



Potential Credits

Technical Memorandum

Final

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Executive Summary

Introduction

The Southeast Metro Stormwater Authority (SEMSWA) Board is considering the possibility of offering SEMSWA customers credits, a policy-based component of the rate structure that would reduce the user fees some properties pay. This memorandum presents an analysis of the credits for the Board's review and recommendations for credits to be analyzed further in the next phase of the project.

Background

The "rate structure" of a public utility is the framework that describes how much each parcel pays. One component of a rate structure is a rate modifier, of which credits are one type. A credit is an ongoing reduction in a property's calculated stormwater fee that is given for:

- 1) On-going activities on the property that reduce demand on the stormwater system;
- 2) On-going activities on the property that reduce the utility's cost of service.

Generally, stormwater credits are granted to enhance equity or to provide incentives to implement an overall community stormwater management plan.

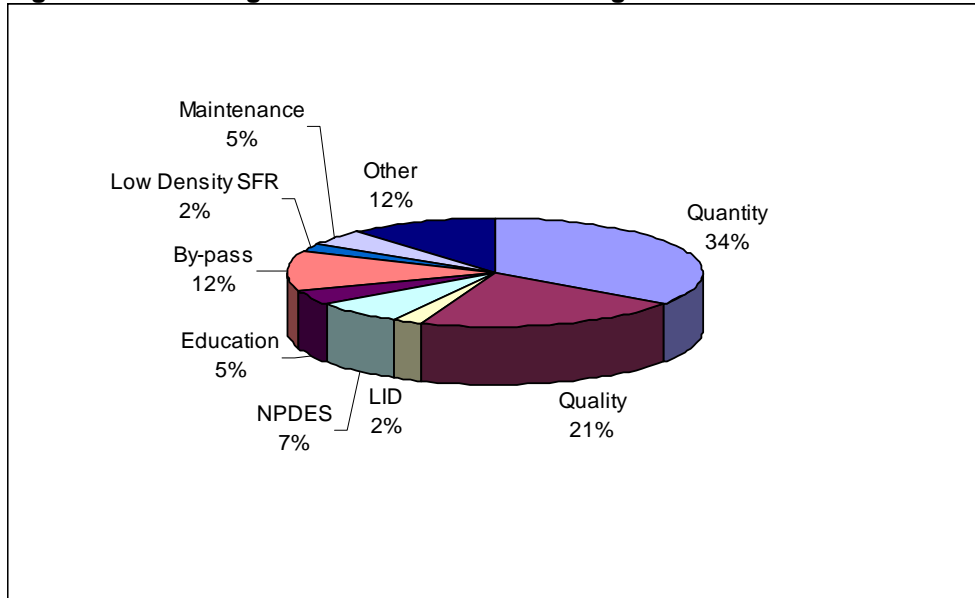
Credit Types

The credits analyzed in this memorandum are:

- **Quantity Credit:** offered as one time offset and/or annual credit to properties that exceed peak and volume control requirements on a parcel or a regional basis.
- **Quality Credit:** offered as one time offset and/or annual credit to properties that exceed water quality treatment requirements on a parcel or a regional basis.
- **LID Credit:** offered as one time offset and/or annual credit to developments that exceed low impact development standards.
- **NPDES Credit:** offered as an annual credit to properties that maintain and are compliant with an NPDES permit.
- **Education Credit:** offered as an annual credit to educational institutions that conduct stormwater education for students.
- **By-Pass Credit:** offered as an annual credit to properties that by-pass the stormwater system and directly discharge into surface waters.
- **Low Density Single Family Residential Credit:** offered as an annual credit to properties that place reduced impact on the stormwater system because of the way in which they were developed.
- **Self-Maintenance Credit:** offered as an annual credit to properties that maintain their own stormwater system that SEMSWA would otherwise maintain.

Survey Summary

A review of the Colorado stormwater utilities as well as those in surrounding states was conducted to determine whether the utilities had credits and if so, what type of credits were offered. A total of 45 utilities were contacted, either through phone, email, or website search; 13% of Colorado utilities and 43% of all utilities surveyed offered at least one form of credit. Figure 1 shows the breakdown of the type of credits offered. In some instances a utility offers more than one credit. Additional details and survey results can be found in Appendix A.

Figure 1. Percentage of Utilities with Credit Programs that Offer Particular Credits

Recommendation

Based on the analysis of several potential credit options, it is recommended that SEMSWA choose 1-2 one time credits (offsets) and 3-4 annual credits. Part 2 of this study will analyze the selected options further and make a recommendation of which credits to implement. More specifically, Part 2 of this study will identify:

1. What types of properties would be eligible
2. General qualification requirements, particularly what could qualify as “exceeding standards” for credits such as the water quality and quantity credits and for the LID credits, based on the Arapahoe County, City of Centennial, UDFCD, and Cherry Creek Basin Water Quality, Drainage Criteria Manuals, water quality sections, and other related requirements for new development.
3. Budgetary level estimate of potential hard dollar savings and/or general benefits to SEMSWA from creditable activities (e.g. maintenance, construction, etc.) based on which of SEMSWA’s cost drivers would be affected by the creditable activity.
4. Analysis concerning the degree to which the creditable activity would or would not result in cost savings and/or general benefits to SEMSWA rather than shift the revenue burden to other rate payers.
5. Potential revenue impact of the credit (approximate).
6. Potential administrative costs (approximate).
7. Detailed pros and cons.

The credits recommended for further analysis are:

- Self Maintenance
- LID
- Low Density Residential
- Quantity/ Quality
- Education

It is assumed that the results of the assessment of the Quantity credit will be closely related to or directly transferable to the Quality credit. Low Density SFR has already been assessed and it is recommended that the results of the assessment be presented in the quantitative analysis for comparison with the other recommended credits.

Introduction

The Southeast Metro Stormwater Authority (SEMSWA) Board is considering the possibility of offering SEMSWA customers credits, a policy-based component of the rate structure that reduces the user fees some properties pay. This memorandum presents an analysis of the credits for the Board's review.

This memorandum presents the requested information in the following four sections:

1. **Survey Results** – Presents the results of the survey conducted on the credit policies of 45 existing utilities, and compares those results to those of an outside survey.
2. **Credit Types** – Presents descriptions of each of the credit options as well as three options for offsets. Data about these credit options are presented as a part of the descriptive section (see Attachment 1 for a table of utilities).
3. **Screening Matrix** – Designed to assist the Board in narrowing down the credit options by qualitatively comparing their characteristics.
4. **General Considerations** – Summarizes information and recommends credits for further consideration. Credits that are deemed most desirable from a policy perspective will be analyzed in a separate process to assess their impacts quantitatively.

