

25/36



Extended essay cover

Candidates must complete this page and then give this cover and their final version of the extended essay to their supervisor.

Candidate session number

Candidate name

School number

School name

Examination session (May or November)

May

Year

2012

Diploma Programme subject in which this extended essay is registered: FVSS

(For an extended essay in the area of languages, state the language and whether it is group 1 or group 2.)

Title of the extended essay: How has the population increase in the residential colony of DLF Phase I (Gurgaon) altered the garbage management methods within the time span of 10 years (2000 to 2010)?

Candidate's declaration

This declaration must be signed by the candidate; otherwise a grade may not be issued.

The extended essay I am submitting is my own work (apart from guidance allowed by the International Baccalaureate).

I have acknowledged each use of the words, graphics or ideas of another person, whether written, oral or visual.

I am aware that the word limit for all extended essays is 4000 words and that examiners are not required to read beyond this limit.

This is the final version of my extended essay.

Candidate's signature:

Date: 21/2/2012

Supervisor's report and declaration

The supervisor must complete this report, sign the declaration and then give the final version of the extended essay, with this cover attached, to the Diploma Programme coordinator.

Name of supervisor (CAPITAL letters) _____

Please comment, as appropriate, on the candidate's performance, the context in which the candidate undertook the research for the extended essay, any difficulties encountered and how these were overcome (see page 13 of the extended essay guide). The concluding interview (viva voce) may provide useful information. These comments can help the examiner award a level for criterion K (holistic judgment). Do not comment on any adverse personal circumstances that may have affected the candidate. If the amount of time spent with the candidate was zero, you must explain this, in particular how it was then possible to authenticate the essay as the candidate's own work. You may attach an additional sheet if there is insufficient space here.

as a EVSS student has worked well on the local study of garbage in her neighbourhood. She has collected most of the data first hand herself to come to a conclusion on the altered garbage management methods.

study reflects her understanding of the solid garbage disposal problems in cities and efforts being made to overcome them.

The scope of her study was very manageable and enabled her to collect primary data together with some secondary data to come to a conclusion.

This declaration must be signed by the supervisor; otherwise a grade may not be issued.

I have read the final version of the extended essay that will be submitted to the examiner.

To the best of my knowledge, the extended essay is the authentic work of the candidate.

I spent 4 hours with the candidate discussing the progress of the extended essay.

Supervisor's signature: _____

Date: 21/2/2012

Assessment form (for examiner use only)

Candidate session number

Achievement level

Criteria	Examiner 1	maximum	Examiner 2	maximum	Examiner 3
A research question	1	2	1	2	
B introduction	2	2	2	2	
C investigation	3	4	3	4	
D knowledge and understanding	3	4	3	4	
E reasoned argument	2	4	2	4	
F analysis and evaluation	3	4	3	4	
G use of subject language	3	4	3	4	
H conclusion	2	2	2	2	
I formal presentation	3	4	3	4	
J abstract	2	2	0	2	
K holistic judgment	3	4	3	4	
Total out of 36	25		25		

Signature of examiner 1: _____
(ITAL letters)

Examiner number: _____

Signature of examiner 2: _____
(ITAL letters)

Examiner number: _____

Signature of examiner 3: _____
(ITAL letters)

Examiner number: _____

IB Cardiff use only: B: _____

IB Cardiff use only: A: _____

Date: _____

Extended Essay

Environmental Systems and Societies

Research Question:

How has the population increase in the residential colony of DLF Phase1 (Gurgaon) altered the garbage management methods within the time span of 10 years (2000 to 2010)?

Candidate Name:

Candidate Number:

Centre Number:

Session: May 2012

Word Count: 3982

Abstract

In today's world, urban waste management has assumed significant proportions in most of the big cities. Developed countries like the US, UK and the EU already have devised special mechanisms to effectively dispose off household /domestic waste, but the developing countries are still lagging behind on this subject. This is due to the fact that research & development, infrastructure and other facilities and resources including the budget/finances for civic amenities are very limited. The problem is further aggravated due to unplanned construction of townships & residential plots, which are rapidly expanding due to growing populations.

