ONE SIZE FITS ALL? A REGULATORY APPROACH TO UTILISING DISCHARGE LIMITS TO ACHIEVE IMPROVED ENVIRONMENTAL OUTCOMES

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ABSTRACT (200 WORDS MAXIMUM)

It is common knowledge that intervention is necessary to mitigate the ongoing effects of urban contamination on our waterways.

Intervention is usually achieved via discharge consents, granted only if appropriate management practices are implemented to avoid, remedy or mitigate effects on the receiving environment. However, insufficient data exists to determine whether the proposed controls and limits are achieving environmental outcomes. In particular, not enough is known about specific receiving environments, which makes setting discharge limits 'guesswork'.

Industrial and Trade Activities (ITA) within the Auckland region often rely on the perceived performance of 'standard' treatment devices rather than providing a full AEE which considers their specific receiving environment. Relying on the perceived performance of a device is only a suitable approach if all receiving environments are the same.

The need to review and set water quality limits at a catchment level is gaining momentum with the advent of the NPS: Freshwater Management, the Auckland Council Unitary Plan and the proposed 'super catchment' Network Discharge Consents. With this in mind, better information about the likely tolerances of specific receiving environments is required to inform the consent process.

Moving forward, environmental improvement cannot be achieved if councils and businesses continue to operate in an isolated manner. All parties need to recognise the constraints and opportunities and work collaboratively to achieve the best environmental outcomes possible.

KEYWORDS

Industrial and Trade Activity (ITA); Discharge Limits; Regulation; Receiving environments; Urban Runoff; stormwater; baseline assessment; environmental outcomes.

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1. INTRODUCTION

Are we achieving improved environmental outcomes under the current regulatory framework? This paper discusses this question in relation to the application of discharge consents for stormwater and industrial and trade activities (ITA), particularly within the Auckland region.

1.1 LEGISLATIVE BACKGROUND

The Resource Management Act (MfE, 1991) (the Act) is an 'effects- based' piece of legislation that most of the general populous will be aware of. Part II, which refers to sustainable management of resources, is probably the most well known part of the Act.

Section 15 of the Act requires that no person may discharge to land or water unless allowed by resource consent. Resource consents therefore play a pivotal role in regulating and managing discharges of contaminants. The Auckland Council Regional Plan: Air, Land and Water (ACRP: ALW), which became operative in April 2012, develops the overarching provisions of the Act in a manner that is specific to the Auckland region, and which contains objectives, policies and rules that provide the framework for regulating discharges in this region.

The consenting process (for Section 15 discharges) within the Unitary Authority of Auckland Council is administered by the Resource Consents Department, and specifically for regional discharge consents, the Natural Resources and Specialist Input Unit, the Major Infrastructure Team and the Network Consents team.

Discharge consents range in scale and through the RMA consenting processing, are assessed accordingly. Individual sites or developments can apply for their own consent with an assessment of environmental effects (AEE) specific to their activity or proposal. At a larger scale, utility operators compile Integrated Catchment Management Plans (ICMP) when applying for Network Discharge Consents (NDC). The ICMP informs the decision making process by assessing the scale and intensity of effects related to their activity or other potential activities within the catchment. ICMPs can provide a holistic assessment of effects which can then inform individual developers what the stormwater management performance requirements are. Whilst independent stormwater consents may not be required within catchments where an NDC is in effect, discharge consents for ITA sites are almost always required under the rules of the ACRP: ALW.

1.2 LEGISLATIVE CHANGES

There are two key changes to the regulatory framework that will affect the Auckland region and are pertinent to the discussion of stormwater and ITA discharges. These are the introduction of the Auckland Council Draft Unitary Plan (ACDUP, Auckland Council,

2013a) and the advent of the National Policy Statement: Freshwater Management 2011 (NPS: FW) (MfE, 2011).

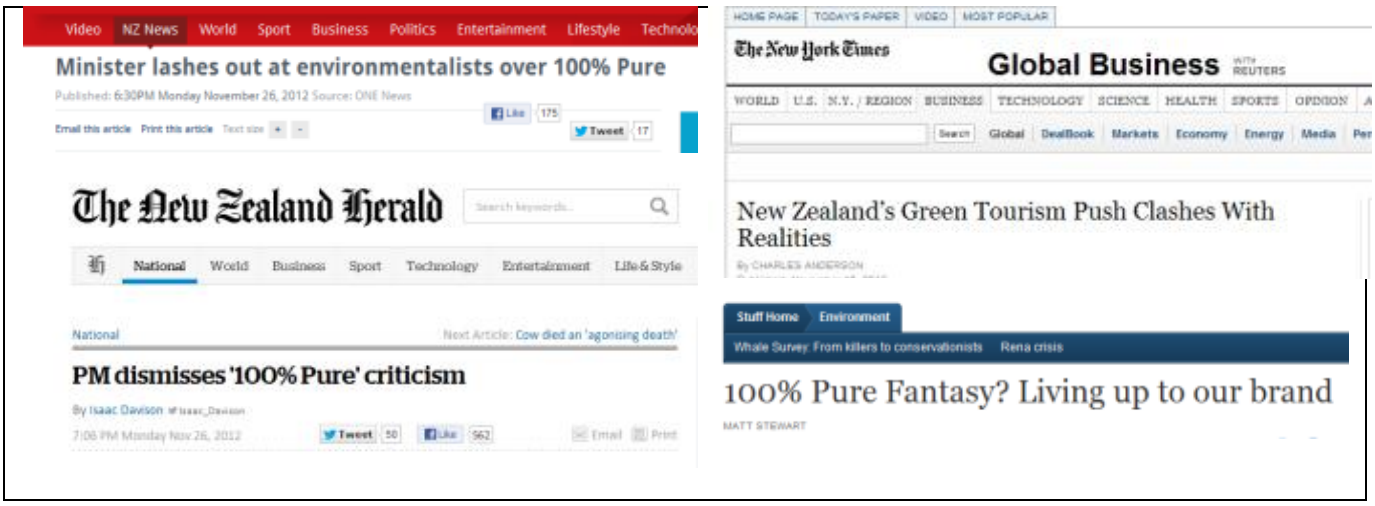
The ACDUP has been released for comment (15 March 2013), and when released for notification later in 2013, will merge the functions of the existing District and Regional Plans and Policy Statements. The ACDUP applies a more land-use focussed approach to managing the scale and intensity of development than the ACRP: ALW and requires controls to this end.

Further, the NPS: FW has been developed to provide national level guidance to regional authorities with respect to the management of fresh water resources, and specifically with the aim to implement limits-based water quality standards. The guidance provided should be considered and reflected in the decision making process once it comes into effect.

These shifts in framework will be far reaching and the implications are still unclear. How can we as regulators make best use of the current and future tools available to effectively, consistently and transparently help achieve the Mayor's vision to create the world's most liveable city as well as improved environmental outcomes?