A legal review of the potential options and their legal implications is recommended.

Background

What is a stormwater utility rate structure?

The “rate structure” of a public utility is the framework that describes how much each parcel pays. The rate structure is composed of the basic rate methodology and additional rate components. The basic rate methodology defines the basis for the rate that users will be paying. Additional rate components include: (1) modification factors, which can be applied to any of the rates to enhance equity, reduce costs, and meet other objectives; and (2) secondary funding methods that can be adopted in concert with the service charges. This memorandum provides information that will enable decision-making upon a commonly used modification factor: credits.

Among stormwater utilities, rate structures differ widely. The differences may reflect program goals or priorities, the influence of other policy objectives such as growth management or economic development, technical constraints, or the availability of resources such as geographical information systems or other databases.

What is SEMSWA's rate structure?

In 2007, SEMSWA established its methodology for calculating stormwater service fees, based on its customers' demand upon utility services. The methodology was identified in order to establish the base for the revenue stream. Stormwater user fees are based on properties' demand on the stormwater system to discharge runoff.

SEMSWA's adopted rate structure:

- A) Stresses equity through its five-tiered Single Family Residential (SFR) structure (based only on the square footage of impervious area), and

- B) Recognizes the differing demand placed upon the stormwater system by parcels with various densities of development through its three-tiered Non-Single Family Residential (NSFR) structure (based on square footage of impervious area and the percentage of the parcel that is impervious).

SEMSWA has not adopted rate modifiers, a policy-based component of the rate structure that changes the user fees some properties pay. One type of rate modifier is a credit.

What are credits?

A credit is an ongoing reduction in a property's calculated stormwater fee that is given for:

- 1) On-going activities on the property that reduce demand on the stormwater system;
- 2) On-going activities on the property that reduce the utility's cost of service.

Generally, stormwater credits are granted to increase simplicity, enhance equity, or to provide incentives to implement an overall community stormwater management plan. Many utilities do not have a credit program: only 39% of respondents to a 2007 survey of stormwater utilities offered credits, according to a 2007 Black and Veatch study. SEMSWA is considering the following modifiers: impact fee offsets (referred to as "one-time credits") and user fee credits (annual credits).

There is a wide variety of credit types in use among stormwater utilities. Credits can be offered for structural modifications to a property, education provided by a property owner, actions taken by a property owner to reduce stormwater, or other reasons. Credits can be large or small amounts of reductions in the stormwater fee. Each type of credit has its own pros and cons related to the cost and ease of administration, demand reduction and utility revenue, the environment, community members, and ultimately, the goals of the utility. The eight types of credits examined in this study are:

1. Quantity Credit
2. Quality Credit
3. LID Credit
4. NPDES Credit
5. Education Credit
6. By-Pass Credit
7. Low Density Single Family Residential Credit
8. Self-Maintenance Credit

It is important to note the difference between the term "credit" and the term "offset". A "credit" is a continuing reduction in the user fee as long as the recipient applies for and continues to maintain the basis for the credit. The term "offset" is a type of credit, but refers more specifically to a one-time reduction in the drainage basin fee (system development fee) that offsets a one-time action taken by a property (in this case, the developer of a property) to benefit the utility. SEMSWA is considering both offsets and annual credits as shown below:

Table 1. Credit Types Considered for Offsets and Annual Program

Credit Type	Offset (One-Time)	Annual
Quantity Credit	X	X
Quality Credit	X	X
LID Credit	X	X
NPDES Credit		X
Education Credit		X
By-Pass Credit		X
Low Density Single Family Residential Credit		X
Self-Maintenance Credit		X

Survey

A review of the Colorado stormwater utilities as well as those in surrounding states was conducted to determine whether the utilities had credits and if so, what type of credits were offered. A total of 45 utilities were surveyed through websites, and a subset of those utilities was contacted through phone or email. The utilities contacted through phone or email were asked to verify which credits they offered, to describe the participation rate and revenue impacts of the programs, to cite any hurdles and successes with the program, and to describe the success with incentive behaviors, as well as the perceived administrative burdens.

In addition, a 2007, Black & Veatch study of stormwater utilities is referenced in this memorandum. This study researched 71 stormwater utilities in 22 states, including a brief evaluation of their credits. Both the comparative analysis conducted for this project and the Black & Veatch 2007 Study were used to evaluate the credit types.

General Findings

As shown in Table 2, of 23 Colorado utilities, only 13% of the utilities (3 utilities) offered at least one credit. Of utilities in other states surveyed (22), 73% of utilities (16) offered at least one credit. Thus, it appears that a smaller percentage of Colorado utilities offer credits when compared utilities in other states. For all 45 utilities surveyed, 43% (19) offer one or more credits. This figure is in line with Black and Veatch's national utility survey, which found that 39% of utilities it surveyed offered credits (Black and Veatch, 2007).

