

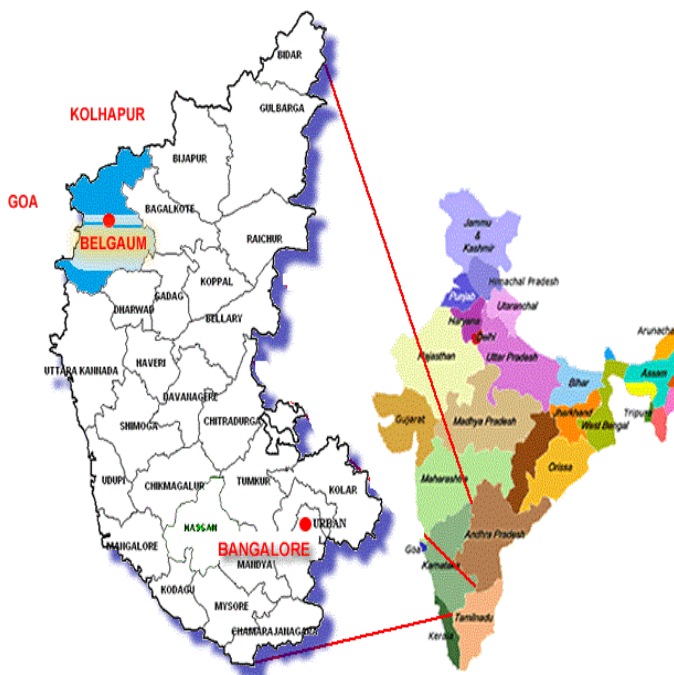


Inspection Report of Municipal Solid Waste Management site in Belagavi city

ZONAL OFFICE (SOUTH), BENGALURU

Background:

Belgaum city is one of the oldest cities in Karnataka state. The city is located at 15.87°N 74.5°E and has an average elevation of 751m above sea level. The city is in the north-western parts of Karnataka and lies at the border of two states, Maharashtra and Goa on the Western Ghats. The total area of the city is 94.08 Sq.km. The population of the city is 4,90,045. The temperature of the city varies between 25°C-40°C during summer and varies between 18°C-26°C during winter.



Suvarna Vidhana Soudha, Belagavi

Belgaum city is the administrative headquarters of the Belgaum district. The city was renamed as Belagavi from November 1, 2014 by the Government of Karnataka.

The Government of Karnataka has proposed making Belgaum the second capital of Karnataka, hence a second state administrative building Suvarna Vidhana Soudha was build and inaugurated on 11 October 2012.

It is the 4th largest city in the state and the fastest growing urban centre. Belagavi is also a business hub and education centre of Karnataka. The city has been shortlisted by Ministry of Urban Development for development as one of the 100 smart cities in India. Belagavi exhibits swift and kaleidoscopic changes in topography, vegetation and climate.