DLF Phase 1 is an example of such an integrated township is Gurgaon, a satellite town of the capital of New Delhi, which has grown rapidly over the years. But due to non-planning by the private colonizers like DLF, Unitech, etc., and equally lackadaisical attitude of the local government & the civic authorities, there was no regulation on construction. Private developers were involved in making a fast buck during the housing boom. Due to the lack of resources of the local municipal authority –the Municipal Corporation of Gurgaon, the basic civic amenities like garbage collection and disposal facilities were not developed and modernized adequately to accommodate the growing population in the township.

This essay explores the implications of the population growth of one such place – DLF Phase 1 which has seen exponential growth in the last decade, and it's implications on the garbage and it's disposal. It also discusses the ways the garbage management system has evolved & developed over the years due to more private and public involvement in it.

The subject with which this essay is in regard to is Environmental systems and societies. Hence, growing garbage has many environmental concerns attached to it such as the need for more land, its method of disposal being 'environmental friendly' and so on. Therefore, my essay would explore some of these aspects briefly as well.

Discussion of research question / method / conclusion

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Introduction

Solid waste management is an issue that concerns most of the urban areas around the World. A growth of population leads to more waste being generated and the disposal of this waste is either a job of municipal government agencies or of private contractors. This problem of disposing waste (which includes commercial and domestic refuse) is mostly faced by developing countries that also have a rapidly increasing population.

"Waste generation rates are affected by socioeconomic development, degree of industrialization and climate. Generally, the greater the economic prosperity and the higher percentage of urban population, the greater the amount of solid waste produced"¹.

Gurgaon is a city which may be considered as an extension of New Delhi. It comes under the National Capital Region in India and over the past 25 years, has witnessed extraordinary growth. Most of the Multinational Companies operate from branch offices in Gurgaon and along with being the new commercial hub of the capital, it has also become a residential attraction. Hence, rapid increase in population and urbanization of the area has lead to the development of many colonies of individual houses as well as multistoried buildings.

DLF phase 1 is one of the high-end individual housing colonies in Gurgaon which had tremendous increase in the number of independent houses that were built between 2000 and 2010. All the houses here have 6 people living on an average². Therefore, with the increase in population of the area, the waste disposal system was affected and I will carry out a study to investigate this.

But before researching the status of garbage collection and the effective disposal of the same in DLF 1, I would like to highlight the common practices pursued in the developed countries for garbage disposal in addition to it, my curiosity led me further to research on the subject. Due to this, I now have a better understanding of the laws and procedures of the Indian government agencies that specifically provide instructions to municipal bodies and housing societies regularly in their circulars & publications for the treatment of garbage and sewage. By going through them I have found that the disposal system of garbage, not only in DLF

¹
<http://web.mit.edu/urbanupgrading/urbanenvironment/resources/references/pdfs/WhatAWasteAsia.pdf>

² Refer Appendix A

Gurgaon but other towns of India also, still remains in primitive stages. The excerpts of the findings have been elaborated below in context of the essay:

STANDARD WAYS FOR DISPOSAL OF GARBAGE IN DEVELOPED COUNTRIES:

In the developed countries like the US/UK, the method of garbage collection and its disposal is scientific and systematic. Almost all of the states and counties of the US & UK respectively have a separate garbage collection and disposal department that looks separately on the garbage and recycling program.

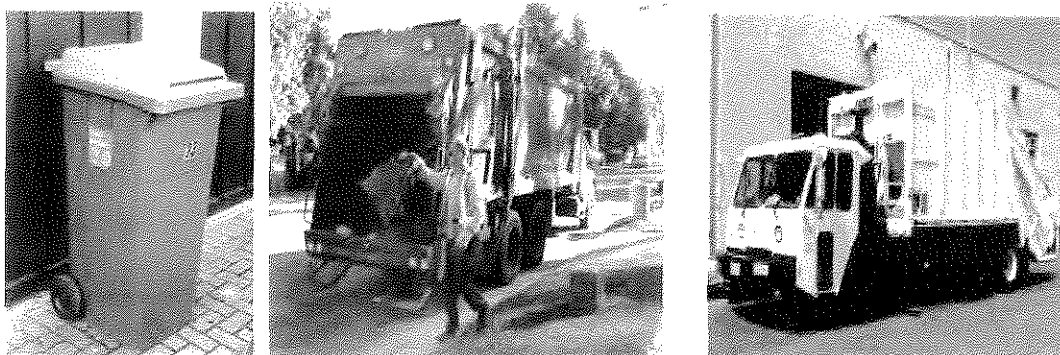


FIGURE 1: WAYS OF GARBAGE COLLECTION IN DEVELOPED NATIONS

Some of the salient features of the US garbage collection system in comparison to that in Indian (Urban) systems are:

US	India
1. Most of the household garbage is collected by an automated system. In this system automated carts are assigned to each residence which serves as the only container for the collection of garbage. The automatic carts needs to be filled in and should be placed in the designated area near the roadside only on specific times (generally early morning) and dates that are announced prior to collection of garbage. If there is no automatic cart, then special garbage cans and bags should be used for disposal which are	In India, there are few automated carts, but actually cycle carts that go out to the houses in the morning to collect garbage. These can be irregular. There is no certain alternative to this. Therefore, in case of the cart not arriving, people may resort to a variety of alternatives.

visibly distinguishable from normal bags	
2. There is a limit on the kind of trash that can be put in the automated cart – not all household waste is permitted. Certain items are banned like glass, dirt, furniture, flammable objects, paints, etc. There are separate carts for products like these.	In contrast to this, in India, there is no such limit and almost everything and anything goes together. Garbage separated later by rag pickers who may collect material for recycling. Paper or metal, and other such things can be stored by households and then sold to these recyclers.
3. Grasses and leaves should be disposed off by different procedure as notified by the authorities. Burning of leaves, grasses, etc., are banned and must be disposed as mentioned.	Burning of dry leaves and grass is the most common practice.
4. Illegal dumping of garbage is strictly prohibited.	Laws are not strictly followed or legislated.

In US, once the garbage has been collected it is either disposed off by sending to a landfill or an incinerator. It may also be sent to an energy recovery Centre to generate electricity, etc., or it may be sent to a resource recovery center (which is not a popular practice yet).

In some countries of the EU as well as other countries, a collection system called Envac is used which is a proprietary system for collecting garbage. Vacuum system is employed to transport the garbage via underground conduits.³

In a landfill, the garbage is simply buried in the ground, which is earmarked for the purpose as they are situated in areas far from population, natural vegetation and the terrain may be of unused quarries or pits which are made to hold the waste. A properly managed landfill site is the most preferred method of garbage disposal even in developed countries like the US & UK (where land is generally available for it). However this method is not viable in places and countries where shortage of land is a problem. Proper and sufficient restoration of land and the problems of losing habitat for flora and fauna are some of the concerns attached to this.

³ http://en.wikipedia.org/wiki/Envac_Automated_Waste_Collection_System

Even if a landfill is a good option, it has to be taken proper care of as an ill maintained landfill will cause more harm than good causing adverse impacts on the environment. Poorly maintained landfills can cause vermin to be attracted, the litter could be blown by wind action to dwellings, liquid leachate may be generated which can contaminate the ground water. So, in designing a modern landfill, care should be taken that it does not cause adverse impact on the environment. To contain leakage, clay or appropriate lining material such as plastic is used in landfill sites. Additionally the waste is compacted so that the stability and density of the garbage is increased. The landfill site might also have a gas extraction mechanism to extract the trapped gas in the garbage which can be further used to generate electricity.

In Japan or Vienna and other countries that are too small to afford large tracts of lands to be used as landfills, different method to dispose garbage is used; incinerators in which the solid waste of organic origin is combusted which converts it into gaseous state and solid residual material. The waste materials are converted into steam, heat, gas and ash. But incinerators have been subject to controversy and criticism as they generate harmful gases that pollute the environment.

Some developed countries like Germany employ energy recovery mechanisms to recover energy from garbage and waste materials. In this process either the waste material is directly used as a fuel or is processed into a different type of fuel for combustion.