Table 2. Percentage of Surveyed Utilities offering Credits

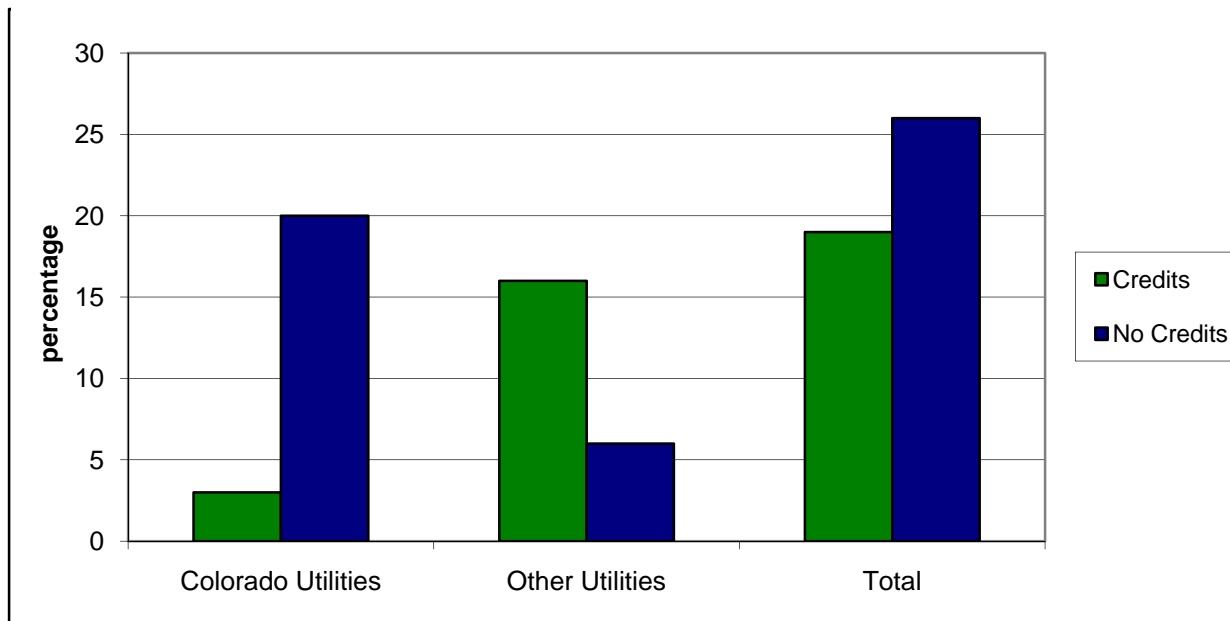
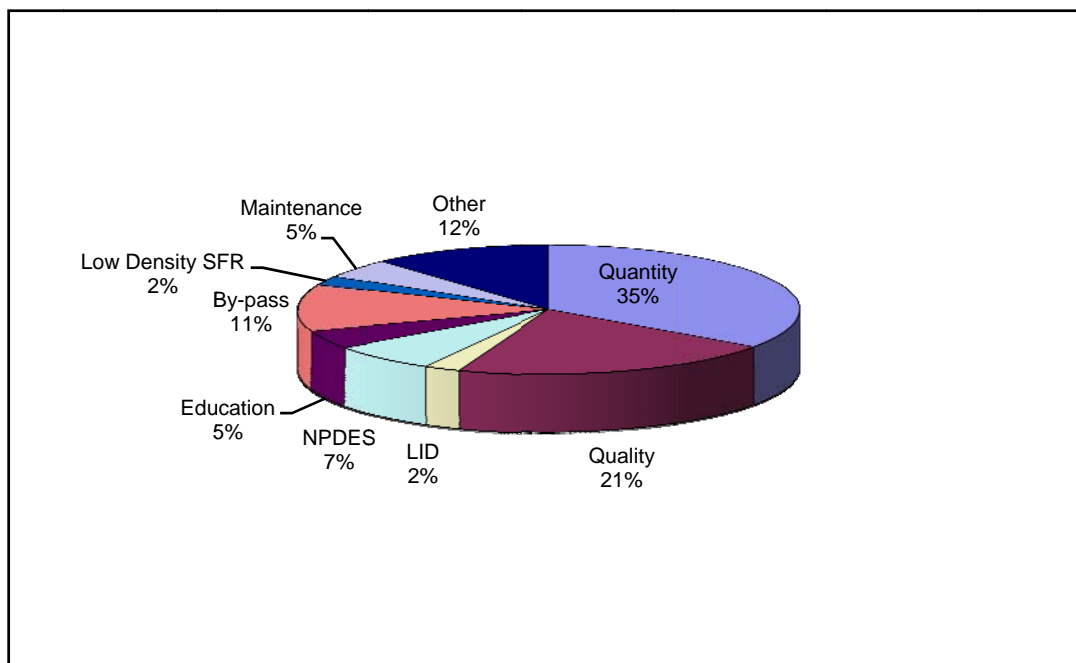


Figure 2 shows the relative frequency with which the credits of interest were offered among surveyed utilities with a credit program. In some instances a utility offers more than one credit. Additional details and survey results can be found in Appendix A.

An additional finding, among the utilities surveyed by phone or email was that participation rates in credit programs are low and that, consequently, the overall revenue impacts and administrative burdens are also low. For example, one utility described the revenue impact as “insignificant.”

Figure 2. Percentage of Utilities with Credit Programs that Offer Particular Credits



Credit Types

The eight types of credits examined for this study and described in greater detail below are:

1. Quantity Credit
2. Quality Credit
3. LID Credit
4. NPDES Credit
5. Education Credit
6. By-Pass Credit
7. Low Density Single Family Residential Credit
8. Self-Maintenance Credit

For each credit, there is a short description, a narrative of the pros and cons of each credit, a table of the pros and cons and survey data, if available.

Approach to Credit Pros and Cons

The pros and cons for each credit that are examined include a qualitative assessment of a wide variety of considerations. These considerations are summarized for the reader's reference below, and are also shown in the screening matrix in a later section.

Table 3. Considerations for Pros and Cons

Consideration	Questions Asked to Assess Consideration
Cost of entry for ratepayers/developers	Does an application require costly calculations or measurements for the applicant? Does the creditable structure or activity have high construction or maintenance costs?
Ease of administering credit for SEMSWA	How easy is review of applications, tracking, and enforcement?
Revenue impacts	Can we know ahead of time who is eligible for the credit and calculate the amount of revenue difference if eligible ratepayers applied for and received the credit? Are there potential saving to SEMSWA from credited activities? How much is the potential revenue impact?
Policy implications	Are we encouraging a desirable activity or structural solution? Does the credit increase equity in the rate structure? Are there unintended policy consequences?
Defensibility	Is there a clear relationship between the credit and the demand reduced? Is the credit easy to explain to ratepayers?
Legal issues	Are there potential legal issues with the credit?

Offsets (One-time) and Annual Credits

SEMSWA is considering one set of credits that could be offered as one-time offsets to developers, as well as annual credits. As described below, offsets are logically offered in these three instances because of their potential as incentives for regional water quantity and quality treatment as well as Low Impact Development. Offsets give developers an incentive to build regional facilities that might not otherwise be built and to design new developments in innovative ways to preserve water quality.

