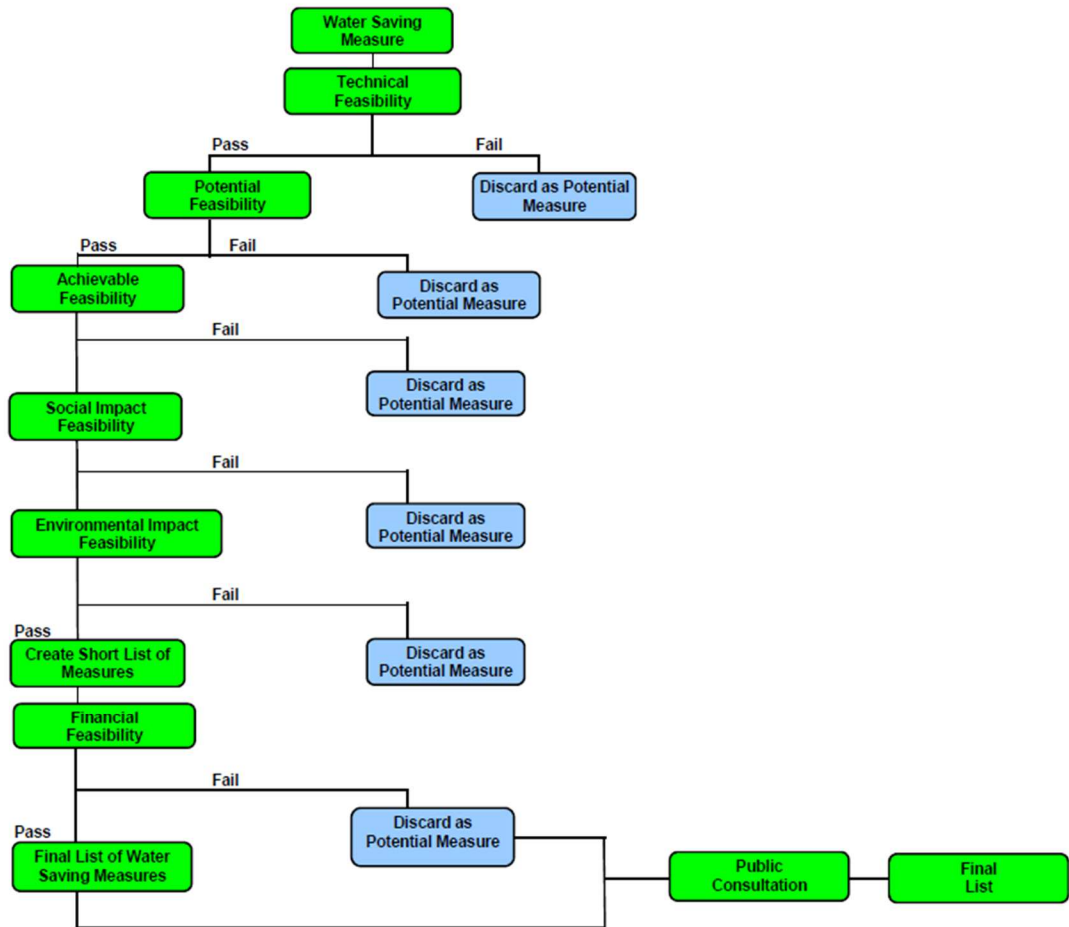


Figure 1: Decision Tree for Screening Water Efficiency Measures (Resource Management Strategies Inc., 2009).

2.0 EVALUATION CRITERIA

2.1 *Criteria Development*

Expanding on the initial criteria used for the evaluation of measures for the 2009 Update, the project team proposed new criteria to stakeholders for consideration. As part of this process the criteria were presented to Community Liaison Committee members, community members and stakeholders via outreach events and on-line engagement. The below sections of this report discuss the approach undertaken through engagement of respective audiences and feedback attained.

