

1 SFD Lite Report

Dalton/Coolair, uMshwati Local Municipality, uMgungundlovu District Municipality

This SFD Lite Report was prepared by Emanti Management

Date of production/ last update: 14/02/2022



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The publication of this report emanates from a project entitled: Country-wide Shit-Flow Diagram: Establishing National Excreta Flows in South Africa (WRC Project No. K5/2813/3)

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ISBN

Printed in the Republic of South Africa

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2 The SFD Graphic

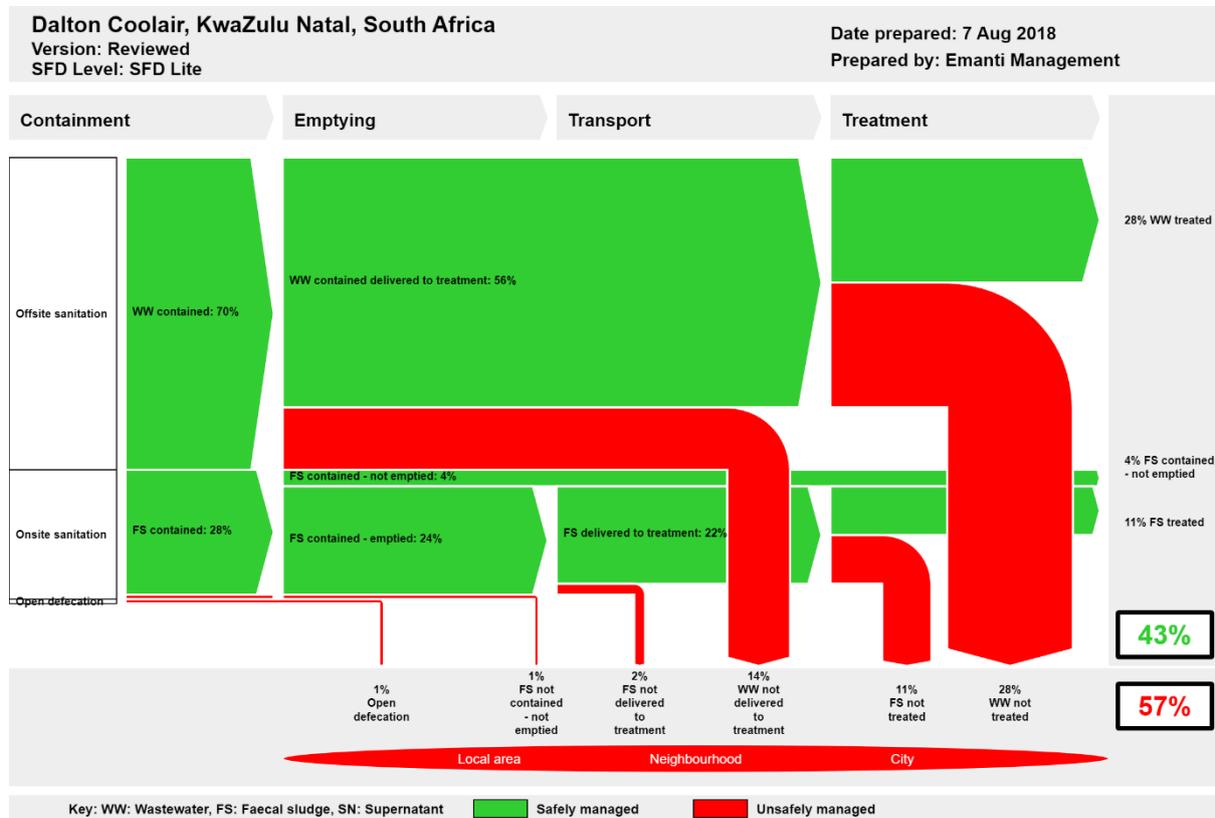


Figure 1. SFD graphic of Dalton / Coolair, KwaZulu Natal province, South Africa

3 SFD Lite information

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South African Local Government Association (SALGA)

Municipal Benchmarking Initiative (MBI)

Institute of Municipal Engineering South Africa (IMESA)

