

**WASTE MANAGEMENT BY RESTAURANT
OPERATORS IN PETALING JAYA**

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**FACULTY OF SCIENCE
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**WASTE MANAGEMENT BY RESTAURANT
OPERATORS IN PETALING JAYA**

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ABSTRACT

There are number of factors contribute to municipal waste generation growth rate globally and locally factors are represented by increasing population levels, development, rapid urbanization and the rise in community living standards. Malaysia municipal waste is growing rapidly due to influence by these factors. This makes improving waste management practice highly demanded in every sector producing this waste. Restaurants have credible share in municipal waste as one of major waste source globally and in Malaysia as well, therefore this increase the necessity of study waste management practice among restaurants. This study aims to investigate waste management practice among restaurants in Petaling Jaya city with reference to the compliance, awareness on waste management, and incorporating these findings on waste management practice. The study was done using two approaches; the first approach way a survey to study the compliance of the restaurants to the Local Government Act (LGA) 1976 and that was done by researcher walkthrough investigation. The second approach was done by questionnaire through personal interview by the researcher. SS2 district has been suggested by Petaling Jaya city council for being the most complied area. Perception and waste management practice were assessed by e-checklists prepared according to Green Restaurant Checklist prepared by Burbank Green Alliance, January 2009 and Supplemental Checklist for Restaurants and Food Service prepared by Green Business Program, February 23 2010. Perception and waste management practice were done based on interview by modifying the checklists into questionnaire. The data of this study has been analyzed manually by analyzing the closed-ended questions and answers and then find out the total result from different parts in the study. Compliance study is to assess commitment of restaurants operators to the Local Government Act 1976. , which find 93% compliance among the surveyed restaurants. Perception study on waste management is to find out level of understanding by restaurants operators on waste management

aspects. The total result of perception study on waste management was 21%. Waste management practice is converting perception of restaurants operators on good waste management performance. The total result of waste management practice performance was 66%. Therefore, the result of waste management practice comes as effort of empowering the Act which gives restaurant operators high compliance.

ABSTRAK

Terdapat beberapa faktor yang menyumbang kepada kadar pertumbuhan generasi sisa perbandaran global dan tempatan. Faktor-faktor ini disebabkan kepada peningkatan tahap penduduk, pembangunan, perbandaran yang pesat dan peningkatan taraf hidup masyarakat. Sisa perbandaran Malaysia sedang berkembang dengan pesat kerana dipengaruhi dengan faktor-faktor ini yang juga menaiktaraf amalan pengurusan sisa di setiap sektor yang menghasilkan sisa. Restoran merupakan salah satu penyebab utama dalam sisa global termasuk di Negara Malaysia Dengan sedemikian peningkatan ini semestinya di ikuti dengan amalan pengurusan sisa di kalangan restoran. Kajian ini bertujuan untuk menyiasat amalan pengurusan sisa di kalangan restoran-restoran di bandar Petaling Jaya dengan merujuk kepada kajian pematuhan, kesedaran pengurusan sisa, dan menggabungkan penemuan ini atas amalan pengurusan sisa. Kajian ini dilakukan melalui dua sudut pendekatan Sudut pertama mengkaji pematuhan restoran kepada Akta Kerajaan Tempatan 1976. Kajian ini dilaksanakan melalui oleh penyelidik serara Walkthrough. Sudut kedua kajian ini telah dilakukan melalui soal selidik dan temu duga oleh pengkaji. Seksyen SS2 telah dicadangkan oleh Majlis Bandaraya Petaling Jaya kerana daerah ini yang paling mematuhi peraturan Amalan Persepsi dan pengurusan sisa dinilai melalui 'e- checklist' yang telah disediakan mengikut checklist "Green Restoran" "Green Business Program". Persepsi dan amalan pengurusan sisa telah dilakukan berdasarkan temubual di mana soalan didapati dari mengubahsuai soalan dari senarai semak. Data kajian ini telah dianalisis secara manual dengan mencari peratusan jawapan kepada soalan dan kemudian mengetahui jumlah hasil dari bahagian-bahagian yang berbeza dalam kajian ini. Kajian ini telah mendapati bahawa pematuhan restoran untuk kepada LGA 1976 adalah 93% yang sepertimana dianggap sebagai baik. Pematuhan untuk LGA 1976 adalah tinggi disebabkan kuasa penguatkuasaan pelesenan yang ketat. Kajian persepsi pengurusan sisa untuk mengetahui tahap pengetahuan di kalangan

restoran pengendali kepada aspek-aspek pengurusan sisa. adalah 21% yang dan dianggap sebagai hasil yang rendah kerana penemuan ini mewakili hanya enam restoran daripada jumlah restoran yang dikaji. Amalan pengurusan sisa adalah menukarkan persepsi pengusaha restoran di dalam pengurusan sisa yang baik. Prestasi amalan pengurusan sisa adalah 66%. Keputusan ini mewakili 20 daripada 31 restoran yang dikaji. Amalan pengurusan sisa bergantung kepada usaha memperkasakan Akta yang memberi pengusaha restoran persepsi pematuhan yang tinggi terhadap pengurusan sisa yang didapati rendah dari kajian ini., Keputusan hasil amalan pengurusan sisa sebagai adalah purata antara hasil daripada pematuhan kepada LGA 1976 dan persepsi terhadap pengurusan sisa di kalangan restoran di SS2. Sejak keputusan latihan pengurusan sisa purata antara pematuhan restoran di SS2 kepada LGA 1976 yang tinggi dan hasil daripada persepsi terhadap pengurusan sisa di kalangan pengendali restoran yang rendah, oleh itu amalan pengurusan sisa di kalangan restoran di SS2 perlu meningkatkan persepsi terhadap pengurusan sisa di kalangan pengendali restoran.

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LIST OF SYMBOLS AND ABBREVIATIONS

AC	:	aerobic composting
AD	:	Anaerobic Digestion
ARTI	:	Appropriate Rural Technology Institute
CDM	:	Clean Development Mechanism
CHP	:	Combined Heat and Power
Cl	:	Chloride
COM	:	Composting
COS	:	Co-digestion with Sewage Sludge
DEFRA	:	Department of Environment, Food and Rural Affairs
DF	:	Dry Feeding
DOE	:	Department Of Environment
EC	:	European Commission
EEA	:	European Environmental Agency
EPA	:	Environmental Protection Agency
EU	:	European United
FWD	:	Food waste disposer
GDP	:	Gross Domestic Products
ICI	:	Industrial, Commercial and Institutional
IEA	:	International Energy Agency
IQR	:	interquartile range
Kg	:	Kilogram
LGA 1976	:	Local Government Act 1976
MHLG	:	Ministry of Housing and Local Government
MOE	:	Ministry of Environment
MOH	:	Ministry Of Health

MS	:	Member State
MSW	:	Municipal Solid Waste
MSWM	:	Municipal Solid Waste Management
NEA	:	National Environmental Agency
PJ	:	picojoule per second
PDD	:	Project Design Documents
RC	:	restaurants category
SBGF	:	Swedish Bio Gas and Fuel
SCB	:	Survey of Consumer Buying
SEP	:	Standard Error of Proportion
SGA	:	Swedish Gas Association
SOG	:	State of Garbage
SOU	:	Statens Offentliga Utredningar (Swedish Government Official Reports)
SWM	:	Solid Waste Management
TJ	:	terajoule
UK	:	United Kingdom
UNEP	:	United Nation Environmental Plan
UNFCCC	:	United Nation Framework Convention on Climate Change
U S	:	United State
USA	:	United State of America
WF	:	Wet feeding
WG	:	waste generation
WLGA	:	Welsh Local Government Association
WRAP	:	World Responsible Accredited Production
WtE	:	Waste to Energy

CHAPTER 1

INTRODUCTION

1.1 Waste Management

Waste Management can be defined as a process that goes through several stages, beginning with generation of (municipal solid waste) MSW and followed by storage, collection, transference, transportation, processing and ending with final disposal. The main aim of waste management is to protect human health and promote quality of the environment. Hence, in order to achieve the sustainable targets of waste management systems, different sectors in both government and public, need to co-operate (Renbi et al, 2002). Waste Management needs to be carried out in accordance with the principles of economics, consideration of the environment, engineering, feasibility, human health and conservation of the resources and aesthetics (Agamuthu, 2001). Waste management process used in order to reduce the amount of waste which is sent for disposal in order to achieve one or more of targets (Baud, et. al, 2004), these targets are following:

- (i) Reducing the impact of waste on the environment.
- (ii) Reducing transportation cost.
- (iii) Separating material and recovering energy or materials.
- (iv) Reducing the volume of waste that is sent to landfills for disposal.
- (v) Minimizing overall costs.
- (vi) Reducing the risks on the environment and public health, and
- (vii) Conserving the natural resources.

1.2 Wastes from Food Business

Food waste is any by-product or waste product from the production, processing, distribution, and consumption of food. Food waste is any food that is not consumed by humans and can be generated at any level within the food chain (farms, processing plants, manufacturers, commercial establishments, and households) (Westendorf, 2000).

Study was done in Hawaii by (Okazaki, 2008) among 8253 food establishments which include 16 types of food establishments including restaurants, found out that 336,510 tonnes of food waste generated annually by food establishments in Hawaii.

1.3 Problem statement

Standard of living in Malaysia has increased due to urbanization and population growth which also increases the waste generation. The municipal waste generation in Malaysia presently is exceeding 31, 000 metric tonnes/day and is expected to increase by 3% per annum (Agamuthu, et. al, 2009).

Restaurants have considerable share in generating waste which is not only limited in food waste but also other type of wastage material as well. Improving waste management practice in its different aspects such as proper collection, reducing, recycling, and efficient disposal became urgent requirement due to its contribution in declining the negative impact on the environment by avoiding sending the waste to the landfills and conserving the resource by applying the methods of reduce, reuse and recycle (3Rs). The share efforts between the authority, contractor and business provider is highly important to achieve the goal of improving waste management practice in restaurants. Since there are not many studies and research done in Malaysia to find out the contribution of restaurants on waste sector, this study comes to establish base line for restaurants waste in its generation, composition and potential opportunities to manage this waste in order to

mitigate its burden or adverse impact on human health and environment such as production of greenhouse gases and consumption of the natural resources.

1.4 Aim and Objectives

This study is to assess waste management practices among restaurants in Petaling Jaya to the available Rules and Regulation, By-Law and Guidelines used by the authorities for restaurants operators. The study also aims to find out the quantity of waste being generated, composition, waste management efforts (waste collection, handling, storage, reduction, recycling) in Petaling Jaya. The study also aims to describe better ways for managing restaurants waste in order to achieve ultimate purpose of minimizing waste produced by restaurants. Objectives of this study are listed as follow:

- (i) To assess the compliance of restaurants operators toward Local Government Act 1976 (Licensing for food establishments).
- (ii) To identify the perception of restaurants operators about awareness of waste management, to relate the relationship between waste management awareness with degree of law-compliance.
- (iii) To assess waste management practice by restaurants operators.

1.5 Scope of Work

In this study of waste management practice by restaurants operators in Petaling Jaya, the researcher amended the study to be according with activities and targets of waste management mentioned above in topic No. 1.1. Therefore the study goes through compliance of restaurants operators to Local Government Act 1976 (LGA 1976) which is applied through survey and observation by researcher in the first part of the study.

The study in the second part looks at awareness according to compliance and also looks at waste management practice among the restaurants that was conducted through a questionnaire. In addition to the questionnaire, personal interview with restaurants operators was undertaken. Figure 1.1: shows the framework of this study, which is assessing waste management practice by restaurant operators. The study investigates waste records by operators in terms of its amount and composition (food waste and non-food waste) and then investigate waste management aspects of which covers; collection, handling, storage, reduction and recycling for food waste and other types of waste such as plastic, paper, tissues, glass, beverage cans, equipment, grease and cooking oil, degree of compliances with rules, regulations, guidelines and by-law will be identified during the survey and interview.

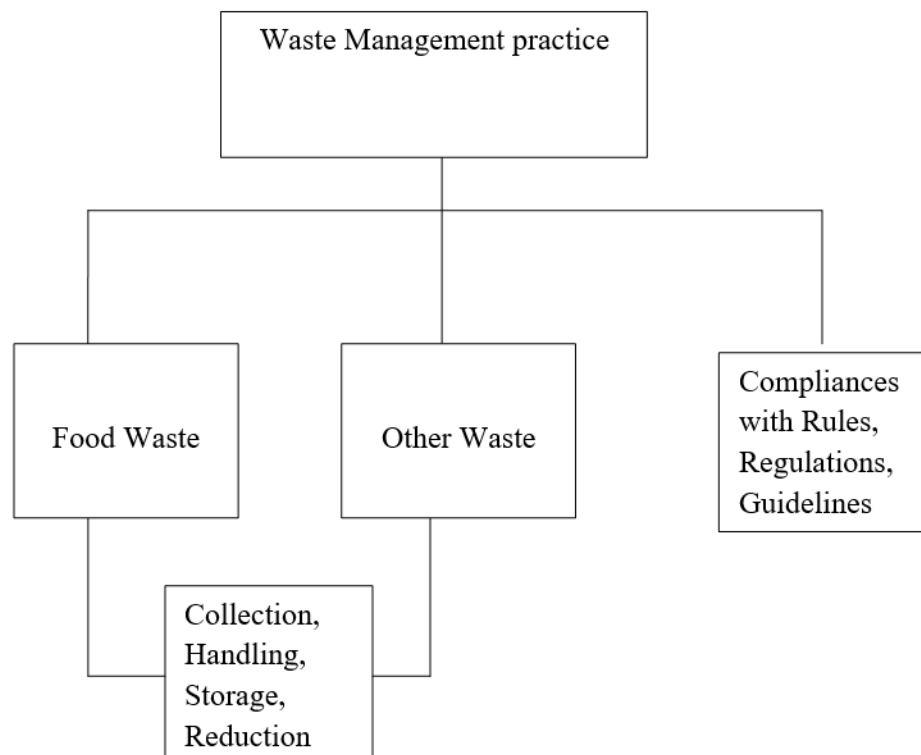


Figure 1-1: Framework for the study of waste management practice by restaurants operators.

1.6 Research Outcome

The purpose of this study is to evaluate the waste management practice amongst the restaurant operators in Petaling Jaya. The study will seek to see the practices in all stages during the day to day operation which include during (collection, storage, reduction and recycling). This study was being carried out by interviewing restaurants operators and workers; a walk through survey at the premises was also carried out after the interviews. Information with regards to waste management by authorities (municipalities) and private sectors (cleansing contractors) were also being sought. Result of the study will show the overall compliance of Food Establishment By-Laws by random food operators and what is their perception of the waste management practices.

CHAPTER 2

LITRETUREREVIEW

2.1 General Overview on Food Waste Generation

Generation of solid waste is considered natural outputs of human life and to get rid of this solid waste will improve the quality of life (Ashok, 2009). Increasing of solid waste generated in its both quantity and variety attributed by many factors such as, increasing of population, urbanization and enhancing living's standards due to new technology (Asokan et al., 2007). In the modern life the municipal solid waste (MSW) is rising throughout the time in its volume, whereas a food scraps consider as part of solid waste stream (NEA, 2009). Hence, food waste is a main factor of municipal solid waste (MSW), which is loading the waste; decreasing the ability of storing, moving, cutting and segregating; moisture intrusion and chloride (Cl) in the acting of incineration; which causes the emission of odorous compounds; negatively impact on the quality of leachate from landfill, and so on (Durlak, et al., 1997; Wang et al., 1999). Information of food waste generation in this topic is to make comparison between Malaysia food waste generations with other countries, concentrating on Asia region.

2.1.1 Food Waste Generation in Malaysia

Malaysia rapid economic growth for the last two decades has resulted in expanding of urban areas, population growth rising of consumption level and this definitely reflected in the change in lifestyle. The amount of the waste produced referred basically to the growing of population number, industrial development and standard of living improvement which may leads to lifestyle change (Narisa, 2004). According to these facts, generation of municipal waste in Malaysia at present time is more than 31,000 tonnes/day (Agamuthu et al., 2009). The organic waste in Malaysia as shown in Figure 2.1 is quite high compared to other types of waste produced in Malaysia like paper,

plastic glass, metal, textile, wood and other which mostly includes types of waste such as demolition and solids come from treated waste-water.etc.

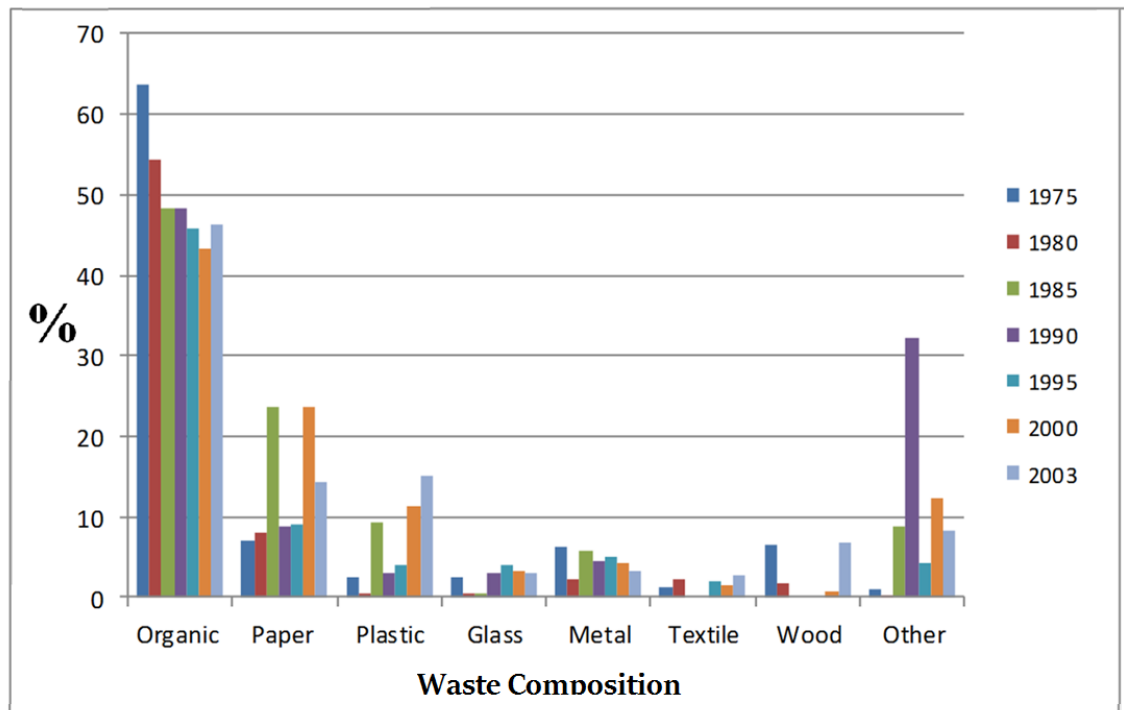


Figure 2-1: Waste composition in Malaysia from 1975-2003
Source: [http://www.kpkt.gov.my/statistic/peangkaan 2002](http://www.kpkt.gov.my/statistic/peangkaan%202002)
(Fauziah & Agamuthu, 2003)

Kitchen’s organic waste is the main component of waste composition; this can be observed via looking at the compound of (MSW) created from selected cities of Petaling Jaya, Kuala Lumpur, Shah Alam and Bangi which are planned cities and have the most population. Figure 2.2 indicates that organic waste which includes food waste is major component of municipal solid waste (Agamuthu, 2001).

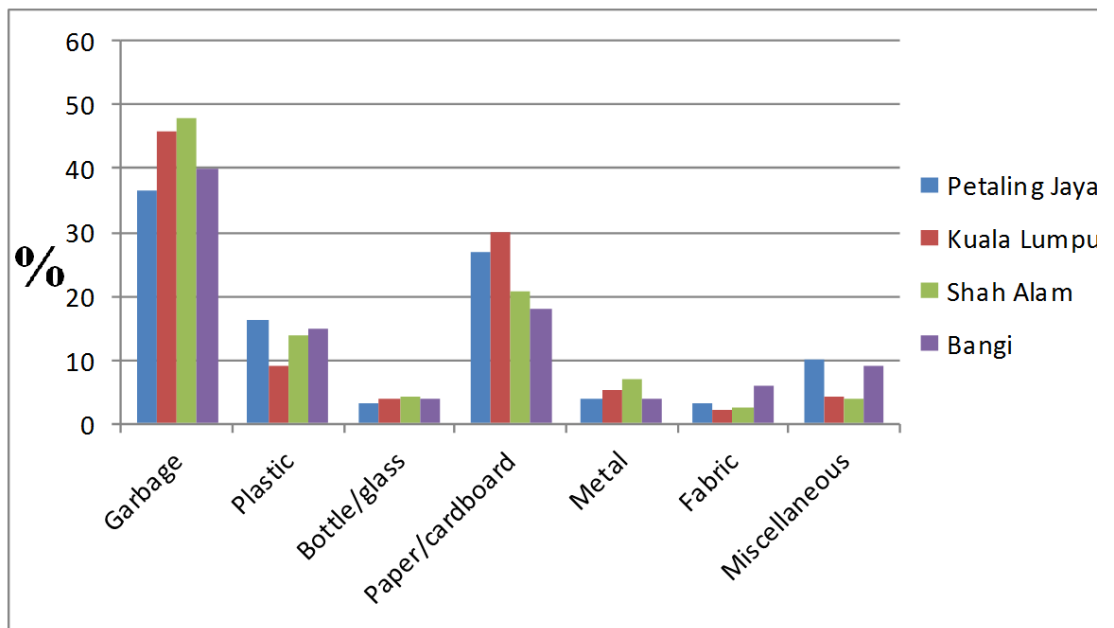


Figure 2-2: Solid waste composition (% by weight) of certain urban places in Malaysia (Source: Agamuthu, 2001)

Malaysia generate 930 tonnes /day of food waste; which does not include food residue, whereas the unused waste mostly includes old or rotten fruit and expiring bread and eggs (Aruna, 2011). This amount produced can be calculated as 339, 450 tonne/year. Based on same reference (Aruna, 2011), compared to developing nations like India and Bangladesh, Malaysia is about to catch up with the developed country situations regarding waste generated, whereas those developing countries do not have unconsumed food. Malaysian urban areas have high level of food wastage than the rural areas because of the high level of income comparing with low income in the rural areas.

In Petaling Jaya food waste percentage is high compared to other types of waste and varies from socio-economic class to another as mentioned below in Figure 2.3 that food waste percentage in low socio-economic area higher than middle and high income area compared to the high and middle socio-economic area (Agamuthu et al., 2001), this may refer to the difference in population size between the three income areas.

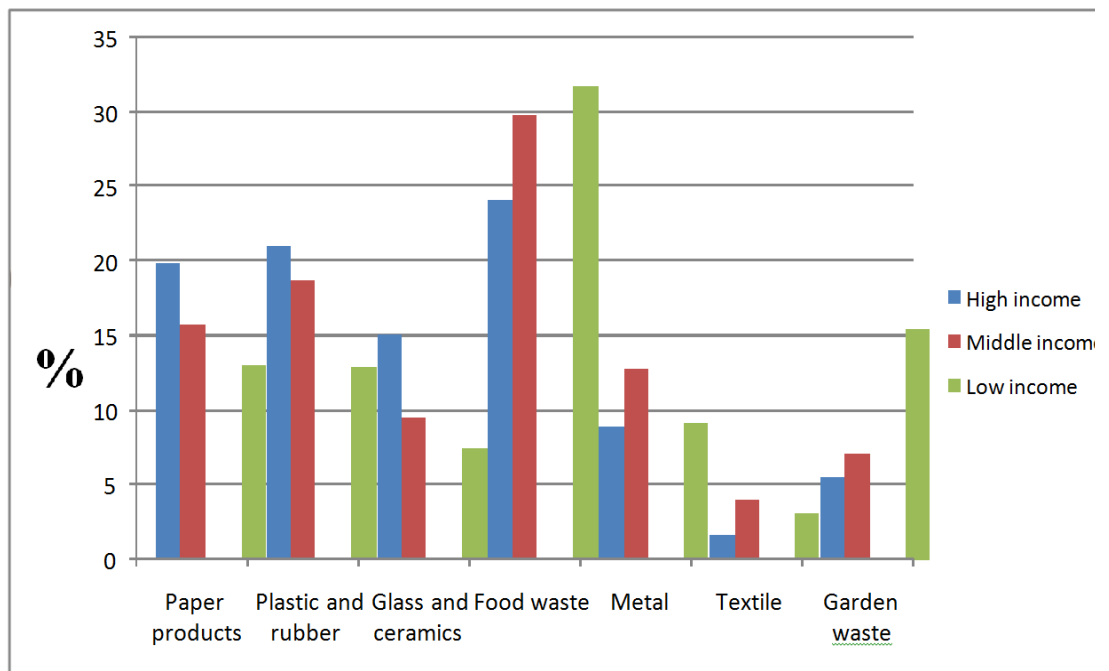


Figure 2-3: MSW generated area by the high and medium and low socio-economic area in Petaling Jaya (Agamuthu, 2001)

2.1.2 Comparison of Food Waste with Other Countries

To compare food waste generation in Malaysia with some Asian countries lying in same region of Malaysia Figure 2.4 below shows municipal solid waste composition in its organic and inorganic components in some Asian countries in same region area with Malaysia. Percent of municipal solid waste given in Figure 2.4 shows that Malaysia is similar to China and Thailand in term of food waste production percent, since food waste percent in Malaysia is approximately 50% of municipal solid waste based on (Fauziah & Agamuthu, 2003).

