

REPUBLIC OF SOUTH AFRICA

**Water Quality Management  
Series**

**Operational Guideline  
U 1.6**

**Managing the Water Quality  
Effects of Settlements: -**

**GUIDELINES  
FOR  
LOCAL AUTHORITY  
STAFF**



Department of Water Affairs and Forestry

**SEPTEMBER 2001**

**Water Quality  
Management Series**

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**MANAGING THE WATER QUALITY EFFECTS OF SETTLEMENTS:-**

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## **DOCUMENT INDEX**

This document forms part of the Department of Water Affairs and Forestry's National Strategy for Managing the Water Quality Effects of Settlements. It represents one of the outputs of a project that was jointly funded by the Department of Water Affairs and Forestry and the Danish Government via their DANCED program.

The Department of Water Affairs and Forestry reports in this series are: -

### **Policy Documents**

Managing the Water Quality Effects of Settlements.

The National Strategy, Edition 1. Policy Document U 1.1

Managing the Water Quality Effects of Settlements

Considerations for the Sustainable Management of Pollution from Settlements.

Policy Document U 1.4

**Managing the Water Quality Effects of Settlements**

**The National Strategy. Edition 2, Policy Document U 1.3**

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How to implement the National Strategy.

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## PREFACE

Pollution from densely populated and poorly serviced settlements is perhaps one of South Africa's most *important*, but most *complex* water quality problems.

*Important*, because pollution in and from these settlements not only affects downstream users, but has its most significant impacts on the communities living in these settlements. Failing sanitation and waste removal systems create appalling living conditions in many settlements, and contribute to serious health problems in these communities. Pollution in and from these settlements is, therefore, not only a water quality issue, but has much wider implications for government's aims to provide a better life for all

*Complex*, because pollution in settlements is rooted in the socio-economic, political and institutional conditions in the settlement. The use, or misuse, of services together with the way in which the services are maintained by Local Authorities lies at the heart of the pollution problem in many settlements. This is further complicated by the legacy of South Africa's apartheid history. Solutions, therefore, lie in changing the way in which the services are supplied and used.

However, *sustainable* solutions to the problem lie not only in our ability to supply and use waste and sanitation services to best effect, but also in the longer-term capacity of local government to maintain these services. This is likely to be the biggest stumbling block to sustainable management of pollution from settlements. Local government in South Africa clearly has significant capacity problems, and misuse of services, for a variety of reasons, is endemic in many settlements across the country. More importantly, failing waste services contribute to poor living conditions, and hence to the misuse of the services. Non-payment for services also limits the capacity of the Local Authority to effectively maintain the services, which then leads to further failure of the services.

Strategies to manage pollution in settlements must take a broader view of both Local Authority capacity, and the socio-economic and political dynamics of the community in order to arrest this downward spiral. The Department of Water Affairs and Forestry, therefore, initiated a study of the links between pollution, community perceptions and local government capacity, to run in parallel with the Test Cases. A number of reports have been produced to support this study.

It is hoped that these reports provide compelling arguments to address this problem both by ensuring better planned and run services, but also by active intervention and assistance where there are clear and immediate threats to community health and the environment. This report forms part of this process.

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## **A SUMMARY OF THE STEPS YOU NEED TO TAKE**



### **STEP 1**

DO A PRELIMINARY PROBLEM ANALYSIS AND LIST ALL POTENTIAL POLLUTION PROBLEMS AND POSSIBLE CAUSES

### **STEP 2**

MEET WITH THE COMMUNITY AND REACH CONSENSUS ABOUT THE FACT THAT THERE IS A POLLUTION PROBLEM AND WHICH STAKEHOLDERS SHOULD BE INVOLVED.

### **STEP 3**

DETERMINE THE ROOT CAUSES OF POLLUTION BY ASKING THE QUESTION "WHY" AND THEN VERIFYING THE CAUSES.

