

## 15. How can the “green drop” results trickle down to good effect?

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### ABSTRACT

In the past two years, numerous newspaper articles have highlighted the dysfunctional condition of much of South Africa’s wastewater treatment infrastructure. Concern about this deteriorating infrastructure has tended to focus on poor management and budgetary constraints. In late April 2010, the Department of Water Affairs released its 2009 “Green Drop” Report, which provided an assessment of the condition and performance of the nation’s wastewater infrastructure. This Report represented official recognition of the extent of the crisis facing the wastewater and sanitation industry. The “Green Drop” Report revealed that close to half of the 852 wastewater treatment plants around the country were not in a state to even be assessed. Water Services Authorities (usually District Municipalities) responsible for the wastewater treatment plants did not appear to have the systems, procedures or capacity in place to handle such a basic assessment of their performance. Of those that provided sufficient information for an assessment, only a very small percentage received the Green Drop Certification Status. This paper will propose guidelines and make recommendations on the measures that technical managers in cities, towns and remote areas can adopt to address the poor performance highlighted by the “Green Drop” Report. The paper will look at the methodologies, strategies and approaches that can be used, given that budgets and resources may, in many cases, be limited.

### 1. THE PRESENT STATE OF AFFAIRS

During the final municipal demarcation process in 2000 the restructuring of local government structures, which allowed the transfer of personnel to other departments resulted in a loss of knowledge, capacity and technical background to deal with proper planning, operations and maintenance of wastewater treatment works and sewer infrastructure. The impact of this resulted in inexperienced managers and/or managers with other technical backgrounds and requiring “easy quick fix” guidelines in planning, budgeting for refurbishments and upgrading of wastewater treatment works infrastructure and reticulation networks.(De Swardt et al, 2008). Therefore, growing concerns of the municipalities’ inability to perform against required standards and expectations has prompted rigorous research, media coverage, public debates and political pressure. (Van der Merwe-Botha et al. 2010) Furthermore, increasing pressure has been added by government’s prioritised accelerated housing development in the country without taking into account the associated sanitation requirement of these developments and the much needed upgrade and refurbishment of sewerage networks and wastewater treatment facilities. The Department of Water Affairs (DWA) has been forced not only to look at wastewater quality alone as has been done for many years before, but also to look at the condition of the infrastructure and procedures necessary to achieve that quality.

### 2. OVERALL SYSTEM APPROACH

The Department of Water Affairs (DWA) released a Green Drop Report in April 2010, reporting on the status of wastewater plants in South Africa. Furthermore DWA created two regulatory approaches namely: a targeted risk-based regulation and an incentive-based regulation, the latter being known as the Green Drop certification system. The targeted risk-based regulation

system is based on information that reflects on the state of the 852 waste water treatment facilities in the country. This approach will assist in creating effective intervention plans to achieve optimum performances at treatment facilities within the specified legal requirements. Incentive-based regulatory system provides a platform from which to recognise, acknowledge and promote excellence in the wastewater treatment sector. Each wastewater treatment facility will be assessed and scored according to set parameters that will ensure sufficient measure within the stipulated legal requirements.

The objective of this paper is as follows:

- Develop an understanding of the various factors influencing the wastewater treatment work’s efficiency to date. The purpose of the paper is not to elaborate on the underlying causes
- Comprehend the overall service delivery environment that creates further challenges in this sector.
- Introduce action plans and prioritise essential requirements in order to improve assessment results.
- To inform the reader that the first step to better assessment results is building capacity in technical and management spheres of the wastewater treatment facilities.

The figure below summarises the understanding of the system process for optimal performed wastewater treatment facilities.

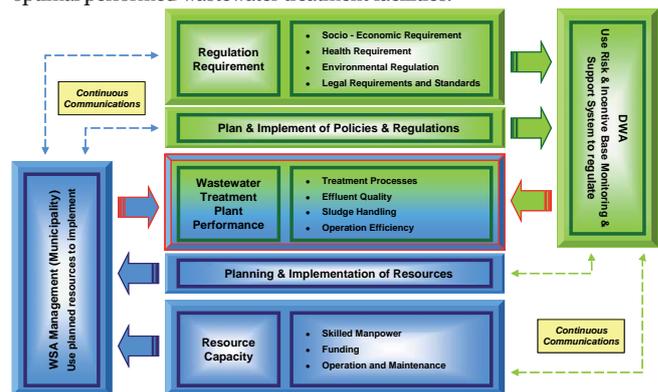


Figure 1: Management System Process for a wastewater treatment works

The focus of this paper is to address the objective in three critical areas namely; Regulation Requirements, Planning and Implementation and Resource Capacity.