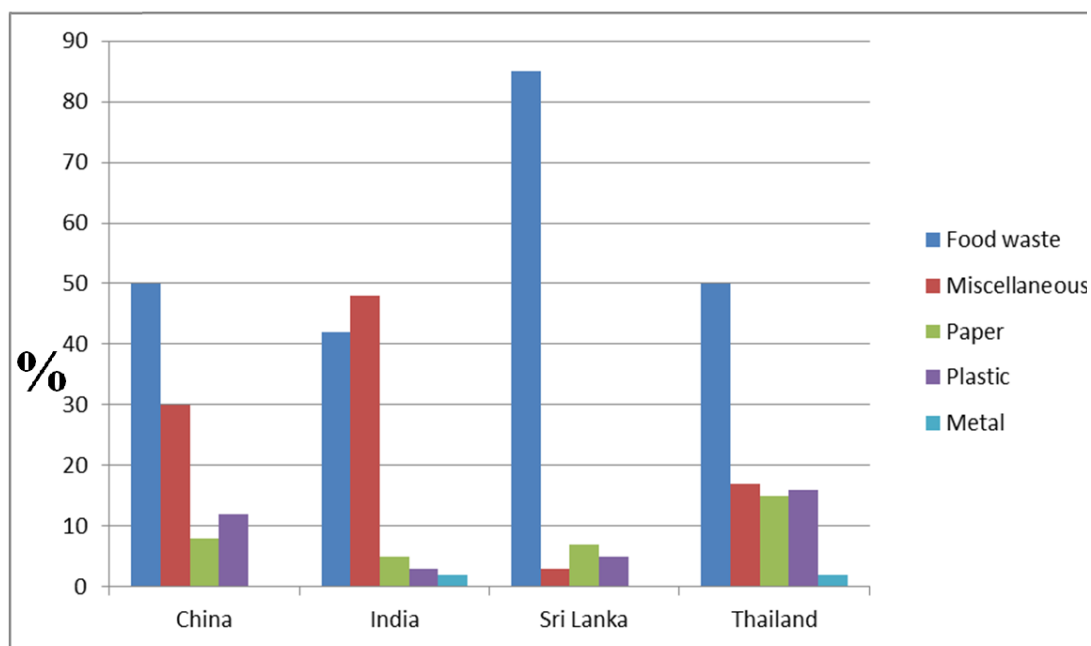


Figure 2-4: Organic and inorganic components of MSW in selected countries (Visvanathan & Trankler, 2005)

2.1.3 Food Waste Policy and Practices Status in Malaysia

Local Authorities took further actions to regulate waste management at three governmental levels namely federal, state and local throughout the country as response to increasing in MSW generation and lacked in disposal sites which faced by Malaysia in late the 1960 and early 1970 (Hoe et al., 2003). At the Federal level, the MSW matters are under the purview of Ministry of Urban Well-being, Housing and Local Government (MOWHLG), while the state government is responsible to guide and assist the Local Authorities in strengthening their institution and financial capabilities for MSW management (Haniba et al., 2002). Local Government Act, 1976, on the management of solid waste and maintaining cleanliness of town and cities are under the local act. The three existing legislations adopted which are directly related to solid waste management in Malaysia (Haniba et al., 2002) are:

- i. Environmental Quality Act – This act was enacted in 1974 for the prevention, abatement and control of environmental pollution and enhances the general quality of the environment.
- ii. Local Government Act – The act was adopted in 1976 and provided better legal and institutional framework for Local Authorities to carry out their duty. The act provides power to Local Authorities to maintain deadlines in towns and put up sanitary services for the removal of waste in their respective operational areas. It also prohibits the deposition of waste in any channel, stream, drain and river. Local Authorities are empowered to enact the by-laws to assist them in carrying out their duty under this act.
- iii. Town and Country Planning Act – This act was enacted in 1976 for proper control and regulation of town and country planning and development in LA areas. It provides for the local planning authority, whose function is to prepare draft structure plans and spells out measures for improvement of the physical environment and connections.

This act which adopted in 1976 included legislations for licensing of food establishments based on measurement criteria will be reviewed later in part from this chapter.

2.1.4 Food Waste Policy and Practices International Status

Waste philosophy has obvious effects on the process of food waste when it is generated (European Commission, 2010). Food waste prevention measures implemented at EU level to enhance previous efforts to protect food waste where created options of five policies (European Commission DG ENV Directorate C final report, 2010), these options as following:

Option 1: The data of EU food waste creating requirements

This policy enables legislators of European and national level to make an action on food waste by introducing quantitative standards for target seeing and policymaking.

Option 2: Date labeling coherence

This aims to enhance the safety of consumers and help them make their decision.

Option 3: EU targets for food waste prevention

This is a program of national waste prevention including methods for addressing targets can be set at member states level.

Option 4: Subsidy and recommendation on the isolation collection of food waste in the Member States.

This aims to isolate collection of food waste from household or food service in member states.

Option 5: Beset awareness campaigns

The policy aims to increase awareness on food waste prevention for certain sectors.

2.2 Food Waste Management Status in Malaysia

Malaysia faced a tremendous increase in MSW generation and lacked in disposal sites, in late the 1960s and early 1970s (Hoe et al., 2003). The local authorities took further actions to constitute some regulations related to waste management at the three tiers of government structure namely federal, state and local throughout the country as a response to this situation, (Haniba et al., 2002). Malaysian Local Government Act 1976 for licensing of food establishments, which consist of eight parts, can be set as following;

Part 1 (preliminary):

Includes citation, (commencement and application) and interpretation.

Part II (license):

Includes license, application of license, license not transferable, fee nonrefundable, deposit, suspension and revocation of license, duration of license, renewal of license, license to be exhibited and produced, temporary license, and surrender of license.

Part III (general provisions for food establishments):

Includes building, sanitation, supply of refuse bins, wet solid refuse, disposal of refuse, spilling of offensive matter, effluent and sewage pollution, water supply, sanitation facilities, lighting and ventilation, work safety and sanitation, provision of mess room etc., fire prevention, store room and storage facilities, burning, spreading dust, etc, noise, Business hour, grading of food establishment, cleaning of bottles and receptacles, insect and pest control, and presumptions.

Part IV (special requirements at the food shop):

Includes: food shall be covered, prohibition of sleeping at food shop, tables to be provided, type of kitchen, stalls, and other precautions for public health.

Part V (special requirements for bread factory): includes tables, etc must be clean, walls and floors, bake house, other precautions for public health.

Part VI (special requirements for dairy):

Includes sanitation of dairies, milk containers, vessels for sale of milk, cleansing of milk containers, containers not to be used for drinking, important sanitation to be observed in milking, disease at premises, and odor to stop supply, distribution or sale of milk.

Part VII (enforcement):

Includes power to enter and inspect, search, search of female person, seizure, forfeiture, forfeiture if there is prosecution, forfeiture if there is no prosecution, no cost or damage arising from seizure to be recoverable, and power to close.

Part VIII (miscellaneous):

Includes prosecution, compounding offences, penalty, and repeal and transitional provision schedule (See appendix C).

Solid waste management in Malaysia started in 1988 with the launching of the Action Plan for Clean and Beautiful Malaysia (Ministry of Housing and Local Government, 2008). Solid wastes are generally categorized into three major categories, and each category is under the responsibility of a different government department:

- i. Municipal solid waste – under Ministry of Housing and Local Government (MHLG)
- ii. Schedule/hazardous waste – under Department of Environment (DOE)
- iii. Clinical waste – under Ministry of Health (MOH).

Malaysia Plan estimated that about 45% of the future waste will be made up of food waste, 24% of plastic, 7% of paper, and 6% of iron and glass, with the balance made up of other materials. Although food (organic) waste is the major component followed by mix paper and plastics, yet, unfortunately the consideration of the authority towards this direction is not sufficient enough to tackle this issue (Latifah et al., 2009). Malaysia also is among large number of developing countries currently disposing unsorted food waste by landfills (Ngoc et al., 2015).

2.3 Food Waste Management in Other Countries

This part of the literature review discusses the global to manage the food waste which is deal as one of the constituents of municipal waste. Some countries have been

selected from different world regions to show the global efforts to control production of food waste and manage what is produced. The part also includes information about food waste management practice in Malaysia.

2.3.1 General Overview of Food Waste Management in Asia

Asia's region is generally defined as a wide and heterogeneous. However, there are developed economies such as South Korea, and Japan, as well as developing economies like China, India, and Indonesia. To study food waste management in Asia Japan, South Korea and Singapore are selected as example for developed Asian countries, while, China and India have selected as example for developing Asian countries:

Due to accumulative ecological compression and decreasing landfill capacity Japan is typical country that adopted principles of prevention of municipal solid waste (MSW) and endorsing recycle, reusing and recapture (Buttol et al., 2007). Various recycling laws were endorsed, including the containers and packaging law, the electric and household applications recycling law, the food recycling law, the automobile recycling act, and the construction material recycling act in the late 1990s and early 2000s (Okuda & Thomson, 2007). In Kawasaki city for example, under the national law on solid waste management, the city administration is in charge of the collection and environmentally friendly dealing for municipal solid waste (MSW), including left-over from families, offices, public amenities, shops and restaurants. Manufacturing sectors manage and treat their industrial wastes under the supervision of the city management. Food waste from the commercial sector such as shops and restaurants are burned experiencing private costs. Due to the difficulty in storing food waste at home and collecting it once a week basis, organic waste from households has been excluded as an option for recycling.

In South Korea the major practices for treating waste are dry feeding (DF), wet feeding (WF), and composting, while anaerobic assimilation and co-digestion with sewage sludge are the minor practices, and landfilling of food waste was banned in Korea in 2005. Dry feeding (DF), wet feeding (WF), and composting (COM) are currently the primary methods used for food waste management in Korea. 50%, 31%, and 19% of the generated food waste was treated by dry feeding, wet feeding, and composting, respectively, in 2008–2009. Approximately 45%, 45%, and 10% of food wastes generated nationwide in Korea were treated by animal feeding (including dry feeding and wet feeding), composting, and other methods (including Anaerobic Digestion (AD), co-digestion with sewage sludge (COS), and vermicomposting), respectively, in 2006 (MOE, 2008). Anaerobic absorption (AD) and co-digestion with sewage sludge (COS) are presented as potential waste management methods that are not commonly used in Korea but could meet current demands for renewable energy recovery from biomass. Food waste disposal (FWD) is considered as substitute food waste organization system due to its rewards, which include improved hygiene, convenience, and energy recovery (Mi-Hyung et al., 2011).

The annual generation of food waste in Singapore was 542,700 tons in 2006 and increased to about 640,500 tons in 2010, which is around 10% of the total waste output in Singapore and the amount of food waste has hit a record high of 703,200 tons in 2012 (Rajni et al., 2014). Singapore since has a signed Kyoto Protocol in April 2006, energy effective and more ecological waste treatment methods will be required after. The food transfiguration methods that are used are: burning, recycling via anaerobic digestion (AD) united with composting of digestate matter, and a suggested aerobic composting plant (Hsien et al., 2010). Composting plant is proposed for the purpose of increasing the recycling options, and for diverting food waste away from incinerators as well. The introduced composting process is an aerobic type based on (Suk-Hui et al., 2007).

Waste-to-energy has been applied widely in Singapore to produce energy from leftover materials and reduce the volume of waste. Due to the limitation of land, Singapore has applied the policy of burning all ‘incinerable’ solid waste, including food waste (NEA, 2009). Therefore Singapore has facilities to recycle food waste from different sources including restaurants by converting it to energy, and Figure 2-5 and 2-6 give example about how this be done.

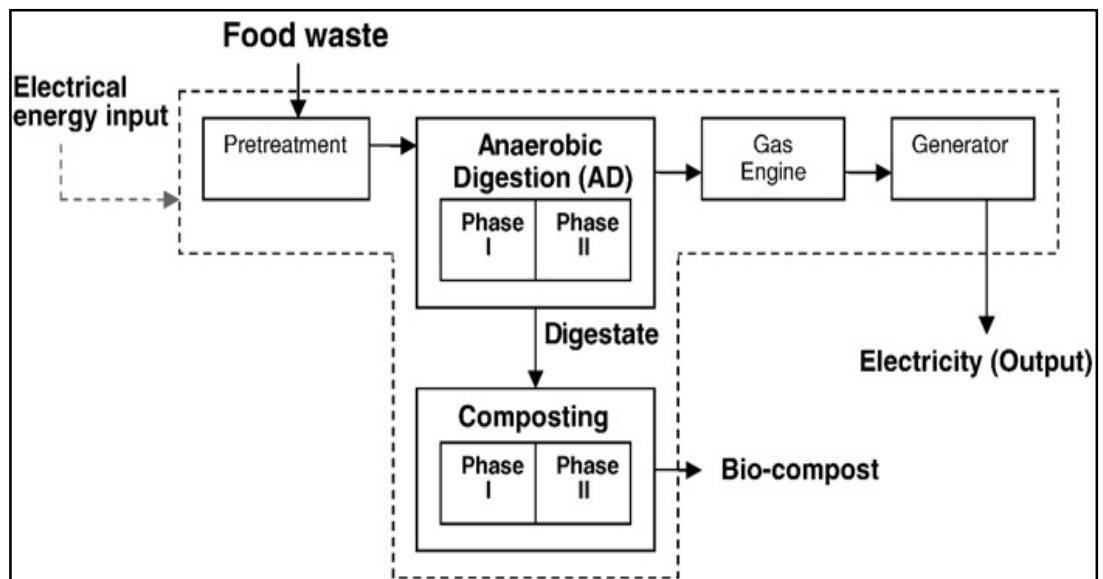


Figure 2-5: Food waste recycling facility in Singapore (Hsien et al., 2009).

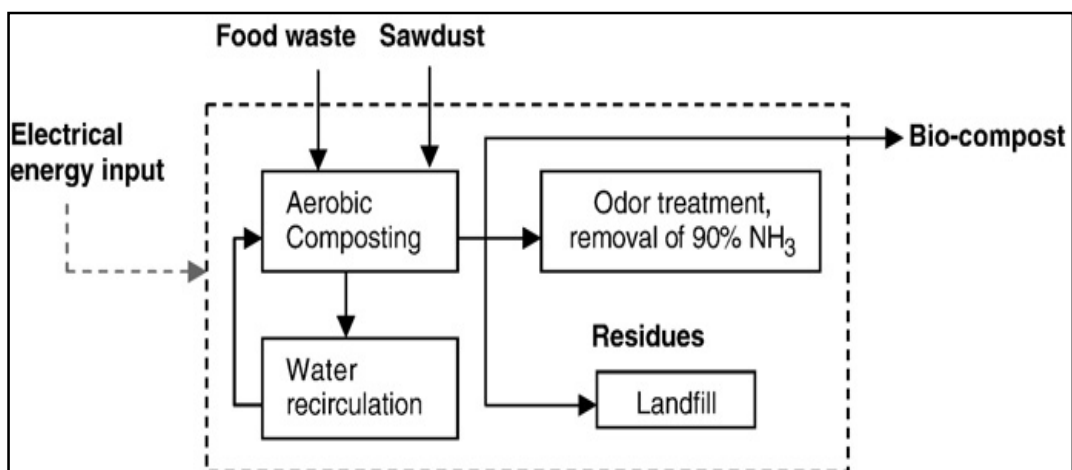


Figure 2-6: Aerobic composting food waste in Singapore (: Hsien et al., 2009).

China is among large number of developing countries, currently disposing unsorted food waste by landfills. China has a weak recycling system due to insufficient infrastructure for collection and inadequate treatment facilities. Because of the huge proportion of food waste, there are only some large cities, such as Beijing and Shanghai that is implementing waste separation at sources and there being collection at homes, while hotels and restaurants deal with their food waste by using biochemical processes. Only seven food waste treatment sites are currently operating in China, while nearly 0.9 million tonnes of food waste in Beijing, Shanghai and Guilin that is segregated and treated by biochemical processes. Although the full scale of food waste-based a plant has not yet been developed, roughly twenty municipal solid waste, food waste, and manure co-fermentation anaerobic digestion projects are under preparation or implementation. However, most of those anaerobic digesters might not function properly due to technical failures, inadequate operations, or management regulations (Ngoc et al., 2015)

India has a large amount of food waste, but their recycling activities are poor, and the dump sites are mostly used to dispose of organic wastes. In India, various institutes and NGO's have established different kinds of anaerobic digesters on household and commercial scales to develop anaerobic digestion technology for food waste treatment. India implemented anaerobic digestion in a pilot scale and opened biogas plants that are used by various institutes (Ngoc et al., 2015). Currently, there are more than 70 composting facilities in India treating mixed municipal solid waste, which recycles up to 5.9% of a total food waste amount to generate about 4.3 million tonnes of compost each year. Almost all composting facilities handle mixed wastes, and two plants in Vijayawada and Suryapetare are known to handle source separated organic wastes (Ranjith, 2012).

2.3.2 General overview of Food waste management in European Union (EU)

Food waste is generated before, during or after meal preparation in the household, and in the manufacture, distribution, retail and food service activities (Rispo et al., 2015). Approximately 42% of total food waste in the European Union is generated by households, 39% by production and processing industries, 14% by the food service and catering sector, and 5% by the retail/wholesale sector (Willem & Nahman, 2015). The landfilling is still the principal treatment option for the EU's public waste. There are significant differences in how countries are depending on landfilling (EEA, 2007, p.8). Netherlands, Denmark, Sweden and Belgium – have already arrived at very low landfilling rates. These countries not only have a substantial level of incineration; they also have a high level of material recovery. In general, there seems to be two strategies for diverting municipal waste from landfill: to aim for high material recovery combined with incineration, or to aim for material recovery which includes recycling, composting and mechanical biological treatment (EEA, 2007). Here also as example for food waste management in EU selected countries are studied below:

The estimated amount of waste in the UK by 2020 is between 33 and 42 million tonnes, based on annual growth rates of 0.75–2.35%, respectively (DEFRA, 2006). In the UK, there is increasing awareness of the environmental impact of food waste and the positive consequences of reducing this waste at source (Quested et al., 2013). The waste hierarchy gives overall priority in reducing the waste stream. In 2005, major UK retailers signed up the Courtauld Commitment with the Waste and Resources Action Programme (WRAP) to collaborate on finding packaging solutions and technologies to reduce waste. They agreed to stop the growth in packaging waste by 2008; to deliver reductions in packaging by 2010; and to identify ways to reduce food waste. Waste-based energy encompasses the technologies that recover energy from waste. One form of waste-based

energy generation includes anaerobic digestion and gasification of organic waste which definitely includes food waste.

Sweden's household and restaurant waste, separated at source, has a biogas potential of 3.4 PJ (Linne et al., 2005), a potential thus available for controlled and more efficient biogas production, compared with landfills, in the future. In addition, industrial organic waste (e.g. from the food industry) could contribute another 3.3 PJ, of which approximately 10% is at present utilised for biogas production (Linne et al., 2005; Nordberg et al., 1998; SBGf, 2001). Waste generated by municipalities in the year 2004 was handled mainly by incineration (47%), material recirculation (33%) and landfilling (9%). Approximately 10% was treated biologically by anaerobic digestion and composting (RVF, 2005a). The interim target within the national environmental objective regarding a good built environment, stating that 35% of municipal food waste and all uncontaminated food waste from food industries should be treated biologically by the year 2010 (Anonymous, 2003, 2005). Since approximately 20% of municipal food waste was treated biologically in 2004 (RVF, 2005a), the biologically treated waste must increase by 35% by 2010. In 2014 the amount of food waste going to co-digestion plants has risen by 21 percent, while food waste going to central composting plants has fallen by 16 percent (Avfall Sverige, 2014).

2.3.3 General Overview on Food Waste Management in North America

In US, a separate food waste composting survey found 273 facilities currently accept food waste (Olivares and Goldstein, 2008a–d; Olivares et al., 2008). There is much discussion among policymakers and environmental advocates to increase programs to divert waste from landfills via source reduction, recycling and composting. One alternative for the diversion of waste from landfills is to increase the quantity of food waste that is treated biologically, either by aerobic composting (AC) or anaerobic

digestion (AD). The management of food waste in composting facilities is less developed and perhaps only in its infancy. There is nonetheless considerable interest in food waste composting and the desire to increase food waste diversion is likely to increase (Levis et al., 2010).

2.3.4 Overview on Food waste Management and Disposal in Africa

There is no clear information about food waste management in Africa, but generally there are two successful clean development mechanism (CDM) municipal solid waste (MSW) composting projects in Africa. The first is in Cairo (Egypt) and involves mechanical and manual sorting of dry waste, followed by the shredding and turned windrow composting of the wet waste (UNFCCC PDD, 2007). The second clean development mechanism (CDM) composting project is in Lagos (Nigeria) (UNFCCC PDD, 2009), and involves the shredding of unloaded waste followed by windrow composting. In addition, in Khartoum (Sudan) a composting plant is at planning stages (Tawfig, et al. 2009). This means even waste management in Africa still in its infant stage.

2.4 Local Government Act 1976

Licensing food establishments is necessary to help in organizing operation in these food establishments. Local Government Act 1976 has described number of requirements to be guidelines to give food establishments in Malaysia operation license as showed summarily in Table 2.1 below and listed in details in the Act (see Appendix A). As it is seen in Table 2.1 LGA 1976 consists of eight parts. Every part describes set of provisions required by the Act. The requirements described by the Act includes licensing procedures, general provisions for food establishments, special requirements demanded in some establishment such as food shops, bread factories, and dairies.

Table 2-1: General Description of LGA 1976 for Licensing of Food Establishments

Part	Description
I. Preliminary	Consists of: 1. Citation, commencement and application 2. Interpretation
II. License	Consists of: 3. Licence 4. Application for licence 5. Licence not transferable 6. Fee non refundable 7. Deposit 8. Suspension and revocation of licence 9. Duration of licence 10. Renewal of licence 11. Licence to be exhibited and produced 12. Temporary licence 13. Surrender of licence
III. General provision for food establishments	Consists of: 14. Building 15. Sanitation 16. Supply of refuse bins 17. Wet solid refuse 18. Disposal of refuse 19. Spilling of offensive matter 20. Effluent and sewage pollution 21. Water supply 22. Sanitation facilities 23. Lighting and ventilations 24. Work safety and sanitation 25. Provision for mess room, etc. 26. Fire prevention 27. Store room and storage facilities 28. Burning 29. Spreading dust, etc. 30. Noise 31. Business hour 32. Grading of food establishments 33. Cleaning of bottles and receptacles 34. Insect and pest control 35. Presumptions
IV. Special requirements at food shop	Consists of: 36. Food shall be covered 37. Prohibition of sleeping at food shop 38. Tables to be provided 39. Type of kitchen 40. Stalls 41. Other precautions for public health
V. Special requirements	Consists of: 42. Tables, etc. must be clean 43. Walls and floors

for bread factory	44. Bake house 45. Other precautions for public health
VI. Special requirements for dairies	Consist of: 46. Sanitation of dairies 47. Milk containers 48. Vessels for sale of milk 49. Cleansing of milk containers 50. Containers not to be used for drinking 51. Important sanitation to be observed in milking 52. Disease at premises 53. Order to stop supply, distribution or sale of milk
VII. Enforcement	Consists of: 54. Power to enter and inspect 55. Search 56. Search of female person 57. Seizure 58. Forfeiture 59. Forfeiture if there is prosecution 60. Forfeiture if there is no prosecution 61. No cost or damage arising from seizure to be recoverable 62. Power to close
VIII. Miscellaneous	Consists of: 63. Prosecution 64. Compounding offences 65. Penalty 66. Repeal and transitional provision

Table 2.2, set down all requirements described in part three and four in LGA 1976 for food establishments licensing such as building design, sanitation, refuse bins, how waste to be disposal, sewage system, water supply, sanitation facilities, lighting, ventilation and work place safety.

Table 2-2: Detail Description of Part III and VI in LGA 1976 – General Provisions for food establishments

Section	Detail Description
Building	<ul style="list-style-type: none"> • Walls • Floors • Living room • Drains • Floors of the upper story • Ceiling of the food establishment
Sanitation	Sanitation shall be in a good and clean condition at all times (see Appendix A).
Supply of refuse bins	Adequate refuse bins shall be provided

Wet solid refuse	All wet solid refuse shall be placed in plastic bags or other suitable container
Disposal of refuse	refuse shall be disposed in such manner as may be determined by the Authority
Spilling of offensive matter	<p>(a) Shall not throw into any drains</p> <p>(b) shall not pass into any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises;</p> <p>(c) dries any article of food or other article or thing in any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises;</p> <p>(d) throws, places, spills or scatters any blood, brine, swill, noxious liquid or other offensive or filthy matter of any kind in such manner as to run or fall into any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises;</p> <p>(e) drops, spills or scatters any dirt, sand, earth, gravel, clay, loam, stone, grass, straw, shavings, sawdust, ashes, garden refuse, stable refuse, trade refuse, manure, garbage or any other thing or matter in any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises;</p> <p>(f) sieves, shakes, cleans, beats or otherwise agitates any lime, ashes, sand, coal, hair, waste paper, feathers or other substance in such manner that it is carried or likely to be carried by wind to any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises; or</p> <p>(g) Throw or leaves behind any bottle, glass, can, food container, food wrapper, particles of food or any other article or thing in any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises</p>
Effluent and sewage pollution	No licensee shall discharge or cause or permit the discharge of any effluent or sewage pollution unless at the point or points of discharge of any effluent and shall follow the manner as determined by the Licensing Authority or any relevant authority
Water supply	<p>(1) Sufficient and fixed water supply shall be provided at all times at any licensed premise and all tap shall be connected directly to the main pipe from the public water supply.</p> <p>(2) Application for water supply to the licensed premises shall be made according to the procedure and approved by the relevant authority.</p> <p>(3) No water supply shall be taken from the tap or other sources from the toilet or bath room</p>

Sanitation facilities	<p>(1) Provide suitable toilet, sink, wash basin, and place to wash crockery and washing room pursuant to any manner and amount as the Licensing Authority thinks fit.</p> <p>(2) The toilets at all-time equipped with sufficient water supply, tissue paper, detergent, fragrance or air freshener, refuse bin and hand electric dryer, roll towel or clean towel, tissue paper, water tap and pail or hose for cleaning.</p> <p>(3) The toilets, sinks, wash basins, urinals, shower rooms, place to wash crockery and other fixtures and fittings attached to it shall at all time is cleaned, maintained, repaired and changed when necessary and if required by the Licensing Authority at any time.</p> <p>(4) The toilet walls, shower room and urinals shall be made from shining tiles and the heights shall not be less than 1.5 meter and it shall be fixed with tiles flooring.</p> <p>(5) The toilets, urinals, bath rooms and washing rooms shall be equipped with sufficient lighting and air circulation or in the manner prescribed by the Licensing Authority.</p> <p>(6) Each of the toilets, urinals, sink and other garbage waste shall be in the flow as in the manner prescribed by the Licensing Authority.</p> <p>(7) The toilet is open for use by any person at the operating hour</p>
Lighting and ventilations	<p>(a) adequate and bright lighting in his premise;</p> <p>(b) the emergency lighting system</p> <p>(c) Adequate ventilation in the premises.</p> <p>(d) all parts in the premises is provided with adequate lighting</p>
Work safety and sanitation	<p>(1) Sound and healthy environment at the licensed premises.</p> <p>(2) The floor and stairs at the licensed premises</p> <p>(3) sufficient first aid</p> <p>(4) No appliances kept or hung at premises.</p> <p>(5) premises shall not be overcrowded</p>

2.5 Food Establishments Laws in Other Countries

Legislating for food establishments has found good concern from governments in the world. In this part of the literature review looking at three international Acts and then evaluate later in this study their similarity to Local Government Act 1976 which is used in licensing food establishments in Malaysia.

