Waste Water Risk Abatement Planning

By Akash Singh

WRC WWRAP Guideline

Wastewater is the FIRST barrier in a multi-barrier system of ensuring public- and environmental health

Key aspects of the approach

- Allows for a differentiation & management of risks at less advanced treatment works (financially constrained operations)
- Increases the control of excreta related infections where reclaimed water is reused

Key aspects of the approach

- Dependent on actual circumstances relevant to the specific wastewater treatment plant, within a specific catchment or drainage area
- Powerful tool to safely manage treatment and effluent disposal.
- Development (validity of **W2RAP)** dependent on reliable technical and accurate scientific information.

The primary objectives of a W2RAP

- To minimize contamination of the resource to which the treated effluent is returned
- To reduce or remove contamination through the treatment processes
- To prevent contamination during transport of wastewater, storage and disposal of sludge.

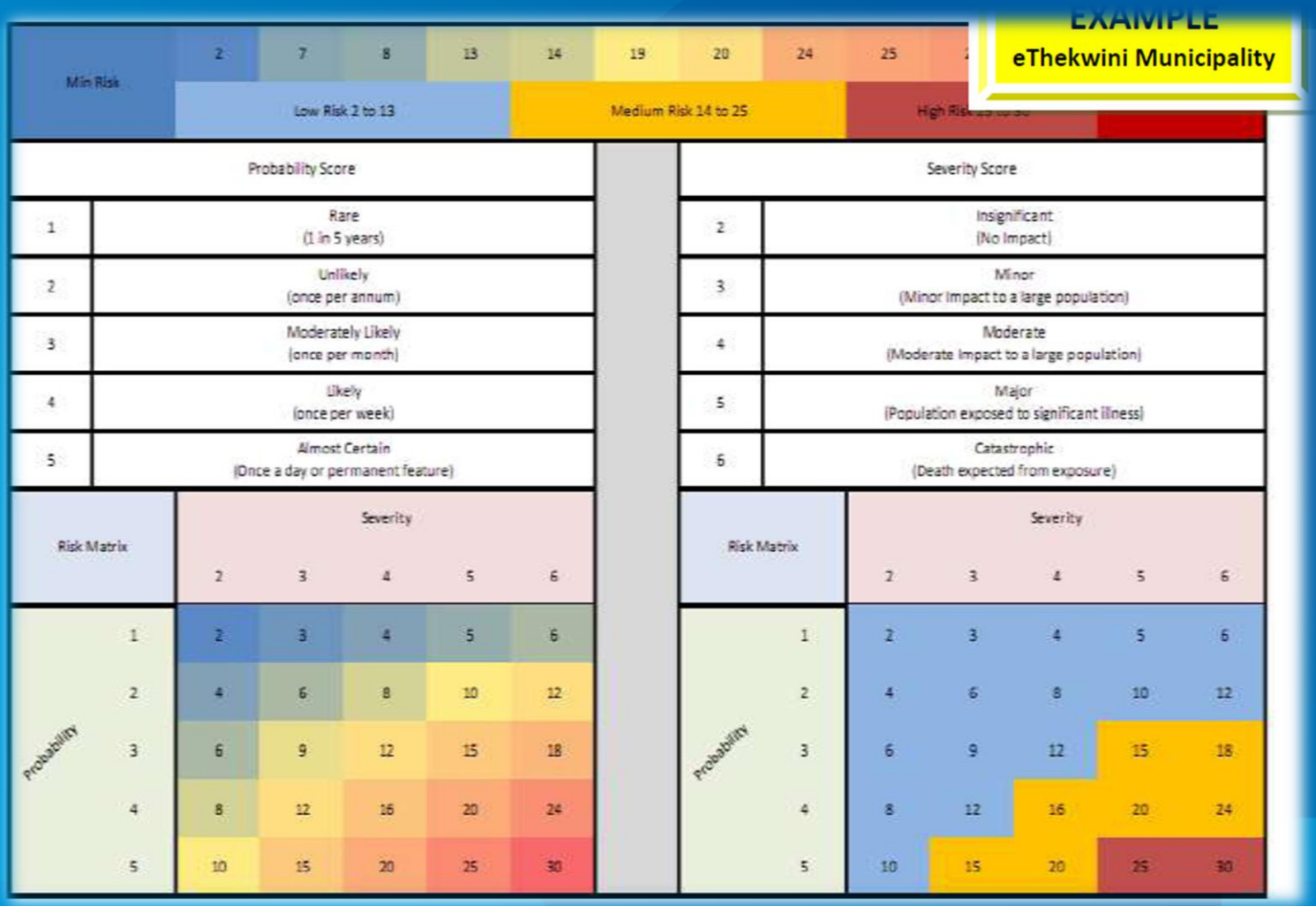
What is Risk?