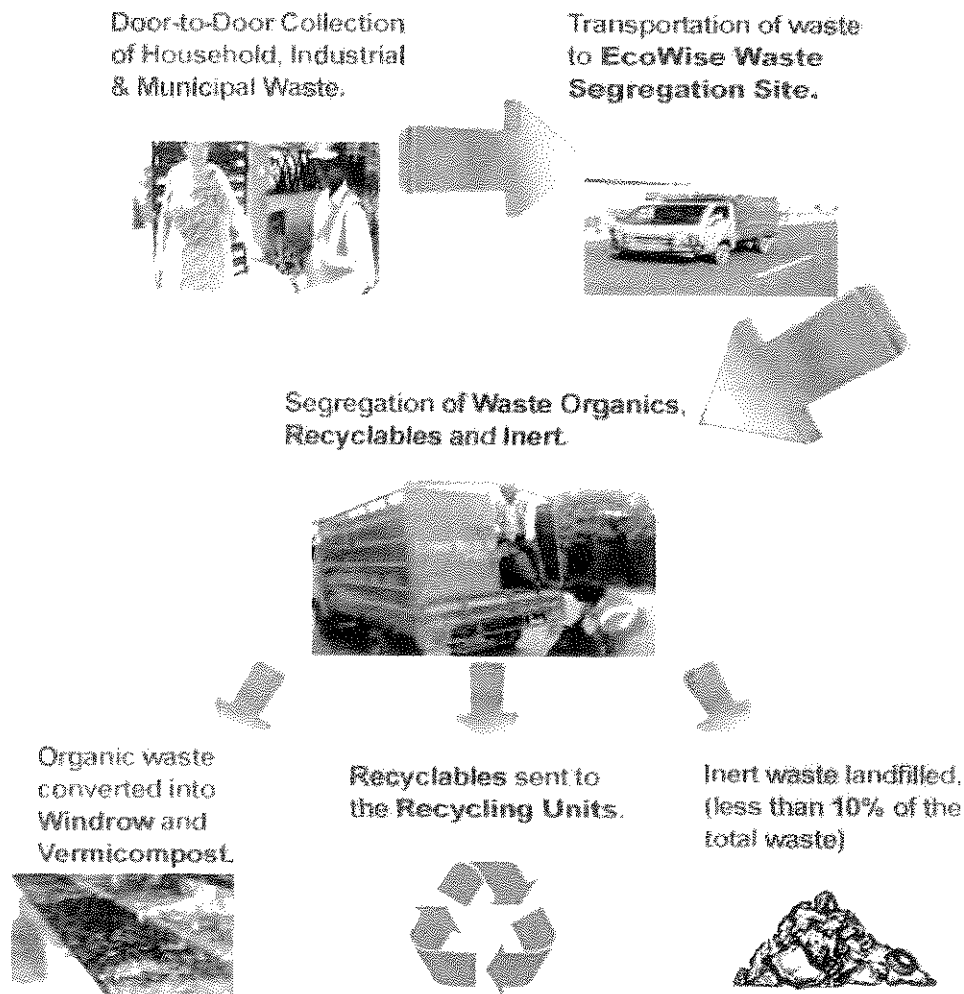


FIGURE 2: IDEAL HOUSEHOLD GARBAGE/WASTE MANAGEMENT SYSTEM

In India the general way of garbage disposal system has been traditional landfill sites which are not designed on international lines and are just a stop gap arrangement for disposing the accumulating garbage. Incineration and energy recovery is not a common practice for disposing garbage here. The same holds true for Gurgaon and DLF Phase I. Also, the following study will reveal how the garbage had been deposited thoughtlessly over the years due to lack of any regulation or initiative.

**A STUDY ON THE GARBAGE DISPOSAL SYSTEM OF DLF 1 AND THE
CHANGES IN THE LAST DECADE DUE TO THE RISING POPULATION**

Aim: To find how the quantity of waste produced and disposal methods changed due to an increase in the population.

Specific Aim: To find how the quantity of household waste and the garbage disposal system changed over a period of ten years (2000 to 2010) due to an increase in the population of DLF phase 1.

Hypothesis: The population has rapidly increased and so an increase in the garbage content has lead to alternative disposal systems between the years 2000 and 2010.

Variables:

- Independent variable- Population
- Dependent Variable- Garbage
- Controlled- Area, number of houses studied, time taken into consideration

Method:

1. Collect statistical data on the population of the area for the time period by doing a survey on the houses of the society and interviewing the RWA officials to get statistics on the population.
2. Interview the concerned Residents Welfare Association's employees⁴ to collect information on the disposal system, where does the garbage go, etc. Also find out what was the old system and what is the new one. Why was the new one implemented?
3. Interview the employees at the Municipal Corporation of Gurgaon to find out what is their policy.
4. Interview old and new residents to find out what they do with their garbage and whether they recycle. If yes, then how?
5. Go to the landfill sites to collect first hand information on the landfill area, nature of garbage dumped, total garbage dumped on a daily basis, recycling of garbage, etc.