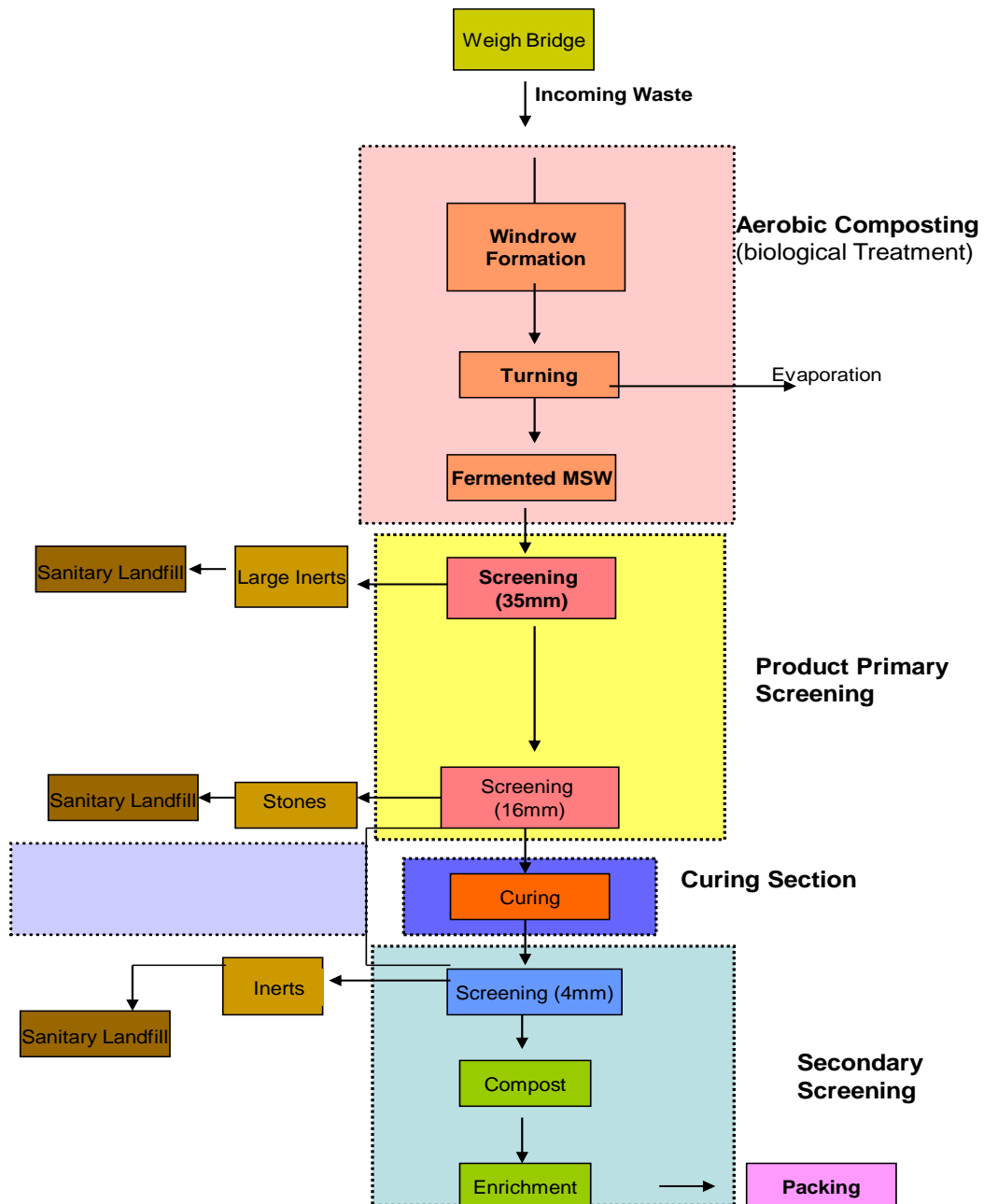
Belagavi city corporation is the responsible authority for Solid waste management, Water supply and Sanitation in the city. The city is divided into 58 wards by city municipal corporation. The Municipal Solid Waste management in the city is detailed below:

Sl. No.	Description		Status
1.	Name of the City	:	Belagavi
2.	Present Population of the city	:	4,90,045
3.	No. of Wards	:	58
4.	Agency/Agencies responsible for handling MSW	:	M/s Ramky Enviro Engineers Ltd, Hyderabad
5.	Contact Person	:	Project Manager: Mr. Murali : 8861268963 Mr. Reddy : 9901048558
6.	Generation of MSW per day (in Tonnes/day)	:	200-230 MT/Day (as per receipts)
7.	Per Capita Waste Generation	:	Approx-400grms
8.	No. of employees engaged for collection & transportation of waste	:	Permanent: 272 Temporary:1099
9.	Whether reported MSW generation is based on actual survey/or it is based on estimation	:	Actual survey
10.	The year of reporting for generation of MSW	:	Current year (2015)
11.	Composition of MSW and who has done this	:	Compostable (organic) Matter: 35% Inerts: 48% Recyclables (includes): <ul style="list-style-type: none"> Plastics : 14% Rags : 3% Calorific value: 2800Kcal/Kg (done by M/s Ramky Enviro Engineers Ltd, Hyderabad)
12.	Quantity of waste collected every day (from collection points/ dustbins) (T/d)	:	190-200 tons
13.	Percentage of door to door collection	:	94%