Table 4. Credit Types for Annual and One-time Offsets

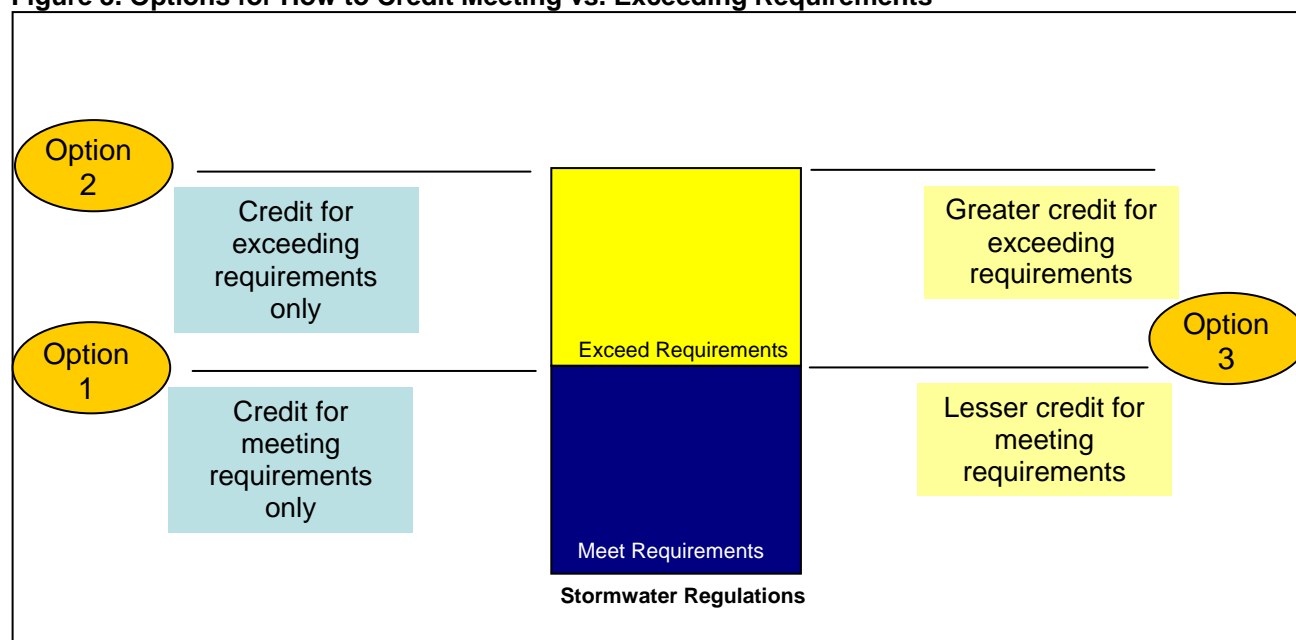
Credit Type	Offset (One-Time)	Annual
Quantity Credit	X	X
Quality Credit	X	X
LID Credit	X	X

Meeting versus Exceeding Requirements

One aspect of the three credits that are being considered in this category is that SEMSWA would prefer to offer the credits for stormwater controls and LID that *exceed* the requirements. **Three approaches are used for quantity credits: 1) grant credit for properties that *meet* existing regulatory detention or retention standards, 2) grant credits only for properties that *exceed* regulatory standards, or 3) combine the two approaches, offering a small**

credit for meeting requirements and proportionally larger credits for exceeding requirements. Some entities do not offer credits for meeting the requirements, as additional incentives are not granted for meeting the minimum standards. SEMSWA favors the second approach, granting credits only for properties that exceed regulatory standards. Offering offsets and credits only for exceeding standards rather than meeting them should encourage over-design of facilities, which could help to prevent or lessen flooding, channel degradation, and water pollution over the long term.

Figure 3. Options for How to Credit Meeting vs. Exceeding Requirements



Quantity Credit

Description. After land is developed, its hydrologic response during and after precipitation differs from its pre-developed condition. This change in hydrologic response is formed of two components: the peak flow and the total runoff volume. The peak flow from a developed property is both greater in volume and faster in time than from an undeveloped property. Overall, the developed property has a greater runoff volume that it did before it was developed, since less precipitation is infiltrated into the soil. The new demand can be envisioned thus: the runoff demands more of the stormwater system's capacity more of the time.

Many stormwater utilities have implemented credits to recognize properties' ongoing reduction in water quantity demand placed upon the systems. Some credits recognize a decrease in peak demand through a "detention credit" and others recognize a decrease in total volume through a "retention credit." Some utilities give credit for both aspects of demand. SEMSWA has the same choice with regard to offering one-time offsets to developers for retention and detention facilities: offsets could be given for facilities that meet *or* exceed standards.

Pros and Cons. Practically, this credit would appear to increase the equity of the rate structure because it recognizes a property's reduced impact upon the stormwater system. The major costs to the utility that can be associated with increased water quantity resulting from development are maintenance costs that preserve the capacity of the stormwater system and capital improvements costs that are necessary to increase the capacity of the system to carry increased peak runoff volumes.

From a broader policy perspective, offsets, since they are offered up front, can encourage regional thinking and behaviors. Offsets give developers an incentive to build regional facilities that might not otherwise be built. Offering offsets and credits only for exceeding standards rather than meeting them should encourage over-design of facilities, which could help to prevent or lessen flooding and channel degradation over the long term.

In general, giving credits for engineered controls and over-designed controls in particular present two cost hurdles that can discourage participation in the offset/credit program. The first cost is the additional expense of the control itself. The credit must be generous enough to encourage over-design. The second cost is an “entry” cost into the program. In order to ensure that the structure meets the criteria for the credit, applicants must submit proof in the form of stamped calculations and as-built drawings that demonstrate the structure meets or exceeds the credit design requirements. The difficulty and expense of applying for structural control credits may present a barrier to entry, and block the achievement of the policy goals.

Administering a water quantity credit also presents costs to SEMSWA. Staff must review the calculations and possibly field-verify the design of the structural control. In addition, the credit is conditioned upon its “on-going” nature, meaning that the water quantity control must continue to control peak flows and volume. In order to ensure the controls are well maintained and continue to function properly, SEMSWA will have to administer an ongoing program with periodic reporting, inspection and enforcement activities.

Table 5. Quantity Offset and Credits Pros and Cons Table

Pros	Cons
Increases rate structure equity	Entry costs high for developers or owners
Clear relationship between demand and credit (easy to explain and defensible)	Administration requires design review, possibly field verification
Offsets encourage regional design that might otherwise not occur	Administration requires on-going verification that facilities function
Encourages designs to exceed standards	Can be difficult to predict revenue impacts
	Difficult to measure (savings, costs, & revenues)

Survey. Nationally, 46% of utilities surveyed in a 2007 study offered retention or detention credits, while 54% did not offer such credits (Black and Veatch, 2007). Of utilities surveyed in preparation for this memorandum, sixteen offered water quantity credits

Quality Credit

Description. A property that reduces stormwater runoff pollution provides a benefit to the stormwater program by helping it meet stormwater quality goals or requirements. Some stormwater utilities offer a credit to recognize an ongoing reduction in water quality pollution. As with water quantity credits, some utilities offer a credit for meeting requirements while others offer a credit for exceeding standards.