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6. Find out how the systems have changed over the years.
7. Then come to a conclusion and an evaluation of this study.

Data Collection:

By interviewing the Residents Welfare Association president- Mr. Pradeep Arora, I was able to collect data on the number of houses at the end of each year and found out that on an average 6 people live permanently in each house (including the domestic help):

Year	Number of houses(at the end of each year)	Population (6xnumber of houses)
2000	280	1680
2001	400	2400
2002	440	2640
2003	480	2880
2004	400	2440
2005	420	2520
2006	480	2880
2007	576	3456
2008	640	3840
2009	560	3360
2010	720	4320

Further, in order to calculate the garbage produced in the whole area per day, I found out the average weight of garbage that is produced by an urban Indian individual and then multiplied it by the total population. "As GNP increases toward the middle income range, the per capita waste generation rates also increase, ranging from 0.5 to 1.1 kg per day. As predicted, the high income groups show the greatest generation rates, which vary from 1.1 to 5.07 kg per capita per day."⁵

5

<http://web.mit.edu/urbanupgrading/urbanenvironment/resources/references/pdfs/WhatAWasteAsia.pdf>

India is still a low-income country but the population under consideration of the particular area is more of the high-income group. Individuals living in cities generate twice as much solid waste as individuals living in rural parts of the country. This is because people in urban areas use a much larger amount of resources. When I asked the garbage collector for the data he said that on an average each house generates approximately 6-7 kg of garbage per day. Therefore, I will consider the average weight generated by each individual as 1.1 kg per capita per day. This figure will then help me consolidate the fact that average garbage produced increased along the years:

Year	Population (at the end of the year)	Garbage produced on an average (Kg per day) = population \times 1.1
2000	1680	1848
2001	2400	2640
2002	2640	2904
2003	2880	3168
2004	2440	2684
2005	2520	2772
2006	2880	3168
2007	3456	3801.6
2008	3840	4224
2009	3360	3696
2010	4320	4752

These calculations have been done by approximating the estimate of average number of people living in a house and the average amount of waste produced by 1 person per day. However, according to the above provided data, the population of DLF phase 1 increased by 157.6% in the last decade and due to this, the solid waste generated by the population of the area has also increased by 157.7%.

On interviewing the RWA president⁶, I also found information on how the disposal system was affected due to the rapid increase in population and in solid waste generation. Mr. Arora

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explained that, “We do not have MCG (Municipal Corporation Gurgaon) for this area. A private firm- ‘K.B Enterprises’ manages it. But I feel the system is good enough and so is the sanitation. The locality seems clean and well maintained.”

Thus, a private firm looks after the collection of waste from household as well as cleanliness of the locality i.e sweeping the roads etc. It collects the solid waste from houses in carts, which is then transferred onto trucks and then taken to a dump-yard called Kachra chowk. From this dump-yard, the waste is then sent off to a landfill site for final disposal. Sometimes it is also left behind.

Next, I interviewed the MCG commissioner⁷ to find out what the government’s policy on garbage disposal are. Mr. Sudhir Rajpal said, “As far as management of wastes is concerned, yes although still not accurate enough, the government is working towards improving the situation further and thus making new and affective plans... Apart from public agencies there are other important agents who play their part in the overall scheme of solid waste management in the city. There are private sweepers and garbage collectors employed by the people for cleaning privately owned premises, waste pickers, waste dealers and recycling industries, which consume recyclable waste to produce recycled products.” The MCG trucks are the ones that collect waste from the private collectors of DLF phase 1 and then take it further to landfill sites or dump-yards for treatment.

On more investigation with the RWA president, said “However, this procedure takes care of approximately only 50% of the colony’s garbage”. When I asked old residents, I found out that 10 to 15 ago, years garbage was simply collected from each house by a collector. It was the taken to the landfill site nearby or burnt down. While researching, I read in an article written in 2008 that “waste is either burnt in empty plots and parks across the city or finds its way to the Aravalli belt near DLF.”⁸

Therefore, the method that was carried out 10 years ago for only 1680 people approximately is now carried out for 4320 people. An old employee of the private firm responsible for waste collection and cleanliness of DLF phase 1; Arjun Desai explained that, “earlier (about 10 years ago) 1 man was allotted each block because there were such few houses. He would take

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⁸ <http://www.expressindia.com/latest-news/No-garbage-disposal-Gurgaon-wallows-in-own-filth/325857/>

one cart once in 2 to 3 days and could easily manage carrying all the garbage. But now, with development of the area and increase in population, 1 man is allotted 4 to 6 lanes and collects the garbage daily."

