

A ROAD MAP FOR SMART OUTCOMES IN STORMWATER MANAGEMENT

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ABSTRACT

Historically Hastings District Council held permits for discharging stormwater from their reticulated and open channel network to carry stormwater from the built environment into receiving waters.

To support the comprehensive discharge permits (as is now expected from Regional Councils) and given the absence of detailed and robust local stormwater data, a 'road map' was developed to form a catchment based stormwater management regime.

The 'road map' approach facilitates improvements to the overall management and effects of stormwater discharges. It enables the 'connectiveness' of the urban and rural stormwater that ultimately discharges to the main receiving environment, the Karamu Stream, to be properly considered.

The 'road map' complements existing statutory and non-statutory mechanisms and enables comprehensive stormwater discharge information to be obtained, enabling more robust responses to be made on an informed and rational basis, including better consent conditions.

The feedback loop and effectiveness of the 'road map' will be documented in the Catchment Management Plan(s) and Annual Monitoring Report.

The road map approach is a 'pathway' towards integrated management. It is a collaborative and adaptive management approach based on outcomes derived from monitoring results and responses, comprehensive conditions and catchment management plan outcomes.

KEYWORDS

Road map, integrated management, adaptive management, catchment management plan, outcomes

PRESENTER PROFILE

Grant is a Project Manager and Senior Planner for MWH, based in Hawke's Bay. With over 15 years experience, Grant has worked on a vast range of planning, resource management and engineering projects, involving a myriad of disciplines.

As a Resource Management Planner, Grant has to constantly balance the needs and desires of many environmental and engineering disciplines, while steering them towards great environmental outcomes.

1 INTRODUCTION

The Hastings District Council ('the Council') has a broad vision for the management of stormwater generated from urban catchments, and has adopted a 'road map' approach among other initiatives, which is aimed to protect and enhance (where appropriate) inland waterways.

The Council is aware of the 'connectiveness' of urban stormwater to the Karamu Stream system, and sees the 'road map' approach as a means to improve the overall management of stormwater discharges from the urban catchments of Hastings and Havelock North. The 'road map' is an adaptive management process to align a toolbox of statutory and non statutory measures that can be used to sustainably manage the discharge of stormwater from the urban catchments of Hastings and Havelock North.

The 'road map' is tied to the comprehensive discharge consent for stormwater that expires in 2022.

1.1 BACKGROUND

To plan for the future it is important to firstly understand the past. From the onset of approaching the complexity of obtaining comprehensive discharge consents for stormwater, an understanding of the past suite of permits and consents for discharging stormwater was required.

It was discovered fairly early on in the process, of reviewing previous permits and consents, that Council was never required by the Regional Council to keep detailed stormwater quality nor quantity records. As a result the Council has no comprehensive stormwater discharge information. When the 'renewal' process started for the comprehensive discharge consent the Council was not in a position to provide any detailed stormwater quality and quantity data given the passing of time and the lack of any robust stormwater discharge information collected under previous permits and consents. Furthermore, for the resource consents granted under the Resource Management Act 1991 to date there has also been no specific detailed stormwater monitoring requirements. As such, the Council did not hold any detailed monitoring information to quantify the extent of effects on the environment associated with the discharge of stormwater from the urban catchments of Hastings and Havelock North.

The Regional Resource Management Plan for Hawke's Bay generally provides for the discharge of stormwater from any constructed open drainage system or piped stormwater drainage system as a Permitted Activity or a Controlled Activity. This infers that based on the information that was available at the time the Regional Resource Management Plan was developed it was considered that the actual and potential adverse effects on the environment from the discharge of stormwater from urban reticulated stormwater systems will be no more than minor. This may

be one of the reasons why specific monitoring programmes have not been required in the past.

Nonetheless, to support a comprehensive discharge consent, robust and validated information must be provided to the decision makers. This enables the decision makers to make informed and reasoned decisions on managing stormwater discharge activities.