- Risk - A probability or threat of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through preemptive action

Vs

- Hazard - a potential source of harm

Risk Assessments



EXAMPLE
eThekwini Municipality

Min Risk	2	7	8	13	14	19	20	24	25	
	Low Risk 2 to 13				Medium Risk 14 to 25			High Risk		

Probability Score	
1	Rare (1 in 5 years)
2	Unlikely (once per annum)
3	Moderately Likely (once per month)
4	Likely (once per week)
5	Almost Certain (Once a day or permanent feature)

Severity Score	
2	Insignificant (No Impact)
3	Minor (Minor Impact to a large population)
4	Moderate (Moderate Impact to a large population)
5	Major (Population exposed to significant illness)
6	Catastrophic (Death expected from exposure)

Risk Matrix	Severity 2	3	4	5	6
Probability 1	2	3	4	5	6
2	4	6	8	10	12
3	6	9	12	15	18
4	8	12	16	20	24
5	10	15	20	25	30

Risk Matrix	Severity 2	3	4	5	6
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3	6	9	12	15	18
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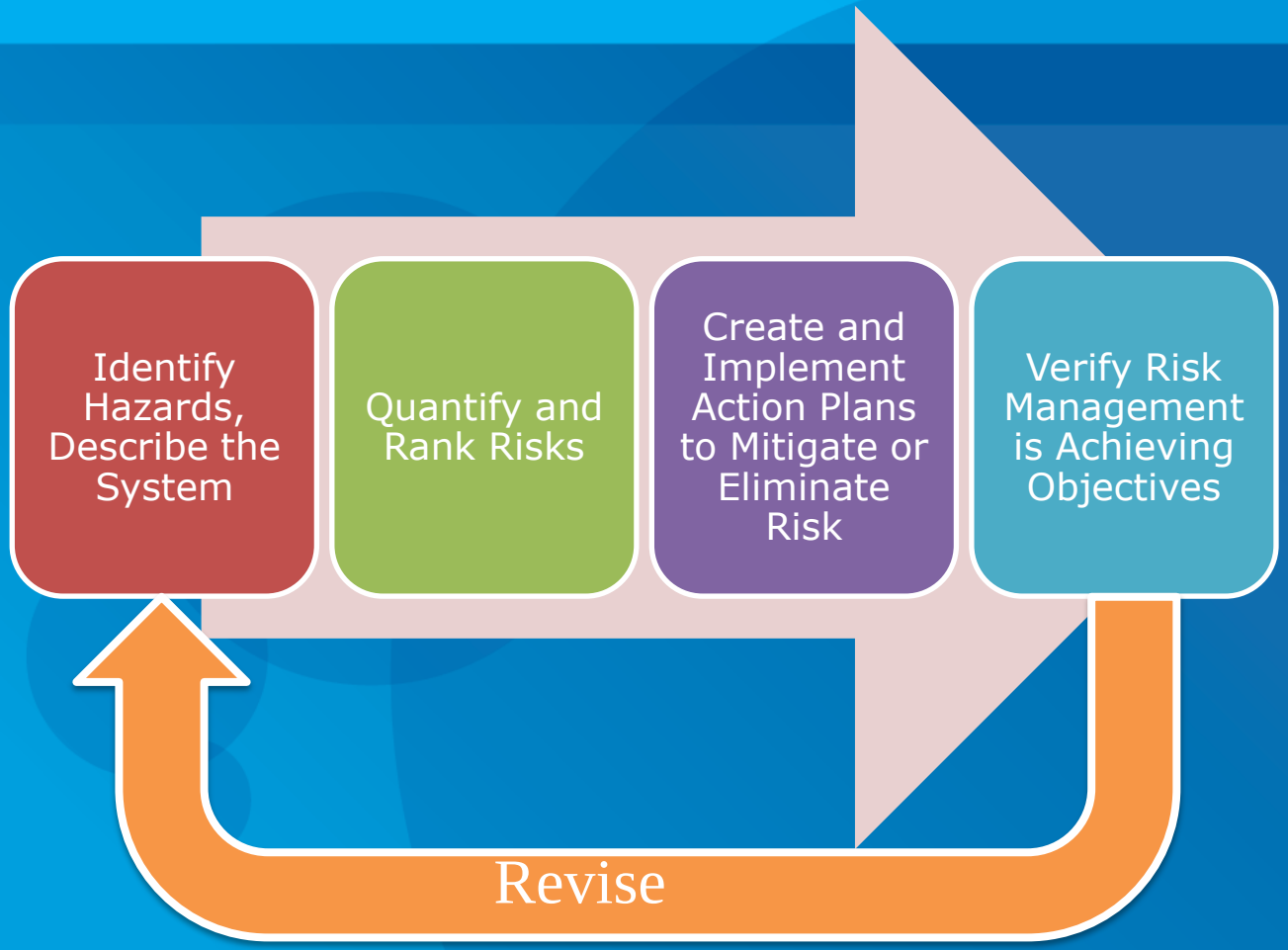
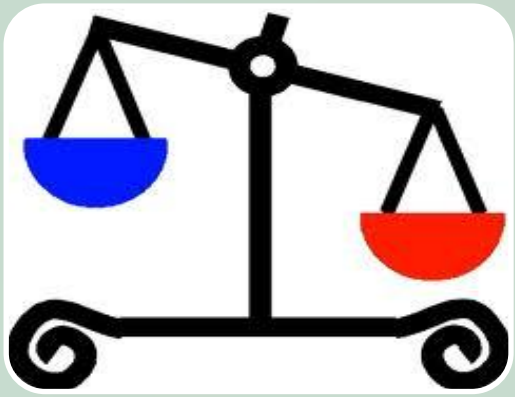
Basic Methodology