### 2.1 Regulation Requirement

Municipalities registered as Water Services Authorities (WSA) are referred to as Organs of State. Criminal prosecution of WSA’s for non performance under Section 156 of the National Water Act (NWA) of 1998 is not a simple process. The National Environmental Management Act (NEMA) of 1998 does not allow Organs of State to be criminally charged and prosecuted. The Department of Water Affairs (DWA) possesses an important water services protocol to regulate services. This in terms of Chapter 2 of the Constitution: Bill of Rights, Chapter 3 of the Constitution: Principles of co-operative government and intergovernmental relations, mandates DWA through NWA and the Water Services Act. Therefore DWA must proceed in a constitutional manner. In terms of Section 63 of the Water Services Act the DWA may intervene to rectify non-compliance but obviously this section must be viewed against the requirements of Chapter 3 of the Constitution. If the assistive approach to regulatory compliance fails, then litigation would ensue. The Intergovernmental Relations Framework Act of 2005 (IRFA), Section 40 states that all organs of state must make every reasonable effort to avoid intergovernmental



disputes when exercising their statutory powers or performing their statutory functions and to settle intergovernmental disputes without resorting to judicial proceedings. Furthermore, Section 40 sub-section 2 of the IRFA states that any formal agreement between two or more organs of state in different Government departments regulating the exercise of statutory powers or performance of statutory functions, must include dispute-settlement mechanisms or procedures. These mechanisms and procedures would be appropriate to the nature of the agreement and the matters that are likely to become the subject of a dispute. When a WSA fails to comply with the regulations the DWA may issue a pre-directive as to how the non-compliance is to be rectified within a specified time frame. Should the WSA fail to comply in spite of technical support and funding from DWA then legal actions may be enforced in terms of the National Water Act of 1998. (DWA, 2008). The Purple Drop status will be awarded in situations where the Water Services Authority (WSA) has shown no intention or very limited intention to improve wastewater quality management practices after the pre-directive was issued and no action plans have been submitted to rectify the situation. Since 2008 and up to March 2010, the DWA has issued 49 pre-directives and seven directives to municipalities responsible for the treatment facilities which have not shown much intention to comply. To date no actual "Purple Drop" has been awarded to any non-compliant Water Services Authority. The author has compiled some possible reasons for this lack of action viz.

- Not to create a "Name and Shame" event that may create more political in-fighting in the various governmental spheres.
- This is an incentive-base accreditation approach and it may jeopardise the credibility of the system.
- Not all the treatment facilities were assessed which may lead to unfair monitoring and regulation practices.

The view of the author is that the reluctance of the DWA to issue 'purple drops' is to demonstrate that the DWA has given all possible assistance to the non compliant WSAs.

### 2.2 The Criteria to Achieve Green Drop Status

Water Services Authorities (WSAs) in order to be awarded GREEN DROP certification status are required to comply with 90% the weighted criteria in a biannual assessment.

Table 1: Green Drop Criteria for 2010

CRITERIA	REQUIREMENTS	Secondary Weighting (%)	Primary Weighting (%)
Operations, Maintenance and Management Skill	Registration certificate, design specifications and actual capacity of system. (Regulation 2834 of National Water Act)	20	10
	Registration certificate of Process Controllers and Supervisors.	50	
	Maintenance team details.(Logbooks and/or Contracts)	10	
	Site-specific Operation & Maintenance Manual	20	
	Daily inflow and outflow measurements		
Wastewater monitoring	Details of sampling sites, determinants and frequencies of operational monitoring.	30	10
	Details of sampling sites, determinants and frequencies of compliance monitoring. (include ground water sources)	40	
	Adequate monitoring coverage of distribution network. (80-95%)	30	

