Project Design Phase-I
Proposed Solution Template

Date	24 September 2022
Team ID	**PNT2022TMID34892**
Project Name	Smart Waste Management System For Metropolitan Cities
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Due to lack of proper systems for disposal and collections, wastes and garbages end up in the roads and surroundings.It is impossible to manage large amount of waste waste as most of the waste ends up on the most of the roads and Public places. It is the major cause of spreading diseases. Lack of the proper system for monitoring the waste is also major issue in the waste management. The initial stage of waste management system comprises of proper disposal of collection of waste. Installing sensors in the trash bin to monitor the amount of waste would be greatly helpful to manage the wastes.
2.	Idea / Solution description	There were numerous waste management initiatives which has failed to acheive significant results. Ultrasonic sensors: To its solve this problem, ultrasonic sensor which can senses upto some distance can be used. The ultrasonic sensor is on the list of most leading devices in the IoT platform. Ultrasonic sensors transmit ultrasonic waves from its sensor head and again receives the ultrasonic waves reflected from an object. By measuring the length of time from the transmission to reception of the sonic wave, it detects the position of the object. Ultrasonic sensors are devices that use electrical–mechanical energy transformation to measure distance from the sensor to the target object. Ultrasonic waves are longitudinal mechanical waves which travel as a sequence of compressions and rarefactions along the direction of wave propagation through the

medium. Apart from distance measurement, they are also   used in ultrasonic material testing (to detect cracks, air bubbles, and other flaws in the products), Object detection, position detection, ultrasonic mouse, etc.

A robust sensor is placed in waste bins & containers and measures the fill level, no matter what has been deposited inside. This technology is qualified for reliability and intelligence. Consequently, it automatically adapts to changing surfaces and different kinds of waste. The waste in the dustbin can be detected by using wifi module so it is easy for the person to collect the waste without time delay.

Ardino board:

 An ardino board is also used in the management system. Arduino is an open-source prototyping platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing. The sensing element is fastened on to the bread board. The affiliation between the Arduino board and sensing element is created with the assistance of connecting wires. The operating program is fed into the Arduino board. The GSM module is additionally connected to identical Arduino board with the assistance of wires. the facility offer to the system is given with the assistance of a battery.

LCD :

LCD (Liquid Crystal Display) is the technology used for displays in notebook and other smaller computers. Like light emitted diode(LED) and gas-plasma technologies, LCDs allow displays to be much thinner than cathode ray tube(CRT) technology. LCDs consume much less power than LED and gas- displays because they work on the principle of blocking light rather than emitting it. The sensors senses the signal and gives to the output and it in turns gives the signal to the LCD display. An LCD is a small low

		cost display. Its is easy to interface with a microcontroller because of an embedded controller(the black blob on the back of the board). This controller is standard across many displays which means many microcontrollers have libraries that make displaying messages as easy as a single line of code. LCDs with a small number of segments, such as those used in digital watches and pocket calculators, have individual electrical contacts for each segment. An external dedicated circuit supplies an electric charge to control each segment. This display structure is unwisely for more than a few display elements. Internet of Things: The term IoT, or Internet of Things, refers to the collective network of connected devices and the technology that facilitates communication between devices and the cloud, as well as between the devices themselves. This technology can be used efficiently in the management of wastes.
3.	Novelty / Uniqueness	We have proposed a novel idea of introducing sensors in the trash bin to sense level of garbage. The idea in the Proposed system would be able to automate the Process solid and waste management monitoring process and management of the Overall collection process using IOT (Internet of things). The received signal indicates the waste bin status at the monitering controlling system. Whenever Waste bin gets filled this is acknowledged by placing the circuit at the waste bin, the which transmits it to the the receiver at the desired place in the area or spot .
4.	Social Impact / Customer Satisfaction	India faces challenges related to waste policy, waste technology selection and the availability of appropriately trained people in the waste management sector. Until these fundamental requirements are met, India will continue to suffer from poor waste management and the associated impacts on public health and the environment. There are major issues associated with public participation in waste management and there is generally a lack of responsibility towards waste in the community. There is a need to cultivate community awareness and change the attitude of people towards waste, as this is fundamental to developing proper and sustainable waste management systems.

		Sustainable and economically viable waste management must ensure maximum resource extraction from waste, combined with safe disposal of residual waste through the development of engineered landfill and waste-to-energy facilities. Population growth and particularly the development of megacities is making SWM in India a major problem. The current situation is that India relies on inadequate waste infrastructure.
5.	Business Model (Revenue Model)	The developed system provides improved database for garbage collection time and waste amount at each location. The environmentalists felt the great use of this when it comes to use. This makes it possible to plan more efficient routes for the trash collectors who empty the bins, but also lowes chance of any the bin being full. The initial up front investment can be substantial however, the long run as well as maintained system can lower the insurance cost thus lower the insurance cost.
6.	Scalability of the Solution	This proposed solution is scalable enough to fit the device in the trash bin. The cost of the device with sensors may be high. It can be used in management of Waste in metropolitan cities.