Date of production: 01/03/2019

Last update: 18/03/2022

4 General municipal information

This *Shit Flow Diagram* (SFD) Lite Report was developed for the Dalton / Coolair area in uMshwathi Local Municipality which is the largest of the six smaller local municipalities in the uMgungundlovu District Municipality. The Constitution of South Africa classifies municipalities into three (3) categories (A, B and C). Category A municipalities are metropolitan municipalities which consist of a major urbanised core. Category C municipalities are District Municipalities that consist of one (1) or more Local Municipalities (Category B municipalities). The District Municipality administers some of the functions of local government for a district which includes more than 1 Local Municipality (LM). As defined by the Water Services Act 1997, uMgungundlovu District Municipality serves the *Water Service Authority* (WSA) for the district (Republic of South Africa, 1997). The uMgungundlovu District Municipality, as part of the process of preparing the *Integrated Development Plan* (IDP) for its jurisdiction, is required to submit a *Water Services Development Plan* (WSDP) for review and approval.

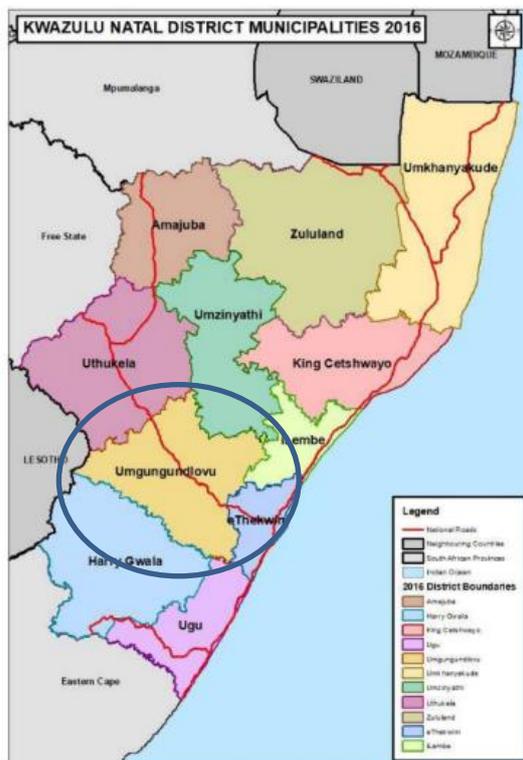


Figure 2. Location of the uMgungundlovu District Municipality within the KwaZulu-Natal Province, South Africa (Umgungundlovu District Municipality, 2020)

Local Municipalities within the uMgungundlovu District Municipality jurisdiction: Msunduzi; Impendle; Umshwathi; Mkhambathini; Mpofana; Umngeni; and the Richmond Local Municipality.

The uMshwathi Local Municipality is the largest of the six smaller local municipalities in the uMgungundlovu District Municipality. The local municipality is in an area that was largely under the control of tribal authorities until very recently. There are towns, however, that were built by German immigrants some 150 years ago. The land area of uMshwathi LM is approximately 1,866 square kilometres (km²) with a population size of 111,645 according to 2016 Stats SA Community Survey (Municipalities of South Africa, 2021). This is the population for the local municipality, not Dalton/Coolair area. Agricultural production (timber and sugarcane) and rural-

residential settlements are dominant land uses with the local municipality. The local municipality consists of 4 main urban centres (UMshwathi Local Municipality, 2018):

- New Hanover which serves as the Administrative Hub of the local municipality.
- Wartburg which serves as the main commercial centre.
- Dalton which is the main Service Industrial Hub.
- Cool Air.

Outside of these 4 main urban areas are various other development nodes that consists of different economic activities, high concentrations of people, mixtures of land use and the availability of goods and services. The local municipality is also characterised by large tracts of land under traditional authority (Ingonyama Trust Board) (UMshwathi Local Municipality, 2018).

The Spatial Development Framework for the local municipality identifies 4 development nodes: (UMshwathi Local Municipality, 2018)

- Primary Node: Wartburg and New Hanover
- Secondary Node: Dalton, Coolair, Trustfeed
- Tertiary Node: Swayimane, Bhamshela/ Appelsbosch, Mpolweni, Cramond
- Rural Service Node: Harburg, Noodsberg

The uMshwathi LM has defined an urban edge where the shift from urban area to peri-urban and rural development is observed and involving different land use characteristics and density or intensification of land use development. This urban edge delineation will allow the local municipality to promote upgrade and refurbishment of infrastructure based on the availability of the resources to be able to support any proposed development. Outside the urban edge, the municipality indicates that it will provide basic infrastructure and social facilities (UMshwathi Local Municipality, 2018). A map of this delineation is available on the municipal IDP 2018/2019; however, the map key is difficult to read due to the resolution of the image (UMshwathi Local Municipality, 2018).