Wastewater sample analysis	Details of Laboratory used. (In-house, on-site, or external)	30	5
	Certificate of Accreditation with associated methods OR Z-scores results ( $-2 \geq z\text{-score} \geq 2$ are unacceptable) in a recognized Proficiency Testing Scheme.	40	
	Assess interpretation of results and associated amendment to process in filed situation.	30	
Data submission	Data submission to DWAF (12 months results - WWSRS/GDS)	100	10
Wastewater quality compliance	Wastewater quality compliance data for the past 12 months and standards used (e.g. License; General Authorization; etc).	40	30
	Expectation: 90% compliance per determinant (measured against overall compliance percentage).	60	
	Compliance penalties: 1. Less 20% between actual data and submitted data on DWQRS 2. Less 20% only 11 months data available to do assessment.  Bonus: Add 40% for a practical and acceptable Wastewater Management Rectification Plan to recorded poor compliant treatment works.		
Wastewater failure response management	Documented Waste Water Incident Management Protocol.	30	10
	Evidence of implementation of Protocol. (Wastewater Quality Failure Incident Register)	70	
Stormwater and Water Demand Management	Stormwater management plan detailing how stormwater will be prevented from entering sewer systems and how sewer spillages or sewerage from entering storm-water. Evidence of implementation required.	70	0
	Water Demand Management Plan including a practical strategy to address artificial water demand due to leakages causing higher hydraulic loading of waste water collection and treatment infrastructure, including a Water Balance.	30	
Bylaws	Proof of the Bylaws providing for the regulation of industrial (trade) effluent (volumes & quality) discharged into municipal system, package plants, decentralized systems, vacuum tank discharges and spillages into the environment.	70	5
	Evidence of Bylaws Enforcement by Local Authority.	30	
Wastewater treatment facility capacity	Design capacity (hydraulic and organic) of the wastewater treatment facility. (ADWF & COD)	20	5
	Documented daily receiving flows over 12 months of assessed period (must be < than design capacity).	40	
	Medium to long term planning to ensure sufficient capacity for treatment system and to ensure effluent quality compliance	20	
	Medium to long term planning to ensure sufficient capacity for collector system and associated budget.	20	
Publication of Wastewater treatment management performance	Annual Publication of wastewater management performance against the requirements of the site-specific authorization specification/s. (Include compliance detail)	40	5
	Publication in various communication mechanisms to reach wider audience, in particular information to the public. (Copy of each media form. Electronic (web) reporting will equate 40% of this sub-criteria)	60	

Wastewater asset management	Annual Audit report addressing the collection and treatment infrastructure and process control. (Proof of Technical Audit/ Inspection Report/ Implementation Plan)	50	10
	Updated sanitation / waste water infrastructure Asset Register	20	
	50% score for proof of Operation and Maintenance budget and 50% score to proof comparative expenditure to budget. Option 1: Low end Technology - R0.50/Kl - R1.20/Kl. detail Option 2: Express R55 000/MI per day plant capacity.	30	
	Maintenance records of pump-stations		
TOTAL		100	

(Source: DWA Regional Office, East London, June 2010)

Criteria becoming increasingly comprehensive and stringent each year are applied to facilitate an incremental and continuous improvement approach to wastewater management practices. The Site Audits and pre-assessments are conducted by assessors between July and August of each year and the final assessments from end of September to November. The reporting will be aligned to World Water Monitoring Day (in October) and the WISA/ DWA Conference in May each year. Water Services Authorities may object to the score, should valid grounds exist for objection. (DWA, 2008). The evaluation criteria's weighted average changes as the planned level of compliance increases nationally.

Table 2: Percentage allocated Weighted Criteria

EVALUATION CRITERIA	Weighed Percentage (%)		
	2009	2010	2011*
Operations, Maintenance and Management Skill	10	10	10
Wastewater Monitoring	10	10	10
Wastewater Sample Analysis	10	5	5
Data Submission	10	10	10
Wastewater Quality Compliance	35	30	25
Wastewater Failure Response Management	20	10	10
Stormwater and Water Demand Management	0	0	5
Bylaws	0	5	5
Wastewater Treatment Facility Capacity	5	5	5
Publication of Management Performance	0	5	5
Wastewater Asset Management	0	10	10
TOTAL	100	100	100

(Source: Water Quality Regulation Draft 2008)

\* Weights per criterion are subject to change.