2.2 *Criteria Weighting*

2.2.1 Community Engagement

For Open House #2, a simplified version of the draft criteria was developed to solicit feedback from residents at community events. This approach was undertaken to increase community participation in gaining feedback. Community members were asked to provide their input on how important each criteria was to them. A scoring system was used where 1 was of low importance and 5 was of high importance. From responses received a total score for each criteria was then calculated by multiplying the ranking of importance by the number of replies and summing all scores to form a total.

MindMixer is an online tool used by the City of Guelph to make engagement activities more accessible to those residents not attending community events. A call for public participation as part of this online forum was conducted via the City's Facebook and Twitter pages from September 24 to October 4, 2015. Community members were allowed to select either "I love it!", "I like it!", "It's OK" and "Neutral" which was scored as 3, 2, 1 and no stars respectively. Results for MindMixer feedback represent the total amount of stars received for each criteria and are shown in Table 1. A total of 113 community members completed the online survey.

Table 1 summarizes the total results from community engagement at the Jazz Festival, Vegfest, Village Fair and Run for the Cure events as well as those received through the online MindMixer tool. In total there were 122 residents surveyed at the events between September 19 and October 4, 2015. Total score for each criteria for all events is the summation of the total scores for each event. Scores were calculated as shown in the example below. This exercise confirmed that these criteria are not considered to be equally important by the community and that the evaluation process would benefit from developing a specific weighting score for each criteria.

Table 1: Evaluation Criteria Total Scores, Community Engagement Results.

Criteria Surveyed	Jazz Festival & Vegfest	Village Fair	Run for the Cure	MindMixer	Total
	Residents Surveyed				
	82	12	28	113	235
Total Scores					
Reduce water use as part of new growth.	353	47	105	44	549
Develop/pilot new technologies to save water.	357	21	117	29	524
Reduce water use in existing buildings.	334	37	89	38	498
The technology is proven and easily implementable in the City of Guelph.	315	27	91	40	473
Stimulate the Guelph economy.	280	21	102	23	426
Minimize costs to City.	249	37	92	11	389

Appendix A provides the results for all community engagement. An example of how the score was derived from the category of “Minimize costs to City” at the Jazz Festival & Vegfest within Table 1, is as follows;

- 82 residents responded to this criteria,
- 9 residents surveyed scored this criteria of low importance (9x1=9),
- 13 residents surveyed scored this criteria a 2 (13x2=26),
- 31 residents surveyed scored this criteria a 3 (31x3=93),
- 24 residents surveyed scored this criteria a 4 (24x4=96),
- 5 residents surveyed scored this criteria of high importance (5x5=25),
- Total score is combination of all scores which is 249 (9+26+93+96+25).

2.2.2 Community Liaison Committee

This draft criteria was presented to Members of the Community Liaison Committee at their meeting on September 29, 2015 with members asked to provide input at that time. Similar to the public process, the committee members were also asked to provide a score from 1 to 5 relating to the level of importance of each criteria (Table 2) and to give their reasoning for their selected score. Feedback was received from 13 members of the Community Liaison Committee. As per prior process, the score provided is a calculation of level of importance multiplied by the number of respondents as shown in the example above.

Table 2: Evaluation Criteria Total Scores, Community Liaison Committee Results.

Criteria Surveyed	Total Score
Technology is applicable and provides cost effective water savings: Considers the viability of the technology, it's applications in the marketplace and the cost-benefit ratio of its implementation.	53
Focuses resources on the source of the problem: Considers water use in all sectors and across all demographics when targeting problem of excessive water use.	48
Growing Efficiently (or Smart Community Growth): Considers water efficiency in new construction for beyond Ontario provincial building code.	46
Source water protection: Contributes to the Considers protection of aquifer and surface water quantity and quality.	46
Development/implementation of new technologies: Considers the ability to pursue potential technology opportunities.	46
Water savings value equal or greater to cost of delivery/implementations: Considers the Return on Investment to the City of Guelph of individual programs / measures / applications. (Value = triple bottom line assessment of measure).	44
Compliance: Considers compliance with federal and provincial regulations and City by-laws.	43
Climate change resilience: Considers increased resilience to climate change impacts.	43
Contributes to the reliability of the service supply: Considers water efficiency in the context of maintaining supply.	41
Energy conservation and greenhouse gas emission reductions: Considers energy use in the context of water system efficiency and the City's Community Energy Plan.	39
Contributes to systems operations and maintenance: Considers opportunities within the water systems operation for increased water efficiency.	37
Economic development: Considers the value to the local economy of Guelph.	36
Water savings value equal or greater to cost of implementations to customer: Considers the Return on Investment to the customer of individual programs.	28