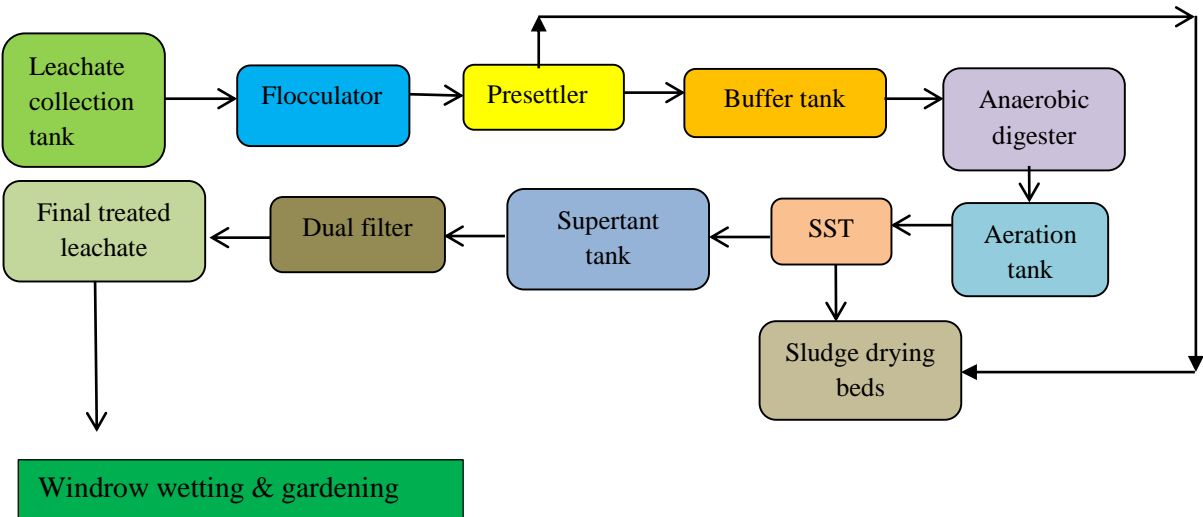
14.	Segregation of Waste at the source is practised(Yes/No)	:	Partially undertaken
15.	No. of Bins used for collection of waste	:	i) 50 Nos. 1.1 cum containers ii) 20 Nos. 3 cum dumper placer container
16.	No. and Type of vehicles used for collection and Transportation of waste	:	Collection: 20 auto tippers and push carts Transportation: 55 tippers and compactors
17.	Quantity of waste remaining uncollected (from collection points/ dustbins) (T/d)	:	10-20 T/d
18.	Quantity (Approximately) of waste littered at different places (other than dustbins) (T/d)	:	2-36 T/d
19.	Annual expenditure on O& M	:	15 Crore
20.	Quantity of waste processed (T/d)	:	Composting: 200 T/day Vermi composting: Nil RDF: Nil Waste to Energy: Nil Others: Nil
21.	Quantity of waste landfilled per day (T/d) <ul style="list-style-type: none"> Number of landfills in operation and the area Whether operational landfill are complying with MSW Rules 	:	100 T/day <ul style="list-style-type: none"> One landfill site is in operation and the area is 5500 Sq.mt Yes
22.	Funding agencies	:	M/s Ramky Enviro Engineers Limited
23.	Implementing Agency	:	M/s Ramky Enviro Engineers Limited
24.	Status of Consent to operate	:	The combined consent issued by KSPCB under water and Air act is valid till 30 th June, 2016. A copy is enclosed as Annexure I
25.	Status of Authorization for waste processing facility under MSW Rules, 2000	:	Authorization for waste processing facility and sanitary landfill issued by KSPCB under MSW Rules, 2000 is valid till 31 st December, 2015. A copy is given at Annexure II .
26.	Status of log books maintained	:	The log books are maintained by the agency both in soft and hard formats.
27.	No. of labours working in Landfill site	:	Permanent: 24 Nos Temporary: Nil
28.	Any particular recurring diseases noticed in & around the site (if any)	:	No
29.	Whether any action plan has been prepared for management of MSW	:	The DPR for solid waste management is under progress
30.	If yes, Summary (if available detailed report may be attached)	:	-