WWRAP Development Approach



WASTEWATER SYSTEM ASSESSMENT

- Assemble a team to conduct assessment
- Understand and describe the system
- Understand the risks and hazards

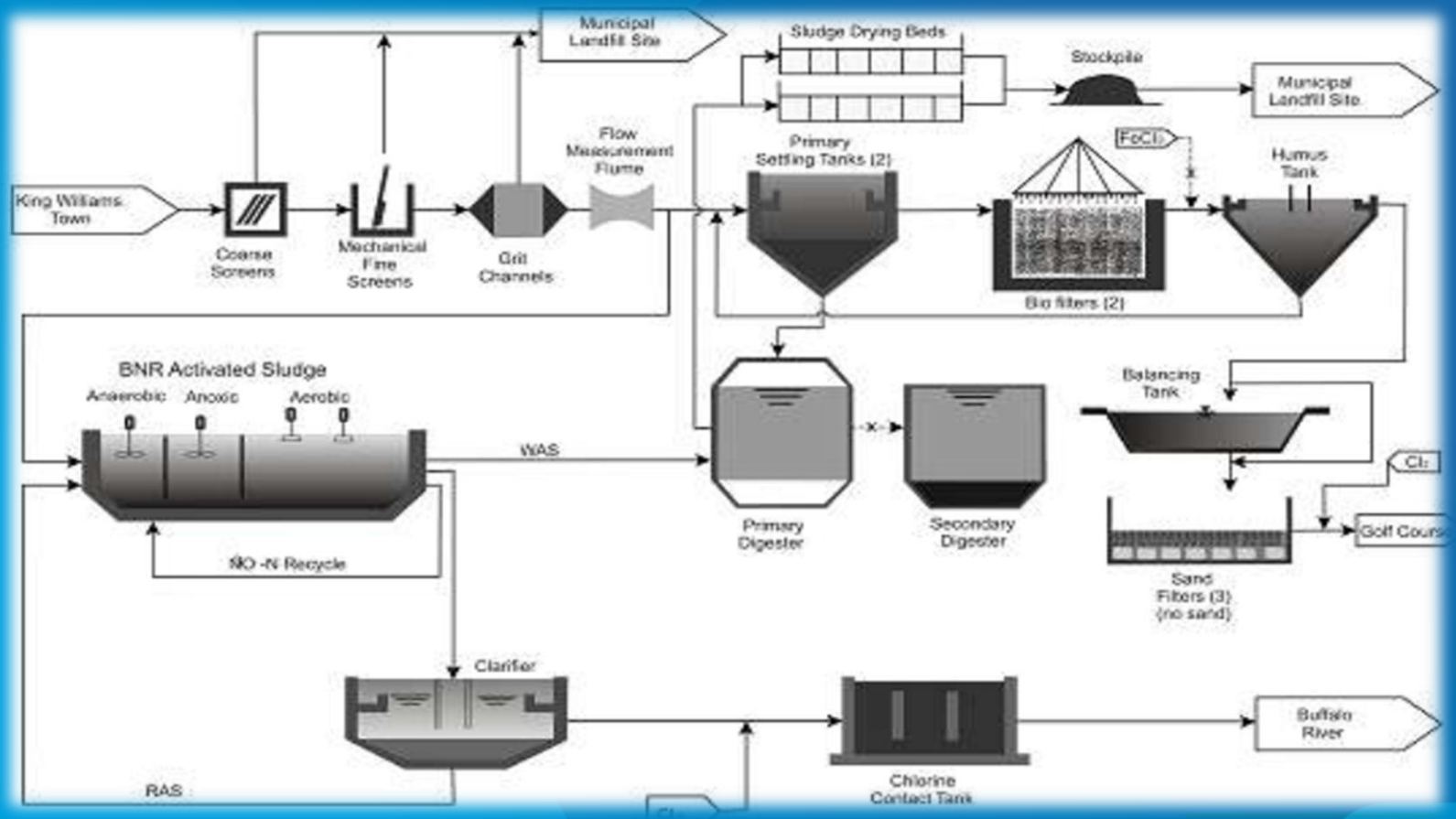
RISK ASSESSMENT

- Hazard identification
- Hazardous event and risk identification
- Rating of risks for hazard to cause harm to health and environment

RISK MANAGEMENT

- Apply control measures
- Operational monitoring
- Management procedures (corrective action and incident / emergency response)
- Supporting programmes
- Record keeping, reporting documentation
- Validation and verification

Waste Water System Assessment



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Departments Involved

- Works
- Waste Water networks
- Mechanical and Electrical
- Pollution and Environment
- GIS
- Scientific Services
- Asset Management
- Design

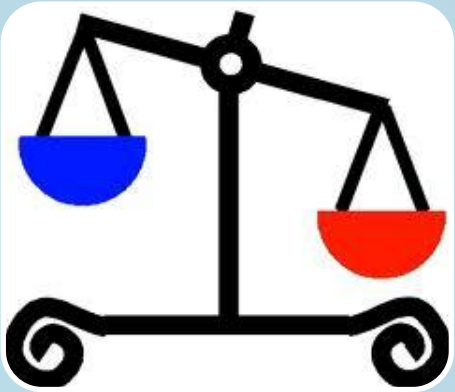
Time Frames

- Largely dependent on size and number of Works and availability / experience of staff

DWA Cumulative Risk Rating

- First Order Risk Assessment
  - CRR = A*B + C + D
    - A = Design Capacity
    - B = Actual Inflow
    - C = Technical Skills of Operational Staff
    - D = Effluent Quality Compliance
- Second Order Risk Assessment
  - CRRr = E*H*I
    - E = CRR
    - H = Environmental sensitivity
    - I = Management (Green Drop Score)

Risk Assessments



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Risk Assessments