2.2.3 Results

Feedback received via consultation with Community Liaison Committee members, the City's Water Efficiency Strategy Update project team, community residents and stakeholders informed the selection and refinement of final criteria as shown in Figure 2. Table B-1 in Appendix B illustrates the methodology utilized to merge the criteria from Tables 1 and 2. Based on comments from the second Community Liaison Committee meeting an additional three criteria were developed.



Figure 2: Determining Evaluation Criteria and Weighting.

A weighting for the evaluation criteria was developed based on input from all solicited parties during the consultation process and is illustrated in Figure 3 below.

$$\text{Weighting} = \frac{(\text{Community Feedback Total} + \text{Community Liaison Committee Total})}{(\text{Max community Feedback Total} + \text{Max Community Liaison Committee Total})}$$

Figure 3: Criteria Weighting Formula

An example of how each criteria weighting was developed can be shown in the following example.

Criteria: “Measure is innovative (Develop/pilot new technologies to save water)”.

- The community engagement feedback gave the criteria a total score of 524 (Table 1),
- The Community Liaison Committee gave the criteria a score of 46 (Table 2),
- The highest rated criteria for both the community events and the Community Liaison Committee was used as a perfect score and used as the denominator. For the community events the highest ranked criteria was “Reduce water use as part of new growth” with a total score of 549 (Table 1). The “Technology is applicable and provides cost effective water savings” scored the highest from the Community Liaison Committee at 53 (Table 2).

$$\text{Weighting: “Measure is innovative”} = \left(\frac{524+46}{549+53} \right) = 0.95$$

The Community Liaison Committee provided feedback in regards to potential gaps in the criteria. As a result of the discussion three new criteria were developed and included in the final criteria for program evaluation. Weighting for the additional criteria was assigned by the Water Efficiency Team based on comments from the Community Liaison Committee. The new criteria added are:

- Maximize social benefits (weighting = 0.9),
- Easy for customer to implement (weighting = 0.8),
- Minimize administrative burden for City (weighting = 0.5).

Table 3 provides a summary of the criteria and weighting based on the Criteria Weighting Formula (outlined in Figure 3).

Table 3: Draft Evaluation Criteria, Description and Weighting.

Draft Criteria	Description / Examples	Weighting
Focus is on new construction.	Affects demands in new development - exceeds Ontario Building Code requirements. Examples that would score high are on-demand hot water circulation, greywater rough-in, and deeper topsoil.	0.99
Measure is innovative.	Measure is relatively new and innovative, at least in Guelph. Examples that would score high are bioswales, water reuse, and district water.	0.95
Focus is on high water users.	Examples that would score high are irrigation reduction, and capacity buyback programs.	0.91
Maximize social benefits.*	Fair to all customers and customer classes. Examples that would score high are equitable rate structures for all customer classes, sewer surcharge rebate where appropriate, and forgiveness for in-home leakage if corrected.	0.90
Measure based on proven technology.	Measure has been proven in other markets and is suitable for implementation in Guelph. Examples that would score high are toilet rebates, capacity buyback program for industrial/commercial/institutional customers, and irrigation reduction programs.	0.87
Measure has positive environmental benefit.	Helps limit need to develop new water sources; maintains water and wastewater quality and provides source water protection. Other positive environmental benefits considered will be recycle or reuse of materials, extension of the life cycle of a fixture, appliance, or piece of equipment, provide cleaner discharges and infiltrates more water into the ground. Examples that would score high are water reuse, and alternative landscapes (water efficient and reduce runoff).	0.87
Reduces energy use and greenhouse gases associated with water and wastewater system operation.	Maximize climate change resilience. Examples that would score high are gravity-fed rainwater harvesting systems for greywater use and water banking.	0.81
Easy for customer to implement.*	Little effort required by customer. Examples that would score high are Blue Built Home, and Point-of-Purchase rebates.	0.80