In a Regulatory Impact Statement released in April 2011, it was noted that 'improving the way we manage freshwater is critical to New Zealand's future economic growth, environmental integrity and cultural well-being' (Sowden, 2011). This is emphasised again in the recently released *Freshwater Reform 2013 and Beyond* document published by the Ministry for the Environment (2013). From a social and cultural point of view, there is an expectation that both freshwater and marine environments will be clean and 'safe'. From an economic point of view, New Zealand markets its 'brand' on the perceived purity and green credentials of our environment (100% Pure New Zealand campaign (figure 1). As exemplified by the headlines in Figure 1 below, the clean, green 100% pure image is not as widely accepted as the marketing campaign might otherwise suggest.

Figure 1: International and national headlines questioning the accuracy of the NZ brand



Regulators and industry professionals need to become better informed about the specific values of receiving environments and discharge quality in order to achieve improved environmental outcomes while also providing for economic growth within the Auckland region.

2 IMPLEMENTING THE LEGISLATION

2.1 THE RULES

In the following sections, the rules in the ACRP: ALW for stormwater and ITA discharges are described, as they provide the basis under which a BPO approach is implemented within the Auckland region.

2.1.1 STORMWATER RULES

Under the current ACRP: ALW, the trigger for requiring resource consent for the diversion and discharge of stormwater is based on new impervious area (post-2001). Where an developer proposes to create more than 1000m^2 of new impervious area on a site, a series of controls are required under the provisions of the ACRP: ALW in order to mitigate effects. The controls required are determined based on the scale of potential effects and are specified through Rules 5.5.1 – 5.5.5. These rules focus on the following broad effects:

- Water quality;
- Water quantity; and,
- Aquatic habitat protection.

This paper will focus on the water quality aspect. The provisions of the ACRP:ALW, typically require stormwater treatment devices to be designed in accordance with ARC Technical Publication 10 (TP10, Auckland Regional Council, 2003) to achieve 75% TSS removal on a long term average basis. Under TP10, treatment devices have effectively been 'approved' where they are shown to meet this requirement. However, devices designed to remove 75% TSS will not avoid the discharge of certain contaminants, and in some cases, the residual contaminant load can result in measurable adverse environmental effects.

If the development is assessed under Rules 5.5.2-5.5.4, then by installing TP10 approved devices, an assessment of the actual and potential effects on the environment is not required to obtain consent (as would normally be required). As such, the discharge quality from the site is considered to have a less than minor effect based on proportional TSS removal. This cannot be compared to numeric discharge limits (Clark & Pitt, 2012) such as those provided within ANZECC guidelines.

Currently proprietary devices can be subjected to an independent verification process to confirm their performance claims. This helps to enable operators and regulators to make more informed decisions about the appropriateness of a device and its treatment efficiency for different contaminants. It is up to the proprietary device vendor to make claims and relate them to different land use or contaminant types. Such claims are likely only to relate to more common land use types (such as residential developments) rather than the contaminant-specific issues normally associated with ITA sites.

2.1.2 ITA RULES

Schedule 3 of the ACRP: ALW classifies 20 ITA processes and breaks them down into a further 92 activities, ranging from chemical manufacture to motor vehicle services and food manufacture to recycling facilities. Each of these processes and activities has the potential to generate a variety of contaminants of concern. Schedule 3 then further classifies risk (low, moderate, high) based on the nature of the activity and the size of the associated activity area. Based on just this simplistic assessment of the classification of ITAs, it is clear that discharges from ITA sites have a level of complexity greater than that of stormwater discharges. ITA consents are usually issued under two rules, one related to the use of land for an ITA and one related to the discharge of contaminants

from an ITA. This distinction is important to note as it is fundamental to how controls are applied and regulated on different sites depending on risk classification.

Schedule 3 identifies timeframes within which different activity types must comply with the relevant criteria listed within the rules relating to discharges from the site.

Historically, high risk activities, as described in schedule 3 of the ACRP: ALW, have been assumed to have a greater level of risk of potential effects resulting from discharges than moderate or low risk activities. As a result, all sites that fall into the high risk category are deemed to require consent to discharge contaminants. Activities classified as moderate or low risk do not require consent provided they comply with the relevant permitted activity rules.

In the event that a discharge from the site results in significant adverse effects, the operator may be required to seek a consent as a controlled activity.

For permitted activities, there is no requirement for consent, so there is no statutory obligation for the ITA operator to undertake an initial assessment of the receiving environment, the potential cumulative effects and no regulatory ability to set discharge limits. The permitted activity rules are in effect 'land-use' rules and are limited to the application of controls to the activities on site, rather than monitoring the quality of discharges from the site. It is the responsibility of the operator to understand what their controls and management system performance is in order to maintain their permitted activity status.

As such, the level of control required and the ability to assess the appropriateness of the treatment approach is restricted to sites that require consent under the ACRP: ALW as defined within Schedule 3.

For the purposes of this paper, the use of discharge limits and the quality of discharge are considered, which are inherent to the potential effects on the receiving environment. In addition, there is the potential for cumulative effects of multiple discharges and sources ('low', 'moderate' and 'high' risk sites) into catchments and wider receiving environments. Further, the application of a 'one size fits all' approach to managing stormwater and contaminant discharges from sites, regardless of their nature, raises a number of questions to consider when determining what appropriate controls for ITA sites may be.

2.2 AT THE COALFACE

In trying to achieve improved environmental outcomes that the Act and ACRP: ALW aim for, it is crucial to ensure that the on the ground implementation of consent processing is up to speed and transparent.

The process through which an application for a discharge consent is assessed involves an assessment and evaluation of the nature and quality of the discharges and the proposed controls that are to be put in place. The Act requires that management controls are implemented to appropriately avoid, remedy or mitigate any actual or potential effects on the environment. The level of control required is generally considered in accordance with the likely scale and severity of effects. The Best Practicable Option (BPO) approach is often applied to enable an acceptable level of control/treatment, whilst recognising potential limiting factors associated with the site, process or operations. As such, the regulatory process is required to assess whether the options proposed and/or implemented are in fact the BPO, and if not, determine under what circumstances consent could be granted.

To that end, the intent of the rules of the ACRP: ALW is that if they are followed and appropriate controls implemented, where required, then improved environmental outcomes should be achieved. However, it is the application of generic 'one size fits all' BPO approaches that causes some confusion and a level of uncertainty in terms of actual environmental outcomes achieved.

When looking at the use of treatment devices, it is recognised that stormwater treatment is entering a phase beyond accepting 'approved' or 'one size fits all' units which make specific performance claims. Internationally there is a move towards a numeric discharge limit approach (Clark & Pitt, 2012) that seeks to be reflective of the nature of the discharge and characteristics of the receiving environment.

Under the ACRP: ALW, the 'receiving environment' is defined in relation to stormwater and wastewater as "[…] *any land or water body to which a discharge occurs*." Such a definition can be confusing and misconstrued to a have a negative connotation as it can be interpreted as a place to discharge contaminants to, rather than it being a complex mixture of different environments.