All Water Services Authorities (WSA) wastewater systems scoring 80% and above will be assessed by an independent Advisory Committee to validate the score. The Advisory Committee will be appointed with a set terms of reference, and will include representatives from DWA (Water Services Regulation), DWA Regional Offices and subject matter experts.

### 2.2.1 How to Improve Your Green Drop Results

Many municipalities in small towns and rural areas do not know how to assess their poor results of the previous year, nor do they have the capacity to prepare a rectification plan to submit to DWA. Improvement of wastewater treatment facilities is a long-term process, which needs thorough planning and phase implementation. Set out below are the author's views on what is necessary for WSA to improve on the Green Drop accreditation assessments :

- Build capacity and give training to wastewater treatment staff.
- Improve and strengthen operations and maintenance capabilities.

- Registration of accredited operating staff (Process controllers and supervisors) and create an achievement recognition platform for ALL technical and management staff.
- Wastewater quality compliance.
- Regular submission of wastewater quality information to DWA.
- Management response to wastewater failures and management planning relating to the treatment works capacity and infrastructure.
- Plan for funding to refurbish and / or upgrade noncompliant treatment works.

### 3. PLANNING AND IMPLEMENTATION

Water and sanitation services of a local municipality are important as they contribute 40 - 60% of total services revenue and 20 - 40% of the expenses of a Local Municipality. These values are dependant upon the contributions of its service area. Municipal Infrastructure Investment Planning, together with Integrated Development Planning, is necessary for long-term financial sustainability of municipal assets. In support of this, it is critical that municipalities have both maintenance programmes for their assets as well as the necessary resources and capacity to match.

#### 3.1 Prepare and Update the IDP

An Integrated Development Plan (IDP) is a framework plan in which budget proposals run in parallel with the Municipal Council's Integrated Development Planning process, particularly in terms of objectives, outputs and targets envisioned for the set Medium Term Expenditure Framework (MTEF). According to Section 27(2) of the Municipal Systems Act (MSA), the IDP binds both the district and local municipalities. Furthermore, Section 28 of the MSA provides for the preparation and adoption of a Process Plan that is in fact an organised activity plan that outlines the process of developing the IDP. The main purpose of the process is to decide and agree on the best allocation of resources to fund Council's priority items.

#### 3.2 Formulate a WSDP

To comply with the Water Services Act, the Water Services Development Plan (WSDP) should be prepared as part of the IDP process unless there is no IDP process in which case it can be prepared separately. The WSDP is a sectoral plan that falls within the conglomerate of inter-sectoral plans of an IDP. The WSDP sectoral planning and integrated development planning, must inform each other. It is therefore important to start the WSDP planning process by making the water services development goals conform to the overall development goals of the IDP. This in essence becomes the overall framework within which detailed water services needs and development projects can be benchmarked and tested. Section 14 of the Water Services Act requires the Water Services Authority (WSA) or the local municipality to act as the WSA and Water Services Provider (WSP) and take reasonable steps to bring its draft WSDP to the different stakeholders for the opportunity to comment. Section 15 of the Water Services Act requires that the WSA or LM must supply a copy of the WSDP to the Department of Water Affairs (DWA), Department of Co-operative Governance and Traditional Affairs (COGTA), the relevant Province and all neighbouring WSAs/LMs as well as the governing District Municipality.

#### 3.3 Implementation at Risk

The operations and maintenance of wastewater treatment assets including sewer reticulation systems, are the biggest challenge for a WSA. The lack of resources for planning and implementation within the available budgets further emphasises the local municipality's crisis. This is a serious threat to



WSA's and requires immediate intervention. The District Municipality (DM) is responsible in terms of the Structures Act for achieving the "integration, sustainability and equitable social and economic development" of its area as a whole. There seems to be insufficient involvement from DMs across the country with regards to services provision for their LM's, mostly due to internal capacity problems at DM level.