2.5.1 Oklahoma State Department of Health- Food Establishment Construction Guide

Table 2.3 mention to the requirements used as guidelines by Oklahoma State Department of Health- Food Establishment Construction Guide Act and detailed description for these requirements (Oklahoma State Department of Health, 2013). These requirements are listed in details by Oklahoma State Department of Health- Food Establishment Construction Guide Act (see Appendix D). As it is shown in the table Oklahoma State Department of Health- Food Establishment Construction Guide Act consists of twenty two parts. Every part discusses set of requirements are demanded by the act for food establishment's construction.

Table 2-3: General Description of Oklahoma State Department of Health- Food Establishment Construction Guide

Facility	Facility Description and Requirements
1.Floors	Floors of all premises parts must be well constructed
2.Walls and ceiling	Must be in good finishing.
3. Water supply	Potable water shall be provided.
4.Sewage disposal	Sewage and wastewater shall be disposed into a public sewage system.
5. Plumbing	Plumbing shall be sized, installed and maintained in a safe manner and according to the International Plumbing Code, applicable local ordinance or health code.
6. Hot water	Hot water shall be supplied to all sinks.
7.Hand washing facility	A minimum of one hand washing sink is required in all food preparation areas.
8. Mop sink	At least one mop sink or curbed cleaning facility with a floor drain shall be provided.
9. Restroom	Adequate toilet facilities shall be provided

10. Lighting	Adequate lighting bulbs shall be provided.
11. Equipment	Floor-mounted food equipment shall be certified by the National Sanitation Foundation (NSF) or an equivalent organization.
12. Hoods and ducts	Ventilation hood systems and devices shall be installed.
13. Refrigeration	Refrigeration units at premises.
14. Hot food storage or display	All hot storage or display facilities at premises.
15. Storage	Utensils and equipment storing at premises.
16. Customer self service	Sneeze shields at premises.
17. Dishwashing facilities	dishwashing facilities at food establishment premises
18. Outer openings	Protection against the entry of insects and rodents.
19. Garbage refuse	Garbage refuses management at premises.
20. Living area	No operation of a food establishment shall be conducted in any room used as living or sleeping quarters. Laundry equipment may be installed in storage rooms containing only pre-packaged food or single-service items.
21. Employee locker area	Lockers or other suitable facilities shall be provided and used for the storage of employee's clothing and other possessions. Dressing rooms shall be provided, if the employees regularly change their clothes, in the establishment
22. Other	All electrical, mechanical, or plumbing work MUST be performed by individuals licensed by the Oklahoma State Department of Health.

2.5.2 Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada)

Table 2.4 included general descriptions for Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada) (see Appendix E), these regulations have been elaborated in details by the Act (Queen's Printer, 1999). The act consists of three parts; every part includes set of provisions. Part one discusses licensing of food establishments, part two mentions to food establishment's construction guides, while part three in its seven divisions describes the operation in food establishments.

Table 2-4: General Description of Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada)

Part	Description
1. Interpretation and Application	<ul style="list-style-type: none"> • Interpretation • Application • Prescribed health hazards and regulated activities
2. Construction of Food Premises	<ul style="list-style-type: none"> • Plans and specifications to be approved • General construction requirements • Washroom facilities
3. Operation of Food Premises	<p>Division 1 — Approvals and Permits:</p> <ul style="list-style-type: none"> • Approval • Notification of health hazard • Permit to operate food service establishment • Repealed <p>Division 2 — Training:</p> <ul style="list-style-type: none"> • FOODSAFE training <p>Division 3 — Food Sources and Protection:</p> <ul style="list-style-type: none"> • Food from approved sources • Protection of food from contamination • Contaminated food • Processing, storage and display • Previously served food <p>Division 4 — Equipment, Utensils and Cleaning:</p> <ul style="list-style-type: none"> • Equipment, utensils and food contact surfaces • Maintenance • Storage • Refrigeration and hot holding equipment • Single service utensils and containers <p>Division 5 — Employees:</p> <ul style="list-style-type: none"> • Employee hygiene • Communicable disease <p>Division 6 — Food Safety Management:</p> <ul style="list-style-type: none"> • Food handling procedures • Sanitation procedures <p>Division 7 — Miscellaneous:</p> <ul style="list-style-type: none"> • Animals • Pests • Storage of chemicals

Table 2.5 shows detailed description for the part two sections used as measurements in this study which are equivalent to the measures of part III and VI in LGA 1976 that have been used in this study (see Appendix E2). Part two in this act consists of eight requirements needed to be considered in every food establishment premises. These requirements include provisions such as safety, sanitation, separate food establishment from direct access to living quarters, water supply, lighting and ventilation.

Table 2-5: Detail Description of Part Two in Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada)

Section	Detail Description Requirement
General construction requirements	<ul style="list-style-type: none"> <li data-bbox="596 770 1007 808">(a) shall be soundly constructed <li data-bbox="596 846 1082 884">(b) safe and sanitary handling of food <li data-bbox="560 922 1417 1028">(c) constructed from materials that are, suitable for their intended purpose, durable, easily cleaned and free from any noxious or toxic substance, <li data-bbox="560 1066 1417 1171">(d) separate from and without direct access to living quarters, or any area in which activities are carried out that are incompatible with the safe handling of food <li data-bbox="560 1209 1417 1314">(e) connected to a source of potable water, and a waste disposal system operating in compliance with the requirements of the government agency that has jurisdiction <li data-bbox="560 1352 1209 1391">(f) hot and cold water shall be adequately supplied <li data-bbox="560 1429 1054 1467">(g) adequate lighting shall be provided <li data-bbox="560 1505 1417 1646">(h) equipped with ventilation equipment that is adequate to prevent the accumulation of smoke, grease, water vapor and objectionable odors, and supplied with equipment that will ensure the safe and sanitary handling of food

2.5.3 Ministry of Health and Family Welfare (Food Safety and Standards Authority of India)

Table 2.6 includes general descriptions for the requirement used by Ministry of Health and Family Welfare (Food Safety and Standards Authority of India) (see Appendix G) for organizing food establishment operation (Ministry of Health and Family Welfare, 2011).the act consists of five parts, discuss requirements to be followed by food business operators such as hygiene practice, sanitation.

Table 2-6: General Description of Ministry of Health and Family Welfare (Food Safety and Standards Authority of India)

Part	Description
I. General Hygienic and Sanitary practices to be followed by Petty Food Business Operators applying for Registration	<ul style="list-style-type: none"> • Sanitary and hygienic requirements for food manufacturer/ processor/handler • A. Sanitary and hygienic requirements for street food vendors and units other than manufacturing/ processing
II. General Requirements on Hygienic and Sanitary Practices to be followed by all Food Business Operators applying for License	<ul style="list-style-type: none"> • Location and surroundings • Layout and design of food establishment premises • Equipment and containers • Facilities • Food operations and controls • Management and Supervision • Food Testing Facilities • Audit, Documentation and Records • Sanitation and maintenance of food establishment premises • Personal hygiene • Product information and consumer awareness • Training
III. Specific Hygienic and Sanitary Practices to be followed by Food Business Operators engaged in manufacture, processing, storing and selling of Milk and Milk Products	<ul style="list-style-type: none"> • Sanitary requirements • Personal hygiene requirements • Sanitary requirements for storage • Wrapping and packaging
IV. Specific Hygienic and Sanitary Practices to be followed	<ul style="list-style-type: none"> • Slaughter House

by Food Business Operators engaged in manufacture, processing, storing and selling of Meat and Meat Products	
V. Specific Hygienic and Sanitary Practices to be followed by Practices to be followed by Food Business Operators engaged in catering / food service establishments	<ul style="list-style-type: none"> • Good maintaining practices for whole premise • Good food hygiene practices • Personal hygiene • Transportation and handling of food • Storage • Special requirements for high risk foods

Table 2.7 shows detailed description for the part II sections used as measurements which are equivalent to the measurement of part III and VI in LGA 1976 which are used in this study (see Appendix H). The part discusses set of requirements needed to be followed by food establishments such as premises design, facilities, food operation control and supervision, sanitation, maintenance and training.

Table 2-7: Detail Description of Part II in Ministry of Health and Family Welfare (Food Safety and Standards Authority of India)

Section	Detail Description and Requirement
Location and surrounding	<ol style="list-style-type: none"> 1. Food establishment premises location 2. Protect the manufacturing area from any potential contamination. 3. Should not have direct access to any residential area.
Layout and design of food establishment premises	<ol style="list-style-type: none"> 1. Floors, ceilings and walls must be maintained in a sound condition 2. Doors shall also be made of smooth and non-absorbent surfaces 3. The floor of food processing / food service area shall have adequate and proper drainage. 4. Adequate control measures should be in place to prevent insects and rodents from entering the processing area from drains.

	<p>5. Windows, doors & all other openings to outside environment shall be well screened with wire-mesh or insect proof</p> <p>6. manufacture, store or expose for sale or permit the sale of any article of food in any premises not effectively separated</p>
<p>Equipment & containers</p>	<ol style="list-style-type: none"> 1. Equipment and containers that come in contact with food and used for food handling, storage, preparation, processing, packaging and serving shall be made of corrosion free materials. 2. Equipment and utensils used in the preparation of food shall be kept at all times in good order and repair and in a clean and sanitary condition. 3. Every utensil or container containing any food or ingredient of food intended for sale shall at all times be either provided with a properly fitted cover/lid or with a clean gauze net or other material of texture sufficiently fine to protect the food completely from dust, dirt and flies and other insects. 4. No utensil or container used for the manufacture or preparation of or containing any food or ingredient of food intended for sale shall be kept in any place in which such utensil or container is likely by reason of impure air or dust or any offensive, noxious or deleterious gas or substance or any noxious or injurious emanations, exhalation, or effluvium, to be contaminated and thereby render the food noxious. 5. Equipment shall be so located, designed and fabricated that it permits necessary maintenance and cleaning functions as per its intended use and facilitates good hygiene practices inside the premise including monitoring and audit. 6. Appropriate facilities for the cleaning and disinfecting of equipment and instruments and wherever possible cleaning shall be adopted. 7. Equipment and containers for waste, by-products and inedible or dangerous substances, shall be specifically identifiable and suitably constructed. 8. Containers used to hold cleaning chemicals and other dangerous substances shall be identified and stored separately 9. If required, a waste water disposal system / effluent treatment plant shall be put in place. 10 All items, fittings and equipment that touch or come in contact with food must be: <ul style="list-style-type: none"> • kept in good condition

	<ul style="list-style-type: none"> Chipped enameled containers will not be used. Stainless steel /aluminum / glass containers, mugs, jugs, trays etc. suitable for cooking and storing shall be used. Brass utensils shall be frequently provided with lining.
Facilities	<ul style="list-style-type: none"> Water supply For Cleaning Utensils / Equipment Washing of Raw materials Ice and Steam Drainage and waste disposal Personnel facilities and toilets Air quality and ventilation Lighting
Food operations and controls	<ul style="list-style-type: none"> Procurement of raw materials Storage of raw materials and food Food Processing / Preparation, Packaging and Distribution / Service Food Packaging Food Distribution / Service
Management and Supervision	<ol style="list-style-type: none"> A detailed Standard Operating Procedure for the processing of food as well as its packing, dispatch and storage shall be developed The Food Business shall ensure that technical managers and supervisors have appropriate qualifications, knowledge and skills
Food Testing Facilities	<ol style="list-style-type: none"> A well-equipped, laboratory for testing of food materials Food shall be tested before dispatch from the factory. Regular testing shall be done through an accredited lab notified by FSSAI.
Audit, Documentation and Records	<ol style="list-style-type: none"> A periodic audit of the whole system daily records for food establishment operation
Sanitation and maintenance of establishment premises	<ul style="list-style-type: none"> Cleaning and Maintenance Pest Control Systems
Personal hygiene	<ul style="list-style-type: none"> Health Status Personal Cleanliness Visitors
Product information and consumer awareness	All packaged food products shall carry a label and requisite information.
	<ol style="list-style-type: none"> The Food Business shall ensure that all food handlers are aware of their role and responsibility in protecting food from contamination or deterioration. The Food Business shall ensure that all the food handlers are instructed and trained in food hygiene and safety aspects.

Training	3. Periodic assessments of the effectiveness of training, awareness of safety requirements and competency level shall be made 4. Training programs shall be routinely reviewed and updated
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2.6 Summary

All the acts provided in the earlier text will provide guidelines to food establishment's operators to follow and comply with the regulation. All these guidelines should be compulsory for food establishments licensing and for proper waste management practice. .

CHAPTER 3

METHODOLOGY

3.1 General Outlines

In the course of the study the researcher applies two methods; survey and questionnaire. The survey is conducted to check the compliance of restaurants operators to the requirement of LGA 1976 for licensing food establishments. The questionnaire is conducted to look at restaurants operators' performance on the waste management practice. The first part of the study, discusses the results of survey of restaurants operators compliance to LGA 1976 which was done by researcher observations. The second part of the study discusses the questionnaire results which were carried out through direct interview with the restaurants owners and managers whom will be referred to as the subjects throughout the study.

Petaling Jaya as other Malaysian cities has all variation of local food restaurants including Malay, Chinese and Indian restaurants. The list of SS2 restaurants is as shown in Table 3.1. Chinese restaurants have highest number representing 85% of the whole 95 restaurants in the study area. Muslim Indian restaurants came second representing 7% of restaurants population in the study area and lastly Malay restaurants has the lowest number of restaurants among the local restaurants in SS2 which was just one restaurant representing around 1% of total number of restaurants. There is also Sandwich a few shop restaurants and Non-Malaysian restaurants representing 7% of whole 95 restaurants in the study area.

Table 3-1: Restaurants Classifications Percent from the Total Number of Restaurants in SS2

Type	Number	Percent (%)
Chinese restaurants	81	85
Indian restaurants	7	7
Malay restaurants	1	1
Sandwich shop restaurants	3	3.5
Non-Malaysian restaurants	3	3.5

In terms of sampling selection the questionnaire was designed to cover all types of restaurants in Petaling Jaya city, named as:

- i. Local restaurants which are divided into three subclasses (Malay, Chinese and Indian restaurants).
- ii. Non-Malaysian food restaurants.
- iii. And sandwich shops.

Out of 95 restaurants listed by Petaling Jaya City Council (MPPJ), 35 restaurants have been selected as sample of this study deemed to be sufficient to cover all types of restaurants in the study area. Questionnaires conducted by direct interview and the researcher conducted the interview personally and explain to subjects the methods in order to ensure that the subjects understand the purpose of the study. The questions cover areas such as following:

- i. Waste Generation; estimation of daily amount of waste generated by restaurants generally and amount of food waste separately.
- ii. Waste Composition; the materials likely are generated by restaurants.
- iii. Waste Collection, Storage and Handling.
- iv. Waste Reduction.
- v. Recycling Status
- vi. Waste-water Management

- vii. Energy and Water Consumption
- viii. Awareness of waste management

SS2 area is surrounded by red circle in the map, it has been chosen as the area of the study. The area of SS2 was suggested by Petaling Jaya City Council (MBPJ) which holds the responsibility of waste management in Petaling Jaya City. Petaling Jaya City Council (MBPJ) adopts regular township waste management campaign and SS2 is the proposed district while this study is conducted.

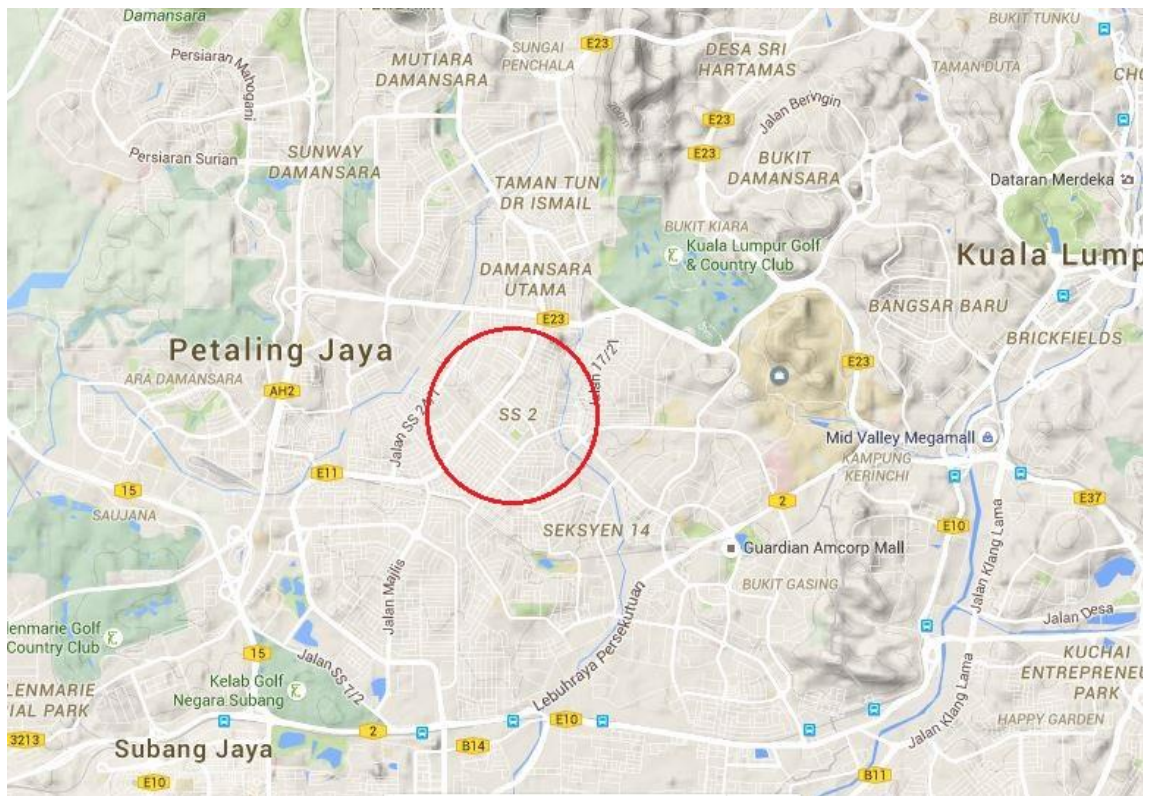


Figure 3-1: Map of Petaling Jaya and SS2 indicated by Arrow on the map

3.2 Assessment Compliance of Restaurants Operators to LGA 1976

The study on compliance assessment was carried out by walkthrough investigation to find out whether restaurants operators compliance to Local Government Act 1976 which is appointed for licensing food establishments (See Appendix B). A survey has been done to answer the checklist which was conducted to find out compliance

of restaurants to the Local Government Act 1976 requirements in term of licensing food establishments. Table 3.2 shows the list of the checklists which was used in the survey.

Table 3-2: List of the Requirements for licensing Food Establishments According to the Part III and IV from Local Government Act 1976

Related By-Laws	References
Building and Design	Section 14(1-6), details in Appendix C
Waste Handling and Storing	Section 16, 17 and 20, details in Appendix C
Water Supply and Sanitation Facilities	Section 21(1-3) and Section 22(1-7), details in Appendix C
Safety Procedures	Section 23 and Section 24(1-5) and Section 26 and Section 30, details in Appendix C
Food and Food Stuff	Section 27(1-6), Appendix C
General Hygiene Condition Conserving	Section 15 and Section 29 and Section 34, details in Appendix C

3.3 Assessment of Perception of Restaurants Operators on Waste Management Awareness: relationship between waste management awareness and the degree of law-compliance

The study on perception was carried out through questionnaire and interview with the restaurants operators to find out the level of awareness of waste management and the awareness among restaurants operators in SS2 (see Table 3.3). The researcher introduced the questions one by one and then the restaurant operator answers the question. Questions mode are short answer questions or give them options to choose and most questions are answered in closed ended questions with yes/no answer (see Appendix A). The questions in this part of study were done based on Green Business Program, 2010.

Table 3-3: Contents of Interview on Waste Management Perception

Question No.	Purpose of Question
1	The question aim to measure restaurants operators knowledge of the necessity of reducing waste production to save the environment
2	The question aim to check restaurants operators efforts involving restaurants customers in their waste management efforts
3	The question aims to find out if that environmental policies adopted by restaurants operators which also can serve the target of second question
4	The question aims to check restaurants operators efforts in improving the level of waste management practice among restaurants staff
5	The question aims to insure that restaurants managers conduct periodic all-staff presentations on waste management which is regarded as sustainable training for restaurants staff
6	The question aims to insure that restaurants managers have good concern of waste management
7	The question aims to give picture on restaurants managers' knowledge of waste management activities
8	The question aims to check restaurants operators information these programs especially reduction, recycling, and purchasing
9	The question aims to check restaurants operators' information of the facilities which can help them with their waste management practice, therefore prove their knowledge of facilities needed to improve waste management practice in their restaurants.

3.4 Assessment for Waste Management Practice by Restaurants Operators: determination of the contributing factor for discrepancies in Waste Management Practice

The study on waste management practice was carried out through questionnaire and interview with the restaurants operators. Then the researcher determined the contributing factor for discrepancies in waste management Practice. The interview on waste management practice aims to look at restaurants operators' performance on waste management practice as it's shown in Table 3.4 below. The mode of answers to the questions was yes/no as mentioned above. The questions in this part of study were done based on Green Business Program, (2010) and (Burbank Green Alliance, 2009).

Table 3-4: Contents of Interview on Waste Management Practice

Area of Waste Practice	Question No.	Purpose of Question
Waste generation	10	To know about the concern of restaurants managers to record daily amount of general waste produced by restaurants
	11	To know about the concern of restaurants managers to record daily amount of food waste produced by restaurants
	12	To know about the concern of restaurants managers to record daily amount of cocked oil produced by restaurants
Waste composition	13	To measure restaurants managers information of waste composition produced by their restaurants
Waste Collection, Storage and Handling	14	Lid waste containers
	15	Lined waste containers
	16	Segregation of restaurants waste
	17	Utilizing filtering drain plugs / screens to prevent the solid to drain with water
	18	Label recycling bins
	19	Locate bins and dumpsters appropriately
	20	Restaurant waste removal schedule
	21	Waste stored in room with exhaust fan
	22	Waste storage area free from odors, contaminants, or signs of pets
	23	Appoint waste collecting full time staff
	24	Appoint waste disposal contractor
	25	Oil and grease collection contractor provide for restaurant sealed waste grease bins or covered, water-tight waste bins
	26	Check dumpster if is full at the time it is emptied necessary for contractor collection trip number per day
	27	The service of waste management is part of lease business requirement
Waste Reduction	28	How ship and receive goods
	29	How deliver goods to the site
	30	How goods when received are packaged
	31	Purchasing recycled or re-manufactured products
	32	Materials reduced in order to reduce the waste production in the restaurants
Waste Recycling	33	Adopting recycling program
	34	Facilities used in recycling program
	35	Where the recyclable waste goes

Waste Water	36	internal drainage system
	37	Connection of internal drainage system with the public drainage system
	38	Pre-treated for waste water before discharged
	39	Using grease trap or interceptor
	40	Person or contractor to clean the trap or interceptor
Energy and Water Consumption	41	Using saving energy dishwasher
	42	Using saving energy water heater
	43	Turn off the lights and cooling in unoccupied areas
	44	Encourage customers to save water and energy

(sources: Green Business Program, February 23, 2010 supplemental checklist for restaurants and food services and Burbank Green Allianc, January 2009. GREEN RESTAURANT CHECKLIST)

3.5 Outcome of Interview with Restaurants Operators

The questionnaire which was applied through interview with restaurants operators in SS2 was conducted to find out the perception of waste management among restaurants operators and then reflection on waste management practice. In part of waste management awareness, the interview was done to look at restaurants operators' knowledge of preliminary waste management activities and then how they interpret this knowledge as practice. In part of waste management practice, the interview covered waste management practice status in terms of waste generation record, composition record, waste collection, waste storage, waste handling, waste reduction, waste recycling, waste-water management, energy consumption, water consumption. The content of this interview is shown in Table 3.5.

Table 3-5: Content of Interview with Restaurants Operators and Managers in SS2 on Perception and Practice Aspects

Category	Purpose
Perception Study	<ul style="list-style-type: none"> • Perception of waste management among restaurants operators. see Appendix A
General View on Waste Status	<ul style="list-style-type: none"> • Waste Generation • Waste Composition: with prioritizing waste items from 1 to 5 based on its bulk • Waste Collection, Storage and Handling see Appendix A
Waste Reduction and Recycling Performance	<ul style="list-style-type: none"> • Waste Reduction in SS2 Restaurants • Recycling Status among SS2 Restaurants. see Appendix A
Waste-water Management, Energy and Water Consumption Status	<ul style="list-style-type: none"> • Waste-water Management Status of SS2 Restaurants • Energy and Water Consumption Status in SS2 Restaurants. see Appendix A

3.6 Statistical Analysis

Data have been manually analyzed to find out percent of answers. In terms of waste generation and waste composition data have been analyzed for whole surveyed restaurants and then analyzed by restaurants class individually (Chinese, Indian, Malay, non-Malaysian and Sandwich shops restaurants). Spreadsheet Microsoft Excel has been used to find out minimum, maximum, median and interquartile range for waste generation. Standard error of proportion (SEP) given by (Box *et al.*, 1994) was used in all study parts using the following formula: $SEP = P\sqrt{(1 - P)/n}$ where (p) is the proportion size, and (n) is the sample size.

CHAPTER 4

RESULTS

4.1 General Outlines

Chapter four includes two parts; first part discusses the questionnaire result which was done through direct interview with the restaurants managers and operators in order to assess their waste management practice. The second part shows the checklist results which was done through researcher observations. Questionnaire and the checklist are attached with this dissertation as Appendix A and Appendix B respectively.