2 ADAPTIVE MANAGEMENT

To achieve smart outcomes and to provide for the ever changing world of stormwater management an adaptive management process is required. A plethora of information is available that purports to define the meaning of 'adaptive management.' This paper is not about examining the intricate nature of its meaning, suffice to say that (Holling 1978) states that adaptive management, is a structured, iterative process of optimal decision making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring. Holling goes on to say that in this way, decision making simultaneously maximizes one or more resource objectives and, either passively or actively, accrues information needed to improve future management. Adaptive management is a tool which should be used not only to change a system, but also to learn about the system.

As adaptive management is based on a learning process, it improves long-term management outcomes. The challenge in using adaptive management lies in finding the correct balance between gaining knowledge to improve management in the future and achieving the best short-term outcome based on current knowledge.

Our 'road map' accepts the fact that the discharge of stormwater must proceed even if we do not have all the information we would like, or we are not sure what all the effects of discharging stormwater might be. It views adaptive management not only as a way to achieve objectives or smart outcomes, but also as a process for interrogating and probing to learn more about the resource or system being managed. Thus, learning is an inherent objective of adaptive management. As we learn more, we can adapt our policies and actions to improve management success and to be more responsive to future conditions (Johnston B.L. 1999).

3 LOCAL CONTEXT – HASTINGS DISTRICT

From a wider urban catchment perspective, the Council operated over a number of years under a suite of ad hoc stormwater permits, without any comprehensive or integrated discharge permit for stormwater within the urban catchments of Hastings and Havelock North. Further to this, there has been no statutory requirement or identified need to gather environmental information on the quality and quantity of stormwater discharges from these urban areas. However, this position has changed from both the viewpoint of the Regional Council and the Council. The new stormwater management approach is now being seen as an

opportunity to put in place a new regime of practical stormwater management in the urban areas of the District. The Council has developed and is implementing a 'road map' as the most efficient and effective tool to achieve the outcomes desired for managing urban stormwater discharges.

3.1 TOOL BOX OF REGULATORY AND NON-REGULATORY APPROACHES

A suite of regulatory and non-regulatory approaches have been used in the past and will continue to be used in the future to manage urban stormwater discharges. These include but are not limited to the following:

- Drainage Governance Agreement (to clarify roles and responsibilities);
- Adherence to the Hastings District Council Engineering Code of Practice for Subdivision and Land Development (revised 2010);
- Designing and constructing stormwater detention basins;
- Designing and constructing 'coherent' pipe and groundwater systems as an infiltration gallery (when conditions are suitable);
- Compliance with the Council's Water Services Bylaw (stormwater drainage);
- Development and ongoing review of the Stormwater Asset Management Plan;
- Protocols, policies and procedures for spill management;
- Treatment systems, for example sumps or primary treatment;
- Stormwater outlet maintenance and upgrades;
- New urban development and subdivision consent intervention;
- District Plan mechanisms, including hazardous substances and subdivision objectives, policies and rules.

These existing measures will be complimented by the 'road map' and will ensure that the Council continue to adopt a coherent and integrated response to urban stormwater management. The stormwater management 'journey' that the Council and community is on is constantly evolving and subject to wider public consultation processes. A key 'driver' behind the community uptake of stormwater management is set out in the Long Term Council Community Plan, which will positively impact on the long-term management of stormwater.

4 KEY PHASES TO ROAD MAP COMMITMENT

While a bundle of regulatory and non-regulatory methods exist they need to be aligned to ensure a coherent approach is adopted.

The 'road map' provides this coherent approach and is delivered by five key phases:

Phase One	Information Gathering
Phase Two	Ongoing Monitoring
Phase Three	Education for 'Sustainable Futures'
Phase Four	Catchment Management Plan
Phase Five	Ongoing Implementation, Monitoring, Feedback and Effectiveness

Some of the timelines for the implementation of the phases will overlap in the delivery of their key outputs.

The 'road map' provides a commitment by the Council in Phase One to conduct a series of stormwater investigations and assessments, to document Council processes and procedures on stormwater management, and to collate data to assess and prioritise industrial and trade premises classified as 'high risk' facilities in terms of potential adverse effects to the quality of stormwater and ultimately to the downstream receiving environments.