Area	Location	System	Hazard/Risk Description	Could this issue result in a risk?	Likelihood	Consequence	Score (before consideration of any controls)	Inherent Risk Characterization	Existing controls	Control ref	Control Effectiveness	Residual Risk Score	Residual Risk Characterization	Recommended mitigation/ improvement plan	Responsible	Deadline	Budget	Signatu
land Area	Dassenhoek	Inflow Metering	Removal and delay in replacing/repairing non functional flow metering equipment	Y	4	4	16	Medium	reactive maint	A3	0	16	Medium	M&E require additional staff	AC	x/x/2011	R	
Central Coastal Area	Central	Human resources	Lack of maintenance staff	Y	4	5	20	Medium	None	A66	0	20	Medium	Maintenance contract	VM	y/y/2011	R	
Southern Coastal Area	Isipingo	Primary Settling	Inefficient or inadequate maintenance	Y	3	5	15	Medium	6 PSTs, Bearings part of critical spares item, Routine oiling and /or greasing or all moving equipement, Checks on	B10	0	15	Medium	Preventative maintenance roster	KM	z/z/2011	R	
Northern Coastal Area	Gennazano	Screening	Inefficient or inadequate maintenance	Y	3	5	15	Medium	Manual screen.	C02	0	15	Medium	Preventative maintenance roster	KM	b/b/2011	R	

Risk Management

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- Design
- Planning
- Finance

Time Frames

Ethekwini WWRAP

Parallel Processes Included in the WWRAP

- Microbiological Risk Policy
- Stormwater Management Plan
- Works Water Quality Failure Response Protocol Phase II.
  - Revision of Protocol
  - Implementation
  - Site Specific limits to be incorporated