In light of the regulatory framework outlined above, it is clear that there is a need to move into a more tailored approach to evaluating the effectiveness of proposed treatment devices in order to address the proposed limits in the ACDUP and the aspirations of the NPS: FW.

These changes are to a degree welcome, because up until now, the Australian and New Zealand Environment and Conservation Council (ANZECC, 2000) trigger levels for protection of aquatic species have been used as a guide for evaluating the quality of stormwater or ITA discharges.

With a wider range of limits available to assess against, it will become increasingly appropriate to provide a more site specific application of discharge limits depending on the state of the receiving environment as well as the specific future goals for its quality.

There is typically insufficient robust information available (to consent holders, applicants and regulators) to determine the quality of the receiving environment. Consequently, there is also uncertainty around what discharge limits should be applied to prevent further degradation, or promote environmental improvement in degraded systems (Park *et al*, 2009; Barbosa *et al* 2012). The NPS: FW potentially holds promise to at least scoping the scale of this issue and may provide some innovative ideas to collating and making available a wealth of information that has not yet been realised.

In terms of the improved environmental outcomes sought, is it realistic to either set regional discharge limits that applicants must achieve, or limits that are based on the specific receiving environment?

The provision of specific discharge limits could set out some regulatory form which will seek to improve our aquatic ecosystems. Simultaneously, the level of monitoring data (and interpretation) required by the consent holder, and the level of quality treatment that might be required to achieve these, may be impractical and/or the level of investment may not be appropriate given that BPO is currently the preferred approach for both applicant constraints and regulatory discretion.

3 IDENTIFYING THE CHALLENGES

Evidence suggests that despite the current regulatory framework, which provides objectives, policies and rules intended to result in environmental improvement, we are

still faced with declining environmental water quality (Sowden, 2011; Neale, 2012). Given the apparent disconnect between a sturdy regulatory framework and actual outcomes on the ground, experience highlights three key challenges that should be considered when determining potential future solutions.

1. **How do we achieve environmental improvement within the current legislative framework?**

When an application for consent is lodged, further information can be requested (under section 92 of the Act) to enable a fair and reasonable assessment of the potential effects. Current legislation restricts when information can be requested and what can be reasonably asked for. In order to make better informed decisions about the potential effect of discharges from a site, it may be necessary to ask for more information in terms of discharge quality. . Consideration needs to be given to inherent time delays in obtaining sufficient data as it may be better to adopt an adaptive management approach by installing an 'unproven' treatment device, pending further results rather than to spend time (without treatment) to determine what the best treatment for the site will be.

2. **How can we determine the effects based on the information available to us?**

Often there is insufficient information available about the quality of both the site discharge and the receiving environment (usually assessed in the form of an Assessment of Environmental Effects (AEE), Stream Ecological Valuation (SEV) or sample results) to make informed decisions and fully appreciate the impact of the discharge. Too often, applicants rely on a generic 'Best Practicable Option' (BPO) approach rather than site specific information.

The risk is that BPO may be based on old technologies and practices or expectations previously 'accepted' or 'approved' by industry or regulators, but which are often not proven to be effective for the potential contaminants of concern specific to that site. The pending change in direction towards numeric discharge limits, will place a greater requirement on confirming whether the BPO 'one size fits all' approach is achieving the environmental improvements required.

3. **How do we overcome the uncertainty surrounding the limitations to accessing quality data relating to site discharges and the receiving environment.**

Current information regarding the state of the receiving environment is limited. State of the Environment (SOE) monitoring can be a useful tool, however monitored sites tend to be based in non-industrial catchments and are therefore unable to provide data applicable to industry and potential cumulative effects.

A further challenge is that for new ITA sites, it is not possible to assess the quality of the discharge to determine treatment requirements before operations commence. In many cases the only method available to require ongoing monitoring of discharge quality is through the provision of conditions of consent. As such conditions of consent need to be as clear and concise as possible, whilst being enforceable.

4 THE CHALLENGE WITH CONTROLS – NOTHING IS EVER EASY

As discussed in section 2.1.2, stormwater discharges from ITA sites, particularly those classified as high risk, have the potential to generate a greater variety of contaminants when compared to typical urban stormwater discharges. This section looks at how ITA

discharges will require further thought to enable better management of discharges to enable environmental improvement.

4.1 CURRENT CONTROLS: MANAGEMENT OF DISCHARGES

4.1.1 ALL SITES

Structural and procedural controls for land used for an ITA are essentially identical for low, moderate and high risk sites. Procedural controls are detailed through the EMP which includes an Emergency Spill Response Plan (ESRP). ITA sites classified as moderate or high risk require an Environmental Management Plan (EMP) which sets out the structural and procedural controls that the site will implement to demonstrate how the site complies with either the permitted activity rules and/or conditions of consent.

The current legislative framework is structured to take a broader view of all the contaminants that are potentially associated with that particular activity. Schedule 3 makes an assumption that high risk activities discharge higher volumes, concentrations or more significant contaminants based on activity area size and activity type than moderate or low risk activities. Further, the level of treatment required and the ability to assess the appropriateness of the treatment approach is restricted to sites that are required to obtain consent.

Unlike stormwater treatment approaches, which utilises TP10, there are limited guidance documents for how to treat specific ITA contaminants. As a result, approaches that are utilised are based fundamentally on the TP10 design principles as this is a 'one stop shop' for all stormwater treatment devices in the Auckland Region. The diverse nature in contaminant profile and concentrations associated with each individual ITA site often requires a treatment train approach that utilises two or more TP10 approved devices. To date, these varying treatment approaches have been considered and assessed as being BPO. The use of BPO is not criticised and is provided for within the objectives and policies of ACRP: ALW. However, sole use of BPO guidance documents is considered by Clark and Pitt (2012) to be out of date when stormwater treatment is entering a new phase of proposed numeric objectives, such as those set out under the ACDUP/NPS: FW.

4.1.2 TREATMENT APPROACH: STORMWATER

The ACRP: ALW in relation to stormwater, and as discussed in section 2.1.1 focuses on the removal of 75% total suspended solids as a key measure for reducing the effects from diverting and discharging stormwater from impervious surfaces. TP10 has up until now been really the only guideline or tool available for identifying how this performance target might be achieved. There is little discretion afforded in the ACRP: ALW to seek a higher standard of treatment for stormwater discharges, and the rules do not make it clear that other contaminants of concerns be addressed through treatment.

The objectives and policies go some way to permitting an assessment of additional contaminants, but to date the driving treatment mode in Auckland has been focussed on achieving 75% TSS removal efficiency.

The use of ANZECC trigger values has often been a default reference for operators and regulators to develop a perceived quality of discharge in relation to a guideline value. However, the ANZECC guideline cannot be considered a definitive guide, and should not be treated as a tool for establishing limits in isolation.