Developing and carrying out comprehensive stormwater monitoring in Phase Two will ensure a robust monitoring protocol and programme is established and agreed upon prior to conducting field work. Water quality, sediment and aquatic ecological monitoring will inform the Council and Regional Council on the state of the environment of the receiving environments for stormwater and to gauge over time the effects of stormwater discharges.

Under Phase Three education for 'sustainable futures', a focus on sustainable stormwater management will be developed and implemented to ensure community awareness is raised about sustainable stormwater management and stormwater flows ('kerb to stream to sea'). Further progress on implementing and reporting on the effectiveness of the Water Services Bylaw (stormwater drainage), the Engineering Code of Practice and the Hastings District Plan will occur. Reporting on these measures will demonstrate the level of achievement of integrated sustainable practices around planning, design and construction of stormwater infrastructure.

The preparation of the Catchment Management Plan under Phase Four will largely provide for and document the management initiatives, operational procedures and implementation methods used to manage stormwater discharges. The nature and scale of the discharge activities along with any criteria determined to be appropriate for preparing the Catchment Management Plan will be informed by a number of supporting technical reports that will be pulled together into a Catchment Management Study Issues and Options document. Overall, the Catchment Management Plan will generally assist the Council to achieve the conditions of consent.

Implementation, monitoring, feedback and effectiveness will be an ongoing commitment under Phase Five. This will be achieved through both regulatory and non-regulatory methods. These include the implementation of the conditions of consent, the stormwater monitoring programme, putting into action any stormwater education strategy and the ongoing implementation, among other mechanisms, of the Hastings District Plan, the Engineering Code of Practice and the Water Services Bylaw.

The feedback loop and 'road map' effectiveness will be documented in the Annual Compliance Monitoring Compliance Report and the Catchment Management Plan.

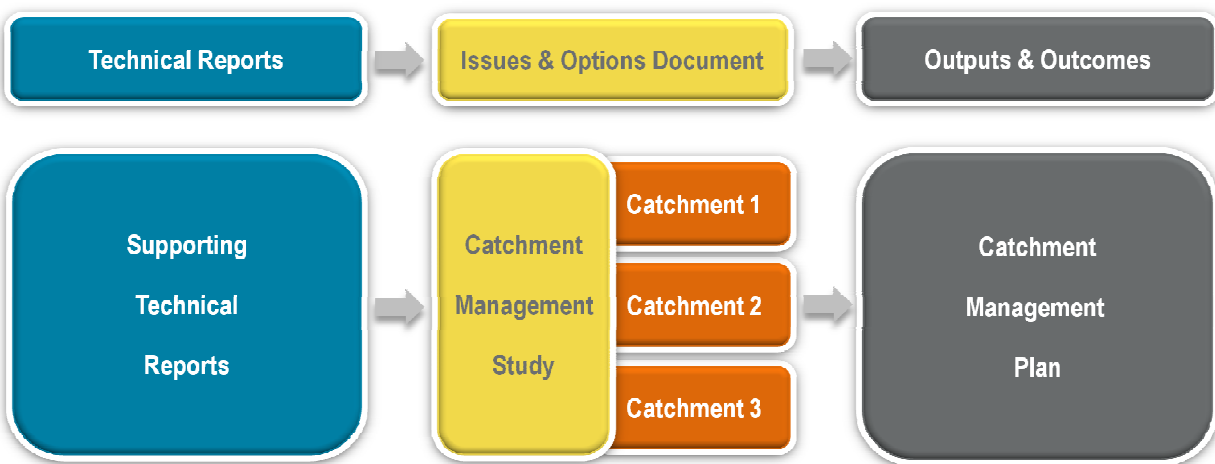
The 'road map' and adaptive management process is a long term strategic approach to urban stormwater management.

5 DEVELOPING THE CATCHMENT MANAGEMENT PLAN

One of the key steps of the 'road map' commitment is the development and implementation of the Catchment Management Plan. To ensure a collaborative approach to the development of the Catchment Management Plan the establishment of a Project Steering Group was agreed too. The main objective of this Group is to facilitate and spearhead the process for the development and implementation of the Catchment Management Plan.

An early outcome of the Group was an agreed high level 'structure' to prepare the Catchment Management Plan. The Catchment Management Plan will be developed under the following structure.

Figure 1: Broad approach to developing the Catchment Management Plan.