Draft Criteria	Description / Examples	Weighting
Benefits local economy.	Supports local businesses, does not compete with local businesses. Examples that would score high are professional landscape audits and, direct to contractor rebates.	0.77
Cost-effective to City vs. expanding supply.	Total implementation cost to City equal to or less than equivalent cost of supply of \$4.682 per litre per day of capacity. Examples that would score low are the “purple pipe” and municipal rainwater systems.	0.72
Reduces water and/or wastewater infrastructure costs.	Examples that would score high are alternative sources for fire-flow (smaller pipe sizes, reduced need for flushing) and risk-based asset management for pipe replacement.	0.70
Cost-effective to the customer.	Total savings over 3-year period equal to or greater than implementation costs. Examples that would score high are irrigation reduction and the Capacity Buyback program.	0.53
Minimize administrative burden for City.*	Requires minimal staffing and administration to City. An example that would score high is third-party delivered initiatives. .	0.50

*Indicates criteria developed and weighted by Water Efficiency Team based on comments from the second Community Liaison Committee meeting.

2.3 **Criteria Scoring**

Each criteria will be scored based on the following scale that includes both positive and negative values. It is possible for an efficiency measure to have both positive and negative aspects (e.g., a measure could score high on the “Focus on High Water User” criteria but low on the “Easy for Customer to Implement” criteria).

Score	Reasoning.
2	Strong agreement with criteria.
1	Somewhat agrees with criteria.
0	Neutral.
-1	Somewhat disagrees with criteria.
-2	Strong disagreement with criteria.

Once assigned a score, it will then be multiplied by the weighting. The Water Efficiency Measure Score will be the sum of all weighted scores for each criteria.

2.4 **Using the Evaluation Criteria**

After being scored the water efficiency measure will either meet or exceed a threshold score that has yet to be determined. If the score is equal to or above the set threshold then the measure will be considered for immediate implementation and research/pilot studies.

If a measure’s score does not meet the minimum threshold but it is considered to have validity in future planning, it may be included in either a 5-, 10-, or 20-year plan. Or, if a measure scores high for innovation but below the overall threshold, it may be re-considered for a research/pilot study.

If the water efficiency measure score falls below the set threshold and is not considered a viable option for either long term planning or research/pilot study in the City of Guelph, it will be discarded.

An example of how water efficiency measures will be scored is illustrated in Table 4. Through this example the existing City of Guelph water efficiency program “Blue Built Homes Program level Bronze”, resulted in a weighted score of 8.1, based on the process outlined in Figure 4.

Table 4: Blue Built Homes Level Bronze Scoring

Draft Criteria	Weighting	Score	Weighted Score
Focus is on new construction.	0.99	2	2
Measure is innovative.	0.95	-2	-1.9
Focus is on high water users.	0.91	0	0
Maximize social benefits.	0.90	0	0
Measure based on proven technology.	0.87	2	1.7
Measure has positive environmental benefit.	0.87	1	0.9
Reduces energy use and greenhouse gases associated with water and wastewater system operation.	0.81	1	0.8
Easy for customer to implement.	0.80	2	1.6
Benefits local economy.	0.77	2	1.5
Cost-effective to City vs. expanding supply.	0.72	1	0.7
Reduces water and/or wastewater infrastructure costs.	0.70	1	0.7
Cost-effective to the customer.	0.53	1	0.5
Minimize administrative burden for City.	0.50	-1	-0.5
Total		10	8.1