A specific challenge relating to quantifying discharge limits for ITA sites, and something that is unlikely or suitable to be resolved by any regulatory framework, is how to address the broad suite of contaminants that may arise from an ITA site. No set of discharge limits will ever fully encompass the potential multitude of possible suites, which is why

the development of site-specific limits based on actual discharge quality is the preferred approach.

The legislative framework for the future appears to provide for a much broader scope of consideration when assessing management controls for all discharges. The challenge, or demand, is for supporting information to enable this direction to be successful and it will require collaboration between industry groups and the regulator (MfE, 2013).

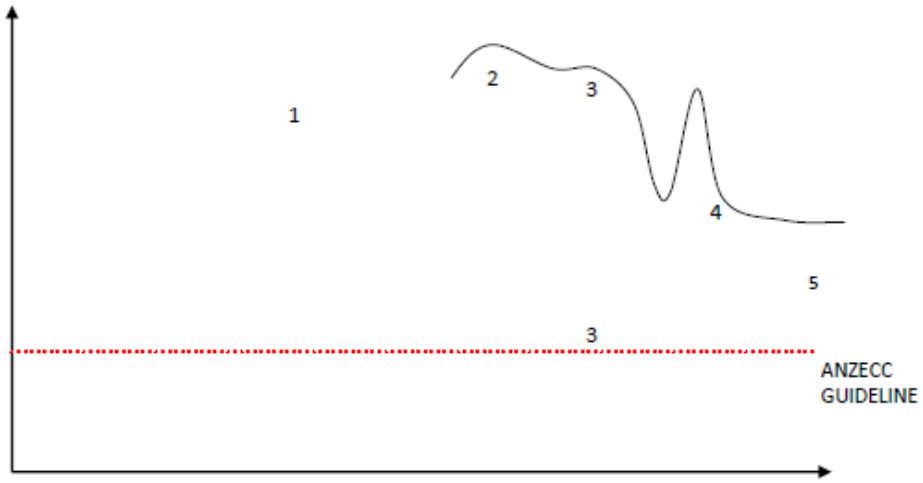
4.2 SETTING LIMITS WITHIN LIMITATIONS

There is currently insufficient information available to determine the existing state of all receiving environments in Auckland, let alone the quality of the discharge from the site. Obtaining a little information is better than having none, and having reliable data is better than lots of inaccurate information (Barbosa et al 2012). Given the current limitations discussed, how can the need to set discharge limits that are considered to be 'fair' and achieve the expected (and desired) improved environmental outcomes be addressed?

Information in terms of the actual discharges and the state of the receiving environment is, of course desired, but not currently a necessity to obtain consent. Generally the widely accepted assumptions of a BPO approach are relied upon and no quantitative information or data regarding the discharge is provided or required under the ITA rules.

Figure 2 below represents the status quo approach to ITA consent applications that exists within the current framework of the ACRP: ALW.

Figure 2: Annotated representation of sampling through previous consent process



Historically sites applied for consent with no requirement for sampling data for either their site or the receiving environment (1). Likely contaminants of concern are identified based on inventory of environmentally hazardous substances (EHS) onsite and assumptions made under schedule 3. Proposed controls would include treatment based on BPO and/or TP10, or limited to procedural controls. Consent conditions required sampling to determine if the implemented controls are appropriate (2). Trigger values based on ANZECC values, and results (3) compared to these in the annual report. A downward trend would be found if controls working (3). However, due to the trigger values, incidents (for example from lack of maintenance or an incident on site) were often not followed up or reported as discharge levels were already in exceedence of the trigger levels, and returned to their downward trend (4). Ongoing reporting discusses 'significance of effects' against ANZECC but provides no measure of the receiving environment upon which to compare these to (5).

It should be noted that the above scenario applies to established sites that are able to monitor their discharges. A new operator and a new site would not be able to achieve this, and so may be reliant upon as yet unavailable discharge data (modelling, industry guideline, associated environmentally hazardous substances (EHS)). However, discharge limits could be set by the provision of information on the quality of the receiving environment. The issue with this is that existing sites are being assessed on their discharge, whereas the new sites could only realistically be assessed against the receiving environment and therefore are likely to have more stringent trigger levels – is this fair to all?

At a catchment scale, areas of industrial land use can be identified as 'contaminant hotspots' in ICMPs, and characterised based on data such as the contaminant load model. However 'contaminant' hotspots do not specify which contaminants are of concern.

A study by Park et al (2009) identified that modellers utilising the same geographical information interpreted land use definitions differently, and therefore the runoff water quality characterisation was different. There is an inherent risk of variability between interpretations of land use which is difficult to address in detail at a catchment scale. By identifying this risk, tools can be developed to support decision-making which recognise the importance of knowing more about the specific receiving environment and what the contaminants of concern actually are.

Additional matters to consider include; is the site in the upper or lower catchment? What is the quality of the receiving environment? If the site is in the lower part of an industrial catchment, should they be allowed to discharge a higher contaminant loading than a similar site in the upper catchment who is discharging into cleaner water? Research into information gaps should precede legislation, so that regulatory functions can rely on up to date information, however this is often not the case. New legislation with improved policies and objectives, and a more dynamic approach to assessing the impact of a site on the receiving environment, may actually help define different minimum thresholds for engineering solutions and become the driving force for technological advancements (Barbosa et al, 2012).

Environmental decision making is difficult at the best of times, due to the intricacies of environment systems and the interests of multiple stakeholders (Mouri et al., 2012). How then as regulators can we take into consideration the needs of these stakeholders whilst implementing controls that result in improved environmental outcomes within these limitations?

4.2.1 THE 'NORM': ITA-CASE STUDIES

The following case studies are included to provide an example of how discharge limits or contaminant profiling has been undertaken in some real examples. The names of the organisations have been excluded to ensure anonymity. These sites are considered to be 'ahead of the game' however it should become clear there is still some way to go.

4.2.1.1 SITE A

Site A is a foundry located within a predominantly industrial/commercial catchment in central/south Auckland. Under Schedule 3, Site A is classified as 'processing of metals' and is therefore high risk. The site was originally granted ITA consent in 2006. The original consent specified the use of Enviropods within catchpits on site as the primary structural control, to address the main contaminant of concern which was metal fines. Additional structural and procedural controls (including an EMP) were also implemented at the site.

Due to fundamental changes to the site processes, the consent expired in 2011. A new consent application was lodged in June 2011 which specified that the scale of the operation had reduced and changes to processes on site had been made. The new application did not propose any change to the controls on site that were previously consented.

The application included results from the stormwater monitoring undertaken in 2006. Under section 92 of the Act, further sampling was requested to demonstrate the effect that the implemented controls had had with regards to the discharges from the operation.