Considering the above, this SFD Lite Report was produced for the area defined by the District Municipality as *Dalton/Coolair*. This includes the towns of Dalton, Coolair, New Hanover and Wartburg and the surrounding areas. The key statistics of the urban centres are presented in the **Table 1** below (Census, 2011). The data presented is from the Stats SA Census conducted around 10-years ago. It was challenging for the research team to find statistics related to each of the towns and the surrounding areas as the District and Local Municipality present data for the entire area of their jurisdiction. The actual figures for towns and smaller settlements are not presented within IDP reports; percentages for wards are presented but not for sanitation provision. Further, as the area under consideration for the SFD is different, climatic, and topographical data is not presented in this SFD Lite Report. To develop the SFD for the targeted area – Dalton/Coolair – we have relied on the District Municipality to provide data related to population statistics and access to services as officials within the municipality would be best placed to understand the delineation patterns and implementation of basic services.

Table 1. Statistics of the four towns considered in the development of the Dalton/Coolair SFD

Statistic	Dalton	Coolair	New Hanover	Wartburg
Population	1,493	2,570	3,175	906
Population density (persons/km ²)	1,169	2,089	172	478
Number of households	947	840	822	331
Average household size	1.5	2.9	3.4	2.6
Formal dwelling (%)	89.5	75.8	74.9	93.4
Flush toilet connected to sewerage (%)	44.0	62.0	56.9	43.8
Flush toilet connected to septic tank (%)	33.7	1.5	5.4	48.9
Pit with ventilation (%)	0.4	1.7	2.4	0.6
Pit without ventilation ¹ (%)	0.6	12.6	19.1	4.5
Chemical toilet ² (%)	0.3	15.6	0.0	0.6
Bucket toilet ¹ (%)	0.7	0.6	2.2	0.0
Other sanitation (%)	3.8	1.1	8.9	0.3
No sanitation ³ (%)	16.4	4.9	5.1	1.2
Piped water inside dwelling (%)	69.2	61.6	37.2	88.2
Electricity for lighting (%)	81.0	63.6	66.1	94.0
Weekly refuse removal (%)	53.1	66.2	71.4	92.7

Note: ¹, Not considered appropriate sanitation. ², Temporary sanitation. ³, No sanitation can be considered as open defecation. Municipal IDP indicates that there are no bucket toilets through municipal investigation and in contradiction to Census (2011).

5 Service outcomes

This section presents the range of sanitation technologies/infrastructure, methods and services designed to support the management of *faecal sludge* (FS) and/or *wastewater* (WW) through the sanitation services chain in Dalton/Coolair. This report has used estimates that were provided by District Municipality officials within the Dalton/Coolair municipal-defined service area (see also section 5 for further details of the quality of the services provided).

All the plastic, concrete and cement block tanks are referred to as *septic tanks* by the District Municipality. These tanks, however, do not have an outlet/discharge point, and therefore are not defined as a septic tank as per SFD definitions (see row 3 on Table 1). In this report, these are categorised according to their design and functioning as per SFD terms.

Table 2: Sanitation technologies and contribution of excreta in terms of percentage of population

No.	Sanitation technologies and systems as defined by:	SFD reference variable	Percentage of population	
	Umgungundlovu District Municipality SFD promotion initiative			
1	Toilet discharges directly to sewer	Toilet discharges directly to a decentralised/separate sewer	T1A1C4	70%
2	Septic tank (plastic or concrete)	Connected to soak pit	T1A2C5	19%
3	Septic tank (plastic or concrete)	Containment (fully lined tanks, with no outlet or overflow)	T1A3C10	8%
4	VIPs (urban)	Pit (all types), never emptied but abandoned when full and covered with soil, no outlet or overflow	T1B7C10	1%
5	VIPs (urban)	Pit (all types), never emptied, abandoned when full but NOT adequately covered with soil, no outlet or overflow	T1B8C10	1%
6	No toilets	Open defecation	T1B11 C7 to C9	1%