31.	Date of Inspection	:	03/12/2015
32.	Inspected by (Name & Designation)	:	Anjana Kumari V, Sc.C
33.	<p>Waste Generation, Collection & transportation: The city is divided into 58 wards. The total waste generation in the city is around 200-230 MT/day from all 58 wards. The quantity of waste collected every day is 190-200 T/d. Out of 58 wards the waste from 43 wards is collected by outsourced agency (M/s Ramky Enviro Engineers Ltd.) and the wastes from remaining 15 wards are being collected by corporation.</p> <p>The door to door collection is adapted in all 58 wards. The waste is collected through vehicles like auto tippers and push carts. The percentage of door to door collection is about 94%. The segregation of waste at the source has been initiated in some of the wards. The same will be implemented in all wards in phased manner.</p> <p>The collected waste is transported to processing site through vehicles like tippers and lorries covered with plastics / tarpaulins, dumpers and compactors. The total number of vehicles engaged for collection and transportation of waste is around 80.</p> <p>Segregation: The segregation of waste at the source has been initiated in some of the wards. The same will be implemented in all wards in phased manner.</p> <p>Waste Treatment facility: Initially, the solid waste management in Belgaum city was one of the major problems faced by city corporation. To overcome the problem, City Corporation Belgaum has established an integrated municipal solid waste treatment and disposal facility at Sy. No. 19, 40 and 42 of Turamuri village, Belgaum Taluk and District in an area 66 acres which is around 10 Km away from the city. Further, for development and operation of MSW landfill facility in scientific manner as per MSW guidelines and rules corporation made an agreement with M/s. Ramky Enviro Engineers Ltd., Hyderabad on MoU basis for a period of 20 years. The site is operational since from July 2009.</p> <p>The treatment facility consists of following components :</p> <ol style="list-style-type: none"> Weigh bridge Windrow platforms Compost processing yard Leachate collection tank Landfill site Leachate treatment plant <p>Waste Processing and treatment facilities: The wastes collected from the city are transported to the processing facility through vehicles like tippers and compactors covered with plastics/tarpaulins. The vehicles carrying waste are first weighed on weigh bridge available at plant and the data are recorded in both hard and soft formats. The weighed vehicles unload the garbage directly at windrow platform. No segregation of waste is carrying out by the unit. Windrow heap formation is done using excavator and Effective Micro Organism culture added (@ 1kg for 1MT of waste) for decomposition of wastes. 50% moisture is maintained in the heaps. The turning of heaps are carried out at regularly once in week.</p>		

After 35-40 days the fermented material is fed into 35mm sieve and the materials size less than 35mm are further fed into 16mm sieve and the materials below 16mm size are considered as Semi Finished Material (SFM) are stored for 10 days to better recovery of compost. Finally, the SFM are fed through 4mm sieve, the material size ranges less than 4mm are considered as compost and the material size above 4mm are again re fed into 4mm sieve to increase the yield and minimize the inert quantity. The rejected materials from the sieves are sent to secured landfill (SLF) which is located in the premises only. The waste process flow sheet is given below:



Process Flow Sheet

	<p>The final compost is stored in shed which is covered and moisture of 20-25% is maintained & also compost is enriched with EM culture. The compost is analyzed for quality test to meet FCO standards and the same will be sold to farmers in their own brand “Ramky Shakthi” at the cost of Rs. 200/- per 50kg.</p> <p>Landfill site: The inert materials are sent to secured landfill for dumping. The landfill site is of the size 80mX40m. The inert material composition is monitored regularly on monthly basis.</p> <p>Leachate Treatment Plant: The leachate generated from windrow platforms and secured landfill is collected in leachate collection tank and pumped to leachate treatment plant of 30 KL capacity. The leachate is treated by two biological processes i.e. anaerobic digestion and activated sludge process. The treated leachate is used for gardening purpose with dilution. The flow diagram of Leachate treatment plant (LTP) is given below:</p>  <pre> graph LR A[Leachate collection tank] --> B[Flocculator] B --> C[Presettler] C --> D[Buffer tank] D --> E[Anaerobic digester] E --> F[Aeration tank] F --> G[SST] G --> H[Supertant tank] H --> I[Dual filter] I --> J[Final treated leachate] J --> K[Windrow wetting & gardening] F --> L[Sludge drying beds] L --> C </pre> <p style="text-align: center;">Flow diagram of LTP</p>
34.	<p>Observations:</p> <ul style="list-style-type: none"> The Municipal Solid Waste Management site, Belagavi is located in Turamuri village, Belagavi district which is around 10 Km away from the Belagavi city. The total area of the site is 66 acres. The unit was inspected during December 3, 2015. The unit was in operation and is operated by M/s Ramky Enviro Engineers Ltd, Hyderabad since 2009. The unit is operating with valid consent issued by KSPCB. During the inspection, it was observed that vehicles carrying waste are weighed at Weigh Bridge in the unit and sent towards windrow platform for unloading of waste. The vehicles are covered with tarpaulins. All records on receipt of wastes (quantity) are well maintained in hard and soft format. The copy of data sheet on total receipt of wastes generated at the time of inspection is enclosed as Annexure III. The waste is not segregated by the unit. The garbage is completely dumped as received in the windrow platform.

	<ul style="list-style-type: none"> • The composting process is adapted by the unit. The wastes are not segregated at the source as well as in the processing unit. The description of the process along with process flow sheet is detailed above. • The compost is stored in closed shed. The leachate collection system is provided at both windrow platform as well as SLF site. The leachate is collected and treated at Leachate treatment plant. The treated effluent is analyzed before using for gardening purposes. The analysis report of compost and leachate (inlet & outlet) is given at Annexure IV • The inert materials from the process are dumped into secured landfill. The existing landfill size is 80mtsX40mts. The daily cell cover is provided after each dumping of inert material. The inert materials are monitored regularly on monthly basis and copy of the analysis report is enclosed as Annexure V • The unit is using ecosorb solutions for odour control during rotation of waste at windrow platform. No bad odour was sensed during the time of inspection which reflects the efficiency of the technology. The details of the technology is given at Annexure VI • The total cost for collection, transportation and processing of waste is approximately about Rs. 550 per ton of waste. The compost is sold at the rate of Rs. 1800-2000 per ton. • On the day of inspection, the visit around the city was made and it was observed that no garbage or wastes were dumped along roadside or any specific area that indicates efficient garbage collection system in Belagavi city. • The animal wastes from the shops, hotels, slaughter house & restaurants existing in the city are collected in separate vehicles and separate provisions (pit) are made in the site for deep burrial of animal waste. • The housekeeping is satisfactory. <p>Recommendations:</p> <ul style="list-style-type: none"> • The segregation of waste at source shall be fully implemented in the city. • The unit shall carry out segregation of organic and inorganic waste before introducing the wastes to windrow platform. • The unit shall install shredding machine to segregate the wastes for efficient composting process and for fast degradation of waste • To reduce the load on landfill site, the unit shall install bailing machine to compact the plastic waste. • The unit shall adapt Zero Waste Management System so as to reduce the quantity of inert materials. • The unit shall further segregate the inert materials which are having high calorific value and explore the possibilities to adapt the technologies like RDF or waste to energy etc.
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Anjana Kumari V
Scientist C

Photographs taken during inspection

	
<p>The waste carrying vehicle entering the site</p>	<p>The vehicles are weighing at weigh bridge</p>
	
<p>Windrow platform</p>	
	
<p>Leachate collection tank (Leachate from windrow platform)</p>	<p>Fermented material from windrow platform feeding into 35mm trammel</p>



Screening through 35mm & 16mm Trammels



Semi-finished material



Feeding Semi finished MTL to Final Screen



Final compost from 4mm screen



The compost is packed in 50kgs bags



Landfill site



Rejects from 35mm sieve



Leachate treatment plant of 30KL capacity