Process For Evaluating Potential Water Efficiency Measures/Programs

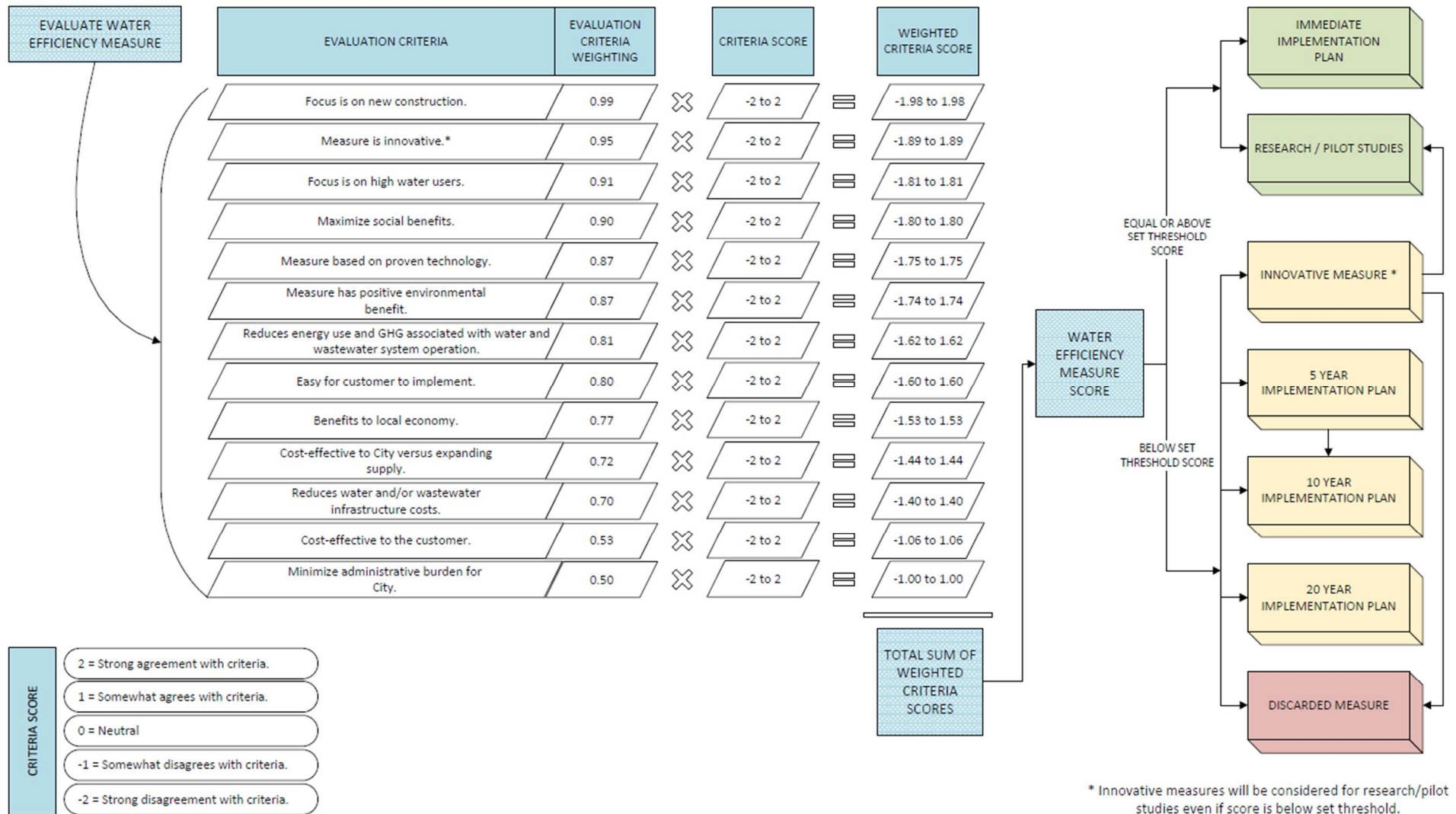


Figure 4: Process for Evaluating Potential Water Efficiency Measures/Programs.