Dalton Coolair, KwaZulu Natal, South Africa, 7 Aug 2018. SFD Level: SFD Lite						
Population: 111465						
Proportion of tanks: septic tanks: 100%, fully lined tanks: 100%, lined, open bottom tanks: 100%						
Containment						
System type	Population	WW transport	WW treatment	FS emptying	FS transport	FS treatment
	Pop	W4b	W5b	F3	F4	F5
System label and description	Proportion of population using this type of system (p)	Proportion of wastewater in sewer system, which is delivered to decentralised treatment plants	Proportion of wastewater delivered to decentralised treatment plants, which is treated	Proportion of this type of system from which faecal sludge is emptied	Proportion of faecal sludge emptied, which is delivered to treatment plants	Proportion of faecal sludge delivered to treatment plants, which is treated
T1A1C4 Toilet discharges directly to a decentralised foul/separate sewer	70.0	80.0	50.0			
T1A2C5 Septic tank connected to soak pit	19.0			90.0	90.0	50.0
T1A3C10 Fully lined tank (sealed), no outlet or overflow	8.0			90.0	90.0	50.0
T1B11 C7 TO C9 Open defecation	1.0					
T1B7C10 Pit (all types), never emptied but abandoned when full and covered with soil, no outlet or overflow	1.0					
T1B8C10 Pit (all types), never emptied, abandoned when full but NOT adequately covered with soil, no outlet or overflow	1.0					

Figure 3: SFD Matrix for Dalton/Coolair District Municipality (2018)

5.1 Off-site sanitation

Containment and transport

According to the key informant interviews with the municipal officials, an estimated 70% of the population have access to the sewerage network (T1A1C4 = 70% on Figure 3). According to the SFD graphic, 70% of the wastewater from the population of the targeted area is contained. An estimated 80% of the wastewater generated from the population of the targeted area is transported to the *Wastewater Treatment Works* (WWTWs) (W4a = 80% on Figure 3). (70 x 80% = 56% of the wastewater generated from the total population of the targeted area).

This estimate has been deduced by municipal officials and is due to the leakage from the aging pipe network. (20% leakage x 70 percentage of population = 14% of the wastewater generated from the total population of the targeted area does not reach WWTWs – *unsafe* percentage).

Treatment

The wastewater that reaches the Dalton WWTW is treated to meet specified requirements (assume compliance to treated effluent requirements as part of compliance monitoring). Although the municipality was unable to present recent results that show the wastewater

treatment plant's efficiency, the most recent green drop (2013) report indicate 50% compliance for microbiological, physical and chemical compliance. (W5a = 50% on Figure 3).

5.2 On-site sanitation

Containment

According to the municipality, 29% of the total population is served with on-site sanitation, the majority of which are septic tanks connected to soak pits (T1A2C5 = 19% on Figure 3). Fully lined tanks with no outlet (also known locally as *septic tanks*) are used by 8% of the population (T1A3C10 = 8% on Figure 3) and 2% of the population use VIPs. Half of these are covered and replaced when full (T1B7C10 = 1% on Figure 3), but half are not adequately covered and remain a public health risk (T1B8C10 = 1% on Figure 3). Only 1% of the total population reportedly practice open defecation.

Emptying and transport

There is currently very little monitoring and management of vacuum truck emptying. However, since it is noted that municipal officials operate the honeysucker and there is no evidence that they discharge illegally, a precautionary 90% for transportation and emptying is assumed (F3 = F4 = 90% on Figure 3).

Treatment

The faecal sludge emptied and transported for treatment is treated by blending the collected faecal sludge into the operations of Dalton WWTW. It is assumed that the collected sludge is treated to meet specified requirements. Due to lack availability of evidence of treatment efficiency a 50% treatment compliance is assumed based on the same estimate for treated wastewater compliance (F5 = W4a = 50% on Figure 3).

5.3 Open defecation

The municipality noted that open defecation is around 1% within the targeted area. The District Municipality also considers full pits never emptied and not adequately covered as part of their¹backlogs and has thus been included as part of the Open Defecation category on the SFD Graphic used in this report.

The uMshwathi Local Municipality indicates that there were 3,891 units of sanitation backlog in their area that were identified from public participation in the WSDP. The public participation in the WSDP also revealed that there 8,948 units of sanitation replacement required; this could be considered a secondary backlog (UMshwathi Local Municipality, 2018). This refers to those who were provided services, however now they are in an unusable condition, resulting in them not having acceptable sanitation services.