Petaling Jaya (PJ) is a residential city with some industrial areas. It is located in the Petaling district of Selangor with an area of approximately 97.2 km². On 20th June 2006, Petaling Jaya was granted a city status. It was first developed as a solution to the problem of overpopulation in Kuala Lumpur in 1952 and has since witnessed a dramatic growth in terms of population size and geographical importance. Until the end of 1953, the town was administered by the Kuala Lumpur District Officer. Administratively and historically, it was considered part of Kuala Lumpur. However, Petaling Jaya ceased to be part of Kuala Lumpur when the latter became a Federal Territory on the first February, 1972. It then became a township in its own right within the state of Selangor. On 1 January 1977, the Petaling Jaya Town Authority was upgraded to Petaling Jaya Municipal Council or Majlis Perbandaran Petaling Jaya (MPPJ). Petaling Jaya city consists of twenty one sub-districts managed by Petaling Jaya city council namely SS1, SS2, etc. In this study, SS2 was selected as the field of study to represent Petaling Jaya.

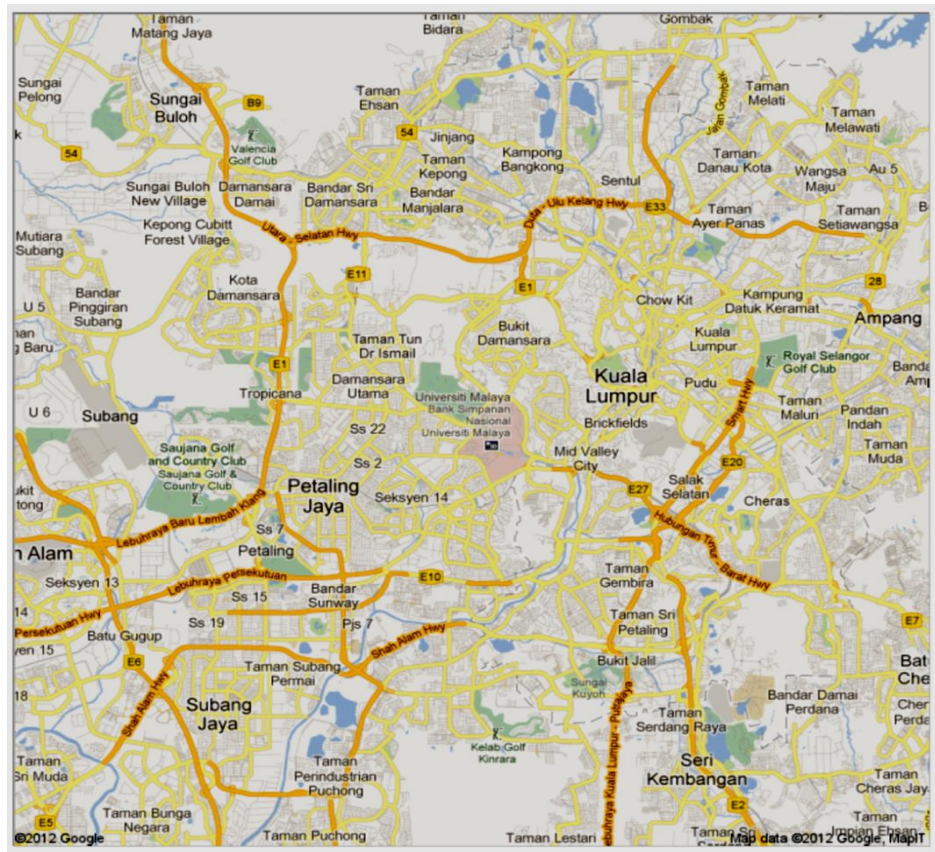


Figure 4-1: Physical Representation of SS2 within Petaling Jaya

The total number of restaurants in SS2 district of Petaling Jaya City Council is 95 including all restaurants classifications. Randomly, 35 restaurants have been selected for this study. Thirty one restaurants responded to the interview where four of restaurants refused due to the absence of authorized person and the need to obtain permission from the head quarter's of the company.

4.2 Compliance of Restaurants Operators to Local Government Act 1976

Petaling Jaya City Council (MBPJ) bears the responsibility of licensing food establishments in Petaling Jaya city. Petaling Jaya City Council gives license to restaurants and food shops with condition to achieve all requirements included in the Local Government Act 1976 which are listed in Part III (General Provision for all Food

Establishments).The licence requirements included in the Local Government Act 1976 are appointed to serve general aspects such as:

1. Building & Food Establishment Design
2. Waste Handling and Storing
3. Water Supply & Sanitation Facilities
4. Safety Procedures
5. Food & Food Storage
6. General Hygiene Condition conserving

4.2.1 Restaurant Building and Design

This section of study based on compliance toward LGA 1976 requirement on restaurants building and design including aspects such as walls construction, floors, drains construction, upper story floors, ceiling construction and furniture. Local Government Act 1976 for licensing of food establishments (Petaling Jaya City Council) By-Laws 2007 (See appendix C), described the food establishment building and design as shown in Table 4.1.

Table 4-1: Restaurants Building Requirement in Local Government Act 1976 for Licensing of Food Establishments

No.	Requirement	Compliant (%)	Non-compliant (%)
1	Building walls well-finished with a smooth surface capable of being easily and quickly cleaned and without any projections or recess or angle that is likely to collect dust	100	0
2	Floors tiled or smoothly finished and graded to allow all fluid easily drained	84	16
3	No living room, sleeping place, partition or mezzanine floor in part of restaurant	100	0
4	Drains constructed of brick lined with good cement and with a semi-circular bottom or of glazed earthenware half-pipes and diameter not less than fifteen centimeters with sufficient number and gradient to carry all water and other fluids	100	0
5	The upper story floors are cement, concrete or close floor boards tongued and grooved or jointed to be water-tight	100	0
6	The ceiling constructed of material as which permitted by the authority (Non-flammable material).	100	0
7	Employee's facilities such as prayer room, mess room, rest room, canteen changing room and suitable lockers are provided at premises and the same facilities for women employees are separated from the men facilities.	19	81
8	Restaurant tables provided with tops of marble or glass or of wood covered with formica or any other material as may be approved by the authority	100	0



Figure 4-2: Example for Bad Floors in Restaurants



Figure 4-3: Example for Good Floors in Restaurants



Figure 4-4: Example for Bad Drains in Restaurants; the images from multisided of the drain



Figure 4-5: Example for Good Drains Restaurants; the images from outside and inside of the drain

4.2.2 Restaurant's Waste Handling and Storing

The section on the waste handling and storing covers aspects such as; sufficiency of refuse bins, separation of wet waste, applying authority instructions on waste disposal, connection and sewage with sewage system. Local Government Act 1976 for Licensing of Food Establishments (Petaling Jaya City Council) By-Laws 2007 (See Appendix C) has listed waste handling and sorting in restaurants as show in Table 4.2. Restaurants in SS2 are 100% fit to the requirements number 9, 12 and 13, while only 29% of SS2 restaurants are achieving requirements number 10 and 11.

Table 4-2: Restaurants Waste Handling and Storing

No.	Requirement	Compliant (%)	Non-compliant (%)
9	Adequate refuse bins are provided as specified by the authority	100	0
10	All w t solid refuse is placed in plastic bags or other suitable container	29	71
11	All refuse disposed in such manner as may be determined by the authority	29	71
12	Waste materials are not thrown or deposited into public area around the premises such as drains, footway, walking pavement	100	0
13	Sewage connected with sewage system determined by relevant authority	100	0

4.2.3 Restaurant Water Supply and Sanitation Facilities

Section of water supply and sanitation facility includes aspects such as; Sufficiency of water supply, sanitation facility situation, lighting situation and availability of toilet service. Local Government Act 1976 for Licensing of Food Establishments (Petaling Jaya City Council) By-Laws 2007 has described water supply and sanitation facilities as showed in Table 4.3. The result revealed that surveyed restaurants in SS2 100% are achieved the requirements of this section.

Table 4-3: Restaurants Water Supply and Sanitation Facilities

No.	Requirement	Compliant (%)	Non-compliant (%)
14	Sufficient water supply provided at all time at premises according to the procedures approved by the relevant authority and not taken from tap or other sources from toilet or bath room	100	0
15	Sanitation facilities such as toilet, sink, wash basin, place to wash crockery and washing room are provided at the premises clean and maintain all the time. Toilet equipped with sufficient water supply at all time	100	0
16	Toilet walls, shower room urinals made from shining tiles with heights not less than 1.5 meters and fixed with tiles flooring	100	0
17	Sanitation facilities are equipped with sufficient lighting and air circulation	100	0
18	Toilet opens for use by any person at the operating hour	100	0

4.2.4 Restaurant Safety Procedures

Section of safety procedures includes aspects such as adequacy of lighting, adequacy of ventilation system, work place safety, fire prevention equipment availability and noise control. Local Government Act 1976 for Licensing of Food Establishments (Petaling Jaya City Council) By-Laws 2007 has described Safety Procedures in food establishments as showed in Table 4.4. The result revealed that surveyed restaurants in SS2 100% are achieved the requirements of this section.

Table 4-4: Restaurants Safety Procedures

No.	Requirement	Compliant (%)	Non-compliant (%)
19	There is adequate and bright lighting in the premises. The emergency lighting system is in operating condition and placed at any staircase, passage and exit doors of the premises	100	0
20	There is adequate ventilation system in the premises	100	0
21	Work place safety and sanitation is managed well	100	0
22	Fire prevention facilities is provided, managed and functioning well; all stairs, pathway, platform and exit way is provided, managed and functioning well; and all stairs, platform access and exit way free from any obstruction and each door inside is built and attached in such way that it is easily open	100	0
23	No noise created as to be a nuisance when operating of restaurant activities	100	0

4.2.5 Food and Foods Stuff Storage in the Restaurant

This section looks as issues regarding storage room, storing manners (between halal food and non-halal food). Local Government Act 1976 for Licensing of Food Establishments (Petaling Jaya City Council) By-Laws 2007 has described Food and Foods Stuff Storage in food establishments as show in Table 4.5. The result revealed that surveyed restaurants in SS2 100% are achieved the requirements of this section.

Table 4-5: Food and Food Stuff Storage in the Restaurants

No.	Requirement	Compliant (%)	Non-compliant (%)
24	Store room or storage area provided for the storage of foodstuffs, utensils equipment and crockery and such store room or storage area not used for dwelling or other purposes and maintained in a clean conditions at all times	100	0
25	Foods stuffs stored or placed less than twenty centimeters from the floor level	100	0
26	Halal food and non-halal food are prepared separately wash and store foods, appliances, utensil, equipment, crockery or cutlery used to prepare and serve the non-halal and 'halal' food separately at different places	100	0

4.2.6 Restaurant General Hygiene Condition

Section of hygiene condition investigates aspects such as regular maintenance, air control, food covering and pets' control. Local Government Act 1976 for Licensing of Food Establishments (Petaling Jaya City Council) By-Laws 2007 has described general hygiene condition of restaurants establishments as show below in Table 4.6. The non-compliance in the requirements No. 27 and 29, are not related to awareness on waste management, but related to compliance to the regulations stated in LGA 1976.

Table 4-6: Restaurants General Hygiene Condition Conserving

No.	Requirement	Compliant (%)	Non-compliant (%)
27	Regular maintenance to maintain premises including fixtures and fitting to ensure it is in good and clean condition at all times	94	6
28	There is no spreading of any quantity of dust, smoke, vapors, heat gas, projection, smell, vibration, smoke or soot from the place or licensed premise which is a nuisance or pollutes the atmosphere	100	0
29	Food is covered and food or drinks in a glass case or any other enclosure drinks to do not come into contact with or be contaminated by any dust, dirt, fume, flies or vermin and such food or drinks shall be in a clean and hygienic condition	90	10
30	Restaurant free from mice, flies, insects, flees, and vermin to breed	100	0

4.3 Perception Study

Table 4.7 shows results of the restaurants operators' perception on waste management and related environmental issues. Importance of waste minimization has the highest perception of 77%, while 100% was for not percept on items such informing customers about business environmental efforts, adopting a written environmental policy statement stating their business, train some of their staff on waste management practice and conducting periodic all-staff presentations on waste management. 42% of restaurants operators are percept on willingness to pay more for waste minimization from your profits. 26% of restaurants operators are percept on waste management difficulties faced by them. There are only 6% of restaurants operators that was percept on waste management (reduction, recycling, purchasing) program needs. 35% of restaurants operators are percept on needed things can be provided by authorities or any concern body to assist them on their waste reduction efforts

Table 4-7: Waste Management and Environmental Awareness Status among SS2 Restaurant

No.	Item	Percept (%)	Non-Percept (%)
1	Perception on importance of waste minimization to the environment conservation	77	23
2	Perception on informing customers about business environmental efforts	0	100
3	Perception on adopting a written environmental policy statement stating your business	0	100
4	Perception on train some of your staff on waste management practice	0	100
5	Perception on conducting periodic all-staff presentations on waste management	0	100
6	Perception on willingness to pay more for waste minimization from your profits	42	58
7	Perception on waste management difficulties faced by restaurants operators	26	74
8	Perception on waste management (reduction, recycling, purchasing) program needs	6	94
9	Perception on needed things can be provided by authorities or any concern body to assist you in your waste reduction efforts	35	65

4.4 Waste Management Practice by Restaurants Operators

This part of study looks at performance of waste management by restaurants operators in term of waste generation records, composition records, collection, storage, and waste handling operation processes. The study also discussed issues of waste reduction and waste recycling, waste-water, water and energy consumption.

4.4.1 General View on Restaurants Waste Management Status in SS2

Waste generation estimation, waste composition, waste collection, storage and handling are necessary to improve waste management practice in restaurants. The study found out waste generation amount for all surveyed restaurants and amount of waste generated for restaurants categories. The study also found minimum (minimum amount of waste generated by one or some restaurants), maximum (maximum amount generated by one or some restaurants), and the median and interquartile range for waste generated

by restaurants, which is necessary to assess reasonability of waste amount produced by surveyed restaurants.

4.4.1.1 Waste Generation

Question No. 10, 11 and 12 in the questionnaire to know the estimation of waste generation amount which consist of general waste, food waste and cooking oil produced by surveyed restaurants. Waste generation is categorized as all restaurants and different types of restaurants Chinese, Indian, Malay restaurants.

Table 4-8: General Waste Generation by Restaurants Categories per day

Number of Restaurants	WG RC	Minimum Kg	Maximum Kg	Median Kg	IQR Kg
31	All restaurants	0.16	4.03	20	13
23	Chines restaurants	0.2	5.43	15	10
3	Indian restaurants	8.3	23.3	30	0.0
3	Non-Malaysian restaurants	2.66	8.3	15	0.0

WG: waste generation

RC: restaurants category

IQR: interquartile range

Table 4.8 shows the general waste including food waste in the surveyed restaurants which was made through visual observation by the researcher and also from the response of the restaurants managers. Through the survey the researcher found that average of minimum amount of general waste generated by SS2 restaurants was 0.16kg/day and average of maximum amount was 4.03Kg/day and the median of the all surveyed restaurants was 20kg/day, where the interquartile range was 13kg. The result showed the general waste generated by the restaurants in SS2 313.5 tonne/year. Average

of minimum amount of general waste generated by Chinese restaurants was 0.2Kg/day, average of maximum amount generated was 5.43Kg/day and the median for the Chinese restaurants was 15Kg/day, where the interquartile range was 10Kg. The result showed that the general waste generated by the Chinese restaurants in SS2 is 202.9 tonne/ year representing 65% from the total general waste for the all surveyed restaurants. Indian restaurants are 3 restaurants from the total surveyed restaurants. From investigation of waste generation among Indian restaurants the average of minimum amount of general waste generated was 8.3Kg/day, average of maximum amount was 23.3Kg/day and the median of 3 Indian restaurants was 30Kg/day, where the interquartile range was 0.0kg. The result showed that the general waste generated by the Indian restaurants in SS2 was 45.6 tonne/ year representing 15% from the total general waste for the all surveyed restaurants. There is only one Malaya restaurant among the total number of surveyed restaurants. Investigation found that the amount of general waste generated by Malay restaurant was 110Kg/day, which are 40.6 tonne/ year representing 13% from the total general waste for the all surveyed restaurants. Non- Malaysian restaurants were 3 restaurants from the total surveyed restaurants. Average of minimum amount of general waste generated by Non-Malaysian restaurants was 2.66Kg/day, average of maximum amount was 8.3Kg/day and the median of Non- Malaysian restaurants was 15Kg/day, where the interquartile range was 0.0Kg/day. General waste generated by the non-Malaysian restaurants in SS2 is 17.5 tonne/ year representing 6% from the total general waste for the total number of surveyed restaurants. In SS2, there is only one Sandwich shop among the total surveyed restaurants. General waste generated by Sandwich shop in SS2 was 20Kg/day, which are 7.3 tonne/ year representing 2% from the total general waste for surveyed restaurants.

Table 4-9: Food waste Generation by Restaurants Categories per day

Number of Restaurants	WG	Minimum Kg	Maximum Kg	Median Kg	IQR Kg
	RC				
31	All restaurants	0	2.41	9	12
23	Chines restaurants	0	3.26	9	12
3	Indian restaurants	3.3	15	20	0.0
3	Non-Malaysian restaurants	0	0.66	0.0	0.0

WG: waste generation

RC: restaurants category

IQR: interquartile range

Table 4.9 shows the food waste generated in the investigated restaurants which was done by the same way of the general waste estimation. There was no minimum amount has found for surveyed restaurants, the average of maximum amount generated was 2.41Kg/day and the median for the 31 surveyed restaurants was 9Kg/day, where the interquartile range was 12kg. The result showed the food waste generated by the all surveyed restaurants in SS2 was 147 tonne/ year representing 47% from total general waste. Food waste generated by Chinese restaurants in SS2, there was no minimum amount of food waste for Chinese restaurants, average of maximum amount was 3.26Kg/day and median for the Chinese restaurants was 9Kg/day, where interquartile range was 12kg. Food waste generated by Chinese restaurants in SS2 was 103 tonne/ year representing 33% from the total general waste of all surveyed restaurants. Food waste generated by Indian restaurants, average of minimum amount was 3.3Kg/day, average maximum amount was 15Kg/day and the median of food waste generated for the Indian restaurants was 20Kg/day, where there was no interquartile range result. The result showed that the food waste generated by Indian restaurants was 27.37 tonne/ year

representing 9% from the total general waste for all surveyed restaurants. Food waste generated by Malay restaurant amount was 40Kg/day which was 14.6 tonne/ year representing 4.7% from the total general waste. Food waste generated by Non- Malaysian restaurants (restaurants sale non- Malaysian food), was no minimum amount for non- Malaysian restaurants, average of maximum amount was 0.66Kg/day and the median of food waste generated for the 3 Non- Malaysian restaurants was 0.07Kg/day, where the interquartile range was 0.0Kg/day. Food waste generated by Non-Malaysian restaurants was 0.73 tonne/ year representing 0.23% from the total general waste. Food waste generated by Sandwich shop restaurants amount was 3Kg/day which is 1.1 tonne/ year representing 0.35% from the total general waste.

Table 4-10: Cooking Oil Generation by Restaurants Categories per day

Number of Restaurants	WG RC	Minimum Kg	Maximum Kg	Median Kg	IQR Kg
31	All restaurants	0	0.55	3	4
23	Chines restaurants	0	0.73	2	4
3	Indian restaurants	1	5	8	0.0
3	Non-Malaysian restaurants	0.3	1.66	5	0.0

WG: waste generation

RC: restaurants category

IQR: interquartile range

Table 4.10 shows the cooking oil generation by SS2 restaurants. From the survey, that there was no minimum amount of cooking oil for the all surveyed restaurants, average of maximum amount was 0.55Kg/day and the median of the generated amount was 3Kg/day, where the interquartile range was 4kg. Cooking oil generated by all surveyed restaurants in SS2 is 43.8 tonne/ year. There was no minimum amount of cooking oil for

Chinese restaurants, average of maximum amount was 0.73Kg/day and the median of Chinese restaurants was 2Kg/day, where the interquartile range was 4kg. Cooking oil generated by Chinese restaurants was 29.2 tonne/ year representing 67% from the total Cooking oil generated by all surveyed restaurants. Average of minimum amount of cooking oil amounts generated by Indian was 1Kg/day, average of maximum amount was 5Kg/day and the median for the Indian restaurants was 8Kg/day, where interquartile range was 0.0kg. Cooking oil generated by Indian restaurants is 9.49 tonne/ year representing 22% from the total Cooking oil generated by all surveyed restaurants. Cooking oil generated by Malay restaurants amount were 3Kg/day. Cooking oil generated by Malay restaurants is 1.1 tonne/ year representing 2.5% from the total Cooking oil generated by all surveyed restaurants. Cooking oil amounts generated by Non- Malaysian restaurants, average of minimum amount generated was 0.3Kg/day, average of maximum amount was 1.66Kg/day and the median for the Non-Malaysian restaurants was 5Kg/day, where interquartile range was 0.0Kg/day. The result showed that the Cooking oil generated by Non-Malaysian restaurants is 4.015 tonne/ year representing 9.7% from the total cooking oil generated by all surveyed restaurants. Cooking oil generated by Sandwich shop restaurants amount generated were 0Kg/day and the result showed that the cooking oil generated by Sandwich shops was 0 tonne/year.

4.4.1.2 Waste Composition

Information about waste composition generated by restaurants can help in planning for waste management mainly in waste reduction and recycling program. To get information about waste composition generated by SS2 restaurants the researcher asked through the survey in question No. 13 Restaurants operators were asked to select five items represent the bulk of their waste stream and then prioritize these waste items from 1 to 5 based on amount produced by the restaurant, and one is indicating the largest percentage waste item. Then depending on their answers find out the composition of the

waste for different classification of restaurants individually. Furthermore researcher introduced to restaurant’s operators types of waste likely generated by restaurants to ease their selection.

Table 4-11: Waste Composition with Ranking from 1-5 for all Restaurants

No	Item	Yes (%)	No (%)
1	Food waste	100	0
2	Plastic containers	74	26
3	Metal can	71	29
4	Miscellaneous plastic ¹	58	42
5	Newspaper	39	61
6	Mix paper ² & glassware ³	36	64
8	Polystyrene foam	29	71
9	White paper ⁴	16	84
11	Yard waste	3	97

1. Miscellaneous plastic: includes (stretch warp, strapping, etc.)
2. Mix paper: includes (corrugated cardboard, glossy inserts, advertising mail, color, etc.)
3. Glassware: includes (drinkware, tumblers, stemware, other glass)
4. White paper: includes (computer, copier, ledger, stationery, etc.)

Table 4.11 shows the result for the interviewed restaurants. Food waste was ranked by all restaurants in percent of 100% as first waste item generated by SS2 restaurants. Plastic containers prioritized as second waste item by 74% of SS2 restaurants, where 26% of SS2 restaurants did not rank plastic container as second waste item. Metal can ranked by SS2 restaurants as third waste item by 71% of SS2 restaurants, while 29% of SS2 restaurants did not rank metal can as third waste item. Miscellaneous plastic ranked by SS2 restaurants as fourth waste item in percent of 58%, while 42% of SS2 restaurants did not rank miscellaneous plastic as. Newspaper was ranked as fifth waste item by 39% of SS2 restaurants, when 61% of them did not rank newspaper as fifth waste item. Mix paper and glassware were ranked as sixth waste item by 36% of SS2 restaurants, while 64% of them did not rank the item. Polystyrene foam ranked as eighth waste item by 29% of SS2 restaurants, where 71% of SS2 restaurants did not. White paper was ranked as ninth item by 16% of SS2 restaurants, while 84% of them did not rank the

item. Yard waste was ranked as eleventh waste item by 3% of SS2 restaurants, when 97% of SS2 restaurants did not rank the item.

Table 4-12: Waste Composition with Ranking from 1-5 for Chinese Restaurants

No	Item	Yes (%)	No (%)
1	Food waste	100	0
2	Plastic containers	74	26
3	Metal can	65	35
4	Miscellaneous plastic ¹	48	52
5	Glassware ² & news paper	44	56
7	Mix paper ³	39	61
8	Polystyrene foam	26	74
9	White paper ⁴	9	91
10	Yard waste	4	96

1. Miscellaneous plastic: includes (stretch wrap, strapping, etc.)
2. Glassware: includes (drinkware, tumblers, stemware, other glass)
3. Mix paper: includes (corrugated cardboard, glossy inserts, advertising mail, color, etc.)
4. White paper: includes (computer, copier, ledger, stationery, etc.)

In order to know the difference between the restaurants classification in term of waste composition Table 4.12 shows the result of the same question among Chinese restaurants which were 23 restaurants from the total 31 surveyed restaurants. Food waste selected as first by all Chinese's restaurants in percent of 100%. Plastic containers ranked as second percent of 74%, while 26% of Chinese restaurants did not rank plastic containers as second waste item. Metal can ranked as third waste item in percent of 65%, while 35% of the Chinese restaurants did not rank the item. Miscellaneous plastic ranked by Chinese restaurants as waste item fourth in percent of 48%, while 52% of the Chinese restaurants did not rank it as fourth waste item. Glassware and newspaper were ranked as waste item number five in percent of 44%, while 56% of Chinese restaurants did not rank the item fifth waste item. Mix paper was ranked by Chinese restaurants as seventh waste item in percent of 39%, while 61% of the Chinese restaurants did not rank Mix paper. Polystyrene foam was ranked by Chinese restaurants as eighth waste item in percent of 26%, while 61% of Chinese restaurants did not rank Polystyrene foam. White paper was ranked by Chinese restaurants as ninth waste item in percent of 9%, when 91% of the

Chinese restaurants didn't rank White paper as ninth waste item. Yard waste was ranked by Chinese restaurants as tenth waste item in percent of 3%, while 96% of Chinese restaurants did not rank yard waste as tenth waste item.