### **STEP 4**

PREPARE A PROBLEM TREE BASED ON THE OUTCOME OF THE PROBLEM ANALYSIS WORKSHOP IN STEP 3

### **STEP 5**

IDENTIFY POSSIBLE SOLUTIONS TO THE ROOT CAUSES OF POLLUTION AND DEVELOP AN INTERVENTION PLAN. INCLUDE THIS PLAN IN YOUR WSDP OR IDP. YOU SHOULD ALSO IDENTIFY OUTSIDE SOURCES OF FUNDING IF NEEDED

# 1 INTRODUCTION

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## 1.1 BACKGROUND

The Department of Water Affairs and Forestry's (DWAF) National Strategy to Manage the Water Quality Effects of Settlements details the approaches towards managing pollution from densely populated and often under-served communities.

The National Strategy document :-

- ?? Describes the generic causes of pollution from settlements
- ?? Outlines the “costs” of this pollution in financial and economic terms, as well as social and environmental costs.
- ?? Describes the legislation that supports management actions to address the problem
- ?? Outlines the overall approaches towards for managing pollution from densely populated areas, and the roll out of the National Strategy, and
- ?? Briefly describes a process of trying to identify the underlying causes of pollution in such settlements, by using a “structured-facilitated” dialogue between the Local Authority, the service providers and the community

The National Strategy document therefore describes DWAFs philosophy of trying to identify and maintain a balance between :-

- ?? The sensitivity of the receiving water resources.
- ?? The amount of waste produced in terms of the size and density of a settlement.
- ?? The level and operation of services in a settlement.
- ?? Financial sustainability.

This document outlines in more detail the stepwise process that should be followed by local Authorities when implementing the “Structured-Facilitated” process to address pollution in their settlements. It is, however, critical that the reader is familiar with the [National Strategy document](#) before undertaking these steps.

## 1.2 OTHER SUPPORTING DOCUMENTATION

This Guide is not intended to be a detailed description of how to implement the structured-facilitated approach, but is simply intended to outline the steps Local Authority staff should take when addressing pollution from settlements. The Guide is therefore supported by more detailed “How To” Guidelines. These include: -

- ?? How to implement the National Strategy.  
[Options for Interventions. Operational Guideline U 1.2](#)  
(This document presents alternative options for addressing pollution problems)
- ?? [A Guide to Problem Analysis.](#)  
(This document provides a detailed guide on how to identify and solve the underlying causes of pollution in settlements. It also describes how to develop monitoring programs to assess the efficacy of interventions.)
- ?? [A Guide to Stakeholder Identification.](#)  
(This document provides a detailed guide on how to select stakeholders.)
- ?? [A Guide to holding workshops](#)  
(This document provides some advice on how to hold a workshop)
- ?? [Working Towards a Clean and Healthy Community](#)  
(This is an information booklet available in English, isiZulu, seSotho and Afrikaans, which helps stakeholders participate in a meaningful way.)

### **1.3 PURPOSE OF THIS GUIDE**

This guide has been compiled to assist Local Authority staff to address pollution from settlements. This forms one of the most important functions of the Local Authority, and eventually plans to address pollution in settlements must be included in the Water Services Development Plan, and/or into the Integrated Development Plan. This guide will therefore also contribute to formulating these plans.

This guide aims to provide these people with a simple step-by-step approach to determine water quality problems by using the structured-facilitated approach. It has been designed so that you can rapidly familiarise yourself with the process without the need to wade through detailed “How To” guides of how each step should be carried out.

### **1.4 WHO SHOULD READ THIS GUIDE**

This Guide is intended primarily for Local Authority staff who would like to address pollution from their settlements. The Local Authority is, however, not exclusively involved in solving the problem and water quality management staff from DWAF or the Catchment Management Agency or community members and other relevant stakeholders will need to be engaged by DWAF and become involved in the process. These stakeholders may also find the guide useful.