5.4 Risk of groundwater contamination

Groundwater contamination is challenging to determine for the targeted area. The assumption used in this report is that there is no/little groundwater pollution as VIPs cannot be built less than 30 metres from a borehole or well and the base of the pit should be more than 2 metres above groundwater. Pits are not recommended to be built within 100 to 200 metres of a natural drainage course and within 1:50 year flood lines for water courses Raising of the slab is also recommended based on seasonal or permanent groundwater within 0.3 metres of the ground surface (Bester & Austin, 2000). Pollution plumes from on-site systems are not expected to exceed more than 3 metres except in high water table areas with significant rainfall (plume can reach nearly 30 metres) (Lorentz, Wickham, & Still, 2015).

¹ Sanitation backlogs are defined as population that has not been provided with acceptable sanitation services/infrastructure that does not meet the minimum standards.

5.5 SFD Graphic

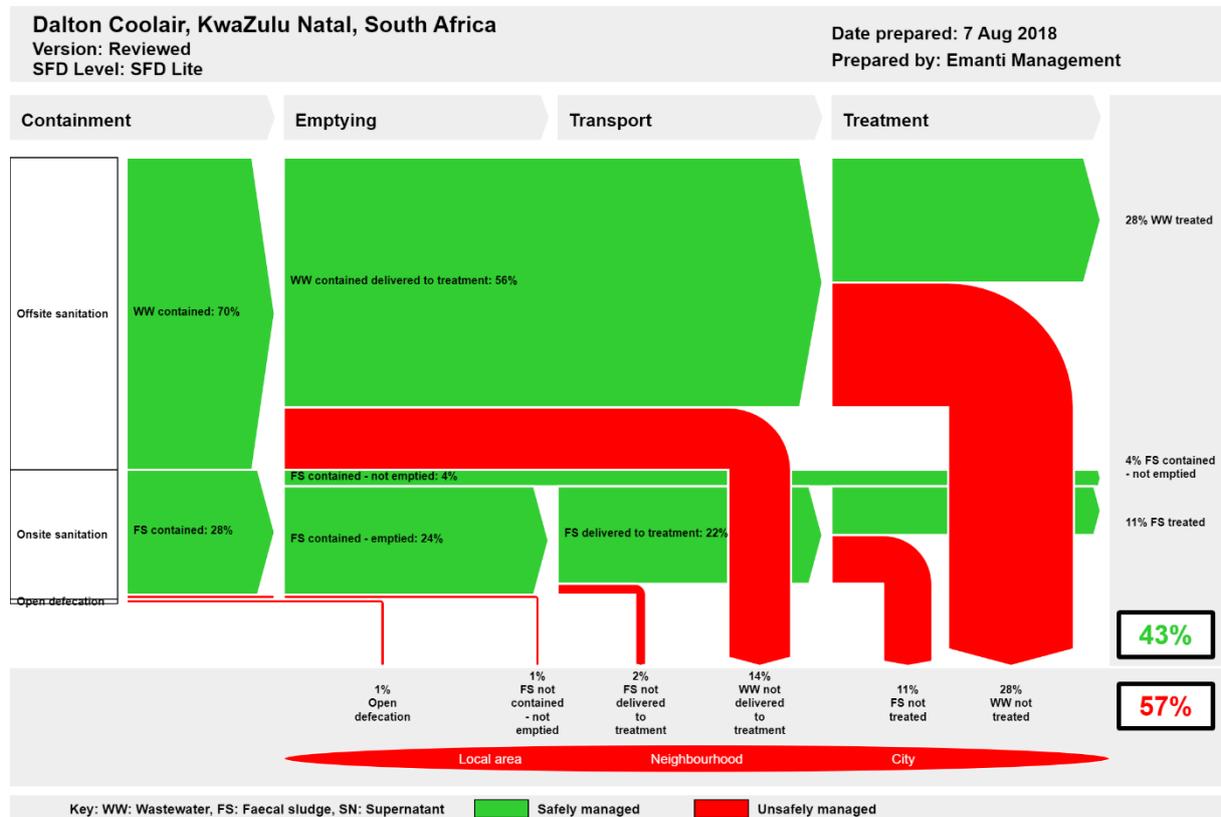


Figure 4: SFD Graphic of Dalton/Coolair and surrounding areas as defined by the District Municipality

Based on the above data, estimates and assumptions, the SFD graphic illustrates that 43% of excreta is safely managed in Dalton/Coolair (Figure 4).