Table 4-13: Waste Composition with Ranking from 1-5 for Indian Restaurants

No	Item	Yes (%)	No (%)
1	Food waste & metal can	100	0
3	Miscellaneous plastic ¹	67	33
5	White paper ² & mix paper ³ & glassware ⁴ & Polystyrene foam & news paper	33	67

1. Miscellaneous plastic: includes (stretch wrap, strapping, etc.)
2. White paper: includes (computer, copier, ledger, stationery, etc.)
3. Mix paper: includes (corrugated cardboard, glossy inserts, advertising mail, color, etc.)
4. Glassware: includes (drinkware, tumblers, stemware, other glass)

Table 4.13 shows the result of waste composition generated in Indian restaurants. Food and metal can were ranked by all Indian restaurants as first waste item in percent of 100%. Miscellaneous plastic has been ranked by Indian restaurants as second waste item in percent of 67%, while 33% of Indian restaurant did not rank miscellaneous plastic. White paper, mix paper, glassware, Polystyrene foam and newspaper were ranked by Indian restaurants as fifth waste item in percent of 33%, while 67% of Indian restaurants did not rank them items as fifth waste item.

Table 4-14: Waste Composition with Ranking from 1-5 for Malay Restaurants

No	Item
1	Metal can
2	Food waste
3	Miscellaneous plastic ¹
4	Mix paper ²
5	Polystyrene foam

1. Miscellaneous plastic: includes (stretch wrap, strapping, etc.)
2. Mix paper: includes (corrugated cardboard, glossy inserts, advertising mail, color, etc.)

Table 4.14 shows the result of waste composition generated by Malay restaurants. There was only one Malay restaurant have been surveyed in this study. Metal can was

ranked by Malay restaurants as first waste item. Food waste has been prioritized by Malay restaurants as second waste item. Miscellaneous plastic has been ranked by Malay restaurants as third waste item. Mix paper was ranked by Malay as fourth waste item. Polystyrene foam was ranked by Malay restaurants as fifth waste item.

Table 4-15: Waste Composition with Ranking from 1-5 for Sandwich Shops

No	Item
1	Mixed paper ¹
2	Miscellaneous plastic ²
3	Plastic containers
4	Food waste
5	Metal can

1. Mix paper: includes (corrugated cardboard, glossy inserts, advertising mail, color, etc.)
2. Miscellaneous plastic: includes (stretch warp, strapping, etc.)

Table 4.15 shows the result of waste composition generated by Sandwich Shops. There was only one Sandwich Shop surveyed in the study. Metal can has been ranked by Sandwich Shops as first waste item. Food waste has been ranked by Sandwich Shops as second waste item. Miscellaneous plastic has been ranked by Sandwich Shops as third waste item. Mix paper has been prioritized by Sandwich Shops as fourth waste item. Polystyrene foam has been ranked by Sandwich Shops as fifth waste item.

Table 4-16: Waste Composition with Ranking from 1-5 for Non-Malaysian Restaurants

No	Item	Yes (%)	No (%)
1	Miscellaneous plastic ¹ & food waste	100	0
3	Plastic containers & newspaper & metal can	67	33
6	White paper ² & mixed paper ³ & polystyrene foam	33	67

1. Miscellaneous plastic: includes (stretch warp, strapping, etc.)
2. White paper: includes (computer, copier, ledger, stationery, etc.)
3. Mix paper: includes (corrugated cardboard, glossy inserts, advertising mail, color, etc.)

Table 4.16 shows the result of waste composition generated in Non-Malaysian restaurants. Miscellaneous plastic and food waste were ranked by Non-Malaysian as first waste item in percent of 100%. Plastic containers, newspaper and metal can have been

ranked by Non-Malaysian as second waste item in percent of 67%, while 33% of Non-Malaysian restaurant did not ranked the items as second waste item. White paper, mixed paper and polystyrene foam these items have been ranked by Non-Malaysian as sixth waste item in percent of 33%, while 67% of Non-Malaysian restaurants did not rank the items.

4.4.1.3 Waste Collection, Storage and Handling

Table 4.17 showed results of waste collection, storage and handling practice among SS2 restaurants. Questions No. 14 and No. 15, the result showed that 87% of the surveyed restaurants their waste containers have lids and lining, where just 3% of the surveyed restaurants answered in the negative.

Table 4-17: Collection, Storage and Waste Handling in SS2 Restaurants

No	Item	Yes (%)	No (%)
14	Waste management practice on waste containers lids	87	13
15	Waste management practice on waste containers lining	87	13
16	Waste management practice on waste separating	36	64
17	Waste management practice on utilizing filtering drain plugs / screens to prevent the solid to drain with water	100	0
18	Waste management practice on having recycling bins with the labeling	13	87
19	Waste management practice on locating bins and dumpsters appropriately	100	0
20	Waste management practice on having waste removal schedule	100	0
21	Waste management practice on keeping waste in storage room with exhaust fan	0	100
22	Waste management practice on checking waste storage area for odors, contaminants, or signs of pets	0	100
23	Waste management practice on having waste collecting full time staff	65	35
24	Waste management practice on having a cleaning and waste disposal contractor	100	0
25	Waste management practice on providing sealed waste grease bins or covered, water-	55	45

	tight waste bins by oil and grease collection company provide to your business		
26	Waste management practice on dumpster situation; is it full at the time it is emptied?	32	68
27	Waste management practice on is the service part of your lease business requirement?	0	100

Question No. 16 the surveyed restaurants showed that only 36% of surveyed restaurants practice waste separation, where 64% is do not carried out waste separation. The result for questions No. 17, 19, 20 and 24 confirmed that 100% of surveyed restaurants utilized filtering drain plugs, bins are located appropriately, have existing removal schedule and cleaning contractor. Question No. 18, as detailed in Table 4.18 the survey showed that just 13% of the surveyed restaurants label their bins, where's, 87% do not label their bins. In question No. 21, the result shows that 100% of the surveyed restaurants said that they do not use exhaust fan, as it is not required to them. The result in question No.22 revealed that there is no waste storage room among all restaurants in SS2, as it is not required to them too. The result in question No.23 showed that 65% of SS2 restaurants have full time waste collection staff, where 35% of SS2 restaurants have no. In question No. 25 the result shows that about 55% of restaurants waste collection company provides with them sealed waste grease bins or covered, water-tight waste bins, where 45% of SS2 restaurants said there were not provided with by Collection Company. For question No. 26 the result showed that 32% of surveyed restaurants said their dumpster is full at time it is emptied; where 68% of surveyed restaurants their dumpster was not full at time it is emptied. In question No. 27 100% of the surveyed restaurants confirmed that waste management is not part of their lease business requirement, as it is not required to them.

4.4.2 Waste Reduction and Recycling Efforts by Restaurants Operators

Waste either before or after consuming the product, the reduction of the waste can be by reduced from its source or through its using process, then recycling comes as

solution for non-avoidable waste. The researcher part investigates on waste reduction and recycling performance by restaurants operators in SS2 by checking reusable crating system, delivery, packaging and use of recycled or re-manufactured products.

4.4.2.1 Waste Reduction Efforts

Delivery of goods to restaurants in reusable crating system has been checked by the questions as shown in Table 4.18. Question No. 28 checked goods delivery system to restaurants in SS2, the result showed that 23% of restaurants in SS2 answered in affirmation when researcher asked if restaurants receive their goods in permanent and reusable crating system, where 77% answered in negative. Delivery medium can help also in waste reduction which is important for waste management practice in restaurants. In Table 4.18, question No. 29 looks at how the goods are delivered to restaurants. Result shows that 94% of restaurants receive their goods by supplier, where 6% do not use the supplier as their delivery medium. 13% contract with delivery services, while 87% do not use delivery services. 65% of the restaurants operators bring goods to their restaurants by them self, while 35% of them use other mediums. To reduce generation of waste in restaurants there is a need to use minimal and reusable packaging. In Table 4.18, question No. 30 looks at this point. The result shows 74% of restaurants use cardboard container, where 26% of them do not use it. Drum has been used by 16% of restaurants, when 84% did not using drum.

Table 4-18: Waste Reduction Status in SS2 Restaurants

No	Item	Yes (%)	No (%)	
28	Waste management practice on shipping/receiving goods in permanent and/or reusable crating system	23	77	
29	Waste management practice on how delivering goods to the business site	Supplier	94	6
		Delivery services	13	87
		Self	65	35
		Malaysia post service	0	100
30	Waste management practice on received goods packaging	Cardboard container	74	26
		Drum	16	84
		Pallet	0	100
		Stretch warp /strapping	87	13
		Bucket	54	46
		Other	12	88
31	Waste management practice on purchasing recycled or re-manufactured products	23	77	
32	Waste management practice on materials reduced in order to reduce the waste in the restaurant	Plain paper fax	16	84
		Coffee mugs	16	84
		Cloth towels	68	32
		Bulk dispensers	3	97
		Duplex copying	3	97
		Refillable products	10	90
		Scrap paper reuse	13	87
		Post / circulate	0	100

The result also shows that 87% were using stretch warp/strapping, while 13% were not using stretch/warp. 54% of restaurants operators were using bucket, while 46% were not using bucket. 12% of restaurants operators have other ways of packaging to receive their goods, where 88% did not have. In Table 4.18, question No. 31 aims to investigate purchasing recycled and re-manufacturing products among SS2 restaurants, the result showed that 23% of the restaurants operators in SS2 are purchasing recycled or re-manufactured products where 77% not purchasing recycled and re-manufactured products. To improve reduction program in restaurants it is necessary to reduce wastage. Question No. 32 aimed to assess how restaurants managers attend to the waste reduction program by reducing the use of some materials. As showed in Table 4.18, the result found that plain paper fax has been reducing by 16% of restaurants operators in SS2, while 84% did not reduce this item. 16% of restaurants operators reduce coffee mugs, where 84%

not reducing this item. 68% of restaurants operators reduce clothes towels, while 32 of restaurants operators no reducing the item. Bulk dispensers and duplex copying are reduced by 3% of the restaurants operators, while 97% not reducing the item. 10% of restaurants operators reduce refillable products, where 90% not do. Scrap paper reuse reduced by 13% of restaurants operators, when 87% not reducing the item. There no restaurant operator reduce post / circulate.

4.4.2.2 Recycling Status

Adopting recycling program by restaurants operators in SS2 is shown in Table 4.19. Question No. 33 aims to get information on practicing recycling in SS2 restaurants in. The result showed that 42% of restaurants have recycling program, while 58% of them have no recycling program; however from observation it can inferred that it is a kind of unsystematic recycling practice done by all of restaurants operators such as selling or donating some material such as beverage cans to bickers. To provide efficient recycling program, restaurants operators need to own some equipment to facilitate their recycling practice. Table 4.19 question No. 34 aimed to provide information about the efforts played by the restaurants operators and managers to improve their recycling program and concentrated on the equipment used to facilitate recycling program in restaurants.

Table 4-19: Recycling Status in SS2 Restaurants

No	Item	Yes (%)	No (%)	
33	Waste management practice on adopting recycling program	42	58	
34	Waste management practice on possessing equipment to facilitate recycling program	Baler	3	97
		Vehicle	19	81
		Loading dock	0	100
		Shredder	3	97
		Extra storage space	23	77
		Large storage containers	13	87
35	Waste management practice on releasing recyclable wastage materials	Drop-off center	7	93
		Hauler collecting	48	52
		Donations	3	97
		Third party collection	84	16
		Other	10	90

The result showed that baler has been chosen by 3% of restaurants operators in SS2, while 97% did not choose the item. Vehicle has been chosen by 19% of restaurants operators, 81% did not choose the item. Shredder has been chosen by 3% of restaurants operators, while 97% did not choose the item. Extra storage space has been chosen by 23% of restaurants operators, where 77% did not choose this item. Large storage containers have been chosen by 13% of restaurants operators, while 87% did not. Efficient releasing for recyclable materials in restaurants improves waste management performance in restaurants. Question No. 35 in Table 4.19 aimed to investigate how restaurants operators in SS2 deal with their recyclable waste. The result revealed that 7% of restaurants operators in SS2 send their recyclable waste to drop-off-center, where 93% of them did not choose drop-off center. Instead 48% of restaurants operators said they send their recyclable waste to hauler collects, while 52% of them did not. 3% of restaurants operators donate their recyclable waste to individuals and some public institutions, where 97% did not do. Most recyclable materials go to the third party; this has been chosen by 84% of restaurants operators, when 16% of them did not choose this option. 10% of restaurants operators send their recyclable waste to other options.

4.4.3 Wastage water, Energy and Water Consumption Management Status

This part of the study investigates on performance of SS2 restaurants in Waste-water management, energy and water consumption.

4.4.3.1 Waste-water Management

Waste-water practice by restaurants operators in SS2 is as shown in Table 4.20. In questions no. 36, 37 and 39, the result showed that 100% of SS2 restaurants have proper internal and external drainage system and use grease trap or interceptor. In question No. 38 the result showed that 48% of restaurants operators pre-treated their wastewater before discharged to the sewer and these considering the filtering system in their restaurants, where 51% replied in the negative. It can observe that restaurant operators pre-treat their wastewater before discharge to the sewer, because filtering system for restaurants operation is enough to pre-treat the wastewater. In question No. 40 the result showed that 32 % of served restaurants have person to clean up their traps, while 67 % they do not. From observation all of them have person to clean the trap mostly from the staff not contractor.

Table 4-20: Waste-water Management Practice in SS2 Restaurants

No	Item	Yes (%)	No (%)
36	Waste management practice on having proper internal drainage system	100	0
37	Waste management practice on connecting the facility with the public drainage system	100	0
38	Waste management practice on pre-treating the wastewater before discharged to the sewer	48	52
39	Waste management practice on using grease trap or interceptor	100	0
40	Waste management practice on hiring person or contractor to clean the trap or interceptor	32	68

4.4.3.2 Energy and Water Consumption

The questions as showed in Table 4.21, was to check energy and water consumption efficiency use among SS2 restaurants. In question No. 41 the result showed that 32% of restaurants have dishwasher, where 67% of them don't use saving energy dishwasher. In question No. 42 result showed that 74% of the restaurants use water heater, where 26% of restaurants do not. In question No. 43 showed that 74% of restaurants do this partially as they turn off cooling sometimes some of the lighting, where 26% of restaurants do not. From observation some of these restaurants keep their shops more attractive to the customers, which make them let lights and cooling system working even during slower business period. In question No. 44, the result showed that 23% of the investigated restaurants encourage their customers to save water and energy, while 77% of them do not, in order not disturbs their customers.

Table 4-21: Energy and Water Consumption Status in SS2 Restaurants

No	Item	Yes (%)	No (%)
41	Waste management practice on using saving energy dishwasher	32	68
42	Waste management practice on using saving energy water heater	45	55
43	Waste management practice on turning off the lights and cooling in unoccupied areas during slower period group customers	74	26
44	Waste management practice on encouraging customers to save water and energy	32	77

4.5 Summary of Chapter Four

Chapter four includes result part of this study. The chapter consists of four hubs come as following:

First: A brief introduction about the study approach which was applied in two methods; checklist for compliance to LGA 1976 Act which was done through observation and questionnaire for waste management practice which was done through interviewing the

restaurants operators. In addition, brief information was given about Petaling Jaya city where the study was held.

Second: The chapter includes results of compliance by restaurants operators to LGA 1976 in its different licensing requirements such as building & design, waste handling & storage, water supply & sanitation facilities, safety, food & food stuff storage, and general hygiene condition.

Third: The chapter includes results of perception of restaurants operators on waste management.

Fourth: The chapter includes results of waste management practice by restaurants operators on aspects such as waste generation & composition records, waste collection, waste reduction program, waste recycling program, efficiency of water using, and efficiency of energy using.

CHAPTER 5

DISCUSSION

5.1 General Overview

As mentioned earlier in Chapter 3, the study was conducted based on survey and observation on the compliance of restaurants operators to (LGA 1976). In the second part of the waste management practice, the study was conducted in questionnaire and interview. The result of study has shown in details in Chapter 4. Thirty items were highlighted in the survey study and 44 items were highlighted in the part of questionnaire study.

5.2 Compliance to LGA 1976, and Comparative Study between LGA 1976 with Some Other Countries Acts

The first part of this study was on compliance of restaurants to LGA 1976 which was done through survey and observation. The second part of the study was done through questionnaire and interview, and comprised of two parts; waste management perception this involved investigating awareness on waste management and second part investigate the application of waste management principle which is described by researchers and educational and professional concern bodies.

5.2.1 Compliance of Restaurants Operators to (LGA 1976)

This session elaborates the first objective of this study (i.e, to assess the compliance of restaurants operators to Local Government Act 1976 (Licensing for food establishments). Based on Singh, (1994) the Local Government Act 1976 (Act 171) is act of parliament outlines the form, organizational structure, functions and responsibilities of a local authority. At the same time, the Town and Country Planning Act 1976 (Act 172) was promulgated to overcome the weaknesses in the planning of land use in local area.

The Act 172 puts the primary physical planning responsibility at local level to the local government. The Street, Drainage and Building Act 1974 (Act 133) explains several other role of local authority regarding drainage, maintenance of municipal roads as well as public buildings. Therefore this study uses this law to measure compliance level among SS2 restaurants.

Table 5-1: Total Result for Compliance of Restaurants Operators to LGA 1976 for 31 Surveyed restaurants

No	Section	Compliance (%)	SEP
1	Building & design	87.9	5.9
2	Restaurant Waste Handling and Storing	71.6	8.15
3	Restaurant Water Supply and Sanitation Facilities	100	0
4	Restaurant Safety Procedures	100	0
5	Food and Foods Stuff Storage in the Restaurant	100	0
6	Restaurant General Hygiene Condition	96	0.13
Average		93	2.4

SEP: Standard Error of Proportion

Every section shown in Table 5.1 covers set of requirements for licensing food establishment in Petaling Jaya city base on LGA 1976. The total result of restaurants operators' compliance to LGA 1976 is 93% (see Table 5.1). By comparing this result with the result of a study carried out by Asnani (2004) to ascertain the status of compliance to the MSW Rules 2000 among 128 cities in India which was 35.5% (see Table 5.2), it can be observed that the total result of compliance of SS2 restaurants to rules sections identified by LGA 1976 is higher than the total result found by Asnani for the surveyed cities in India to the MSW Rules 2000.

Table 5-2: Status of Compliance of MSW Rules 2000 by the 128 Surveyed Cities in India

Section	Compliance%
Disposal	2
Processing of waste	9
Transportation	53
Storage depot	28
Street sweeping	76
Primary collection	38
Segregations of recyclables	36
Storage at source	42
Average	35.5

Source: (Asnani, 2004)

5.2.2 Comparative Study between LGA 1976 with Some Other Countries Acts

This part of the study looks at updating of LGA 1976 to other international Acts used in different places in the world to organize food establishment operation. The comparison based on the similarities to LGA 1976 in its different areas. The international Acts have been chosen for this comparison study, namely:

1. Oklahoma State Department of Health- Food Establishment Construction Guide
2. Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada)
3. Ministry Of Health and Family Welfare (Food Safety and Standards Authority of India)

Table 5.3 describes to the degree of similarity between Local Government Act 1976 Malaysian food establishment licensing Act and the three Acts which are mentioned above in its major sections. Based on similarity study shows in Table 5.3, that Canadian and Indian Acts are 100% similar to LGA 1976 Malaysian food Establishment Act, while the similarity between LGA 1976 and Oklahoma state Act which is used in USA is 83%.

This because restaurant general hygiene condition section was not mentioned directly in Oklahoma Act.

Table 5-3: Comparison between LGA 1976 and Other International Food Establishments Laws for the All Sections

Measurement Area at LGA 1976	Other Laws		
	USA	CANADA	INDIA
Building & design	√	√	√
Restaurant Waste Handling and Storing	√	√	√
Restaurant Water Supply and Sanitation Facilities	√	√	√
Restaurant Safety Procedures	√	√	√
Food and Foodstuff Storage in the Restaurant	√	√	√
Restaurant General Hygiene Condition	x	√	√
Similarities %	83%	100%	100%

USA: Oklahoma State Department of Health- Food Establishment Construction Guide

CANADA: Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada)

INDIA: Ministry of Health and Family Welfare (Food Safety and Standards Authority of India)

5.2.2.1 Building & design

Table 5.4 shows the similarity of LGA 1976 Act with the three international Acts in its sub-sections of restaurant building and design. The similarity study reveals that, LGA 1976 is similar to Oklahoma State Act in its sub-sections of restaurant building and design such as walls to be well finished, floors to be tiled or smoothly finished, no living room, sleeping place at part of the restaurant, employee facilities), while other sub-section such as (drains construction, upper story construction, restaurants furniture, are not included in Oklahoma State Act. The similarity study found that, LGA 1976 is similar to Indian Act in only one sub-section which is floors to be tiled or smoothly finished, while there is no similarity between LGA 1976 and Canadian Act in their sub-sections of building and design.

Table 5-4: Comparison between LGA 1976 and Other International Food Establishments Laws on Sub-section of Building & design

Measurement Law LGA 1976	Other Laws		
	USA	CANADA	I DIA
Walls to be well finishing	√	x	x
Floors to be tiled or smoothly finished	√	x	√
No living room, sleeping place at part of restaurant	√	x	x
Drains construction	x	x	x
Upper story construction	x	x	x
Employee facilities	√	x	x
Restaurants furniture		x	x
Similarities %	57%	0%	14%

USA : Oklahoma State Department of Health- Food Establishment Construction Guide

CANADA: Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada)

INDIA: Ministry of Health and Family Welfare (Food Safety and Standards Authority of India)

5.2.2.2 Restaurant Waste Handling and Storing

As shown in Table 5.5, the Act used by Oklahoma State in USA describes garbage and refuse and sewage waste as well. The Oklahoma Act did not mention to the sub-sections listed under LGA 1976 in details but can be implied through the Act text. Canadian Act mentioned to the necessity of compliance to the government agencies in term waste disposal but did not give any sub-sections details for this compliance. Indian Act agrees on three sub-sections in waste handling and storing with LGA 1976 the Malaysian Act and did not mention the other three sub-sections.

Table 5-5: Comparison between LGA 1976 and Other International Food Establishments Laws on Sub-section of Restaurant Waste Handling and Storing

Measurement Law LGA 1976	Other laws		
	USA	CANADA	INDIA
Refuse bins adequacy	√	x	√
Wet solid refuse to be placed in plastic bags	x	x	x
Compliance to authorities manners in disposing refuse	x	√	√
Waste material to do not thrown or deposited into public area	x	x	x
Sewage to be connected with sewage system determined by relevant authority	√	x	√
Similarities %	40%	20%	60%

USA : Oklahoma State Department of Health- Food Establishment Construction Guide

CANADA: Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada

INDIA : Ministry of Health and Family Welfare (Food Safety and Standards Authority of India

5.2.2.3 Water Supply and Sanitation Facilities

Water supply and sanitation facilities have been discussed in all studied Acts. The Oklahoma State Act has mentioned to two sub-sections described by LGA 1976 such as sufficient water supply to be provided and sanitation facilities to be provided but did not mention the other sub-sections as shown in Table 5.6. The Canadian and Indian Acts are similar to the Oklahoma State Act in their relationship to the LGA 1976 Act in term of water supply and sanitation facilities.

Table 5-6: Comparison between LGA 1976 and Other International Food Establishments Laws on Sub-section of Restaurant Water Supply and Sanitation Facilities

Measurement Law LGA 1976	Other Laws		
	USA	CANADA	INDIA
Sufficient water supply to be provided	√	√	√
Sanitation facilities to be provided and supplied with water all time	√	√	√
Toilet design	x	x	x
Sanitation facilities equipped with sufficient lighting and air circulation	x	x	x
Toilet to be open for use by any person at the operating hours	x	x	x
Similarities %	40%	40%	40%

USA: Oklahoma State Department of Health- Food Establishment Construction Guide.

CANADA: Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada

INDIA: Ministry of Health and Family Welfare (Food Safety and Standards Authority of India

5.2.2.4 Safety Procedures

As appears in Table 5.7 all international Acts which are used in the similarity study, are similar to LGA 1976 in two sub-sections of safety procedures including adequate and bright lighting in restaurant premises, adequate ventilation system in restaurant premises), while no similarity was found in the other sub-sections.

Table 5-7: Comparison between LGA 1976 and Other International Food Establishments Laws on Sub-section of Restaurant Safety Procedures

Measurement Law LGA 1976	Other Laws		
	USA	CANADA	INDIA
Adequate and bright lighting in restaurant premises	√	√	√
Adequate ventilation system in restaurant premises	√	√	√
Fire prevention facilities provided at restaurant premises	x	x	x
Work place safety	x	x	x
No noise created when operating restaurant activities	x	x	x
Similarities %	40%	40%	40%

USA: Oklahoma State Department of Health- Food Establishment Construction Guide.

CANADA: Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada

INDIA: Ministry of Health and Family Welfare (Food Safety and Standards Authority of India

5.2.2.5 Food and Foods Stuff Storage

As appeared in Table 5.8, all international Acts which was used in the similarity study, was similar to LGA 1976 in one sub-section of food and foods stuff storage including is food and food stuff storage, while there was no similarity in other sub-sections. Halal and non-halal food separation is not included in the international Acts used here for similarity study to LGA 1976, because the comparison Acts are from non-Muslim countries.

Table 5-8: Comparison between LGA 1976 and Other International Food Establishments Laws on Sub-section of Food and Foods Stuff Storage in the Restaurant

Measurement Law LGA 1976	Other Laws		
	USA	CANADA	INDIA
Storage room	x	x	x
Food and food stuff storage	√	√	√
Halal and non-halal food separation	x	x	x
Similarities %	33%	33%	33%

USA: Oklahoma State Department of Health- Food Establishment Construction Guide

CANADA: Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada

INDIA: Ministry of Health and Family Welfare (Food Safety and Standards Authority of India

5.2.2.6 General Hygiene Condition

Table 5.9 shows that Indian Act is similar to LGA 1976 Act in sub-sections of general hygiene condition including regular maintenance for restaurant premises, food and drink to be covered, restaurant to be free from mice, flies, insects, flees, and vermin to breed, while there was no similarity in the other sub-section. Also, the similarity study revealed that, Canadian Act was similar to LGA 1976 Act in sub-sections of general hygiene condition such as no spreading of dust, smoke, vapors, heat gas, projection, smell, vibration, smoke or soot from the restaurant premises pollutes the atmosphere, and food and drink to be covered, while no similarity was found in the other sub-sections. Oklahoma State Act and LGA 1976 in sub-sections of general hygiene condition as it is appeared in the Table 5.9.