Sample results indicated a downward trend in all process related contaminants within the discharge. Zinc was still elevated due to the presence of old roofing material which had been previously been identified as an issue and was to continue to be addressed through the ongoing implementation of a roof replacement programme. It is recognised that discharges from roofed areas are only considered under the ITA provision in the event that contaminants from the processes are dispersed on and subsequently discharged via roof runoff to stormwater. By undertaking treatment of the roof, Site A have adopted a stewardship approach to managing the discharges from their site beyond regulatory requirements.

As no data regarding contaminant levels in the receiving environment was readily available, results were compared to 95% ANZECC freshwater guidelines within the stormwater monitoring programme. These results were used to inform the consent decision report and the subsequent application of water quality discharge limits from this site. The applicant discussed the sampling results in the wider context of the catchment and specifically the receiving environment, and the likely effect of their own and cumulative effects on the receiving environment. The receiving environment is ultimately the Panmure Basin, however the site initially discharges to reticulation and then an urban stormwater pond.

No discharge limits were specifically provided within the consent conditions, rather referring to the triggers identified within the stormwater monitoring programme report. The focus has moved from relying on the ANZECC guidelines to triggers which have been defined based on actual sampling results of discharge and receiving environment quality.

In summary, stormwater sampling through the consent process indicates that the previously consented controls had at least shown some improvement to the discharge quality. Because there was no established baseline for the receiving environment confirmation of whether the quality of the discharge is better or worse than the receiving environment water quality was unable to be substantiated. The discharge results only considered the actual discharge from the site and did not consider the receiving environment or dilution factor.

The nature of the contaminants of concern could lead to cumulative effects if they are not appropriately avoided, remedied or mitigated. Additionally specific conditions of consent will require ongoing stormwater monitoring and the provision of trigger levels that will require investigation should they be exceeded. In this case because of the nature of the surrounding catchment, improvements to this site alone are not likely to improve the water quality of the receiving environment.

4.2.1.2 SITE B

Site B stores and distributes inorganic fertilisers and is classified as high risk in Schedule 3. The site is located within predominantly rural land use in south Auckland and discharges to an ephemeral tributary before entering the Manukau harbour.

An ITA consent was originally granted in 2006. In 2010 the consent holder requested a variation to the consent conditions, with particular regard to the requirements of the stormwater monitoring programme. A variation was granted in 2012 after significant discussion between the consent holder and regulator. At the time of granting the original consent, no monitoring of the receiving environment was undertaken and assumptions had been made regarding the water quality within the catchment. It was assumed that due to the rural land use, the catchment would be nutrient enriched. The only water quality data provided was from an Allocation Management Plan, published in 1990, 16 years prior to consent application.

Within the original consent, the primary control on site was a wetland which included a pre-treatment chamber. In addition, the site implemented procedural controls and was required to undertake ongoing monitoring of the discharge. The original consent provided trigger values within the conditions which were developed from a variety of guidelines (CCREM, ANZECC and USEPA).

These trigger levels were close to the ANZECC 95% protection guidelines and were deemed to be unachievable by the site, which was the basis for their section 127 application to vary conditions. In particular, they sought to simplify the monitoring requirements and adjust the trigger values.

Rather than providing only trigger levels, a different approach was applied to the consent conditions whereby target and trigger values were utilised. Target values are the desired state (resulting from site improvements over time) however, in the event of exceeding the trigger levels an investigation is required to determine why the exceedences had occurred and to determine what further actions were required.

Defining appropriate triggers was a time consuming process. Stormwater monitoring had been undertaken (in accordance with consent conditions) since 2006 and these results were used to define the new trigger/target values.

No monitoring of the receiving environment was undertaken and as such, values were based only on the stormwater discharge monitoring results. A stormwater monitoring report summarising results from the site had been provided annually as part of the conditions of consent and had previously identified maintenance issues within the wetland which had resulted in high levels of some contaminants. These issues had been remedied and as such it was expected that the new target and trigger values would be based on more recent results.

The consent holder initially requested triggers that were higher than the maximum discharge values from the site, thereby effectively ensuring they would never breach the trigger levels. For example, the discharge concentration of Dissolved Reactive Phosphorous (DRP) had been in the range of 0.85- 9.1 mg/L. The consent holder requested a trigger value of 15 mg/L DRP based on the view that this was more appropriate for immediate receiving environment. At this point, no assessment of the receiving environment had been undertaken and this view was based on the previously discussed assumptions about rural catchments and nutrient enrichment. Effectively the attitude was that as the stream was already degraded, it was appropriate to discharge high contaminants into it. Comments from the stormwater monitoring report suggested that the proposed high trigger levels were acceptable as a *"site inspection confirmed no visual evidence of adverse ecological effects from discharge"*.

Subsequently, Council officers did not share this view, and provided an alternative approach to determining both targets and trigger levels. Table 1 provides an example of the decision making and justification for the application of the DRP trigger and target

values for this site. Undertaking an assessment of the actual receiving environment may have provided a clearer process to determining appropriate values.

Table1: Original justification for Councils 'unachievable' discharge levels. ....

Parameter Dissolved Reactive Phosphorus (mg/L)	**Target Value**: 0.1 **Trigger value**: 0.5
Reasoning behind target and trigger values Consent XXXXX sets a trigger value of 0.01 mg/L this comes from TP 234 and is similar to the ANZECC guidelines trigger value, using the average filterable reactive phosphate levels for upland and lowland rivers (0.095 mg/L). Multiplying this by 5 would give a proposed target value of 0.05 mg/L, however the ARC recognise that based on monitoring results, this is unlikely to be achieved. Therefore, based on the data for soluble reactive phosphorus in ARC Rivers and Streams Water Quality Annual Report 2007, a target value of 0.1 mg/L is considered achievable. Staying in line with the ammoniacal nitrogen, a trigger value of 5 times this (0.1*5 =0 .5 mg/L) is thought to be reasonable, especially when monitoring results show the site has achieved lower than this.	

The inclusion of target and trigger levels within the stormwater monitoring report, rather than consent conditions, relies on accurate reporting by the consent holder. The inclusion of these levels in the conditions could lead to the need to vary consent conditions based on improved discharge quality and the desire to see continual improvement in this regard, based on improved site controls. Further to this, it is hoped that improved water quality would be seen in the receiving environment, and as such target levels could be amended to reflect this.

4.2.1.3 SITE C

Site C is a high risk metal manufacturing site, located in rural south Auckland and discharging to several streams before entering the Manukau Harbour. The site holds two existing stormwater consents which address discharge of stormwater and treated process water from the site. Each of the consents address two distinct catchments, each serviced by their own treatment systems. Due to the scale of the activity, the primary controls are several treatment devices, including water reuse. A new consent is being sought for areas created since the previous consents were granted. The area subject to consent is currently permitted (under rule 5.5.16) as the application was made within the Schedule 3 timeframes; however the consent holder wanted to ensure that all issues are addressed prior to the timeframes expiring.