So, the garbage collection system was affected due to the increase in population of the area. When more houses were built, more men had to be employed for collecting garbage and as Arjun Desai explained, "The size of the carts also became bigger". Moreover, earlier garbage was burnt or taken away to one particular dump-yard but now many of them are created nearby in order to accommodate the amount of garbage increased.

There are many garbage disposal methods such as incineration, recycling, landfills and so on. But, in India landfills are the most popular and accounts for 90 percent of the nation's municipal refuse. Transportation and collection add up to about 75% of the total cost thus making it an effective method. In a modern landfill, refuse is compressed into a thin layer and covered by soil. Clay is the best type of soil for a landfill. Ten years ago, DLF phase 1 had no landfill sites and would just simply find any isolated strip of the colony to either burn or bury the garbage underground. 5 years later the site to dump garbage shifted a little further from the colony and then, as population increased, the need for more land lead to search for more and larger isolated areas. Landfill sites for DLF phase I are now either Kachra Chowk or Chakkarpur village. The private contractor dumps the collected garbage at the Kachra Chowk. The MCG is responsible for transporting it to the landfill site at Chakkarpur village.



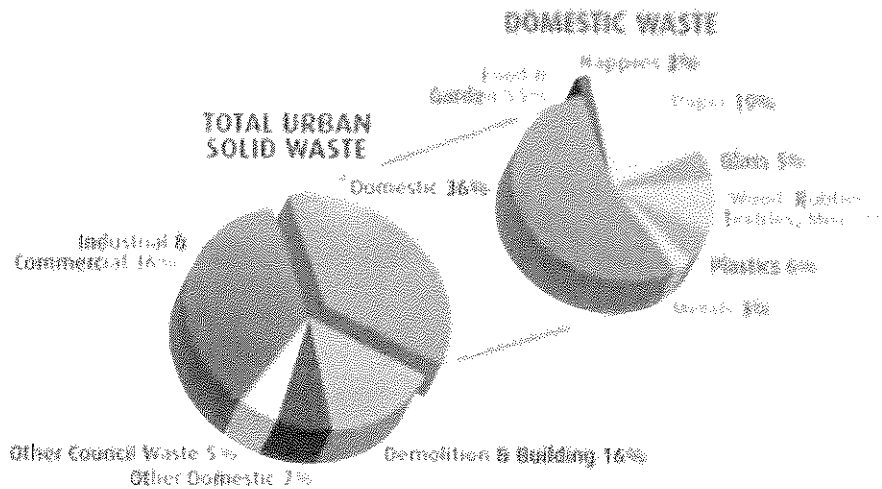
FIGURE 3: KACHRA CHOWK

The composition of the average domestic waste from the housing of DLF 1 is similar to the waste of any other major metropolitan city like Mumbai, Delhi and the constitution is as follows¹⁰:

S. No.	Material	Percentage of waste
1.	Paper/Cardboard	19%
2.	Glass	5%
3.	Textiles	10%
4.	Metals	3%
5.	Plastics	6%
6.	Vegetable matter	55%

⁹ <http://news4u.co.in/gurgaonkachra.jpg>

¹⁰ <http://www.snugglers.com.au/images/piechart.jpg>



The waste materials need to be disposed by using the standard four ways defined for disposal: 1. Collection of garbage at the source, 2. Segregation of garbage into recyclable and non recyclable at source, 3. Collection & Transportation of the waste and 4. The final disposal of waste.



FIGURE 4: STATE OF FILTH AT CHAKKARPUR VILLAGE

The method of recycling solid waste is also an important disposal system. In India, it is an informal sector and is done through 'waste picking'. This is a localized market and the trend of recycling has obviously increased since the past 10 years because of the increase in awareness about sustainable development. As I was informed by the MCG commissioner, "recycling involves separation of waste materials such as plastic, metal, paper etc and then

using it or selling it off further in order to refine and reuse". The local residents of DLF phase 1 also admitted that their contribution to recycling is limited however has increased due to awareness. They reuse materials such as newspapers for other jobs like covering notebooks or even reuse water from swimming pools to watering their lawns.