Table 5-9: Comparison between LGA 1976 and Other International Food Establishments Laws Sub-section of Restaurant General Hygiene Condition

Measurement Law LGA 1976	Other Laws		
	USA	CANADA	INDIA
Regular maintenance for restaurant premises	x	x	√
No spreading of dust, smoke, vapors, heat gas, projection, smell, vibration, smoke or soot from the restaurant premises pollutes the atmosphere	x	√	x
Food and drink to be covered	x	x	√
Restaurant to be free from mice, flies, insects, flees, and vermin to breed	x	√	√
Similarities %	0%	50%	75%

USA: Oklahoma State Department of Health- Food Establishment Construction Guide.

CANADA: Public Health Act- Food Premises Regulation (Victoria, British Columbia, Canada.

INDIA: Ministry of Health and Family Welfare (Food Safety and Standards Authority of India

5.3 Perception of Restaurants Operators on Waste Management Awareness and the Relationship between Waste Management Awareness and the Degree of Law-compliance

This part of discussion elaborates the second objective of this study i.e, to describe the perception of restaurants operators about awareness of waste management and relate the relationship between waste management awareness with the degree of law-compliance. In the perception study all the questions described the sections in this part of the survey have been identified by referring to (Green Business Program, 2010). The study on awareness aims to investigate restaurants operators perception on waste management in aspects of waste minimization, efforts paid in contact with customers to inform them about environmental efforts, adopting existing policy, training of staff, support the waste management efforts by paying more for waste management improvement, realizing the difficulties in waste management, adopting waste management programs and realizing the facilities needed in waste management work.

5.3.1 Perception of Restaurants Operators on Waste Management

The total result of perception of restaurants operators on waste management as shown in Table 5.10 revealed that only 21% is seems quite low, but the section (1) which represents the major hub in the study of awareness is quite high i. e. 77%. Section (1) of the awareness on the waste minimization represents the perception of restaurants operators on waste management including its important target (waste minimization), while other sections from section (2) until the last one section (9) in Table 5.10 are reflecting this perception on their waste management practice. The percentage of 77% for section (1) proves that there is good sense to waste management and waste minimization but this good sense need to be interpreted in efficient practice. The percentage of 23% of restaurants operators have less perception on waste management. However, the interview was not done with the first managers. What is observed here regarding the conflict between the total result of compliance to LGA 1976 which was quite high (93%), demonstrated the result of awareness on waste management which is quite low (21%). On the section of restaurants waste handling and sorting in compliance study (Table 5.1), the result is 71.6% agreeing with the result of the awareness of 21%.

Table 5-10: : Total Result for Awareness of Restaurants Operators on Waste Management for 31 Surveyed restaurants

No.	Section	Percept (%)	Non-Percept (%)
1	Perception on importance of waste minimization to the environment conservation	77	23
2	Perception on informing customers about business environmental efforts	0	100
3	Perception on adopting a written environmental policy statement stating your business	0	100
4	Perception on train some of your staff on waste management practice	0	100
5	Perception on conducting periodic all-staff presentations on waste management	0	100
6	Perception on willingness to pay more for waste minimization from your profits	42	58
7	Perception on waste management difficulties faced by restaurants operators	26	74
8	Perception on waste management (reduction, recycling, purchasing) program needs	6	94
9	Perception on needed things can be provided by authorities or any concern body to assist you in your waste reduction efforts	35	65
Average		21	79

Section No. 2 concerned about informing customers about business environmental efforts and section No. 3 concerned adopting written environmental policy, the answer for the booth sections 100% was negative. This answer can be compared with similar study done by Ying, 2007 at Kansas State University determine the sustainability of waste management Practice in college and university dining services item of Monitor customer food waste to develop polices. In Kansas State University study, the investigator verified that 54.7% answered yes and 45.3% answered no, while the result got through SS2 study 100% are negative in section of informing customers about business environmental efforts and section of adopting a written environmental policy (see Table 5.10). The fourth section in Table 5.3, concerned about training for the restaurants’s staff on waste management and the fifth section in Table 5.10, discussed how to conduct periodic internal training for all the staff with the result on sustainable waste management practices

training which was used by Ying (2007) in the study mentioned above. In section No. 6 willingness to pay more for waste minimization from their profits, 42% positive answer represents 13 restaurants from the total investigated restaurants expressed that they were willing to pay more. In section No. 7, awareness on waste management difficulties faced by restaurants operators and section No. 9 awareness on needed things that can be provided by the authorities or any concerned body to assist in waste reduction efforts. In section No. 8, awareness on waste management (reduction, recycling, purchasing) program needs, the weakness in positive result is because of lack of awareness on necessity of these programs (to the business by saving the operation cost and then increase profit. In the sections 6, 7, 8, and 9 on awareness study shown in Table 5.10, there were no studies found to compare with.

5.3.2 Relationship between Perceptions on Waste Management and Compliance

As shown in Table 5.1 the result achieved in compliance is highly acceptable (93%). However, this result in compliance performance is attributed to power of enforcement not because of awareness which was only (21%) (see Table 5.3). The result of waste management practice reflects the level of compliance to law more than level of awareness. This implies that the training for restaurants operators and staffs need to be legislated.

5.4 Waste Management Practice by Restaurants Operators and the Contributing Factor for Discrepancies in Waste Management Practice

This part of discussion elaborates the third objective of this study; assess waste management practice by restaurants operators and determine the contributing factor for discrepancies. The objective three in this study aims to investigate waste management practice by restaurant operators in aspects such as waste generation record, waste composition daily record, collection, storage, waste reduction, waste recycling, and

waste-water management, and energy and water consumption. Questions of this part of study have been identified based on (Green business program, 2010) and (Burbank Green Alliance, 2009).

The waste generation was done for general waste, food waste and cooking oil through estimation of the amount of waste in kilogram by restaurants operators. The percent of waste generation as shown in Table 5.11 means that all of restaurants operators' answered the questions on waste generation amount generated by their restaurants. Based on (Latifah et al., 2009), 45% of the future waste will be made up of food waste. This study showed that food waste represents 47% from total of general waste produced by restaurants in SS2. This result is it compatible with that of (Latifah et al., 2009).

Waste composition was done by giving managers in restaurants number of waste items expected to be generated by restaurants further they were asked to prioritize the waste items from 1 to 5 based on the bulk of waste. The 100% of waste composition here in Table 5.4 means that all of restaurants operators' answered the questions on waste composition generated by their restaurants and also prioritize the waste items from 1 to 5 based on waste bulk produced. The 9th Malaysia Plan estimated that about 45% of the future waste will be made up of food waste, 24% of plastic, 7% of paper, and 6% of iron and glass (Latifah *et al.*, 2009). Waste composition among SS2 restaurants and also among restaurants classifications prioritizing of waste items comes according with (Latifah et al., 2009) findings. Except sandwich shops food waste was not ranked as first food waste item like others restaurants.

In this section of waste management practice human factor was very important and the practice weakness in this section can be justified by weakness in awareness on restaurants staff training and periodic all staff presentation. A 100% of restaurants was not training their staff on waste management and no periodic in site presentations (see

Table 4.8). There is no similar study in the literature to the best of my knowledge to compare waste collection, storage and handling among SS2 restaurants with.

This study resulted that, efficiency on waste reduction performance by restaurant operators in SS2 was 59%. By comparing this result with finding from developed solid waste reduction strategies in Kansas dining services study), which was 42%, the waste reduction performance by restaurant operators in SS2 could be considered better than the result of found by Kansas dining services study. There is no similar study to compare waste recycling status among SS2 restaurants, the best of my knowledge.

Table 5-11: Total Result for Waste Management Practice by Restaurants Operators for 31 Surveyed restaurants

No	Section	Efficient Practice (%)	SEP
1	Waste Generation Record	100	0
2	Waste Composition Record	100	0
3	Waste Collect on, Storage and Handling	62.5	8.7
4	Waste Reduction Performance	59	8.8
5	Recycling Status	21.3	7.35
6	Waste-water Management Status	76	7.67
7	Energy and Water Consumption Status	43.5	8.9
Average		66	6

SEP: Standard Error of Proportion

There is no similar study to compare waste-water management status among SS2 restaurants with. By comparing result of energy and water consumption status in SS2 which is 43.5% (see Table 5.11) with item of track usage of energy, gas, and water in the study which was done by (Ying, 2007), which was 44.8%, this result is compatible with what was found in Kansas state university dining services.

From this comparison above between performance on waste management practice by SS2 restaurants operators and the performance on waste management practice by Kansas state university dining services in some aspects and activities is better than what was found in Kansas study, considering USA as developed country, this mean SS2 restaurants have potential for more better practice.

5.5 Recommendations on Waste Management Practice

Based on the findings of this study, to improve up waste management practice there is need to identify some inadequate waste management activities and this will require the cooperation between the authority, contractors and restaurants operators. These activities can be listed as following:

1. Adopting waste reduction program, for example find ways to reduce waste coming from kitchen.
2. Adopting waste recycling program, for example segregate waste and sale recyclable materials to the recyclers.
3. Training and teaching restaurants managers and staff to enable them to achieve activity 1 and 2.
4. Enforce the regulations on waste management insure that restaurants operators are committed to these activities.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study on waste management practice among restaurants operators in SS2 revealed that the level of compliance to LGA 1976 is quite high which appears in the total result of 93% (see Table 5.1). This result of compliance indicates that the operators of restaurants in SS2 have good attitude toward cooperating with authorities and concerned bodies in order to improve performance in its different aspects including waste management. Perception of waste minimization which is the final target of waste management practice among SS2 restaurants operators also quite high which is reflected in the result of 77% (see Table 4.8) the first item in awareness study. It can be assumed that the awareness are focusing on the importance of waste minimization to avoid the negative impact on environment; based on the results, there are no awareness for the positive impact of waste minimization on their businesses, which could mean reduction of cost and increasing profits. So their awareness of the practice to achieve waste minimization is quite weak, which can be observed in result of others items in awareness study see Table 4.8 and also the total result of awareness study (see Table 5.3). High result achieved in compliance is due to power of enforcement not due to high level in awareness. The result of waste management practice which reflects level of compliance to law more than to reflect level of awareness means that performance on waste management comes as a result of law enforcement more than of awareness of waste management. This means training restaurants operators and staff need to be made compulsory.

6.2 Recommendation

Based on the results of this study, enhancement of the regulations and enforcements related to the waste especially regulations on waste segregation are important in order to ease waste handling for recycling processes.

Adopting waste reduction programme and this can be achieved through the following ways:

- i. Introduce advice on waste reduction by describing ways to reduce waste coming from kitchen such as food materials by identifying wise usage for these materials.
- ii. Encourage purchasing reusable and long use materials such as packaging and operating materials.
- iii. Explain the importance of waste reduction for their business income that increase the profits and decrease cost (as incentive).

Adopting waste recycling programme is highly important to improve waste management practice and this can be gotten through the following steps:

- (i) Encourage segregation waste especially between dry and wet.
- (ii) Provide sealed bins for cooking oil.
- (iii) Buy recyclable materials from restaurants (as incentive).

To achieve the three above recommendations needs efforts to improve the level of awareness among restaurants operators using short training programmes and demanding them to organize periodic staff presentations to pass their knowledge to their staff.

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APPENDIX A
QUESTIONNAIRE

Restaurant data

Restaurant Name	
Contact Person	
Address	
Date	
Type of service	
Phone	
Fax	
E-mail	

Business Description

Square Meter	
Number of Floor	
Number of Seating's area	
Number of Employees	
Number of working hours	

Perception Study

No.	Question	Yes	No
1	Do you aware by importance of waste minimization to the environment conservation?		
2	Do you inform customers about business environmental efforts?		
3	Do you adopt a written environmental policy statement stating your business?		
4	Do you train some of your staff on waste management practice?		
5	Do you conduct periodic all-staff presentations on waste management?		

6	Do you willing to pay more for waste minimization from your profits?		
7	Have you facing any waste management difficulties?		
8	Do you have anything else you can tell us about your waste management (reduction, recycling, purchasing) program?		
9	There anything can be provided by authorities or any concern body to assist you in your waste reduction efforts?		

Waste Management

i) Waste Generation

No.	Question	Kg
10	How many kilogram of waste do you generate per day?	
11	How many Kilogram of food waste do you generate per day?	
12	How many Kilogram of cooking oil do you generate per day?	

ii) Waste Composition

13. Please select the five items that represent the bulk of your waste stream and prioritize them 15 with one indicating the largest percentage item.

Waste Item	Prioritizing From 1 to 5
White paper (computer, copier, ledger, stationery, etc.)	
Mixed paper (glossy inserts, advertising mail, color, etc.)	
Miscellaneous plastic (stretch wrap, strapping, etc.)	
Corrugated cardboard	
Glass containers/bottles	
Plastic containers	
P a l l e t	
Polystyrene foam	
Yard waste	
News paper	
Other glass	
Food waste	
Magazine	
Metal can	

iii) Waste Collection, Storage and Handling

No.	Question	Yes	No
14	Do your waste containers have lids?		
15	Are your waste containers lined?		
16	Do you handle your waste separately?		
17	Do you utilizing filtering drain plugs / screens to prevent the solid to drain with water?		
18	Do you have recycling bins with the labeling?		
19	Do you locate bins and dumpsters appropriately?		
20	Do you have waste removal schedule?		
21	Do you keep that waste is stored in room with exhaust fan?		
22	Do you check waste storage area for odors, contaminants, or signs of pets?		
23	Do you have waste collecting full time staff?		
24	Do you have a cleaning and waste disposal contractor?		
25	Do your oil and grease collection company provide to your business sealed waste grease bins or covered, water-tight waste bins?		
26	Is dumpster full at the time it is emptied?		
27	Is the service part of your lease business requirement?		

iv) Waste Reduction

No.	Question	Yes	No
28	Do you ship/receive goods in permanent and/or reusable crating system?		
29	How are goods delivered to your site? (Check all that apply)	Supplier	
		Delivery services	
		Self	
		Malaysia post service	
30	How are goods you receive packaged? (Check all the apply)	Cardboard container	
		Drum	
		Pallet	

		Stretch warp /strapping		
		Bucket		
		Other		
31	Are you presently purchasing recycled or re-manufactured products?			
32	What materials do you reduce in order to reduce the waste in your restaurant? (Check all that apply)	Plain paper fax		
		Coffee mugs		
		Cloth towels		
		Bulk dispensers		
		Duplex copying		
		Refillable products		
		Scrap paper reuse		
		Post / circulate memos		
		Food / equipment donation		
		Toner cartridge recharge		
		Reusable plating / flatware		
		Reuse folders/ envelopes		
		Return / reuse packaging		
Other				

v) Waste Recycling

No.	Question	Yes	No
33	Do you have a recycling program?		
34	What equipment do you have to facilitate your recycling program? (Check all that apply)	Baler	
		Vehicle	
		Loading dock	
		Shredder	
		Extra storage space	
		Large storage containers	
35	Where do your recyclable go? (Check all that apply)	Drop-off center	
		Hauler collects	
		Donations	
		Third party collects	
		Other	

vi) Waste -Water

No.	Question	Yes	No
36	Do you have proper internal drainage system?		
37	Is facility connected with the public drainage system?		
38	Is the wastewater pre-treated before discharged to the sewer?		
39	47. Is there any grease trap or interceptor in use?		
40	Do you have person or contractor to clean the trap or interceptor?		

vii) Energy and Water Consumption

No.	Question	Yes	No
41	Do you use saving energy dishwasher?		
42	Do you use saving energy water heater?		
43	During slower period group customers do you turn off the lights and cooling in unoccupied areas?		
44	Do you encourage your customers to save water and energy?		

APPENDIX B
COMPLIANCE OF SS2 RESTAURANTS OPERATORS TO LOCAL
GOVERNMENT ACT 1976

Restaurant Building and Design

No.	Requirement	Yes	No
1	Building walls well-finished with a smooth surface capable of being easily and quickly cleaned and without any projections or recess or angle that is likely to collect dust		
2	Floors tiled or smoothly finished and graded to allow all fluid easily drained		
3	No living room, sleeping place, partition or mezzanine floor in part of restaurant		
4	Drains constructed of brick lined with good cement and with a semi-circular bottom or of glazed earthenware half-pipes and diameter not less than fifteens centimeters with sufficient number and gradient to carry all water and other fluids		
5	The upper story floors are cement, concrete or close floor boards tongued and grooved or jointed to be water-tight		
6	The ceiling constructed of material as which permitted by the authority (Non-flammable material).		
7	Employee's facilities such as prayer room, mess room, rest room, canteen changing room and suitable lockers are provided at premises and the same facilities for women employees are separated from the men facilities.		
8	Restaurant provided with tops of marble or glass or of wood covered with formica or any other material as may be approved by the authority		

Restaurant Waste Handling and Storing

No.	Requirement criteria	Yes	No
9	Adequate refuse bin are provided as specified by the authority		
10	All wet solid refuse is placed in plastic bags or other suitable container		
11	All refuse disposed in such manner as may be determined by the authority		
12	Waste materials are not thrown or deposited into public area around the premises such as drains, footway, walking pavement		
13	Sewage connected with sewage system determined by relevant authority		

Restaurant Water Supply and Sanitation Facilities

No.	Requirement criteria	Yes	No
14	Sufficient water supply provided at all time at premises according to the procedures approved by the relevant authority and not taken from tap or other sources from toilet or bath room		
15	Sanitation facilities such as toilet, sink, wash basin, place to wash crockery and washing room are provided at the premises clean and maintain all the time. Toilet equipped with sufficient water supply at all time		
16	Toilet walls, shower room urinals made from shining tiles with heights not less than 1.5 meters and fixed with tiles flooring		
17	Sanitation facilities are equipped with sufficient lighting and air circulation		
18	Toilet opens for use by any person at the operating hour		

Restaurant Safety Procedures

No.	Requirement	Yes	No
19	There is adequate and bright lighting in the premises. The emergency lighting system is in operating condition and placed at any staircase, passage and exit doors of the premises		
20	There is adequate ventilation system in the premises		
21	Work place safety and sanitation is managed well		
22	Fire prevention facilities is provided, managed and functioning well; all stairs, pathway, platform and exit way is provided, managed and functioning well; and all stairs, platform access and exit way free from any obstruction and each door inside is built and attached in such way that it is easily open		
23	No noise created as to be a nuisance when operating of restaurant activities		

Food and Foods Stuff Storage in the Restaurant

No.	Requirement	Yes	No
24	Store room or storage area provided for the storage of foodstuffs, utensils equipment and crockery and such store room or storage area not used for dwelling or other purposes and maintained in a clean conditions at all times		
25	Are foods stuffs stored or placed less than twenty centimeters from the floor level?		
26	Halal food and non-halal food are prepared separately wash and store foods, appliances, utensil, equipment, crockery or cutlery used to prepare and serve the non-halal and 'halal' food separately at different places		

Restaurant General Hygiene Condition

No.	Requirement	Yes	No
27	Regular maintenance to maintain premises including fixtures and fitting to ensure it is in good and clean condition at all times		
28	There is no spreading of any quantity of dust, smoke, vapors, heat gas, projection, smell, vibration, smoke or soot from the place or licensed premise which is a nuisance or pollutes the atmosphere		
29	Food is covered and food or drinks in a glass case or any other enclosure drinks to do not come into contact with or be contaminated by any dust, dirt, fume, flies or vermin and such food or drinks shall be in a clean and hygienic condition		
30	Restaurant free from mice, flies, insects, flees, and vermin to breed		

APPENDIX C
LOCAL GOVERNMENT ACT 1976
LICENSING OF FOOD ESTABLISHMENTS
(PETALING JAYA CITY COUNCIL) BY-LAWS 2007

ARRANGEMENT OF BY-LAWS

Part	Description
PART I: Preliminary	<p>Citation, commencement and application</p> <p>1. (1) These by-laws may be cited as Licensing of Food Establishments (Petaling Jaya City Council) By-Laws 2007. (2) These By-Laws shall come into operation on 19 July 2007. (3) These By-Laws shall apply only to the area administered by the Petaling Jaya City Council.</p> <p>Interpretation</p> <p>2. In these By-Laws unless the context otherwise requires— “bar” means any places where alcoholic beverages are served or sold and shall include “milk bar” and “snack bar”; “bake house” means any room or enclosure where baking is carried out; “Mayor” means Mayor of Petaling Jaya City Council; “effluent” has the meaning assigned to it in the Environmental Quality Act 1974 [Act 127]; “industrial effluent” means liquid water or waste water produced by reason of or in the course of the production processes taking place at any industrial premises; “food establishments” means any places or premises where food is prepared, manufactured, processed, packed, canned, bottled or stored for the purpose of sale for human consumption and includes a food shop, bakery, dairy and any places where food is served, sold or exposed for sale for human consumption; and includes a cook shop where any food or any food ingredient is prepared or cooked for sale but not for consumption at the premises or any other activities prescribed in the Second Schedule; “stall” includes any lock-up stalls, table, store, benches, basket, chair, stick, wall show-case, show board of whatever nature or any other appurtenances, whether portable or non-portable and whether on wheels or not, whereon or wherein food, drinks or goods of any kind are sold or exposed at any private or public places; “category card” means category card issued under by-law 36; “working area” means the kitchen and includes the area where food is prepared or stored; “food shop” means any places or premises whether permanent or temporary where food is sold for consumption at the place or on the premises whether prepared there or not and this includes a restaurant, coffee shop, ice cream shop and a bar; “bread factory” means any places used for the purpose of baking bread, cake, biscuit or any other confections; “sewage” means any liquid discharges containing human excreta, animal or vegetable matters in suspension or solution derived from domestic activities and being generated from commercial, institutional and industrial premises including liquid discharges from water closets, basins, sinks, bathrooms and other sanitary appliances but excluding rain water and industrial effluent; “Council” means Petaling Jaya City Council; “food” includes every article manufactured, processed, sold or represented for use as food or drinks for human consumption or which</p>

	<p>enters into or is used in the composition, preparation, preservation of any food or drinks and includes bread products, confectionary, chewing substances and any preservation to the food, drinks, confectionary or any other chewing substances; “Health Officer” has the meaning assigned to it in the Local Government Act 1976; “licensee” means any person who has been issued a licence under these By-Laws; “Licensing Authority” means the Mayor or Secretary of a local authority or any other officer authorised in writing by the Mayor; “premises” has the meaning assigned to it in the Street, Drainage and Building Act 1974 [Act 133]; “licensed premises” means any premises operating any activity of food establishments licensed by the Licensing Authority under these By-Laws; “footway” has the meaning assigned to it in the Street, Drainage and Building Act 1974; “milk” includes cream or any liquid purporting to be milk or cream intended for sale for human consumption or for use in the manufacture of products intended for human consumption and “milk product” includes any processed or manufactured; “serving place” means the area where food is kept or ready to be served; “dairies” includes any farm, cow barn, goat barn, milk store or milk shop or other place where milk is kept or from which milk is supplied for sale; and in the case of a vendor of milk, includes the place where he keeps the vessels used by him for the sale of milk, but does not include a shop where milk is supplied or offered for sale in properly closed unopened receptacles; or other place in which milk is sold for consumption on the premises only; “Mayor” means the Mayor of Petaling Jaya City Council.</p>
<p>PART II: License</p>	<p>Licence</p> <p>3. (1) No person shall operate any activities of food establishments or use any places or premises in the local area of the Council for any activities of food establishments without a licence issued by the Licensing Authority.</p> <p>(2) No person in the food establishments or any sections in the food establishments, store any fresh fish, marine products, fresh meat, meat products, fresh fruits, fruits products, vegetables, vegetables products or any raw foodstuffs intended for sale for human consumption without licence issued by the Licensing Authority.</p> <p>Application for licence</p> <p>4. (1) An application for the issuance or renewal of a licence shall be made in such form as determined by the Licensing Authority.</p> <p>(2) The Licensing Authority may require the applicant to attend in person or, in the case of a corporation or firm, by a director, employee or any person authorised by the corporation or firm, at the time the application is made.</p> <p>(3) The applicant shall made the payment of processing fee as stipulated in the First Schedule upon submission of the application and it is non-refundable whether the application is approved or disapproved by the Licensing Authority.</p> <p>(4) Upon approval of the application, the Licensing Authority shall issue a licence subject to—</p>

(a) payment of a deposit, such sum as the Council may determine as a security to ensure that provisions under these By-Laws and conditions of the licence are being complied with;

(b) payment of any fee as stipulated in the Second Schedule; and

(c) any condition and restriction as may be specified therein.

(5) The licence shall be in such form as determined by the Licensing Authority.

(6) The Licensing Authority may issue a licence for a period not exceeding three years and is renewable subject to an application for renewal being made to the Licensing Authority and the payment of fee as stipulated in the Second Schedule.

Licence not transferable

5. (1) No licensee shall transfer his licence to any other person without the prior written approval of the Licensing Authority.

(2) An application for the transfer of a licence shall be made in such form as determined by the Licensing Authority.

(3) The Licensing Authority may require the licence holder to give any documents or additional information as deemed necessary at the time the application is made.

(4) The Licensing Authority may require the applicant to attend in person or, in the case of a corporation or firm, by a director, employee or any person authorised by the corporation or firm, at the time the application is made.

(5) The Licensing Authority may require the licensee to settle any outstanding payment to the Council before approving the said application.

(6) The transfer fee shall be twenty per cent of the licence fee as stipulated in the Second Schedule.

(7) A processing fee as stipulated in the First Schedule shall be paid upon application is made and it is non-refundable.

Fee non refundable

6. Fee paid under these By-Laws shall not be refundable.

Deposit

7. (1) The deposit paid under subparagraph 4(4)(a) shall be at such amount as determined by the Council.

(2) The Licensing Authority may forfeit the deposit in whole or in part if the Licensing Authority is satisfied there is a breach of the conditions or restrictions of the licence or upon revocation of licence before the expiry date or contravention of the provisions of these By-Laws.

(3) Upon forfeiture of such deposit, the licence shall be deemed to be cancelled, unless the Licensing Authority on the application of the licensee allows the licence to continue to be in force subject to repayment of the deposit that has been forfeited.

(4) The deposit paid under subparagraph 4(4)(a) shall, unless forfeited under paragraph (2), be refunded to the licensee after the licensee ceased operating the licensed premises and upon surrender of the licence to the Licensing Authority if the licence has expired.

Suspension or revocation of licence

8. (1) The Licensing Authority may at any time suspend or revoke a licence issued under these By-Laws if there has been non-compliance of any provision of these By-Laws or a breach of any condition or restriction of the licence.