### **1.5 STRUCTURE OF THIS GUIDE**

The Guide has been structured to provide a brief overview of the steps that should be taken when trying to address the water quality impacts of settlements, specifically as they relate to the needs of Local Authority staff.

## 2 PLANNED INTERVENTIONS

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### 2.1 WHAT ARE PLANNED INTERVENTIONS?

The National Strategy promotes the pro-active management of pollution problems through planned interventions. These are deliberately planned and details are worked out to allow for phased implementation of practices to limit pollution from settlements. Planned approaches should tie in with other local government planning approaches as well as the plans of other levels of government, such as:

- ?? Local and Provincial Integrated Development Plans.
- ?? Local Authority Land Development Objectives.
- ?? Local Authority Storm Water Master Plans.
- ?? Local Authority Water Services Development Plans.
- ?? Provincial Environment Departments' General Waste Management Plans.
- ?? Catchment Management Strategies.
- ?? Other planning initiatives.

Please refer to [section 7.4 of the National Strategy Document](#) for more information on how DWAF will help support Planned Interventions in your area.

You may be able to access a "Funding Facility" to help you go through the process outlined in this report. This Facility will provide nominal funding to help you run the workshops, and or to appoint consultants to help you do this. This funding could also be used to print additional copies of some of the training materials provided on the CD.

However, this funding facility will also provide the links to other sources of funding that could be used to implement some of the interventions you decide on.

## 2.2 WHAT STEPS SHOULD YOU TAKE?

### NOTE

It is assumed that the Local Authority has recognised that there are pollution problems in the settlement and is prepared to address these.

### 2.2.1 Step 1: Organise a meeting among the Local Authority staff to do a preliminary problem analysis

#### *What should you do?*

You should organise a meeting to do a preliminary problem analysis as described in [A Guide to Problem Analysis](#). The result of this meeting should be a list of all the potential pollution problems and the possible causes, as the Local Authority staff perceive them. This is important so you can approach the community with some knowledge of what the causes of the pollution problems may be, including those problems that may be caused by the way in which you provide the services. This will help you build a basis of trust with the community from the outset.

You may also wish to involve the regional Department of Water Affairs and Forestry office or the Catchment Management Agency at this point so that they can provide you with assistance, and more information of the pollution problem.

#### **How do you do a preliminary problem analysis?**

You do not need to do a thorough problem identification and analysis at this point. A preliminary problem analysis merely assists you to get a sense of what the effects and symptoms are of pollution problems in your area. If desired, you may also do very basic surveying and sampling to confirm the severity of the problem.

A preliminary problem analysis can be done as follows:

- ?? Do a desktop study using maps, reports *et cetera* of the settlement to enhance your understanding of the pollution problem.
- ?? Consult with relevant people to gather more information.
- ?? If necessary, do sampling (have actual water samples tested) and surveying (use a set questionnaire to gather information).
- ?? Make site visits around the settlement to identify indicators and to unpack the causes of pollution.

Please refer to the [Guide to Problem Analysis](#) to help you.

#### *What additional tools would help you?*

Section 3 – [The Causes of Pollution from Settlements](#) in the National Strategy document can offer guidance in understanding and identifying the generic causes of pollution.

## 2.2.2 Step 2: Meet with the community to reach consensus that there is pollution problem and to undertake a stakeholder identification process

### *What should you do?*

After you have an indication of what may be the underlying causes of pollution, you should organise a workshop with the community. The [Guide to holding workshops](#) can help you arrange this. The result of this workshop should be agreement with the community that there is a problem, and which stakeholders should be involved in solving it.