The support channel between DM and Local Authorities needs strengthening to ensure continuous monitoring of project implementation process. In Feb 2010 Ms. Allyson Lawless commented on 'Coordinated Service Delivery' to the Portfolio Committee on Co-operative Governance and Traditional Affairs and compiled the following action plan with the object of improving Service Delivery:

- Rebuild not Restructure
  - Rebuild structures and develop meaningful organograms.
  - Put training programmes in place to support youth development and develop succession plans.
  - Change terms and conditions to retain staff unless inadequate performance, rather than terminate in the absence of performance reviews.
- Professionalise staff selection rather than politicise
  - Competency models should be developed for staff.
  - Appoint professional, registered, senior officials with sound track record.
  - Review selection criteria guidelines from Profession of Town Clerks Act, Municipal Accountants Profession Act, and Engineering Profession Act.
- Address financial viability
  - A hard line on debt collection should be taken.
  - Equitable share should be made conditional and the formula to increase income for low income municipalities should be reviewed.
  - Losses should be tackled and investment should be made in maintenance.
  - Efforts should be accelerated on Operation Clean Audit.
  - Corruption must be stamped out.
- Responsibility requires authority
  - A split between political and executive roles needed to be considered.
  - Delegations should be reviewed - if officials were given responsibility, they must also be given authority.
  - Officials should be allowed to discipline those who are not performing.
  - Support departments should be support line departments, and not dictate to them.
- Using the private sector
  - Private sector should second experienced municipal staff to local government to rebuild capacity, offer structures and systems, and on-the-job training.
  - Young staff should be seconded to consultants to be trained.
  - Rebuilding of municipal structures should be outsourced to consulting firms.

#### 4. RESOURCE CAPACITY

There is a compounding challenge to balance service levels and resource capacity for capital implementation, management and operation and maintenance of infrastructure and responsibilities. Key resource challenges include finance, manpower and skills.

#### 4.1 Funding

Many District and Local Municipalities face trying budgeting processes with Council's needs far outweighing the limited resource pool available. Some municipalities looked at approaches by allocating their Equitable Share (ES) and Levy Replacement Grant (LRG) according to their ratio of spending of the past financial year. Each municipal department receives a funding budget and attempts to match the need to the available funding pool. The Constitution states that there is a "need to ensure that the provinces and municipalities are able to provide basic services and perform the functions allocated to them". In order to comply with this clause, National Government has defined basic services. Furthermore, these standards are effectively imposed on any local authority that provides basic services and they have to comply. As required by the Constitution, but also in recognition of the fact that many municipalities do not have the revenue base to afford the provision of basic services free to the poor, the ES allocates the local government share of revenues in accordance with the need of municipalities. (Loots 2004). Funding sanitation projects will require a range of sources. However, the largest portion of these sources of funding is in the form of subsidies from Municipal Infrastructure Grant (MIG), the Housing Subsidy System, and the District Municipality itself. Other funds are available but availability is subject to strong motivations. A critical fund is that of the housing subsidies and ES. However, these are not a source, which the local municipalities control, but its availability remains pivotal in service delivery. Only a few local authorities of good financial standing are in a position to access external private sector funding (borrowing) as water and sanitation services remain the priority services. It is very important to understand that the need for additional or upgraded plant infrastructure or the need for additional funding is not the root cause of poor performance at the majority of wastewater treatment facilities.

#### 4.2 Manpower

Professor Jonathan Jansen, Rector of the University of the Free State questioned "Why can we deliver on a multi-billion rand project called the World Cup and not on simple things like collecting people's dirt on time?" He further stated in the media that there are seven reasons why he thinks we delivered on this soccer extravaganza that carried powerful lessons for service delivery:

1. "We delivered on the World Cup because there was a single-minded leadership of this project... The leadership of this project was focused on getting the job done, no matter what."
2. "We delivered because there were clear targets. Once the targets were set, the plans were devised to deliver on those targets. There was no fuzzy thinking or unattainable goals. Every manager down the line knew what was expected."
3. "We delivered because there was the constant threat of withdrawal. There is nothing like a severe penalty clause to keep service deliverers on track."
4. "We delivered because of the pressure of external accountability. FIFA was to South Africa's soccer bid what good inspectors are to schools - they hold you accountable for what you promised."
5. "We delivered because every citizen knows that this is not about soccer; this was about national prestige... That every one of us who went to work every day understood that our labour was about building the nation and not simply our own selfish demands for more material things."
6. "We delivered because of broad participation by all our people in this World Cup."
7. "We delivered because there was the political will to do well. We were not subjected to that daily barrage of political parties trying to out-scream each other with the endless posturing on everything from toilets to trains. Our

leaders must be consumed by passion and principle not to fail.”