Pros and Cons. The characteristics of water quality credits are similar to those of water quantity credits. Water quality credits can:

- Increase the equity of the rate structure by recognizing a property’s reduced impact upon the stormwater system. In the case of water quality, the major costs to the utility that can

be associated with decreased water quality resulting from development are water quality permit compliance costs and watershed and channel preservation and restoration costs.

- Encourage regional solutions
- Encourage over-design of facilities, preventing pollution in the long term
- Create high entry costs
- Create high administrative costs
- Design criteria from Arapahoe County, City of Centennial, UDFCD, and Cherry Creek Basin Water Quality Authority Criteria Manuals may be used to develop the cases where a quality credit may be applied.

Table 6. Quality Offset and Credits Pros and Cons Table

Pros	Cons
Increases rate structure equity	Entry costs high for developers or owners
Clear relationship between demand and credit (easy to explain and defensible)	Administration requires design review, possibly field verification
Offsets encourage regional design that might otherwise not occur	Administration requires on-going verification that facilities function
Encourages designs to exceed standards	Can be difficult to predict revenue impacts
	Difficult to measure (savings, costs, & revenues)
	May be difficult to determine what “exceeds” standards and how it benefits system

Survey. Nationally, 32% of utilities surveyed in the 2007 study offered water quality credits, while 68% did not (Black and Veatch, 2007). Of utilities surveyed in preparation for this memorandum, 10 offered water quality credits.

LID Credit

Description. Low-impact design (LID) is a group of practices that reduce the impact on stormwater systems by creating a developed site whose runoff mimics its pre-developed condition. Thus a credit can be offered to properties employing LID.

Pros and Cons. Because LID structures are decentralized and often scattered throughout a site, and because some practices are not structural but rather concern site layout and preservation of natural infiltration, LID can be challenging to quantify. It has been suggested that rather than minimal LID design standards, a performance criterion such as reduced runoff peaks and flows beyond the pre-developed condition is an effective standard to use (Reese, 2007). In particular, since SEMSWA desires that only developments that exceed LID requirements be credited, a way to quantify “how much” creditable properties exceed standards may be through the use of a performance criterion. Criteria manuals for Arapahoe County, City of Centennial, Cherry Creek Water Quality Basin, and UDFCD Drainage Criteria Manual describe optional best management practices that may set the criteria for a LID credit.

A crucial aspect of SEMSWA’s proposed approach is its desire to offer a one-time credit to developers who exceed LID standards. This approach may go a long way towards encouraging “more LID.” Often, LID credits are offered as on-going credits to property owners only, while the major investment to implement the practices rests on the site developer, who has little to no incentive to build a better development. Encouraging LID serves a broad, long-term policy to change how development occurs and how a community looks. SEMSWA could further

encourage LID through offering the credit to properties that meet rather than exceed standards. The achievability of the program's policy goal and the accrued environmental benefits must be weighed against the entry and administrative costs of the program.

Table 7. LID Offset and Credits Pros and Cons

Pros	Cons
Encourages designs that preserve natural infiltration (decrease demand)	Entry costs high for developers or owners
Defensible	Difficult to quantify "how much LID" should receive credit
Offsets encourage designs that might otherwise not occur and innovation	Administration requires design review, possibly field verification
Encourages design that supports water quality goals	Administration requires on-going verification that facilities function
Encourages integrated design with multiple treatment devices rather than centralized approach	Can be difficult to predict revenue impacts
	Difficult to measure (savings, costs, & revenues)

Survey. No utilities surveyed for this analysis offered an LID credit. However, one utility (Davenport, IA) offered an LID-type credit for properties that infiltrated runoff and preserved open space. AMEC has set up one utility in the past year that is offering an LID credit, but the criteria for the credit essentially demands a case-by-case review by the engineer in the jurisdiction.

Annual Credits

SEMSWA is considering another set of credits that could be offered on an annual basis to ratepayers.

Table 8. Types Considered for Annual Credits

Credit Type	Offset (One-Time)	Annual
NPDES Credit		X
Education Credit		X
By-Pass Credit		X
Low Density Single Family Residential Credit		X
Self-Maintenance Credit		X

NPDES Credit

Description. This option gives an annual credit to industries that have an NPDES permit for stormwater discharge. Under this credit, properties that are covered by and compliant with a valid municipal permit, such as airports and schools, are eligible.

Pros and Cons. This credit is based on the theory that because those subject to an NPDES permit must fulfill above-average requirements with regard to stormwater, their actions assist the utility in reducing the overall impact of stormwater in the community. On the other hand, the reason that these properties must maintain permits is that they have either higher or more toxic levels of pollutants in their runoff. It can be argued that although properties that maintain NPDES permits must and do expend effort to improve stormwater quality, their runoff is still

polluted. Reese also points out that credits “should not be given to someone for the reduction or elimination of illegal activities” (2007).

This type of credit is relatively easy to administer, as the NPDES program is already monitoring stormwater activities.

Table 9. NPDES Credits Pros and Cons

Pros	Cons
Low entry costs	Industrial permit holders may still discharge more polluted water than ordinary properties
Appropriate credit for largest rate payers	Administration requires annual verification
Defensible	Difficult to determine how well the permit holder is meeting their standards
Easy to administer	
Relatively easy to predict revenue impacts (SEMSWA knows who is eligible)	

Survey. Utilities offering an NPDES credit include those of Davenport, Iowa, Normal, Illinois, and Rock Island, Illinois.

Education Credit

Description. A credit that can be made available to local schools or other organizations that provides stormwater education. The rationale is that an institution has the ability to educate a large segment of the public that would be more difficult and costly for the stormwater program to reach.

Pros and Cons. The long-term benefits from an education program are recognized. However, a stormwater education program cannot be quantitatively assessed with ease. One option is to structure an education credit so that it can be shown to reduce stormwater program costs by directly meeting the public education requirements of the program’s NPDES permit. The institution requesting credit would need to submit annual documentation of its program. On SEMSWA’s side, staff time must be devoted to reviewing periodic reporting and, possibly, documentation and/or enforcement activities.