The meeting with the community should involve the following:

- ?? Explain to the community that as their service provider you have identified certain pollution problems in the settlement and you are meeting with them to solve it with their help.
- ?? Explain what you think the causes of pollution may be (i.e. the results of your preliminary problem analysis in Step 1). Give the community opportunity to respond to your perception and to voice their own opinions on the causes.
- ?? Present the National Strategy to the community. The community needs to understand the basic approaches and should agree that it is an appropriate way of addressing the pollution problems. (You can use the presentation material on the CD).
- ?? Undertake a joint stakeholder identification process. The Stakeholder Interactions section in the [Guide to Stakeholder Identification](#) should help you here.
- ?? You need to determine the date and location for a workshop with all identified stakeholders. During this workshop all stakeholders will jointly be doing a formal problem analysis. Up until this workshop everyone involved will have time to reflect on the pollution situation in the settlement.

#### **How do you do Stakeholder Identification?**

- ?? Stakeholders within the community can include, for example, youth and women's groups.
- ?? You should include local councilors from the environmental portfolio and the affected community.
- ?? Include staff from the health, city engineers, parks and the treasury departments.
- ?? Stakeholders from other organisations, such as the DWAF Regional Water Quality Management officials should also be identified.
- ?? Categorise the stakeholders in terms of affected, involved or interested.
- ?? Explore the characteristics of the group, such as the status and structure of the group.
- ?? Identify the interests, motives and attitudes of each stakeholder group.
- ?? Illustrate relationships between interested, affected and involved parties.
- ?? Evaluate the potential of each group, for example what can they contribute or withhold.
- ?? Evaluate the implications for project planning if the group were left out.
- ?? Evaluate your information and choose stakeholders for the process.

(See the Guide to Stakeholder Identification)

### *What additional tools would help you?*

You should use the [Guide to Stakeholder Identification](#) to help you identify and understand the roles of the various stakeholders. The community documents [Working toward a clean and healthy community](#) in the local language will also help stakeholders understand the process you will follow and will allow more meaningful participation. You should leave copies of these with the community.

### 2.2.3 Step 3: Determine the root causes of pollution

#### *What should you do?*

A problem analysis is done in order to identify the root causes of the pollution problems. This helps you focus interventions on the underlying causes of pollution problems. The problem analysis has to be done in a workshop with all identified stakeholders using the structured-facilitated process outlined in the [Guide to Problem Analysis](#).

All stakeholders should be given opportunity to speak freely about the causes of pollution and all comments should be recorded. The result of the workshop will be a list of all the possible causes of pollution in the settlement. You should make sure that stakeholders have identified social, institutional and physical problems in each waste stream.

It is also a good idea to have this workshop facilitated by an outside person, so that you do not show any bias towards the social or institutional problems.

#### **How do you determine the root causes of pollution?**

- ?? The problems identified during your preliminary problem analysis will now need to be fleshed out in more detail. All stakeholders need to jointly identify and prioritise the main problems that are associated with each of the waste streams (sewage, sullage, stormwater and solid waste) so that all stakeholders are clear on what the effects of pollution problems in the settlement are.
- ?? Determine the root causes of pollution problems. You do this by repeatedly asking *Why did this happen?* in order to understand the chain of events that result in the specific symptom being observed. This way you will arrive at the root causes of the problem. You now need to determine whether the causes are physical, institutional or social because this will help you to identify the best possible solution to the identified problem, and will help you make sure you have identified all the possible causes.
- ?? Verify the symptoms and causes. The causes of pollution problems that were identified during stakeholder consultation need to be verified with evidence obtained through site visits, sampling and surveying. This will support the perceptions of the stakeholders and provide back-up data to support the need for interventions.

#### *What additional tools would help you?*

Use the [Guide to holding workshops](#) to help you run the workshop and to capture all the relevant information at the workshop.

You should familiarise yourself with [Section 3 – The causes of pollution from settlements](#) in the National Strategy document before holding the workshop.

Lastly, it is important that you are familiar with relevant sections of the [Guide to problem analysis](#), so that you can ask the right questions.

## 2.2.4 Step 4: Prepare a problem tree

### *What should you do?*

Problem trees provide a visual breakdown of problems into their symptoms and causes. Problem trees are very effective in creating awareness among stakeholders about the problem, how they and others contribute to it and how it effects their lives. This helps to create support for the interventions to solve the problems.