Most of Dalton/Coolair use off-site sanitation (70%) with 29% using on-site sanitation and only 1% of the population practicing open defecation.

The safely managed offsite excreta is wastewater that has been treated at the treatment plants which is 28% (See Figure 4). The balance is from safely managed onsite sanitation and is faecal sludge emptied from the septic tanks and fully lined tanks, transported to the treatment works and treated in compliance with local standards (FS treated =11% on Figure 4). Only 1% is from the population using pit latrines which are safely covered and closed when full.

Therefore, an estimated 57% of the excreta of the whole population is not safely managed. The largest percentages are from the wastewater network, 29% WW not treated, and 14% WW not delivered to treatment on Figure 4, which suggests that highest priority is repairing or replacing the aging pipe network.

6 Data and assumptions

This section provides the background to data and assumption used in developing the SFD Lite Report for Dalton/Coolair. In developing the SFD Lite Report, a number of information sources were used and have been noted in section 6. Data has been sourced directly from uMgungundlovu District Municipality. This includes personal interviews and published reports.

The targeted area includes a few urbanised towns and smaller surrounding areas (peri-urban and rural). Planning is undertaken for the municipal area and not for individual towns and settlements. Thus, the land area and population size in this SFD Lite Report cannot be correlated to other sources (e.g., Stats SA). Further, services are based on the municipal delineation strategy as previously discussed. For this reason, this SFD Lite Report has relied solely on the input from the District Municipality based on their planning and delineation strategy. The population size used in this report is 7,420 (in contrast to the around 8,100 for the combined total of the 4 urban areas – Stats SA 2011). The assumptions used in this SFD Lite Report have been classified according to the different sanitation supply chain components.

6.1 Availability and Accessibility of Data and Data Gaps

Data is easily accessible from Stats SA for towns within the targeted area. Data collection and compilation is undertaken every 5-years. SFDs that are developed in between this 5-year period may not have data that take into account recent developments in service provision. However, the targeted area used in the development of this SFD Lite Report comprised of numerous towns and sections of areas in surrounding areas as determined through the delineation on development nodes within the municipality.

Municipal – district and local – IDPs are available on municipal websites. The IDP is a plan for an area that provides for an overall framework for development. This can be done at District or Local Municipality level and has a lifespan of 5-years. Plans within the IDP have a budget approved by the municipal council. The IDPs are required to contain the WSDP for the municipality. A review of the WSDP submissions on the Department of Water and Sanitation website indicates that an improvement is required for data collection, entry and submission the regulators web portal for WSDPs.

7 List of data sources

The relevant uMgungundlovu Municipal Officials were contacted through e-mail, letter and telephone call prior to the visit to the local municipality. The purpose of the SFD study and depth of data required was conveyed through an introductory letter to respective staff. Although a number of stakeholders of government departments were noted, this SFD study aimed to focus on interviews with staff from uMgungundlovu District Municipality.

In addition to stakeholder interviews, below is the list of data sources used for the development of this SFD Lite Report.

- Published reports: Stats SA Census 2011.
- Published documents: Municipal IDPs and WSDPs.

8 References

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9 Acknowledgements

This report was compiled for a *Water Research Commission (WRC) project Country-wide Shit-Flow Diagram: Establishing National Excreta Flows in South Africa* and as part of the SFD Promotion Initiative. We would like to thank all participating uMgungundlovu District Municipality officials for giving time and necessary information for the assessment. A special thanks to Shantanu Kumar Padhi and Amrita Bhatnagar of CSE India for their supervision and guidance during the assessment and report writing.

Appendix

Table 3. Tracking of stakeholder engagement

Name of organisation	Name of contact person	Designation	Date of engagement	Purpose of engagement
Umgungundlovu District Municipality	Mr. Buhle Msomi	Manager: WSA	5 th , 11 th and 23 rd July 2018 6-7 August 2018	Introducing SFD, securing support for project SFD workshop
Umgungundlovu District Municipality	Ms. Siphindile Shange	Manager: Sanitation	5 th , 11 th and 23 rd July 2018 6-7 August 2018	Introducing SFD, securing support for project SFD workshop



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