(2) Any person who operates or manages the licensed premises during the suspension or after the revocation of the licence, commits an offence.

Duration of licence

9. Any licence unless sooner suspended or cancelled, shall remain in force from the date of the payment of licence fee until 31 December of the current year.

Renewal of licence

10. (1) An application for renewal of licence can be made to the Licensing Authority and upon payment of fee as stipulated in the Second Schedule.

(2) Licensing Authority may request the applicant to submit any additional document or information which they as deemed necessary at the time the application is made.

(3) Licensing Authority may renew the license or refuse to renew the license and shall inform the applicant of its decision in writing.

(4) Licensing Authority may request the applicant to settle any payment to the Council before granting the application.

Licence to be exhibited and produced

11. (1) A licensee shall exhibit the licence at all times at a conspicuous place in the licensed premises and shall produce such licence when required to do so by the Licensing Authority or any authorised officer.

(2) A licensee who fails to exhibit or produce the licence under paragraph (1) commits an offence and shall on conviction be liable to a fine not exceeding five hundred ringgit or to imprisonment for a term not exceeding six months or to both.

(3) For the purpose of this provision, a reference to a licence shall include a copy of a licence certified by the Licensing Authority to be a true copy of the licence and such licence shall be granted upon payment of fee as stipulated in the First Schedule.

Temporary licence

12. (1) A temporary license may be issued to a person pending decision by the Licensing Authority to the application for license.

(2) The temporary license issued under paragraph (1) shall be valid for a term not exceeding six months from the date of issuance thereof.

(3) Subject to paragraph (5), a temporary license may be extended for a further term of six months upon written application by the applicant at or before the expiry of the first six months.

(4) The validity of the temporary license shall not be more than twelve months from the date of the said license is issued.

(5) The temporary license shall be revoked immediately when the application for license is not approved by the Licensing Authority.

	<p>(6) Fee to be paid for the temporary or extension of the temporary license shall not exceed the fee stipulated in the Second Schedule.</p> <p>(7) The temporary license holder shall have the same rights, duties, liabilities and obligations as the licensee under this By-law.</p> <p>Surrender of licence</p> <p>13. A licensee shall surrender his licence upon its expiry, suspension or revocation to the Licensing Authority.</p>
<p>PART III: General Provisions for Food Establishments</p>	<p>Building</p> <p>14. (1) The walls of any food establishment shall be well-finished with a smooth surface capable of being easily and quickly cleaned and without any projections or recess or angle that is likely to collect dust.</p> <p>(2) The floors shall be tiled or smoothly finished and graded so that all fluids may easily be drained.</p> <p>(3) No living room, sleeping place, partition or mezzanine floors shall be allowed in that part of any food establishments use for any of the purpose for which a licence is required under these By-Laws except with written approval from the Licensing Authority.</p> <p>(4) The drains shall be constructed of brick lined with good cement and with a semi-circular bottom or of glazed earthenware half-pipes and shall be of a diameter of not less than fifteens centimeters and shall be sufficient in number and gradient to carry all water and other fluids.</p> <p>(5) The floors of the upper storey of any food establishment shall be of cement, concrete or close floor boards tongued and grooved or otherwise jointed so as to be water-tight.</p> <p>(6) The ceiling of the food establishment shall be constructed of such material as may be permitted by the Licensing Authority.</p> <p>Sanitation</p> <p>15. A licensee shall keep and maintain or caused to maintain part of the licensed premises including any fixtures and fittings, to ensure that it is in a good and clean condition at all times to the satisfaction of the Licensing Authority.</p> <p>Provisions of refuse bins</p> <p>16. A licensee shall provide adequate refuse bin as specified by the Licensing Authority for the reception of refuse.</p> <p>Wet solid refuse</p> <p>17. All wet solid refuse shall be placed in plastic bags or other suitable container before it is deposited into refuse bins.</p> <p>Disposal of refuse</p> <p>18. All refuse shall be disposed in such manner as may be determined by the Licensing Authority from time to time.</p> <p>Spilling of offensive matter</p> <p>19. The licensee shall not—</p> <p>(a) places, deposits or throws or causes or allows to be placed, deposited or thrown any dust, dirt, paper, ashes, carcase, refuse, boxes, barrels, bales or other articles into any drains, footway, walking</p>

pavement or any other public places or road at the front, back or at the side of the premises;

(b) keeps or leave any article or thing whatsoever in any place where it or particles therefrom have passed or are likely to pass into any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises;

(c) dries any article of food or other article or thing in any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises;

(d) throws, places, spills or scatters any blood, brine, swill, noxious liquid or other offensive or filthy matter of any kind in such manner as to run or fall into any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises;

(e) drops, spills or scatters any dirt, sand, earth, gravel, clay, loam, stone, grass, straw, shavings, sawdust, ashes, garden refuse, stable refuse, trade refuse, manure, garbage or any other thing or matter in any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises;

(f) sieves, shakes, cleans, beats or otherwise agitates any lime, ashes, sand, coal, hair, waste paper, feathers or other substance in such manner that it is carried or likely to be carried by wind to any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises; or

(g) throw or leaves behind any bottle, glass, can, food container, food wrapper, particles of food or any other article or thing in any drains, footway, walking pavement or any other public places or road at the front, back or at the side of the premises.

Effluent and sewage pollution

20. No licensee shall discharge or cause or permit the discharge of any effluent or sewage pollution unless at the point or points of discharge of any effluent and shall follow the manner as determined by the Licensing Authority or any relevant authority.

Water supply

21. (1) Sufficient and fixed water supply shall be provided at all times at any licensed premise and all tap shall be connected directly to the main pipe from the public water supply.

(2) Application for water supply to the licensed premises shall be made according to the procedure and approved by the relevant authority.

(3) No water supply shall be taken from the tap or other sources from the toilet or bath room.

Sanitation facilities

22. (1) The Licensing Authority may require the licensed premises to provide suitable toilet, sink, wash basin, place to wash crockery and washing room pursuant to any manner and amount as the Licensing Authority thinks fit.

(2) The licensee shall ensure that all toilet at all-time equipped with sufficient water supply, tissue paper, detergent, fragrance or air freshener, refuse bin and hand electric dryer, roll towel or clean towel, tissue paper, water tap and pail or hose for cleaning.

(3) The licensee shall ensure all toilets, sinks, wash basins, urinals, shower rooms, place to wash crockery and other fixtures and fittings attached to it shall at all time is cleaned, maintained, repaired and changed when necessary and if required by the Licensing Authority at any time.

(4) Toilet walls, shower room and urinals shall be made from shining tiles and the heights shall not be less than 1.5 meter and it shall be fixed with tiles flooring.

(5) Each of the toilets, urinals, bath rooms and washing rooms shall be equipped with sufficient lighting and air circulation or in the manner prescribed by the Licensing Authority.

(6) Each of the toilets, urinals, sink and other garbage waste shall be in the flow as in the manner prescribed by the Licensing Authority.

(7) The licensee shall ensure that the toilet is open for use by any person at the operating hour.

Lighting and ventilation

23. The licensee shall ensure that—

- (a) there is adequate and bright lighting in his premise;
- (b) the emergency lighting system is in good repair and in operating condition and shall be place at any staircases, passage and exit doors of the licensed premises;
- (c) there is adequate ventilation in the premises; and
- (d) every staircase, passage and emergency exit forming part of the premises is provided with adequate lighting.

Work safety and sanitation

24. (1) The licensee shall provide to the employee with sound and healthy environment at the licensed premises in the manner prescribed by the Licensing Authority.

(2) The floor and stairs at the licensed premises shall be—

- (a) managed in flat, good condition, not slippery and not dangerous; and
- (b) free from any hole pursuant to the installation of the covers, water inlet or incomplete conduit and free from obvious nails, opened valves or pipes or any other obvious parts or obstructions.

(3) Each licensed premises shall sufficiently be equipped with first aid kit and shall be placed at the suitable place as prescribed by the Licensing Authority.

(4) There shall be no appliances or any things owned by the employee or any clothes to be kept or hung at any of the sections of the licensed premises except in the approved locker or space by the Licensing Authority.

(5) The licensee shall ensure the licensed premises be not overcrowded that may cause injury or dangerous to the employee health.

Provision for mess room, etc.

25. (1) The Licensing Authority may with written notice request any licensee to provide facilities such as prayer room for the Muslim, mess room, rest room, canteen, changing room and suitable locker or other facilities to his employees.

(2) If the employees in the licensed premises consist of man and woman, the prayer room, mess room, rest room, changing room and the lockers shall be provided separately by the licensee.

Fire prevention

26. The licensee shall ensure that—

(a) sufficient fire prevention facilities is provided, managed and functioning well;

(b) all stairs, pathway, platform and exit way is provided, managed and functioning well; and

(c) all stairs, platform access and exit way free from any obstruction and each door inside is built and attached in such way that it is easily open.

Store room and storage facilities

27. (1) A store room or storage area shall be provided for the storage of foodstuffs, utensils equipments and crockery and such store room or storage area shall not be used for dwelling or other purposes and shall be maintained in a clean conditions at all times.

(2) No food, raw foodstuffs, utensils, equipments and crockery shall be stored or placed less than twenty centimeters from the floor level.

(3) In any food establishments where both ‘halal’ food and ‘non-halal’ food is prepared, licensee shall;

(a) separately wash and store foods, appliances, utensil, equipment, crockery or cutlery used to prepare and serve the ‘non-halal’ and ‘halal’ food separately at different places;

(b) to separately used one set of appliances, utensil, equipment, crockery or cutlery used to prepare and serve the ‘non-halal’ and ‘halal’ food; and

(c) stored or placed all foods, appliances, utensils, equipments, crockery or cutlery used to prepare and serve ‘non-halal’ and ‘halal’ food separately and at different places.

(4) Licensee shall ensure that any of the appliances, utensils, equipments, crockery or cutlery used to prepare and serve the ‘non-halal’ shall not be taken or used from any other places except where the ‘non-halal’ food is prepared and served.

(5) Where the ‘non-halal’ food is prepared and served at the food establishments, the licensee shall at all-time display the sign “Non-Halal Food Only”.

(6) For the purpose of this By-Laws—

(a) “halal food” shall means food that:

(i) non and not comprised of or consist of any part or substance from the animal which is prohibited for the Muslim to eat under Islamic Law or not slaughtered according to the Islamic Law;

- (ii) do not comprised or consist anything considered as just filth under Islamic Law;
- (iii) not prepared, processed or manufactured using anything which is not free from any filth under Islamic Law; and
- (iv) not at the time of preparation, processing or storage in contact with or near to any food that do not satisfy sub paragraph (i), (ii) or (iii) or anything considered as filth under Islamic Law;
- (b) “Islamic Law” shall means Islamic laws according to the Syafie school of thoughts or Islamic laws according to the other teaching such as Maliki, Hambali or Hanafi that is accepted by the Selangor Islamic Council;
- (c) “biological sewerage” shall means anything that is prohibited under the Islamic Law for the Muslim to eat or use.

Burning

28. The licensee shall not burn or cause to burn the flammable material and waste dump unless in accordance with the manner and place approved by the Licensing Authority.

Spreading dust, etc.

29. The licensee shall not cause, allow or approve spreading of any quantity of dust, smoke, vapors, heat gas, projection, smell, vibration, smoke or soot from the place or licensed premise which is a nuisance or pollutes the atmosphere.

Noise

30. The licensee shall not create or cause noise as to be a nuisance when operating any food establishment activities.

Business hour

31. The Licensing Authority may direct any food establishment activities not to be permitted to operate in a licensed place or premises unless during such time and hours as prescribed by the Licensing Authority.

Grading of food establishments

32. (1) The Licensing Authority may at any time evaluate and grade any of the food establishments as grade A, B or C according to the sanitary of the premises, cleanliness of the food and person who manage the food and food management practice. Provided that nothing in these By-Laws shall be construed as preventing the licensee from being prosecuted.

(2) When the evaluation and grading has been determined, the Licensing Authority shall issue the licensee a category card in any form that has been determined by the Licensing Authority to show the grade of the food establishments.

(3) The Licensing Authority may at any time review the grade in any category card and shall issue a new category card to the licensee.

(4) The licensee shall display the category card in some prominent place at the food establishments.

	<p>(5) No licensee can transfer, amend, damage, destroy or caused or allow to be transferred, amended, damaged or destroyed the category card.</p> <p>Cleaning of bottles and receptacles</p> <p>33. (1) The suitable and efficient manner of cleansing bottles and containers shall be provided as determined by the Licensing Authority during the process of bottling, canning and manufacturing of carbonated drinks, cordials, beer or any kind of food or drinks.</p> <p>(2) During the process of canning, bottling, packing, storing or manufacturing any food, adequate measures shall be taken to prevent such food from any contamination.</p> <p>Insect and pest control</p> <p>34. (1) Every licensee shall at all times take such suitable measures that may be necessary to ensure the premises is free from mice, flies, insects or flees or vermin to breed.</p> <p>(2) The Licensing Authorities may at any times order the licensee to ensure the premises free from mice, flies, insects or flees or vermin to breed.</p> <p>(3) If the order under paragraph (2) fail to be adhered, the Licensing Authorities may execute the order and where any expenses are incurred by the Licensing Authorities in carrying out any work, the Licensing Authority shall certify the cost thereto to the defaulting licensee and the certificate of Licensing Authority shall be final.</p> <p>Presumptions</p> <p>35. (1) For the purpose of these By-Laws, it shall be presumed until the contrary is proved, any food prepared, manufactured, packed, canned, bottled, stored or served is for the purpose of sale for human consumption or intended for sale for human consumption.</p> <p>(2) Where any food is sold or exposed for sale, it shall until the contrary is proved, be presumed to be sold or exposed for the sale for human consumption.</p> <p>(3) For the purpose of these By-Laws, it shall be presumed that any person who prepare, sells or serves food in any food establishments, until the contrary is proved, is the operator of the food establishments.</p>
<p>PART IV: Special Requirements at the Food Shop</p>	<p>Food shall be covered</p> <p>36. A licensee shall keep all articles of food or drinks in a glass case or any other enclosure so as not to allow such food or drinks to come into contact with or be contaminated by any dust, dirt, fume, flies or vermin and such food or drinks shall be in a clean and hygienic condition.</p> <p>Prohibition of sleeping at food shop</p> <p>37. No licensee of any food shop shall allow any part of such shop opened to public used as a sleeping place.</p> <p>Tables to be provided</p>

38. Every food shops shall be provided with tops of marble or glass or of wood covered with formica or any other material as may be approved by the Licensing Authority.

Type of kitchen

39. Only gas or electric stove or any other types of stoves approved in writing by the Licensing Authority may be used for cooking or heating food or water in the serving area or dining hall at the food shop.

Stalls

40. (1) The Licensing Authority may allow stalls to be operated in any food shop.

(2) The number and location of such stalls shall as determined by the Licensing Authority.

(3) If the Licensing Authority allows any stalls to be operated in any food shops the licensee shall comply with the following conditions:

- (a) the stall shall be covered or paneled with aluminum sheeting or any other impervious materials as approved by the Licensing Authority;
- (b) all food for display shall be kept enclosed in glass shelves or compartment which should so be made in order to avoid any contamination of the food kept therein; and
- (c) the stall shall be maintained and kept clean at all time.

Other precautions for public health

41. No building or place shall be used as a food shop unless the following conditions are complied with :

(a) for dining hall—

(i) floor of a dining hall for food shop or the restaurant shall be tiled or of any other suitable material as may be approved by the Licensing Authority;

(ii) wall of a dining hall, serving area and any other area as required by the Licensing Authority shall be glazed tiles to a height not less than 1.5 meter from the floor and in the case of an air conditioned food shop such wall shall be provided with wood paneling or of such other smooth surface materials as may be approved by the Licensing Authority;

(b) for kitchen—

(i) floor of the kitchen for food shop or the restaurant shall be tiled or of any other suitable material as may be approved by the Licensing Authority;

(ii) wall of he kitchen and any other area as required by the Licensing Authority shall be glazed tiles to a height not less than 1.5 from the floor;

(iii) shall be provided with a proper smoke hood and chimney until the roof level unless with written exception from the Licensing Authority;

(c) a proper washing area shall be provided with wash sinks and slap bins and no washing utensils, crockery or other containers shall be carried out in a dining hall, serving area or on any five footway, back lane, side lane or over any drains or at heights lower than 0.5 meters from the floor level;

	<p>(d) empty bottles shall not be allowed to be stacked or stored in the serving area or dining hall;</p> <p>(e) every part of the place or building including sanitary accommodation, fixtures and fittings shall be maintained in a good state of repair and a state of cleanliness at all times;</p> <p>(f) all crockery, glassware and other utensils used in the preparation, service or consumption of food shall not be chipped, broken or cracked and shall every time after use be—</p> <p>(i) washed clean and immersed in boiling water; and</p> <p>(ii) unless immediately required for further used, stored in cabinet which has been covered and inaccessible to dust, insects and dirt.</p>
<p>PART V: Special Requirements for Bread Factory</p>	<p>Tables, etc. must be clean</p> <p>42. Every licensee shall cause every baking table and every other tables, shelves or articles used to place bread, cakes, biscuits or other bakery products in or upon to be provided with tops or marble or glass or other smooth material and impervious materials approved by the Licensing Authority and all appliances used to prepare bread shall be washed and cleaned at least once a day.</p> <p>Walls and floors</p> <p>43. (1) Walls of the kitchen, bake house, preparation and packing area shall be provided with glazed tiles to a height not less than 1.5 meters from the floor level.</p> <p>(2) Floor shall be tiled or be of any other water resisting materials.</p> <p>Bake house</p> <p>44. (1) Every bake house or place in which a baking oven is situated shall be constructed of non-inflammable material as determined by the Licensing Authority and so situated as to be freely ventilated and not to cause nuisance or danger to neighbouring premises.</p> <p>(2) No place on the same level with a bake house and forming part of the same building may be used for sleeping purposes or for cooking food.</p> <p>(3) No mess room shall connect directly with a bake house.</p> <p>Other precautions for public health</p> <p>45. (1) All bread, cake, biscuits or other confections shall not be allowed to come into contact with dirty material while being moved from the bake house.</p> <p>(2) Bread, cake, biscuit or any other confections, notwithstanding the fact that they has been securely wrapped, shall not be placed at any other place other than on the tables, trays or shelves or other suitable receptacles not less than 0.5 meters from floor level.</p> <p>(3) Well and organized preparation shall be prepared at all bread factories to receive and store baked bread, cakes, biscuits and any other confections which already baked.</p> <p>(4) Flour and any other ingredients in a bakery shall be stored in a receptacle which is uncontaminated by rat or insect.</p> <p>(5) Store used or storing flour and any other ingredients and equipments shall be free from being contaminated by rat or insect.</p>

<p>PART VI: Special Requirements for Dairies</p>	<p>Sanitation of dairies 46. The licensee shall maintained and cause every part of his dairy to be kept clean at all times as required by the Licensing Authority and shall paint the dairy as when and upon required to do so by the Licensing Authority.</p> <p>Milk containers 47. The licensee of a dairy shall not deposit or keep any milk in any container in any place other than as specified by the Licensing Authority.</p> <p>Containers for sale of milk 48. (1) The licensee of a dairy shall not convey any milk for sale or distribution in any open container. (2) All containers for the conveyance of milk shall be provided with proper close fitting covers and if milk is distributed in containers, such containers shall be fitted with suitable and clean covers.</p> <p>Cleansing of milk containers 49. The licensee of a dairy shall maintain all milk containers in a state of cleanliness and shall clean them after use with steam or boiling water.</p> <p>Containers not to be used for drinking 50. The licensee of a dairy shall not permit any persons to drink out of any container or measures used by him in the sale of milk.</p> <p>Important sanitation to be observed in milking 51. The licensee shall ensure any animal which is milked is clean and free from any disease.</p> <p>Diseases at premises 52. (1) The licensee shall ensure that the animals kept by him free from any infectious disease. (2) The licensee shall immediately notify the Licensing Authority upon discovering any animal in his dairy suffering from any infectious disease or contagious. (3) The licensee shall not caused to be sold or mixed with other milk, the milk of a diseased animal or of an animal which has been in contact with or associated with a diseased animal or which in the opinion of the Licensing Authority is likely to have become contaminated. (4) The licensee shall not allow any person suffering from or carrying any infectious or contagious disease or who have recently been in contact with a person so suffering to reside at or enter into any dairy or milking from any animal or in any way involved in his trade. (5) The licensee shall immediately notify the Licensing Authority of any person on his dairy or residing in his house who is suffering from any infectious or contagious disease. (6) The Licensing Authority shall within a reasonable time after being notified of any person suffering from any infectious or contagious disease notify the same to the relevant health authority.</p>
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	<p>Order to stop supply, distribution or sale of milk</p> <p>53. If the Licensing Authority is in the opinion that any infectious diseases has been caused or is likely to be caused the consumption of milk from any of the dairies, or that the public health is likely to be endangered by any act or default of any licensee of a dairy, the Licensing Authority may make an order in writing prohibiting the licensee from supplying, distributing or selling any milk and the licensee shall not thereafter supply, distribute, sell or offer for sell any kind of milk for as long as such order remain in force.</p>
<p>PART VII: Enforcement</p>	<p>Power to enter and inspect</p> <p>54. (1) The Licensing Authority or any authorised officer may at all reasonable time, without warrant for the purpose of ascertaining whether the conditions or restrictions of a licence or the provision of these By-Laws are being complied with—</p> <p>(a) enter any premise which operate food establishments activities; and</p> <p>(b) carry out any power of inspection at such premise.</p> <p>(2) If the Licensing Authority or any authorised officer has reason to believe that an offence has been committed under these By-Laws in any licensed premises, the person residing in or in charge of such place shall allow the Licensing Authority or any authorised officer, on demand of such person acting as aforesaid, free entry thereto and afford all reasonable facilities for a search therein.</p> <p>(3) If entry to any licensed premises cannot be obtained under paragraph (2), it shall be lawful in any case for any such officer, upon identifying himself and the purpose of the entry to the licensee or his employee, to enter the licensed premises without warrant and search therein and to break open any outer or inner door or window in order to effect an entrance into such place.</p> <p>(4) Wherever any licensed premises liable to be searched or inspected under these By-Laws is closed the licensee, his employees or person being in charge of such premises, if any, shall on the request of any such officer open or caused to be opened such premises and shall allow any such officer free entry thereto and afford all reasonable facilities for a search therein and where entry to such premises cannot be so obtained such officer may proceed in the manner provided by paragraph (3) if he has reasonable believe that an offence under these By-Laws has been committed in such place.</p> <p>Search</p> <p>55. (1) If any Magistrate, on written information and after such inquiry as he thinks necessary, has reason to believe that—</p> <p>(a) an offence under these By-Laws has or is being committed in any licensed premises; or</p> <p>(b) any evidence or thing necessary for the investigation of any offence under these By-Laws can be found at any licensed premises, he may by warrant authorise the Licensing Authority or any authorised officer, to whom it is directed with such assistance, as may be required, to enter and search the place.</p> <p>(2) Notwithstanding paragraph (1), if the Licensing Authority or any authorised officer has reasonable ground to believe that—</p>

- (a) an offence under these By-Laws has or being committed at any licensed premises; and
- (b) by reason of any delay in obtaining a search warrant the purpose of the search is likely to be frustrated, the Licensing Authority or any authorised officer may, enter and search such place and any person whom he reasonably believes to be concerned in the management of any licensed premises.

Search of female person

56. No female person shall be searched under by-laws 54 or 55 except by another female person and such search shall be conducted with strict regard to decency.

Seizure

57. (1) The Licensing Authority or any authorised officer exercising powers under by-laws 54 and 55, may seize anything which he reasonably believes to have a bearing on, or can furnish evidence of, the commission of an offence under these By-Laws.

(2) The Licensing Authority or any authorised officer who seizes anything at any licensed premises under paragraph (1) shall prepare a list of all things seized and forthwith deliver a copy signed by him to the occupant, proprietor or licensee of the licensed premises, or to his servant or agent, present at such licensed premises.

(3) Where the licensed premises are unoccupied, the Licensing Authority or any authorised officer who seizes shall whenever possible post a list of the things seized conspicuously on the premises.

(4) Anything seized under these By-Laws shall be admissible as evidence in any proceedings under these By-Laws.

(5) Where, by reason of its nature, size or amount it is not practicable to remove any thing seized under these By-Laws, the Licensing Authority or any authorised officer who seizes shall by any means seal the things in the premises in which it is found.

(6) A person who, without lawful authority breaks, tampers with or damage the seal referred to in paragraph (5) or removes anything under seal or attempts to do so commits an offence.

Forfeiture

58. All things seized under these By-Laws may be forfeited.

Forfeiture if there is prosecution

59. (1) If there be prosecution involving anything seized under these By-Laws, the forfeiture or release of any such thing may only be made on the order of the Court before which the prosecution has been held.

(2) Notwithstanding paragraph (1), if it is proved to the satisfaction of the court that—

(a) an offence against any provision of these By-Laws has been committed; and

(b) anything is the subject-matter of or has been used in the commission of the offence, the court shall forfeit the thing notwithstanding that no person has been convicted of the such offence.

(3) All things forfeit under these By-Laws shall be delivered to the Licensing Authority and shall be disposed of in accordance with the directions of the Licensing Authority.

Forfeiture if there is no prosecution

60. (1) If there be no prosecution involving anything seized under these By-Laws, thing shall be taken and deemed to be forfeited on the expiration of a period of one calendar month from the date of the seizure unless a claim thereto is made before the expiration of such period in the manner set out in paragraph (2).

(2) Any person asserting that he is the owner of anything seized under these By-Laws and that the thing is not liable to be forfeited may, either personally or by his agent authorized in writing, give notice in writing to the Licensing Authority that he claims the thing seized.

(3) On receipt of the notice under paragraph (2), the Licensing Authority may direct that the thing be released or that the matter be referred to a Magistrate.

(4) A Magistrate to whom reference is made under paragraph (3) shall issue a summon requiring—

- (a) the person claiming that he is the owner of the thing seized; and
- (b) the person from whom the thing was seized, to appear before him on the day appointed in the summons.

(5) On the day appointed under paragraph (4), and upon due service of the summons on each of the persons referred to in subparagraphs (4)(a) and

(4) (b) being proved, the Magistrate shall proceed to the examination of the matter, notwithstanding the non-appearance of any of such persons.