However the Government of India under the Aegis of Ministry of Environment and Forests clearly defines every aspect of collection and disposal of Municipal Solid Wastes (MSW) in its gazette dated 27.09.99 and is known as the Municipal Solid Wastes (management & handling) Rules, 2000. The rules of this gazette apply to every municipal authority in India that is responsible for the waste collection, management and disposal in India. But sadly the Municipal Corporation of Gurgaon had been unable to match the standards and parameters as laid by the Ministry.

For example Schedule II of the MSW Rules specifically state in Serial No. 1, compliance criteria vii that no garbage or leaves shall be burnt. But the sad fact is that the landfills continue to burn wastes and garbage at sites along with empty plots and parks in the city.¹¹

¹¹ <http://www.expressindia.com/latest-news/no-garbage-disposal-gurgaon-wallows-in-own-filth/325857/>



**FIGURE 5: PRIVATE FIRMS HAVE A LONG WAY TO GO IN WASTE
MANAGEMENT**

Things are however set to be far more better when more private players come into the market and setup their own garbage treatment centers like landfill sites, incinerators, setting up of organic waste treatment facility, etc. As the garbage collection and management industry is a profitable one in metropolitan cities, many private players want to enter this market. This is a welcome move as such a step will only lead to the reduction of garbage and filth from the city landscape. In turn not only employment will be generated but also recycling will be done effectively and there would be better use of recyclable materials and pollution will also be checked. It will also lead to generation of natural and organic manure and compost for plants.¹²

In allotting waste management sites at Bandhwari & Rithof, the planning agency HUDA (Haryana Urban Development Agency) has done a good job in keeping a lid on the garbage generated by the city.

¹² <http://eco-wise.blogspot.com/2011/05/waste-disposal-gurgoan.html>

Conclusion

Although Gurgaon is touted as a 'millennium city', the bottom line is that still the basic civic amenities date back to the pre-independence era of India. This is because, inspite of being the fastest growing town in terms of real estate, the township does not have an effective garbage and sewage disposal system as of now. Even though the private waste management companies are doing a good job by keeping a check on the garbage in housings like DLF 1, the fact is that no amount of private involvement can solve the problem alone. It is high time that the MCG wakes up to the issue before an environmental calamity occurs in Gurgaon.

Landfill or burning of the garbage are still the methods of waste disposal adopted by DLF phase 1 however, the number of men employed to collect garbage increased as more houses were built in the area over the past ten years. Also, larger and better landfill sites outside the colony were created instead of dumping the garbage inside the colony. Burning of garbage is an extremely polluting method of waste disposal which may have been reduced over the period.

The hypothesis has proven correct because as displayed in the data; an increase in the garbage content has lead to alternative disposal systems between the years 2000 and 2010. Alternative landfill sites were found. However, this is only to an extent because, due to the lack of resources and effort there have been no drastic modifications in the disposal systems as expected.

Evaluation:

Strengths

- I was able to come to an appropriate conclusion for the study and find out data on what was required under the aim.
- I collected information from a variety of sources. First hand information was derived from the MCG commissioner, RWA president, K.B enterprise employee, old and new residents. I also looked at news articles and other such secondary information.

Weaknesses

- The study lacks deeper detail and information especially as to how the officials have collected their data.
- I could lay more emphasis and find out the role of MCG.

- Concentrate on recycling as a sustainable disposal method.
- Could also look at the sewage disposal system.

APPENDIX A

DATA COLLECTION OF THE POPULATION IN DLF PHASE 1

The number of apartments and houses, their floors and number of flats on each floor has been taken into consideration in the survey for determining the number of occupants in the apartments:

* Example of a survey

Year	Number of apartments (at the end of each year)	Total no. of floors in the apartment	Total no. of flats in each floor	Floor wise Population (6 X no. of flats)	Total population of all the apartment (Floor population X No. of Floors X No. of apartments)
2000	7	10	4	24	$24 \times 10 \times 7$ = 1680
2001	10	10	4	24	$24 \times 10 \times 10$ = 2400
2002	11	10	4	24	$24 \times 10 \times 11$ = 2640
2003	12	10	4	24	$24 \times 10 \times 12$ = 2880
2004	10	10	4	24	$24 \times 10 \times 10$ = 2400
2005	14	10	3	18	$18 \times 10 \times 14$ = 2520
2006	16	10	3	18	$18 \times 10 \times 16$ = 2880
2007	16	12	3	18	$18 \times 12 \times 16$ = 3456
2008	16	10	4	24	$24 \times 10 \times 16$ = 3840
2009	14	10	4	24	$24 \times 10 \times 14$ = 3360
2010	18	10	4	24	$24 \times 10 \times 18$ = 4320