2.5 ***Further Analysis***

Water efficiency measures that meet or exceed the minimum threshold will undergo a financial evaluation. The aim of this work is to compile a list of water efficiency measures/programs for final review and implementation. These will be reviewed with the Community Liaison Committee and Public after the scoring and ranking has been completed.

Following completion of alternative scoring, a list of tentative program recommendations and support justification will be presented for community information and feedback (February 2016).



3.0 REFERENCES

Resource Management Strategies Inc. (2009). *Water Conservation and Efficiency Strategy Update*. Guelph: Guelph.



Appendix A – Community Engagement Results

Table A-1: Evaluation Criteria Survey Results for Jazz Festival and Vegfest Events

Criteria Surveyed	Importance						Total Residents	Total Score
	1	2	3	4	5	N/A		
Minimize costs to City.	9	13	31	24	5	0	82	249
Reduce water use as part of new growth.	0	2	7	32	40	1	82	353
Reduce water use in existing buildings.	0	2	10	40	28	2	82	334
Stimulate the Guelph economy.	5	8	27	22	18	2	82	280
The technology is proven and easily implementable in the City of Guelph.	1	7	19	27	27	1	82	315
Develop/pilot new technologies to save water.	1	3	5	25	47	1	82	357

Table A-2: Evaluation Criteria Survey Results for the Village Fair Event

Criteria Surveyed	Importance						Total Residents	Total Score
	1	2	3	4	5	N/A		
Minimize costs to City.	0	1	1	3	4	3	12	37
Reduce water use as part of new growth.	0	4	0	1	7	0	12	47
Reduce water use in existing buildings.	2	0	2	6	1	1	12	37
Stimulate the Guelph economy.	0	5	2	0	1	4	12	21
The technology is proven and easily implementable in the City of Guelph.	0	1	4	2	1	4	12	27
Develop/pilot new technologies to save water.	4	2	0	2	1	3	12	21

Table A-3: Evaluation Criteria Survey Results for the Run for the Cure Event

Criteria Surveyed	Importance						Total Residents	Total Score
	1	2	3	4	5	N/A		
Minimize costs to City.	2	2	4	11	6	3	28	92
Reduce water use as part of new growth.	0	4	6	6	11	1	28	105
Reduce water use in existing buildings.	1	4	6	8	6	3	28	89
Stimulate the Guelph economy.	0	1	8	9	8	2	28	102
The technology is proven and easily implementable in the City of Guelph.	2	0	3	15	4	4	28	91
Develop/pilot new technologies to save water.	0	2	4	9	13	0	28	117



Table A-4: Evaluation Criteria Total Scores, MindMixer Results

Criteria Surveyed	Total Residents	Total Score
Reduce water use as part of new growth.	113	44
The technology is proven and easily implementable in the City of Guelph.	113	40
Reduce water use in existing buildings.	113	38
Develop/pilot new technologies to save water.	113	29
Stimulate the Guelph economy.	113	23
Minimize costs to City.	113	11

Table A-5: Evaluation Criteria Survey Results for the Community Liaison Committee