The existing consents require sampling of discharges from the treatment devices as part of the stormwater monitoring programme. The site discharges directly to both the freshwater and marine environment, adding to the complexity of assessing the potential and actual effects arising from the sites activities. Additional monitoring (ecology and water quality) has been undertaken that allows for an assessment of the receiving environment up and downstream of the site. Site C has one of the most comprehensive stormwater monitoring programmes of all consented ITA sites.

The results from this comprehensive monitoring have been submitted as part of the new consent application. These results will be utilised to set appropriate target and trigger levels for the discharges arising from the activity areas subject to this consent.

Effectively the ITA consent for Site C covers most of a catchment and as such could be used as example of what catchment works/monitoring should be undertaken. Site C is an excellent example of implementation of appropriate structural and procedural controls and having a proactive attitude. In addition to required monitoring, the site has

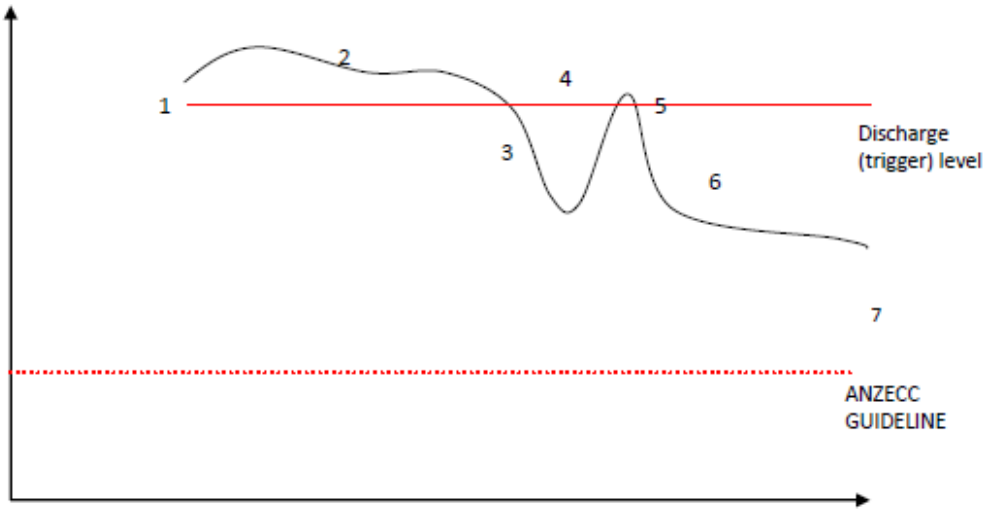
previously undertaken and proposes further planting and fencing of streams. The consent holder also undertakes ongoing consultation with stakeholders.

In summary, while the trigger and target values have not yet been set, as this consent is still being processed, it is worthwhile to recognise the value of this proactive approach. Comprehensive monitoring, of the receiving environment (freshwater and marine, ecological and water quality) as well as of the discharge, means that when conditions regarding triggers and targets are drafted, these will be based on actual information that is relevant to the site at a catchment and local scale. In theory, this will result in ongoing environmental improvement to the receiving environment.

5 SOMETHING BETTER, SOMETHING MORE, SOMETHING NEW

In section 2.1.2 the ITA regulatory framework and the consent process as it currently imposed is set out. The case studies demonstrate that environmental improvements can be made within the regulatory framework, despite the limitations identified through this paper. These case studies are simply indicative of three sites that are willing to, or have been encouraged to, improve their onsite processes and monitoring programmes. Typically this has occurred after some form of consent has been issued. This 'improved process' is represented in figure 3 and discussed below.

Figure 3: Annotated representation of sampling through recent consent process



Currently, some sites, as shown in the case studies A and B, apply for consent with a level of sampling data for the discharges from their site (1). Some of the data is old, or hasn't accounted for all parameters, or indicate an issue, so further data collected (2). A discussion of the results compares results to ANZECC within the application documents and proposes trigger and potential target levels based on results (4). Controls imposed or continued through conditions of consent improve the quality of discharges from the site (3). An incident (for example from lack of maintenance or an incident on site) exceeds the agreed trigger levels instigating an (5). Following the investigation and reporting further measures are taken and a further increase in discharge quality occurs (6). On-going reporting discusses 'significance of effects' against ANZECC but provides no measure of the receiving environment upon which to compare these to (7).

The challenges associated with the current process have been identified in this paper. Discussion will now move to the wider issues, in the context of setting discharge limits and obtaining relevant data to support decision making in the future. The importance of

the social and economic factors that will influence the approach required to obtain the objective of improved environmental quality should also be recognised.

In order to improve the overall process from the outset, there needs to be a better understanding of where we are and where we are going, the potential roadblocks along the way and the methods available to overcome them. In the words of Janez Potočnik (European Commissioner for Environment), "we need something better, something more and something new" for water management (Potočnik, 2012).

5.1 WE'RE ALL IN THIS TOGETHER: MECHANISMS FOR CHANGE

For the most part, regulators are already dealing with degraded receiving environments (Auckland Council, 8/3/2013; Morton, 2012; Neale, 2012) when evaluating the receiving environment in Auckland. Urban waterways are typically viewed as holding little to no value, and as such attract little incentive for protection. Open urban waterways are often perceived as an extension of a discharge system, much like an 'open pipe', rather than the environment itself. Unfortunately,'*...our ability to perceive quality in nature, begins, as in art, with the pretty'* (Leopold, 1949) and 'pretty' is a relative concept.

It is often easier to react to an incident or discharge and take retrospective action, than to recognise that nature is an asset which may not be abused. In order to improve environmental quality before it is degraded, or to evoke a sense of value for an undesirable or unprofitable object or system is not an easy task, particularly when other factors/elements (i.e. economics) come into play. In order to bring about a positive change, and to change perceptions regarding what is 'pretty' or valuable in an environmental context, a change in mindset for those that rely on these systems to reticulate away stormwater is required.

This section identifies what are considered to be the key factors to drive change.

5.1.1 MINDSET

Current legislation and industry mindset has bought us to an attitude of degradation of water quality as being acceptable, or that improvements to that particular environment are not required as long as any discharges do not make it worse. Clark Kerr stated that 'status quo is the only solution that cannot be vetoed', meaning that status quo cannot simply be decided against; action must be taken if it is to change.

A change in mindset can occur at a small scale (one business) to a large scale (catchment, multinational organisations) and include numerous stakeholders. What is currently deemed to be acceptable can be changed through a number of mechanisms. An event can trigger a reaction among a particular stakeholder group that is able to influence policy, new information can inform regulation, an education programme can raise awareness of an issue that motivates a group or group to bring about change.

In short, a change of mindset whilst required is by itself, not enough. Netherwood (in Welford, 1998) states that a fundamental shift in the ethics and values of an organisation is required in any system that adopts a voluntary approach to setting key measures of environmental performance (i.e. discharge limits). Ultimately the mindset of the stakeholder is to make decisions based on what is right for their business in terms of financial and market position and as such 'green washing' is seen as a legitimate business technique. Greenwashing can be defined as when an organisation promotes green-based environmental initiatives or images but actually operates in a way that is damaging to the environment or in an opposite manner to the goal of the announced initiatives.