It shows the supporting technical reports feeding into an issues and options document called the Catchment Management Study and the outputs and recommendations of this Study document becoming the Catchment Management Plan.

A number of questions will need to be addressed during the development of the Catchment Management Plan: are multiple Catchment Management Plan required? Is one required for each of the catchments or catchment types or is it appropriate to produce one Catchment Management Plan for the consented area? Will the Catchment Management Plan be catchment focused or technical area focussed?

It is this learning and interrogating process that will adapt the actions to improve stormwater management to be more responsive to future conditions. In other words, a key element in the framing of the Catchment Management Plan outcomes

will be the development of the goals sought to be achieved by the Catchment Management Plan actions. These goals will be informed by the preceding investigation processes and supporting technical reports and the Catchment Management Study. The outcomes in the Catchment Management Plan will cover a range of activities including:

- Processes that are in place or need to be put in place, refined or documented for managing the effects of development activities.
- Practices for the improved or continued cultural management of stormwater discharges and its effects and receiving environments.
- Short, medium and long term monitoring activities that are required for monitoring the effects of the stormwater discharges.
- Maintenance activities that may be required or required to be modified for the operation of the stormwater system.
- Physical works that may be required to improve the efficiency, safety or environmental performance of the stormwater system.
- A programme for the implementation of the Catchment Management Plan outcomes. It is likely that many of the outcomes (especially in terms of processes) will be documented or actioned during the development of the Catchment Management Plan. It will be important that these changes are also picked up in the documentation of the CMP so that they can be monitored as well.

As Council moves through the Catchment Management Plan development process adaptive management will be crucial to converting new information and learning to providing improved responses.

6 MEASURING OUTCOMES - FEEDBACK AND EFFECTIVENESS

Measuring the effectiveness of the 'road map' hinges on two key outputs – the Annual Compliance Monitoring Report and the Catchment Management Plan.

The outcomes of the Annual Compliance Monitoring Report, in terms of the consent conditions, will inform the overall development of the Catchment Management Plan. The challenge will be to respond to the outcomes of annual compliance monitoring in conjunction with the development and the implementation of the Catchment Management Plan.

It is important to note that monitoring of stormwater effects generally can only be carried out late in the process. This is because stormwater effects tend to be both intermittent and cumulative. This means that some effects only occur as a result of an infrequent event (such as flood events) and cannot be continuously monitored. Other effects can only be monitored as long term trends, such as the effects on the aquatic ecology of receiving environments and are likely to be subject to other activities rather than just the urban stormwater discharges.

Based on the outcomes of annual compliance monitoring, a feedback loop would involve the following steps:

- i. The monitoring programme requires modification;
- ii. Additional or reduced monitoring is required;
- iii. The reporting requirements require modification; and
- iv. The Catchment Management Plan needs to be amended to include additional management initiatives and implementation methods.

The overall Catchment Management Plan programme, driven by the consent conditions is to have the Catchment Management Plan in place by 2017. Ongoing monitoring of the effectiveness of the Catchment Management Plan will form part of the ongoing and regular monitoring of the outcomes of the annual compliance monitoring results. This will be further validated by the Project Steering Group assigned to measures outcomes derived from those monitoring results and responses and the desired outcomes of the Catchment Management Plan.

7 CONCLUSIONS

Faced with a suite of ad hoc stormwater consents, and in the absence of useful local stormwater information, the Council adopted a 'road map' that sets out a commitment to ensure that a comprehensive and programmed approach to the management of urban stormwater is achieved into the future.

The 'road map' demonstrates what the Council intends to commit to over the short, medium and long term for urban stormwater management. This 'road map' underpinned by adaptive management, paves the way forward for information gathering, monitoring, reporting, education and management processes to form part of the ongoing and committed urban stormwater management programme.

Technical information and processes will be packaged into an Issues and Options Catchment Management Study. In turn the outputs and recommendation of the Catchment Management Study will become the Catchment Management Plan.

The 'road map' is a pathway towards integrated management. It is a collaborative and adaptive management approach based on smart outcomes derived from monitoring results and responses, comprehensive conditions and catchment management plan outcomes.

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