Poor progress can be due to human factors such as undue delays in communication and responses, cancelled meetings, postponements of activities and personnel changes, all of which inevitably led to loss of performance momentum and wasted expenditure of money and time. The vast differences in culture and business practices between the private sector, the corporate world and that of the public sector also impacts negatively on service delivery.

#### 4.2.1 Management: Councillor to Line Manager

- Wide-spread political in-fighting and score-settling between and amongst councillors and officials has led to unnecessary vacancies and ineffective governance as people often get suspended for political reasons rather than actual performance deficiencies or shortcomings.
- Lack of appropriate oversight structures and systems that leads to poor governance practices and procedures. Where structures do exist, they are often compromised politically.

#### Skills: Technical and Managerial

- Key positions in areas which include finance, planning, engineering, sanitation, etc., are left vacant for months - in some cases even longer - leading to serious breakdowns in core service delivery disciplines, causing loss of revenue, dereliction of accountability, low morale and a general malaise in municipalities.
- The most pressing need is the critical shortage of trained, skilled and experienced process controllers and mechanical/electrical maintenance staff.
- Most plants operate with insufficient information to guide optimised operations, but this shortcoming CAN be partially overcome by trained and skilled process controllers.

### 5. CONCLUSION

The latest media releases state that hundreds of millions of litres of untreated or inadequately-treated sewage is being illegally discharged into rivers and streams each day, mainly by small town municipalities due to the loss of experienced staff and institutional memory.

Large Municipalities and Metro's have large budgets and a good income structure, which ensure well established information systems, resource structures and functional bylaws and procedures to manage treatment works within the prescribed requirements. Smaller municipalities with very poor and limited income do not have the financial resources to even manage the treatment works and the surrounding connected infrastructures. Thus the necessary maintenance is only implemented once external regulators require immediate results from the non complying authorities. All municipalities in urban regions aim to provide full waterborne sanitation to ensure “equal” level of service to all residents within their management region. Such consideration must be taken with great care, since sustainable services revolve around:

- Available water resources. Municipalities in semi and rural areas with serious potable water scarcity must consider alternative sanitation options.
- Affordability of services by low income residents and
- Increased operations and maintenance after new infrastructure has been installed.

All these factors suggest that any decision taken to specify high levels of services across the spectrum of all communities will not be sustainable or financially viable.

Municipalities with excellent Green Drop assessment results possess the following attributes:

- Strong leadership in management teams,

- Clear goals and targets which are known to everyone in the technical and management team.
- Understanding of the serious penalties involved if compliance regulations are not adhere to.
- Everyone is accountable to themselves and the work they do.
- Everyone must enjoy a sense of belonging within the team.

The municipality must look at innovative ways and technologies that may be of use to support and enhance the level of service structure within its area of responsibility. This requires simple ways to address controls, losses and damages in the system network as well as targeted areas for upgrade of service levels.

The WSA however, will make the biggest advances when implementing infrastructure asset management. The guidelines for asset management are described in detail in “Local Government Capital Asset Management Guideline” as provided by National Treasury.

The implementation of asset management will follow the following phases:

- Compile infrastructure asset register (compliant to GRAP)
- Establish required levels of service and Municipal Strategy
- Establish Asset Management and Implementation Strategy
- Develop Asset Management Plans
- Develop Financial Plans
- Update the IDP.

WSA has a legal obligation to fulfil the legislative compliances and requirements as stipulated by law. DWA has developed a WSA Checklist with qualitative follow-up questions and seventy seven questions relating to legislative compliance. It is designed to provide both municipalities and DWA with primary information on water services authority capacity, and its performance against legislative requirements.

Refurbishment and extension projects of wastewater treatment works including sewerage systems that have been planned and acknowledged in the WSDP and IDP's must be viewed with the regional DWA departments in supporting the level of priority. Furthermore, suggestions to create a Municipal Infrastructure Monitoring Panel with all provincial shareholders to assist with monitoring and implementation of water and sanitation projects Recommendation with the National and Local Treasurer to “ring fence” allocated budgets for critical refurbishment projects on water and wastewater treatment works and its supply networks. Serious intervention options must be investigated to strengthen human resources in the water and sanitation sector in all three governmental spheres.

It is VERY important that Water Services Authorities create an environment in which they acknowledge key personnel who are instrumental in achieving accreditation status. We need to bring PRIDE back into the picture.

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