Table 10. Education Credits Pros and Cons

Pros	Cons
Can capitalize on existing educational expenditures on education	Tracking/monitoring could be cumbersome
Appropriate credit for largest/school rate payers	Not one obvious choice on how to calculate credit
Clear relationship between demand and credit (easy to explain and defensible)	Permitting authority will not allow to count for MS4 public education requirements
Relatively easy to predict revenue impacts	If SEMSWA trains teachers, would require staff time for training and administration
Can provide long term benefits	If not well defined, could be used/misused by non-school users
Long term value in teaching students about water quality	

Survey. Two utilities surveyed offered an education credit. One allowed a certain dollar credit amount for each child that received the education contact hours. Since most often, credits are given as a percentage of the customers' bill, this was an unusual approach. From AMEC's experience, our southeastern clients often favor this credit as a way to easily and fairly reduce the large bills of school systems.

By-Pass Credit

Description. A by-pass credit reduces fees for the owners of properties where runoff bypasses the stormwater drainage system operated by the stormwater utility, thus placing a reduced demand on the system. In some watersheds, properties discharge stormwater runoff directly to a large creek or river, without ever entering the publicly maintained stormwater drainage system.

Pros and Cons. Although the justification for this credit makes intuitive sense, there are compelling arguments against it. It is true that some properties might not convey water within the public system, and so would appear to be creditworthy. However, these same properties benefit *most* from the utility's management of the system upstream. That is, they benefit from the utility's management of flooding and pollution. On the other hand, properties that are high in the watershed use the stormwater system *most* for the conveyance of runoff but benefit less from the utility's protective activities. Additionally, this credit has the effect of treating properties within a watershed differently, and as such, is difficult to support legally (Reese, 2007).

Table 11. Bypass Credits Pros and Cons

Pros	Cons
Properties that do not "use" system are credited for this	May have the effect of treating similar properties differently (potential legal problem)
Relatively easy to predict revenue impacts	Properties benefit <i>most</i> from upstream management receive credit
Simplest tracking	Benefits users based on location only
	Has possibility of encouraging multiple outfalls into drainageways
	May lead to users not meeting the quantity and quality requirements for bypass discharges
	Benefits users based on location, rather than exceeding the standards

Survey. Some utilities offer credits to these properties because the runoff they produce does not make use the public drainage system. For example, Davenport, Iowa, allows a credit for properties that discharge to the Mississippi River. Oshkosh, Wisconsin, and Bloomington, Normal, and Rock Island, Illinois also offer this type of credit.

Low Density Single Family Residential Credit

Description. Fees for single family residential (SFR) detached properties are based on the average impervious area of this class of properties. However, some SFR properties have a smaller ratio of impervious to pervious area (a lower percent impervious area) than the average property. This means that their impervious area is more likely to be disconnected impervious area and places less demand on the stormwater system. A credit can be offered to these property owners to recognize the reduced impact on stormwater they generate.

Pros and Cons. The advantages of this credit are that it is easy for customers to apply, easy for SEMSWA to administer, and predictable in revenue impact. In addition, this credit would satisfy ratepayers with the perception that their lots place lower demand than other residential lots upon the system because of how their lots are developed.

On the other hand, the first is that offering this credit for SFR properties creates dissimilarity between the NSFR and SFR rate structures. The relationship between the percent imperviousness and the rate through the three NSFR tiers is a linear relationship. Thus, although the rate increases with the increase in impervious area, there isn't a "jump" in the rate as impervious area increases that would reward lower impervious percentages. Offering a credit to SFR properties for lower impervious area percentage would create such a "jump" on the SFR side. In addition, as a general policy consideration, this credit could have the effect of rewarding sprawled development. EPA has published a report titled *Protecting Water Resources with Higher-density Development* which describes how low-density development can result in the construction of more impervious area in a watershed, as well as increased greenfield development, as compared to higher density development.

Table 12. Low Density SFR Pros and Cons

Pros	Cons
Low entry costs (easy to apply)	Creates dissimilarity among rate payer classes, potentially correlates to economic status
Easy to administer	Contrary to "New Urbanism" movement that encourages density and maximizes open space
Predictable revenue impact	
Simplest tracking	
Ratepayers perceive as fair	
Simple reward system for users with large lots/less impervious area	

Survey. Two utilities researched for this analysis offered a credit resembling this one. One of them differs in that the credit is offered to NSFR and SFR properties alike and was called a "ratio credit."

Self-Maintenance Credit

Description. This credit is available to property owners who maintain their own stormwater systems. Typically, this type of credit is offered to large properties with the capability to maintain stormwater systems, such as airports.

Pros and Cons. By maintaining his or her own stormwater facilities, the property owner has relieved the utility of the responsibility to use public resources for this portion of the stormwater program and the credit recognizes this fact. On the other hand, the fact that the property owner maintains its own facilities does not mean the utility is free from all responsibility related to that property. The utility will still have to monitor the property to ensure maintenance is performed adequately. The advantages of this credit are that it is easy for customers to apply, easy for SEMSWA to administer, and predictable in revenue impact.

Table 13. Self-Maintenance Pros and Cons

Pros	Cons
Low entry costs (easy to apply)	Credit must be generous enough to make entry worthwhile
Moderately easy to administer	Administration requires on-going verification that system is maintained
Predictable revenue impact	If not clearly defined, could apply to all new developments
	If not clearly defined, could apply to areas such as SEMSWA ROW that would be difficult to track

Survey. Both Davenport, Iowa, and Fitchburg, Wisconsin, offer a self-maintenance credit.

General Considerations

A few other general considerations will shape the eventual credit program and can be assessed as part of the quantitative analysis that will follow this initial process.

Revenue Impacts

Credits typically do not have significant total utility revenue reduction outcome – normally less than 5% on existing developments. There may be a larger reduction for new developments which typically must meet more stringent design standards and, thus, qualify for more credits. SEMSWA will be able to predict the revenue impact of offering some credits more effectively than others. For instance, if a credit were offered for NPDES permit holders, the number of potential applicants could be determined in advance and the impact of giving them all a credit can be established

Generosity of Credits

Utilities vary considerably in the amount of the user fees they make eligible for crediting. The amount of a fee that is eligible for credits might be seen as the relative “generosity” of the credit. There are rational reasons supporting a broad range of considerations. The extent or generosity of the credit should include consideration of which stormwater program costs can actually be offset by the qualifying activities for which users can receive credits. For instance, while a business may reduce its impact on the stormwater system through installing and maintaining a detention pond, SEMSWA may not wish to credit the business for its entire bill. Reasons for this might include that fact that a detention pond does not reduce all of the impacts of the property (volume and pollution) and the reality that there are some fixed program costs that remain regardless of individual actions.