Criteria Surveyed	Importance						Total Residents	Total Score
	1	2	3	4	5	N/A		
Water savings value equal or greater to cost of delivery/implementations: Considers the Return on Investment to the City of Guelph of individual programs / measures / applications. (value = triple bottom line assessment of measure)	1	2	4	3	3	0	13	44
Contributes to systems operations and maintenance: Considers opportunities within the water systems operation for increased water efficiency.	1	1	1	4	3	3	13	37
Climate change resilience: Considers increased resilience to climate change impacts.	3	0	1	3	5	1	13	43
Source water protection: Contributes to the protection of aquifer and surface water quantity and quality.	1	1	0	2	7	2	13	46
Energy conservation and greenhouse gas emission reductions: Considers energy use in the context of water system efficiency and the City's Community Energy Plan.	1	0	5	2	3	2	13	39
Contributes to the reliability of the service supply: Considers water efficiency in the context of maintaining supply.	2	0	0	6	3	2	13	41
Focuses resources on the source of the problem: Considers water use in all sectors and across all demographics when targeting problem of excessive water use.	1	0	0	3	7	2	13	48
Growing Efficiently (or Smart Community Growth): Considers water efficiency in new construction for beyond Ontario provincial building code.	1	0	1	3	6	2	13	46
Economic development: Considers the value to the local economy of Guelph.	1	2	6	2	1	1	13	36
Water savings value equal or greater to cost of implementations to customer: Considers the Return on Investment to the customer of individual programs.	1	1	2	1	3	5	13	28
Technology is applicable and provides cost effective water savings: Considers the viability of the technology, it's applications in the marketplace and the cost-benefit ratio of its implementation.	0	1	1	2	8	1	13	53
Development/implementation of new technologies: Considers the ability to pursue potential technology opportunities.	0	0	2	5	4	2	13	46
Compliance: Considers compliance with federal and provincial regulations and City by-laws.	0	1	2	0	7	3	13	43



Appendix B – Developing the Evaluation Criteria

Table B-1: Merging the Evaluation Criteria

Criteria Surveyed by the Community	Criteria Surveyed by the Community Liaison Committee	Draft Evaluation Criteria
Minimize costs to City.	Water savings value equal or greater to cost of delivery/implementations: Considers the Return on Investment to the City of Guelph of individual programs / measures / applications. (value = triple bottom line assessment of measure)	Cost-effective to City vs. expanding supply.
Reduce water use as part of new growth.	Growing Efficiently (or Smart Community Growth): Considers water efficiency in new construction for beyond Ontario provincial building code.	Focus is on new construction.
Reduce water use in existing buildings.	REMOVED – programs will focus on both existing and new development.	
Stimulate the Guelph economy.	Economic development: Considers the value to the local economy of Guelph.	Benefits local economy.
The technology is proven and easily implementable in the City of Guelph.	Technology is applicable and provides cost effective water savings: Considers the viability of the technology, it's applications in the marketplace and the cost-benefit ratio of its implementation.	Measure based on proven technology.
Develop/pilot new technologies to save water.	Development/implementation of new technologies: Considers the ability to pursue potential technology opportunities.	Measure is innovative.
	Contributes to systems operations and maintenance: Considers opportunities within the water systems operation for increased water efficiency.	Reduces water and/or wastewater infrastructure costs.
	Climate change resilience: Considers increased resilience to climate change impacts.	Reduces energy use and greenhouse gases associated with water and wastewater system operation.
	Source water protection: Contributes to the protection of aquifer and surface water quantity and quality.	Measure has positive environmental benefit.
	Energy conservation and greenhouse gas emission reductions: Considers energy use in the context of water system efficiency and the City's Community Energy Plan.	REMOVED - Incorporated into reduces energy use and Greenhouse gas criteria, along with climate change resilience.
	Contributes to the reliability of the service supply: Considers water efficiency in the context of maintaining supply.	REMOVED – All water saving measures will produce reductions in water use, therefore benefiting the reliability of the water supply.
	Focuses resources on the source of the problem: Considers water use in all sectors and across all demographics when targeting problem of excessive water use.	Focus is on high water users.
	Water savings value equal or greater to cost of implementations to customer: Considers the Return on Investment to the customer of individual programs.	Cost-effective to the customer.
	Compliance: Considers compliance with federal and provincial regulations and City by-laws.	REMOVED – all measures must comply with regulations.
		Maximize social benefits
		Easy for customer to implement
		Minimize administrative burden for City.