5.1.2 STAKEHOLDERS

Despite ITA consents being limited to individual sites, often the competing interests of multiple stakeholders must be considered when determining discharge limits. This may be limited to the operator 'parent company', the local level executive level and landowner. More often than not, the number of stakeholders is likely to extend to a catchment scale where the operator, his neighbours, the local community and the regulator must be aware of the limitations and opportunities associated with any given site. This relies on an inherent need to ensure adequate education is made available across all parties to bring about an ethical and mindset change.

But what can influence this change? Corporate mind shifts in terms of voluntary Environmental Management Systems (EMS) was briefly touched on in section 5.1.1 of this paper. Some companies will do this to gain position in market, to an extent where they will predict future legislation to place them ahead of the game. However, this alone as will be demonstrated, has numerous shortcomings (Welsford, 1998) and ultimately other mechanisms are required.

Operators will change based on the need to be compliant with regulations, but ultimately it is intended to have buy-in from all stakeholders and for them to adopt a philosophy of continual environmental improvement (Brodie, et al. 2012).

The recently released Ministry for the Environment document 'Freshwater Reform 2013 and Beyond' (21013) identifies that stakeholder and general public engagement is essential to developing national objectives for water quality. Central to the New Zealand context is the need for iwi involvement to protect the mauri or life force of waterways.

5.1.3 MARKETS

An indirect stakeholder is the consumer who has the capacity to utilise their purchasing power and ethical choice at a local and industry level to bring about change. The financial implications of operator environmental choices can be measured against the cost of compliance, cost of losing market position (point of difference to consumer) or more directly in paying fines for non compliance with regulations. The company might adopt an environmental programme to benefit their position in the market; however environmental issues are widely defined and too important to be regarded merely as a strategic tool to gaining short term competitive advantage (Welford, 1995 in Welford 1998). An ethical and long term approach is required.

Applying the polluter pays principle, the polluter should pay for preventing and eliminating environmental nuisance. In the absence of a proactive approach, enforcement tools can be used but that does not necessarily result in environmental improvement at a realistic scale. Until recently fines for non compliance with environmental regulations were budgeted for as a cost of doing business, rather than investing in the controls and technology that would prevent environmental crimes. Such a position can make sense from a purely financial perspective providing it does not impact upon the company's image.

5.1.4 EDUCATION

'Education of citizens is necessary as protection of environment is a matter for everyone' (official journal of European communities: c112 20.12.73, in Welford 1998)

The use of generic stormwater treatment options and the management of stormwater is a recognised practice, particularly in Auckland where a regulatory presence over these matters has been in effect for some time. However, there is less awareness around the

requirements for ITA sites to manage the variety of contaminants associated with the site activities.

Improving the availability and dissemination of information is fundamental to securing ITA compliance and thus improved environmental outcomes. How though, are people expected to improve their knowledge beyond the status quo, without a way of learning more and a reason to learn more (i.e. improved regulatory controls).

The former Auckland Regional Council Integrated Pollution Prevention Programme (IP3). was a mechanism to assess sites in a proactive manner and provide site management information and details on how to begin the consent process where required. The programme ran in conjunction with identified catchment issues such as a high number of incident reports, or as industry targeted projects (Timber treatment yards/Automotive Dismantlers).

This programme has not actively been pursued in the Auckland Council, but it is a recognised means of engaging with industry in a way to not only seek compliance with specific rules, but as an educational, pollution profile raising tool. Auckland Council is currently revisiting all industry and stormwater training programmes to better understand the needs of the different audiences that require support, resources or training around stormwater and environmental matters. Addressing specific ITA, stormwater requirements within a broader industry scope could provide better gains and cost savings.

However, McKenzie-Mohr & Smith (1999) list numerous studies and examples that demonstrate how enhancing knowledge and changing attitudes alone will not impact upon sustainable behaviour. A clear direction in terms of the regulatory expectations must align with improvements to education and general awareness.

5.1.5 REGULATION

Regulation provides a means to enforce environmental and economic considerations onto an organisation. A threshold against which environmental compliance can be measured and reported on can be provided, meaning that failure to comply may affect consumer perception and ultimately market position. In this regard, regulation acts to provide more than just an aim to meeting environmental improvement, it can also foster sustainable behaviour within companies and inspire change.

Having the ability to assess and consider discharges in the context of the receiving environment is the ultimate mechanism to enable improved environmental outcomes. This again comes back to the current lack of regulatory requirement to request this 'additional' information.

The application of guidelines such as ANZECC are useful, but better information at a local and catchment scale is necessary to provide sufficient data to support the regulator and the ITA site to make meaningful decisions. It is in the best interests of both the regulator and industry operators, as well as identified stakeholders, to apply real and achievable target and trigger discharge limits based on real information.

The setting of discharge limits based on real information allows both the operator and regulator to quantify environmental performance which influences the ability to report and influence future decisions resulting in improved information and environmental outcomes. With that said, imposing discharge limits at the front end of the consent process is worthless if the regulatory function is not followed through in terms of compliance with them and the conditions of consent.

In addition to the scientific approach, a programme that engages stakeholders resulting in behaviour and perception change is required. The above section explored what can be seen as being required, in terms of fostering positive, environmentally focussed behaviour, and what potential options are available to engage with those who can make a difference.

5.2 WHATS IN THE PIPELINE?

It has been shown in section 4 that improvement in site practices and the imposing of discharge limits is possible within the current regulatory framework. However, the consent process alone cannot be the only mechanism to bring about improved environmental outcome.

5.2.1 REGULATION FRAMEWORK/TOOLS

From a purely consenting point of view, more information about the wider environment included in consent applications, and included in subsequent reporting and comparison would lead to a 'better' understanding of how the site will impact that specific receiving environment. It is much more appropriate (from an environmental outcomes point of view) to start with more stringent limits, which can be softened if sampling results support this.

For example, activities identified as permitted activities do not require consent until there is evidence that they breach the permitted activity rules. For this reason they do not fit within the regulatory framework in the same way as consented sites. As such, there needs to be a move from the consent only approach to a wider reaching approach to get 'better' or improved environmental outcomes.

A Treatment Train Tool is under development at Auckland Council and with improving scientific knowledge, will be able to provide more certainty around device efficiency and appropriateness in relation to treatment of contaminants of concern. This type of tool is anticipated to provide valuable direction for both regulators and site developers/operators.