Summary of Credit Types

Offset Credits

The disadvantages of offset credit types are generally similar: high costs of entry and administration. The pros are more variable. Specifically, both quantity and quality credits can encourage regional solutions, increase the equity of a rate structure, and are easily explainable to the public. At the same time, both quantity and quality credits entail high costs of entry and administration and high enforcement costs. LID, the other type of offset credit described in this memo, has a separate set of pros and cons. LID is defensible to the public and encourages

designs that preserve natural landscapes, however, the impacts of LID practices are difficult to measure, the entry and administrative costs are high, and the revenue impacts are not very predictable.

Annual Credits

With the exception of bypass credits, all the annual credit types described in this memo have similar advantages: they are easy for customers to apply, easy for SEMSWA to administer, and predictable in revenue impact. Each credit type may have additional advantages, and the disadvantages of each vary somewhat.

NPDES credits have low entry and administrative costs, they have a relatively predictable revenue impact, are easily explainable to the public, and are appropriate for the largest ratepayers. However, annual verification of the NPDES permit is required and having the permit does not necessarily mean that permit holders will discharge fewer pollutants than properties without the permit. Like NPDES credits, education credits have relatively predictable revenue impacts, are easy to explain to the public, and are appropriate for the largest ratepayers. In addition, education credits can provide long term benefits to the public and the environment and can capitalize on existing expenditures on education. On the other hand, tracking the educational offerings of a multitude of classroom settings may be cumbersome, and there is no clear way to calculate the credit. Low density SFR credits also have low entry and administrative costs and a predictable revenue stream. However, unlike NPDES and education credits, SFR credits may create dissimilarity among ratepayer classes and may encourage sprawl. Self-maintenance credits have low entry and administrative costs and a predictable revenue impact. On the downside, the self-maintenance credit must be generous enough to make entry appealing to property owners and administration will have to perform on-going verification that the system is being maintained.

Bypass credits have an entirely different set of pros and cons. They are difficult to defend legally, they treat similar properties differently, and the properties that benefit most from upstream management of the stormwater system receive the credit. The advantages of bypass credits are that properties that do not “use” the system receive credits, it entails relatively predictable revenue impacts, and tracking is simple.

Screening Matrix

A simple table has been developed to measure the merits of the credits relative to each other based on the pros and cons found in the credits descriptions. A number, 1 through 3 has been assigned to each screening consideration for each credit. Higher numbers indicate that a credit is stronger (or more positive) in a certain screening consideration.

Under these criteria, the credit options scored as follows:

Credit/Offset	Score
Self Maintenance	19
NPDES	18
Education	17
Low Density SFR	17
Quantity	16
Quality	16
LID	15

By-pass	12
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While the scores are close, they assist with screening out options to examine further. The screening matrix itself is found in Appendix B.

Table 14. Applicability Table

Type of Credit	New Construction	Existing Construction	SFR	NSFR
Quantity	X			X
Quality	X			X
LID	X			X
NPDES	X	X		X
Education		X		X
By-pass	X	X	X	X
Low Density SFR	X	X	X	
Self Maintenance	X	X		X

Recommendation

Based on the analysis of several potential credit options, it is recommended that SEMSWA choose 1-2 one time credits (offsets) and 3-4 annual credits. Part 2 of this study will analyze the selected options further and make a recommendation of which credits to implement. More specifically, Part 2 of this study will identify:

8. What types of properties would be eligible
9. General qualification requirements, particularly what could qualify as “exceeding standards” for credits such as the water quality and quantity credits and for the LID credits, based on the Arapahoe County, City of Centennial, UDFCD, and Cherry Creek Basin Water Quality, Drainage Criteria Manuals, water quality sections, and other related requirements for new development.
10. Budgetary level estimate of potential hard dollar savings and/or general benefits to SEMSWA from creditable activities (e.g. maintenance, construction, etc.) based on which of SEMSWA’s cost drivers would be affected by the creditable activity.
11. Analysis concerning the degree to which the creditable activity would or would not result in cost savings and/or general benefits to SEMSWA rather than shift the revenue burden to other rate payers.
12. Potential revenue impact of the credit (approximate).
13. Potential administrative costs (approximate).
14. Detailed pros and cons.

The credits recommended for further analysis are:

- Self Maintenance
- LID
- Low Density Residential
- Quantity/ Quality
- Education

It is assumed that the results of the assessment of the Quantity credit will be closely related to or directly transferable to the Quality credit.

Low Density SFR has already been assessed and it is recommended that the results of the assessment be presented in the quantitative analysis for comparison with the other recommended credits.

Appendix A: Survey

Local Government Name	State	Credit Manual	General	SFR Eligible?	Quantity (E=exceed)	Quality (E=exceed)	LID	NPDES	Education	By-pass	Low Dens SFR	Maintenance	Other	If Other, Name
Fort Collins	CO	None found	This document: http://stormwaterfinance.urbancenter.iupui.edu/PDFs/Fort%20Collins.pdf mentions a developer credit.											
Loveland	CO	None found	A non-residential customer may request an adjustment to the regular fee by one of the following methods, in order to allow for less impervious surface than the average for the class of use (Method A) or for on-site detention facilities (Method B). The two methods are not cumulative, and only the method resulting in the lower fee shall be used. METHOD A. A fee shall be one-half of the regular fee, plus one-half of the regular fee multiplied by the percent of impervious area multiplied by the class factor. The Commercial class factor is 1.11, the Industrial class factor is 1.174, and the Institutional class factor is 2.49. METHOD B. A fee shall be one-half of the regular fee, plus one-half of the regular fee multiplied by the ratio of the stormwater runoff rate calculated to result after construction of the detention facilities to the stormwater runoff rate which would occur in the absence of detention facilities.	N	X									
Colorado Springs	CO	No												
Castle Rock	CO	None found												
Longmont	CO	No												
Parker	CO	No	2% discount if paid by Feb. 28th.											
ACWWA	CO	None found												
Denver	CO	None found												
Aurora	CO	None found												
Greeley	CO	None	Ag is exempt. There are no reductions or changes UNLESS you are 1.) Residential Low Density and 2.) there is a detention/retention pond for the subdivision within your property. Then you may appeal the Composite C-factor for your property using a C-factor of 0 for the detention/retention pond area only.		X						X			
Arvada	CO	None found												
Windsor	CO	None found												
Pueblo	CO	None found	Credit for commercial properties with detention ponds		X									
Golden	CO	None found												
Federal Heights	CO	None found												
Boulder	CO	None found												
Woodland Park	CO	None found												
Northglenn	CO	None found												
Littleton	CO	None found												
Lakewood	CO	None found												
Westminster	CO	None found												
Canon City	CO	None found												
Englewood	CO	None												
Murray City	UT	Yes	Maximum credit is 45%, based on the actual variable costs of the utility that can be attributed to water quality and quantity	N	X(e)	X								
Orem	UT	Y	Most quantity control is provided by sumps. Program is for quality credits only if water is treated before entering a sump or conveyance. Credit is based on an equation incorporating 1) risk, 2)source controls, and 3) treatment controls. Risk analysis must be performed in order to determine risk.	N		X								