(6) If upon the conclusion of the examination under paragraph (5) in respect of a thing, the Magistrate is satisfied that—

- (a) an offence against any provision of these By-Laws has been committed; and
- (b) such thing is the subject-matter of or has been used in the commission of the offence, the Magistrate shall order the forfeiture of the thing; but if the Magistrate is not so satisfied, he shall order that the thing be released and delivered to the person who in his opinion has a right to such thing.

No cost or damages arising from seizure to be recoverable

61. No person shall be in any proceedings before any court in respect of anything seized in the exercise of any power conferred under these By-Laws be entitled to the costs of such proceedings or to any damages or other relief unless such seizure was made without reasonable cause.

Power to close

62. (1) Without prejudice to the exercise of the powers conferred on him under by-laws 54 and 55, the Licensing Authority may, forthwith take such steps as he may consider necessary to close any licensed premises if he is satisfied that—

	<p>(a) there has been a breach of any condition or restriction of the licence or a contravention of any provision of these By-Laws; or (b) such closure is necessary for public interest.</p> <p>(2) The Licensing Authority may close any premise operating food establishment activities if he is satisfied that premise does not have any licence or is operating under an unlawful licence.</p> <p>(3) If a premise operating food establishment activities is closed under paragraph (1) the licence for that premise shall be deemed to be suspended in the term of closure.</p> <p>(4) In the term of closure the licensee shall take measure as required by the Licensing Authority to ensure that all conditions and restrictions of the licence and any provision of these By-Laws is complied with.</p> <p>(5) The Licensing Authority may after conducting the proper inquiry allow the licenced premise to be opened if the Licensing Authority is satisfied that the source of closure has been concluded and terminated or all conditions and restrictions of the licence and any provision of these By-Laws has been complied with.</p> <p>(6) If until the end of term of closure, the licensee has failed to comply any of the condition or the restriction of the licence or any provision of these By-Laws therefore the Licensing Authority shall revoke his licence.</p> <p>(7) If a premise operating food establishment activities is closed under paragraph (2), the Licensing Authority may allow that premise to be opened upon the issuance of a valid licence and the applicant has settle all the payment of compound, penalty and fee as prescribed under these By-Laws.</p> <p>Power to arrest</p> <p>63. (1) The Licensing Authority, any authorized officer or any police officer may arrest without warrant any person who commits in his presence or whom he reasonably believes to have committed any offence under this By-Laws—</p> <p>(c) if the name of address of the person is unknown to him and the person declines to give his name and address; or (d) if there is a reason to doubt the accuracy of the name or address.</p> <p>(2) A person arrested under this by-law shall be detained and shall be brought before a Magistrate’s Court within twenty-four hours unless his name and address are sooner ascertained.</p>
<p>PART VIII: Miscellaneous</p>	<p>Prosecution</p> <p>64. No prosecution shall be instituted for an offence under these By-Laws except with the written consent of the Public Prosecutor.</p> <p>Compounding of offences</p> <p>65. (1) The Mayor, the President, the Secretary or the Legal Officer of the Council may compound any offence committed by any person under these By-Laws and prescribed to be a compoundable offence by making a written offer to the person suspected of committing the offence to compound the offence upon payment to the Council of an amount of money not exceeding the amount of one thousand ringgit for that offence within the time specified in the offer.</p>

(2) An offer under paragraph (1) may be made at any time after the offence has been committed but before any prosecution for it has been instituted, and if the amount specified in the offer is not paid within the period specified in the offer or within such extended period as the Mayor, the President, the Secretary or the Legal Officer may grant, prosecution for the offence may be instituted at any time after that against that person to whom the offer was made.

(3) If an offence has been compounded under paragraph (1), no prosecution shall be instituted after that in respect of the offence against the person to whom the offer to compound was made and anything seized in connection with the offence shall be released, subject to such terms and conditions as may be prescribed.

(4) All monies received under these By-Laws shall be paid into the fund constituted under any law relating to local government.

Penalty

66. Any person who contravenes any provisions of these By-Laws commits of an offence and shall, on conviction be liable to a fine not exceeding two thousand ringgit or to imprisonment for a term not exceeding one year or to both and in the case of a continuing offence to a fine not exceeding two hundred ringgit for each day during which such offence is continued after conviction.

Repeal and transitional provision

67. (1) Licensing of Food Establishments By-Laws (Petaling Jaya Municipal Council) 1999 [Sel. P.U. 11] are hereby repealed.

(2) Any notice, order, compound, licence or documents made or issued under the repealed By-Laws shall be deemed to be made or issued under these By-Laws and shall continue to remain in force until revoked thereunder.

APPENDIX D

DETAIL DESCRIPTION OF OKLAHOMA STATE DEPARTMENT OF HEALTH- FOOD ESTABLISHMENT CONSTRUCTION GUIDE

Facility	Facility Description and Requirements
1. Floors	Floors of all food prep, food service, food storage, dishwashing areas, walk-in refrigerating units, toilet rooms and vestibules must be constructed of smooth, DURABLE material that is impervious to water and easily cleanable such as ceramic tile, terrazzo, durable grade linoleum or sealed concrete. Carpet is not allowed in food preparation areas, food storage areas or restroom facilities. Junctures between walls and floors must be covered and sealed. Pipes and utility lines shall not be unnecessarily exposed.
2. Walls and ceiling	Must be light colored, smooth, durable, non-absorbent, sealed and easily cleanable. This requirement also applies to restroom stall partitions. Exposed studs, joists and rafters are prohibited in food preparation and dishwashing areas. Pipes and utility lines shall be installed so as not to obstruct proper cleaning.
3. Water supply	Potable water for the needs of the food establishment shall be provided from a source that complies with state laws and regulations.
4. Sewage disposal	All sewage and wastewater shall be disposed into a public sewage system or an individual sewage disposal system that complies with state laws and regulations.
5. Plumbing	Plumbing shall be sized, installed and maintained in a safe manner and according to the International Plumbing Code, applicable local ordinance or health code. The supply lines or fittings for every plumbing fixture shall be installed so as to prevent backflow. This includes all hose bibbs. Equipment and fixtures utilized for the storage, preparation and handling of food, including ice, shall discharge through an indirect waste pipe by means of an air gap. This requirement shall not apply to machines and sinks used solely for dishwashing. An air gap between the water supply inlet and the flood level rim of the plumbing fixture, equipment, or non-food equipment shall be at least two (2) times the diameter of the water supply inlet and shall not be less than one (1) inch. °Floor drains must be easily accessible for maintenance and cleaning and be equipped with proper strainers. A grease trap, if required, shall be located to be easily accessible for cleaning. Water conditioning devices shall be designed and located to facilitate servicing and cleaning. Records demonstrating service and inspection shall be maintained at the food service establishment.
6. Hot water	Hot water shall be supplied to all sinks. Hot water generation shall be sufficient to meet the peak hot water demands throughout the food establishment. The hot water supply to any fixture shall be installed on the left side of the fixture.
	A minimum of one handwashing sink is required in all food preparation areas. Based on the design of the facility, more than one sink may be required. The handwashing sink:

7. Handwashing facility	<ul style="list-style-type: none"> ■Must be conveniently located in food preparation, food dispensing, and dishwashing areas; ■Must be a minimum size of eighty (80) square inches with each side at least eight (8) inches, or a diameter of ten (10) inches and at least four (4) inches deep ■Must provide water at a temperature of at least 100 °F through a mixing valve or combination faucet ■Metered faucets shall provide water for a minimum of 15 seconds; ■Soap and disposable towels must be provided at all handwashing sinks; and ■Shall be located to avoid contamination of food and food-related items and areas. Splash guards may be used.
8. Mop sink	At least one mop sink or curbed cleaning facility with a floor drain shall be provided. They must have provision for the proper storing and air-drying of mops.
9. Restroom	Adequate toilet facilities shall be provided as required in the locally adopted building or plumbing code or the International Plumbing Code. Male and Female Restrooms are required in facilities where the occupant load exceeds 15. The local building, fire department or health department will determine the occupant load. (It is not based on the number of patron seats/chairs that are available). Public access to the restrooms may not be through food preparation areas, food storage areas or dishwashing areas. Approved handwashing sinks shall be properly installed. Restrooms shall be provided with tight fitting, self-closing doors. Restrooms shall be provided with adequate forced-air ventilation. An adequate number of trash receptacles will be provided. A covered trash receptacle must be provided in the women's restroom.
10. Lighting	<p>Light bulbs shall be shielded, coated, or otherwise shatter-resistant in areas where there is exposed food, clean equipment, utensils, linens, and unwrapped single-service and single-use articles. Adequate artificial illumination shall be provided in accordance with the following minimum requirements:</p> <ul style="list-style-type: none"> ■50 foot-candles ■in all food preparation areas, including under ventilation hoods. ■20 foot candles ■in consumer self-service areas and inside lighted equipment; and ■at a distance of 30 inches above the floor in areas used for handwashing, dishwashing, equipment and utensil storage and in toilet rooms. ■10 foot candles ■at a distance of 30 inches above the floor; ■in walk-in refrigeration units and dry food storage areas; and ■in other areas and rooms during periods of cleaning.
	All floor-mounted food equipment shall be certified by the National Sanitation Foundation (NSF) or an equivalent organization. This includes, but is not limited to sinks, ovens, ranges, mixers, prep freezers, refrigerators, grills, griddles, fryers, ice machines and steam tables. The following counter equipment must be certified by NSF or an equivalent organization: slicers, grinders, food processors, crock-pot/hot holding units and other similar food processing equipment. Microwave ovens and handheld

11. Equipment	equipment/utensils do not have to be certified by NSF or an equivalent organization. Equipment and utensils shall be designed and constructed of non-toxic, durable materials. Equipment shall be installed to facilitate cleaning. Floor mounted food equipment that is not easily moveable shall be sealed to the floor or elevated on legs with a minimum height of 6 inches. Wood and wood wicker shall not be used as a food-contact surface, except close-grained hard wood may be used for items such as cutting blocks, boards, bakers' tables, rolling pins, salad bowls. Equipment may be located under automatic fire sprinkler heads, but not under leaking or unshielded sewer lines or leaking water lines Food equipment shall be designed to provide protection of displayed food from consumer contamination. Soft drink machines for self-service and refilling shall be designed to prevent contact with the lip-contact surface of glasses or cups. Beverage tubing and cold-plate beverage cooling devices shall not be installed in contact with stored ice that is intended for consumption. This does not apply to cold plates that are constructed integrally with an ice storage bin. If a washing machine is used to wash items other than wiping cloths, a dryer is required.
12. Hoods and ducts	Ventilation hood systems and devices shall: Meet the requirements of locally adopted codes or the Oklahoma State Board of Health Mechanical Industry Regulations (Chapter 290). (Occupational licensing 405-271-5217) Shall be installed above heat generating equipment that is capable of producing grease-laden vapors. Be sufficient in number and capacity to prevent grease, condensation, smoke or noxious odors from collecting in the food establishment. Filters or other grease extracting equipment shall be designed to be readily removable for cleaning and replacement, if not designed to be cleaned in place.
13. Refrigeration	All refrigeration units shall: Be capable of operating at 41F or below at all times; Be provided with a thermometer, accurate to plus or minus 3F; Residential, home-type refrigerators are not permitted; and Existing establishments may continue to use residential refrigerators if required temperatures are maintained or until equipment is replaced. Any replacement equipment must meet the criteria listed above.
14. Hot food storage or display	All hot storage or display facilities shall: Be capable of maintaining hot food to an internal temperature of 135F or above; and Be provided with a thermometer accurate to plus or minus 3F.
15. Storage	Food, clean utensils and equipment, linens, and single-service articles shall be stored a minimum of six (6) inches above the floor. Items that are kept in closed packages may be stored less than six (6) inches above the floor if stored on dollies, pallets, racks and skids provided such equipment is easily moveable. Unfinished construction is not allowed. All exposed surfaces of all cabinetry and shelving shall be finished with a smooth, nonabsorbent, corrosion-resistant, easily cleanable surface.
16. Customer self service	Sneeze shields shall be installed at all displays of unpackaged foods accessible for service by the customer.

<p>17. Dishwashing facilities</p>	<p>A commercial dishwasher or a three-compartment sink with drain boards is required. Accurate test kits or thermometers shall be provided. The three compartment sink:</p> <ul style="list-style-type: none"> ■Must be NSF certified or equivalent; ■Must have rounded corners, be smooth, and have no welded seams; ■Must have adequately sized self-draining drain boards, racks or tables to accommodate soiled and clean items that accumulate during hours of operation; ■Must have compartments large enough to accommodate immersion of at least half of the largest piece of equipment or utensil used in the establishment; and ■Shall not be used for hand washing or for the disposal of MOP water. The commercial dishwasher: ■Must be NSF certified or equivalent; ■ An exhaust system is to be provided above hot water sanitizing machines to remove steam; ■ Accurate thermometers shall be installed on all dishwashers; and ■Dishwashing machines that use a chemical sanitizer shall be equipped with a device that audibly or visually indicates when more sanitizer needs to be added.
<p>18. Outer openings</p>	<p>If windows or doors are kept open, the openings will be protected against the entry of insects and rodents by sixteen (16) meshes to one (1) inch screens, properly designed air curtains or other effective means.</p>
<p>19. Garbage refuse</p>	<p>Receptacles for refuse, recyclables, returnables and materials containing food residue shall be durable, cleanable, insect and rodent resistant, leak proof and non-absorbent.</p> <ul style="list-style-type: none"> ◦Receptacles used outside the food service establishment shall be designed and constructed to have tight-fitting lids, doors or covers. They must be in good repair and have a drain plug. ◦The outdoor storage surface for refuse shall be constructed of non-absorbent material such as concrete or asphalt and shall be smooth, durable, and sloped to drain.
<p>20. Living area</p>	<p>No operation of a food establishment shall be conducted in any room used as living or sleeping quarters. Laundry equipment may be installed in storage rooms containing only pre-packaged food or single-service items.</p>
<p>21. Employee locker area</p>	<p>Lockers or other suitable facilities shall be provided and used for the storage of employee's clothing and other possessions. Dressing rooms shall be provided, if the employees regularly change their clothes, in the establishment</p>
<p>22. Other</p>	<p>All electrical, mechanical, or plumbing work MUST be performed by individuals licensed by the Oklahoma State Department of Health.</p>

APPENDIX E

GENERAL DESCRIPTION OF PUBLIC HEALTH ACT- FOOD PREMISES REGULATION (VICTORIA, BRITISH COLUMBIA, CANADA)

Part	Description
1. Interpretation and Application	<ul style="list-style-type: none"> • Interpretation • Application • Prescribed health hazards and regulated activities
2. Construction of Food Premises	<ul style="list-style-type: none"> • Plans and specifications to be approved • General construction requirements • Washroom facilities
3. Operation of Food Premises	<p>Division 1 — Approvals and Permits:</p> <ul style="list-style-type: none"> • Approval • Notification of health hazard • Permit to operate food service establishment • Repealed <p>Division 2 — Training:</p> <ul style="list-style-type: none"> • FOODSAFE training <p>Division 3 — Food Sources and Protection:</p> <ul style="list-style-type: none"> • Food from approved sources • Protection of food from contamination • Contaminated food • Processing, storage and display • Previously served food <p>Division 4 — Equipment, Utensils and Cleaning:</p> <ul style="list-style-type: none"> • Equipment, utensils and food contact surfaces • Maintenance • Storage • Refrigeration and hot holding equipment • Single service utensils and containers <p>Division 5 — Employees:</p> <ul style="list-style-type: none"> • Employee hygiene • Communicable disease <p>Division 6 — Food Safety Management:</p> <ul style="list-style-type: none"> • Food handling procedures • Sanitation procedures <p>Division 7 — Miscellaneous:</p> <ul style="list-style-type: none"> • Animals • Pests • Storage of chemicals

APPENDIX F

DETAIL DESCRIPTION OF PART TWO IN PUBLIC HEALTH ACT- FOOD PREMISES REGULATION (VICTORIA, BRITISH COLUMBIA, CANADA)

Section	Detail Description Requirement
General construction requirements	<p>(1) Every person who constructs or makes alterations to food premises must ensure that the food premises are</p> <ul style="list-style-type: none"> (a) of sound construction and in good repair, (b) designed to ensure the safe and sanitary handling of food, (c) constructed from materials that are <ul style="list-style-type: none"> (i) suitable for their intended purpose, and (ii) durable, easily cleaned and free from any noxious or toxic substance, (d) separate from and without direct access to <ul style="list-style-type: none"> (i) living quarters, or (ii) any area in which activities are carried out that are incompatible with the safe handling of food, (e) connected to <ul style="list-style-type: none"> (i) a source of potable water, and (ii) a waste disposal system operating in compliance with the requirements of the government agency that has jurisdiction, (f) capable of supplying hot and cold water that is adequate in quantity and pressure to meet the water needs of the food premises, (g) provided with artificial lighting that is adequate in intensity to permit the sanitary operation and maintenance of the premises, (h) equipped with ventilation equipment that is adequate to prevent the accumulation of smoke, grease, water vapour and objectionable odours, and (i) supplied with equipment that will ensure the safe and sanitary handling of food. <p>(2) Repealed. [B.C. Reg. 361/99, s. 2.] [am. B.C. Reg. 361/99, s. 2.]</p>

APPENDIX G

GENERAL DESCRIPTION OF MINISTRY OF HEALTH AND FAMILY WELFARE (FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA)

Part	Description
I. General Hygienic and Sanitary practices to be followed by Petty Food Business Operators applying for Registration	<ul style="list-style-type: none"> • Sanitary and hygienic requirements for food manufacturer/ processor/handler B. Sanitary and hygienic requirements for street food vendors and units other than manufacturing/ processing
II. General Requirements on Hygienic and Sanitary Practices to be followed by all Food Business Operators applying for License	<ul style="list-style-type: none"> • Location and surroundings • Layout and design of food establishment premises • Equipment and containers • Facilities • Food operations and controls • Management and Supervision • Food Testing Facilities • Audit, Documentation and Records • Sanitation and maintenance of food establishment premises • Personal hygiene • Product information and consumer awareness • Training
III. Specific Hygienic and Sanitary Practices to be followed by Food Business Operators engaged in manufacture, processing, storing and selling of Milk and Milk Products	<ul style="list-style-type: none"> • Sanitary requirements • Personal hygiene requirements • Sanitary requirements for storage • Wrapping and packaging
IV. Specific Hygienic and Sanitary Practices to be followed by Food Business Operators engaged in manufacture,	<ul style="list-style-type: none"> • Slaughter House

<p>processing, storing and selling of Meat and Meat Products</p>	
<p>V. Specific Hygienic and Sanitary Practices to be followed by Practices to be followed by Food Business Operators engaged in catering / food service establishments</p>	<ul style="list-style-type: none"> • Good maintaining practices for whole premise • Good food hygiene practices • Personal hygiene • Transportation and handling of food • Storage • Special requirements for high risk foods

APPENDIX H
DETAIL DESCRIPTION OF PART II IN MINISTRY OF HEALTH AND
FAMILY WELFARE
(Food Safety and Standards Authority of India)

Section	Detail Description and Requirement
Location and surrounding	<p>1. Food Establishment shall ideally be located away from environmental pollution and industrial activities that produce disagreeable or obnoxious odour, fumes, excessive soot, dust, smoke, chemical or biological emissions and pollutants, and which pose a threat of contaminating food areas that are prone to infestations of pests or where wastes, either solid or liquid, cannot be removed effectively.</p> <p>2. In case there are hazards of other environment polluting industry located nearby, appropriate measures should be taken to protect the manufacturing area from any potential contamination.</p> <p>3. The manufacturing premise should not have direct access to any residential area.</p>
Layout and design of food establishment premises	<p>1. Floors, ceilings and walls must be maintained in a sound condition to minimize the accumulation of dirt, condensation and growth of undesirable moulds. They should be made of impervious material and should be smooth and easy to clean with no flaking paint or plaster.</p> <p>2. Doors shall also be made of smooth and non-absorbent surfaces so that they are easy to clean and wherever necessary, disinfect.</p> <p>3. The floor of food processing / food service area shall have adequate and proper drainage and shall be easy to clean and where necessary, disinfect. Floors shall be sloped appropriately to facilitate drainage and the drainage shall flow in a direction opposite to the direction of food preparation / manufacturing process flow.</p> <p>4. Adequate control measures should be in place to prevent insects and rodents from entering the processing area from drains.</p> <p>5. Windows, doors & all other openings to outside environment shall be well screened with wire-mesh or insect proof screen as applicable to protect the premise from fly and other insects / pests / animals & the doors be fitted with automatic closing springs. The mesh or the screen should be of such type which can be easily removed for cleaning.</p> <p>6. No person shall manufacture, store or expose for sale or permit the sale of any article of food in any premises not effectively separated to the satisfaction of the licensing authority from any privy, urinal, sullage, drain or place of storage of foul and waste matter.</p>
Equipment & containers	<p>1. Equipment and containers that come in contact with food and used for food handling, storage, preparation, processing, packaging and serving shall be made of corrosion free materials which do not impart any toxicity to the food material and should be easy to clean and /or disinfect (other than disposable single use types).</p>

	<p>2. Equipment and utensils used in the preparation of food shall be kept at all times in good order and repair and in a clean and sanitary condition. Such utensil or container shall not be used for any other purpose.</p> <p>3. Every utensil or container containing any food or ingredient of food intended for sale shall at all times be either provided with a properly fitted cover/lid or with a clean gauze net or other material of texture sufficiently fine to protect the food completely from dust, dirt and flies and other insects.</p> <p>4. No utensil or container used for the manufacture or preparation of or containing any food or ingredient of food intended for sale shall be kept in any place in which such utensil or container is likely by reason of impure air or dust or any offensive, noxious or deleterious gas or substance or any noxious or injurious emanations, exhalation, or effluvium, to be contaminated and thereby render the food noxious.</p> <p>5. Equipment shall be so located, designed and fabricated that it permits necessary maintenance and cleaning functions as per its intended use and facilitates good hygiene practices inside the premise including monitoring and audit.</p> <p>6. Appropriate facilities for the cleaning and disinfecting of equipments and instruments and wherever possible cleaning in place (CIP) system shall be adopted.</p> <p>7. Equipment and containers for waste, by-products and inedible or dangerous substances, shall be specifically identifiable and suitably constructed.</p> <p>8. Containers used to hold cleaning chemicals and other dangerous substances shall be identified and stored separately to prevent malicious or accidental contamination of food.</p> <p>9. If required, a waste water disposal system / effluent treatment plant shall be put in place.</p> <p>10 All items, fittings and equipments that touch or come in contact with food must be:</p> <ul style="list-style-type: none"> • kept in good condition in a way that enables them to be kept clean and wherever necessary, to be disinfected. • Chipped enameled containers will not be used. Stainless steel /aluminum / glass containers, mugs, jugs, trays etc. suitable for cooking and storing shall be used. Brass utensils shall be frequently provided with lining.
Facilities	<ul style="list-style-type: none"> • Water supply • For Cleaning Utensils / Equipments • Washing of Raw materials • Ice and Steam • Drainage and waste disposal • Personnel facilities and toilets • Air quality and ventilation • Lighting
Food operations and controls	<ul style="list-style-type: none"> • Procurement of raw materials • Storage of raw materials and food • Food Processing / Preparation, Packaging and Distribution / Service

	<ul style="list-style-type: none"> • Food Packaging • Food Distribution / Service
Management and Supervision	<ol style="list-style-type: none"> 1. A detailed Standard Operating Procedure (SOP) for the processing of food as well as its packing, dispatch and storage will be developed for proper management which in turn would help in identifying any problem and the exact point, so that damage control would be faster. 2. The Food Business shall ensure that technical managers and supervisors have appropriate qualifications, knowledge and skills on food hygiene principles and practices to be able to ensure food safety and quality of its products, judge food hazards, take appropriate preventive and corrective action, and to ensure effective monitoring and supervision.
Food Testing Facilities	<ol style="list-style-type: none"> 1. A well-equipped, laboratory for testing of food materials / food for physical, microbiological and chemical analysis in accordance with the specification/standards laid down under the rules and regulations shall be in place inside the premise for regular / periodic testing and whenever required. 2. In case of any suspicion or possible contamination, food materials / food shall be tested before dispatch from the factory. 3. If there is no in house laboratory facility, then regular testing shall be done through an accredited lab notified by FSSAI. In case of complaints received and if so required, the company shall voluntarily do the testing either in the inhouse laboratory or an accredited lab or lab notified by FSSAI.
Audit, Documentation and Records	<ol style="list-style-type: none"> 1. A periodic audit of the whole system according to the SOP shall be done to find out any fault / gap in the GMP / GHP system. 2. Appropriate records of food processing / preparation, production / cooking, storage, distribution, service, food quality, laboratory test results, cleaning and sanitation, pest control and product recall shall be kept and retained for a period of one year or the shelf-life of the product, whichever is more.
Sanitation and maintenance of establishment premises	<ul style="list-style-type: none"> • Cleaning and Maintenance • Pest Control Systems
Personal hygiene	<ul style="list-style-type: none"> • Health Status • Personal Cleanliness • Visitors
Product information and consumer awareness	<p>All packaged food products shall carry a label and requisite information as per provisions of Food Safety and Standards Act, 2006 and Regulations made there under so as to ensure that adequate and accessible information is available to the each person in the food chain to enable them to handle, store, process, prepare and display the food products safely and correctly and that the lot or batch can be easily traced and recalled if necessary.</p>
Training	<ol style="list-style-type: none"> 1. The Food Business shall ensure that all food handlers are aware of their role and responsibility in protecting food from contamination or deterioration. Food handlers shall have the necessary knowledge and skills which are relevant to food

	<p>processing / manufacturing, packing, storing and serving so as to ensure the food safety and food quality.</p> <p>2. The Food Business shall ensure that all the food handlers are instructed and trained in food hygiene and food safety aspects along with personal hygiene requirements commensurate with their work activities, the nature of food, its handling, processing, preparation, packaging, storage, service and distribution.</p> <p>3. Periodic assessments of the effectiveness of training, awareness of safety requirements and competency level shall be made, as well as routine supervision and checks to ensure that food hygiene and food safety procedures are being carried out effectively.</p> <p>4. Training programmes shall be routinely reviewed and updated wherever necessary.</p>
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