The newly released ACDUP recognises that *"freshwater quality is affected by the relative proportion of pipe discharges versus diffuse discharges as this distinction influences the type and level of contaminant containment and treatment possible before the discharges enter a Freshwater system".*

Until the NPS: FW is released, interim water quality guidelines (based on the Macroinvertebrate Community Index (MCI)) will be utilised to ensure the objectives of the ACDUP are strived for. Specifically to this paper, the Water Quality Objectives (3.1.3.17.1 within the Auckland-wide objectives and policies) of the ACDUP are as follows:

1. Areas of high freshwater quality are protected from degradation
2. Areas of degraded water quality are protected from further degradation and they are enhanced where practicable

In relation to point 2, the 2008 Long Bay Structure Plan Environment Court decision provides direction, whereby the court accepted that current poor stream health associated with poor stream management is not a valid baseline against which to determine environmental effects.

The above objectives will be a move in the right direction and an improvement in attitude towards degraded waterbodies in particular.

In order to achieve the water quality objectives of the ACDUP, a paradigm shift within the attitude of ITA operators and regulators is required, to recognise the potential value of currently degraded water bodies (Zgheib et al, 2012).

The 'Freshwater Reform 2013 and Beyond' discussion document was released immediately prior to this paper being completed and is considered to be highly relevant to these discussions. Given the time of its release it was not possible to fully consider the content of this document in relation to this paper.

5.2.2 CATCHMENT APPROACH

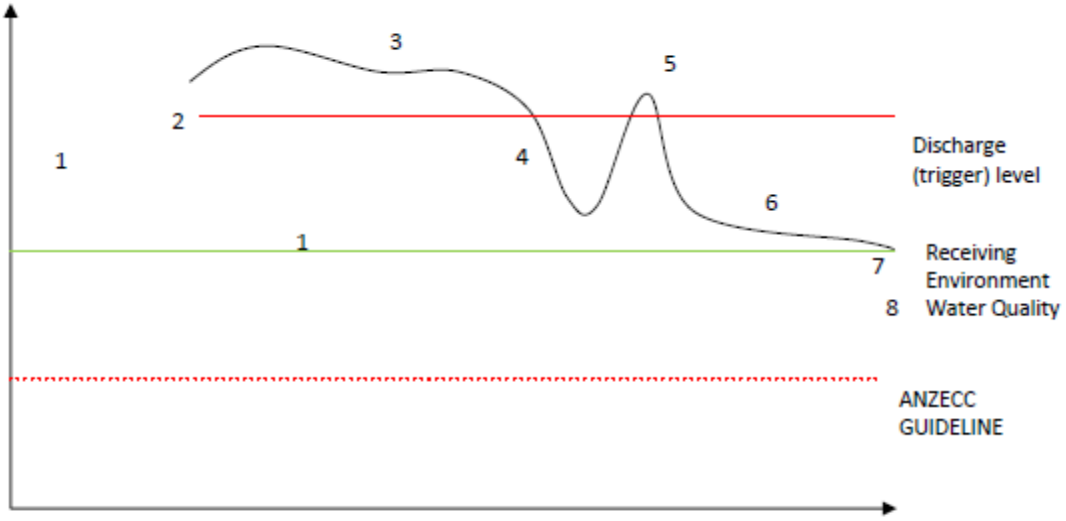
Adopting a catchment approach to assessing receiving environments and site discharges will better address the cumulative effects within catchments. This will also enable a more complete assessment of contaminant hotspots, which can be targeted for prioritised treatment as required.

Collaboration between stakeholders, including most importantly industry groups and the regulator, to work together objectively to improve knowledge will result in environmental improvement. In addition to 'real' information as above, it would be productive to see improved stakeholder engagement, particularly with industry working groups, regulatory and community groups. Use of environmental report cards (such as those currently produced by the Research, Investigation and Monitoring Unit of Auckland Council for Local Boards) can improve awareness and engagement and assist in the mindset shift required to get to better outcomes.

5.3 PIPEDREAMS

If time and budget resources were unlimited and it was possible to approach discharge limits from a solely environmental improvement view point the process shown in Figure 4 below would be desirable.

Figure 4: Annotated representation of sampling through 'perfect' consent process



In our preferred scenario there is readily available data on the receiving environment(1a). The applicant applies (or in pre-application) undertakes sampling of both the discharges and receiving environment (up and downstream) (1b) (2). And uses this information to propose trigger and target levels (1) (3) as well as to inform the decision on the controls required [spreadsheet treatment train approach]. Controls implemented through condition of consent lead to decline in contaminant discharges (4) towards the levels found upstream of the site. An incident (for

example from lack of maintenance or an incident on site) exceeds the agreed trigger levels instigating an (5). Following the investigation and reporting further measures are taken and a further increase in discharge quality occurs (6). Ongoing reporting discusses 'significance of effects' against the RE levels(7) and provides a measure of the receiving environment upon which to compare these to (8). A further discussion regarding the receiving environment baseline and comparison with ANZECC is also required to cover already heavily contaminated receiving environments. In that scenario such a discussion and comparison with ANZECC will provide an outcome based on what the degraded receiving environment should be at, and provide a fairer assessment between the different receiving environments for sites across the region.

In this scenario (figure 4) it is possible to accurately assess the receiving environment as well as the quality of discharge from the site and as such, regulators can make informed decisions about the scale of effects.

6 CONCLUDING STATEMENT

The current regulatory framework and the limitations that exist have been discussed throughout this paper. in addition, the type of information available to us as regulators, to effectively assess and appreciate the impact of varying stormwater and ITA associated discharges within different catchments has been addressed. Due to the variety of contaminants likely to arise from ITA discharges and the inherent difference in ecosystem quality between catchments, it is increasingly difficult to apply a one size fits all approach with respect to limits to gain improved and measurable environmental outcomes.

Moving forward there needs to be a change in focus to numerical discharge limits, which will be supported at a national level through the NPS: FW. Further to this, a mindset change across multiple stakeholders is required, to recognise the value of the receiving environment and to advance technologies to provide better and more varied treatment efficiencies. This can be achieved in part through education and engagement but will ultimately rely on regulation and industry guides /groups to drive the need to learn more.

We want to be in a situation where headlines questioning our 100% pure brand no longer make international news. We would like to be able to have national river quality reports that are more positive than negative about the state of the environment.

Research should lead the way and 'best practice' should be continually evolving to drive ever improving environmental outcomes. Regulators, and businesses need to be able to effectively chase up-to-date technologies and information to ensure that we are at the forefront of environmental initiatives.

In terms of treatment guidelines, we know that one size does not fit all and that the BPO approach is based on limited information and 'accepted' practice. We would like to be able to have sufficient information that we can assess sites against, to understand the actual environmental effects of their site discharges in order to provide certainty to the regulator, the operator and ultimately the receiving environment.

Collaboration between regulatory, industry and treatment device providers is fundamental to improving the way in which we assess sites and provide for better environmental outcomes.

'In the end, we will protect only what we love. We will love only what we understand. We will understand only what we are taught.' Baba Dioum

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DISCLAIMER

The views expressed in this paper are those of the authors and do not represent the policy or position of the Auckland Council.

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