Local Government Name	State	Credit Manual	General	SFR Eligible?	Quantity (E=exceed)	Quality (E=exceed)	LID	NPDES	Education	By-pass	Low Dens SFR	Maintenance	Other	If Other, Name
Taylorsville	UT	Y	Maximum credit is 45%, based on the actual variable costs of the utility that can be attributed to water quality and quantity. Equation for quantity credit is in comment box. Equation for quality is a ratio of number of BMPs implemented compared to the number advised to be implemented by the City engineer.	N	X	X								
West Valley City	UT	Y	Maximum credit is 55%, based on the actual variable costs of the utility that can be attributed to water quality and quantity (up to 30% for quantity and 25% for quality). See Taylorsville for equations.	N	X	X								
Springville City	UT	No												
Kansas City	MO	Y	Maximum credit is 75%. Ratio Credit for high pervious to impervious ratio of up to 50%. Detention credit of 10% for properly maintained basin and up to 50% for documented peak flow attenuation.	Y	X								X	Ratio Credit
Overland Park	KS	None found	Allowed by ordinance but could not find manual or specifications											
Davenport	IA	Y	Maximum credit allowed is so that fee is not less than residential fee. Education is part of integrated BMPs credit and is allowed for businesses. Credit similar to "LID" credit is a "Volume Control Credit" for infiltration and open space preservation. Bypass and Maintenance credits are covered under one credit a "Conveyance" credit.	N	X(e)	X	X	X	X	X		X	X	Integrated BMPs
Bloomington	IL	Y	Maximum credit allowed is 100% for bypass credit and 50% for the detention credit (50% for control of 100 yr storm and 25% for 50 year storm). Bypass credit is contingent on approved water quality treatment.	N	X					X				
Normal	IL	Y	Maximum credit is 50%, except for direct dischargers. Quantity: 20% for meeting 100 yr control requirement, plus 15% for meeting first flush req. Quality: 10% for BMPs to reduce TSS. NPDES permit: 5% for maintaining permit. Direct dischargers: 50% reduction. Direct discharges with NPDES permits: 100%. Education credit: \$2.50 per child.	Y	X(m&e)	X		X	X	X				
Rock Island	IL	Y	Maximum credit is 100% for direct dischargers. Quantity credit is given for rate reductions that meet (25%) and exceed (10%) requirements for runoff rate reductions and for volume reductions that exceed (5%) requirements for volume reduction. Quality credit is given for use of BMPs (up to two, for 10%) that treat water quality. NPDES permit holders get a \$200 dollar credit per year and it must be renewed annually.		X(m&e)	X		X		X			X	Unique and Special Cases
Oro Valley	AZ	None found												
Glenview	IL	None found												
Bismarck	ND	None found												
Duluth	MN	None found												
Alexandria	MN	None found												
Grand Forks	ND	None found												
New Berlin	WI	None found	Credits available for reducing runoff rate and pollution to stormwater system. Must exceed requirements		X(e)	X(e)								
Bargersville	IN	Y	Maximum credit is 50%. Retention (volume) and detention (peak flow) are eligible. To receive full credit, retention pond must retain 100-yr, 6-hr storm. To receive full credit, detention pond must meet requirements in drainage standards manual.	N	X								X	Special circumstances by petition

Local Government Name	State	Credit Manual	General	SFR Eligible?	Quantity (E=exceed)	Quality (E=exceed)	LID	NPDES	Education	By-pass	Low Dens SFR	Maintenance	Other	If Other, Name
Fitchburg	WI	Y	Credits for SFR are \$ amounts per billing period and are given for pervious pavement, rain barrels or cisterns and rain gardens or infiltration systems. Credits for NSFR are calculated reductions in ERUs for pervious pavement, cistern or other stormwater storage, raingarden or infiltration, private maintenance of on-site detention facility	Y	X							X	X	Cisterns, rain gardens, infiltration systems, pervious pavement
Sun Prairie	WI	Y	Maximum credit is 65%: maximum of 35% for quantity and 30% for quality. The base fee is 35% and finances administration, maintenance, and replacement of facilities. Quantity credit is given for meeting requirements of stormwater management ordinance, with percentage credit given for detaining various storms up with max credit given for detaining the 25-yr and larger storm. Quality credit is given for making quantifiable benefit for the 1-yr storm, with percentage credit given for reducing various sizes of suspended solids and for reducing temperature of discharges to thermally-impaired waters	N	X	X								
Oshkosh	WI	Y	Maximum credit is 40%	N						X				

Appendix B: Screening Matrix

Screening Consideration	Quantity	Quality	LID	NPDES	Education	By-pass	Low Dens SFR	Maintenance
Cost of entry is low	1	1	1	1	1	2	3	3
Cost of administration (for SEMSWA) is low	1	1	1	2	1	3	3	2
Ratepayers eligible for credit are known	1	1	1	2	2	2	2	3
Potential revenue impacts are low	1	1	1	1	1	1	2	1
Equity between the "demand for service" and rate structure is high	3	3	3	1	1	1	2	3
Encourages good environmental stewardship according to SEMSWA's vision/goals.	3	3	3	2	3	1	2	1
Easy to explain to ratepayers/public	3	3	3	1	1	1	2	3
<i>Total</i>	<i>13</i>	<i>13</i>	<i>13</i>	<i>10</i>	<i>10</i>	<i>11</i>	<i>16</i>	<i>16</i>