Problem trees are never “right” or “wrong”, as long as they address a water quality issue, and good problem trees simply allow stakeholders to have a common, well-informed understanding of the pollution problems in the settlement and how they are connected.

You should prepare the problem tree back at the office based on the outcome of the problem analysis workshop described in Step 3. Problem trees should be prepared for each waste stream.

You should also present the completed problem trees to the stakeholders during a workshop, to get their feedback on the cause and effect links. All the stakeholders should cooperate to add to and improve the problem trees until consensus is reached about what the problem trees portray.

### **How do you develop a problem tree?**

- ?? Identify all the pollution problems in the four waste streams. Use the information you have gathered from the workshop (in Step 3) to develop a problem tree.
- ?? Select one problem at a time for the analysis. This is not necessarily the main or most important problem. Rather this provides a starting point for building the tree. Write this statement on a different colour card.
- ?? Go through the cards that were compiled during Step 3 to establish the causes and effects of this particular problem. If necessary get additional information on the problem as soon as possible to complete the problem tree accurately.
- ?? Arrange the index cards on a convenient surface into cause and effect relationships around the focal problem.
- ?? As you do this, test the logical flow of the arrangement by doing the following:
  - ✍✍ Add cards if needed to complete the cause and effect logic. That is, if there is a gap in the logic you will need to explore what is causing the problem, or what the effects are.
  - ✍✍ Remove cards that are repetitive.
  - ✍✍ Rewrite cards to be more specific and accurate. Be sure the statements are meaningful.
- ?? Review the problem tree with all relevant stakeholders to ensure that they agree that the cause-effect relationships are valid.

### ***What additional tools would help you?***

The [problem tree](#) section of the Guide to Problem Analysis must be used to help you with this step.



## 2.2.5 Step 5: Identify possible solutions and develop an Intervention Plan and write this into your Water Services Development Plan, or Integrated Development Plan

### *What should you do?*

You should facilitate a workshop with stakeholders to identify appropriate solutions to the root causes of pollution. The result of this workshop should be the development of an Intervention Plan that all stakeholders agree to.

Interventions are a range of actions that will address (solve) the root physical, social and institutional causes of pollution as identified during the problem analysis and problem tree steps. The Intervention Plan should provide a plan for the most effective, least costly way to meet immediate and longer-term water quality objectives based on requirements to address the social, physical and institutional root causes identified.

An Intervention Plan also includes how you will finance the various options, who will do them, when will they be done, and how you will monitor that they have been effective. You will need to use this Intervention Plan to help secure funding to implement some of these interventions. You should also include your Intervention Plan into your Water Services Development Plan, and/or into your Integrated Development Plan. This will help you secure the funds from your Local Authority budget to implement your interventions.

If you applied for funding from the Funding Facility, your Intervention Plan should be submitted to the Facility so that they can identify suitable sources of funds to help you with implementation.

#### **How do you develop an Intervention Plan?**

- ?? Use the Problem tree as a basis to formulate actions that will solve the problems.
- ?? Aim your Interventions at the root causes on the problem tree, as well as at the physical repairs that are necessary.
- ?? Use the [Options for Interventions Guide](#) for identifying and developing a list of suitable alternatives.
- ?? Specify expected outcomes of the interventions and offer detailed plans in respect of each.
- ?? Develop implementation schedules, specific deliverables and the costs attached thereto.
- ?? Use the deliverables as a basis to develop your first set of Key Performance Indicators.

### *What additional tools would help you?*

You should use the [Identifying Appropriate Interventions and Monitoring](#) section of the problem analysis guide and the [Options for Interventions](#) report to help you develop your Intervention Plan.

[Section 6 – Financing Interventions](#) of the National Strategy Document will also help you identify suitable sources of financing.