APPENDIX B

Excerpts of interview held with the Residents Welfare Association president Mr. Pradeep Arora for finding out the state of the garbage collection and disposal methods at DLF Phase 1 on:

Q. 1 Good morning sir, I would like to ask a few questions related to the garbage collection and disposal system at our housing society. Can you spare some of your valuable time for the questionnaire?

A. 1 Of course. Why not? I am not busy at the moment. You can ask me the questions right now.

Q. 2 Do we have any garbage disposal and waste management system here in our society?

A. 2 Yes we do have. A private firm K. B. Enterprises handles the job of garbage disposal in this society.

Q. 3 What about the Municipal Corporation of Gurgaon? Are they not involved in the garbage collection from the society?

A.3 No. The Municipal Corporation of Gurgaon is not involved in the garbage disposal of the society. It is managed only by the private contractor – K. B. Enterprises which has been managing it since 2000.

Q.4 Do you feel that the system is good enough? I mean how can a private contractor handle such a large volume of garbage?

A.4 Yes. No doubt the amount of garbage has increased exponentially over the last decade but the firm is doing it's job well over the years and it's performance has been satisfactory so far.

Q.5 How can you say so? What makes you so confident in saying so?

A.5 See, since the last ten years we didn't had any complaint whatsoever regarding garbage collection and disposal. The area seems clean and sanitized. You can see it for yourself. Did you find even a small amount of trash anywhere in the entire neighbourhood? It's so because the system is robust and over the years it has well absorbed the growing volume of garbage.

Q. 6 Apart from garbage collection, what other jobs are undertaken by the private contractor?

A.6 The firm has been entrusted to look after the general cleanliness and garbage collection of the area. It's job is to clean the place, sweep the roads, collect the garbage and dispose it off on a daily basis.

Q. 7 How is the garbage collected and disposed off?

A. 7 An employee of the firm collects garbage from each and every flat in the apartments. Then the collected garbage is put into hand carts and the accumulated garbage on the cart is dumped into a garbage truck. The garbage truck dumps the garbage to a place called Kachra chowk which is a dump yard for garbages in Gurgaon.

Q.8 Is the garbage left to accumulate at Kachra chowk? Is it left open in the open air to pollute the environment?

A.8 N, not at all. After the garbage had been dumped by the truck, scavengers and other workers separate the recyclable material from the waste. This is done to ensure that no recyclable material is left behind. After the useful recyclable material had been extracted, the garbage is again loaded into the trucks of MCG and sent to a landfill site pre-designated by MCG where it is dumped.

Q.9 Thanks for your valuable time Sir. I have now got quite a wealth of information from you.

A.9 Thank you.

APPENDIX C

Excerpts of interview held with the MCG commissioner, Mr. Sudhir Rajpal or finding out the steps and methods undertaken by the MCG in garbage and waste management in the Millennium City including DLF Phase 1:

Q. 1 Good morning sir. Can you spare some time for a brief interview on MCG's role in garbage collection and disposal please?

A.1 Yes sure. Please go ahead.

Q.2 Sir I stay at DLF Phase 1 and I had recently found that MCG is not involved in collecting garbage from the place. Is it true?

A.2 Yes it is true that presently the MCG is not entrusted with collecting garbage with DLF Phase 1 which falls under ward no. 34. Not only DLF Phase 1, other posh areas and apartments also are not covered by MCG as it falls under the jurisdiction of private developers¹³ and they employ private firms for the job.

Q.3 So how is the garbage at those places managed. What happens to the huge amount of garbage generated at those places? Does MCG doesn't have any role in cleaning up garbage that is generated from those places?

A.3 It's true that MCG directly is not involved in the collection of garbage from private areas like DLF but it is not that we have no role to play. Infact we play a major secondary role as our garbage trucks collect the garbages that have been dumped by private contractors at Kachra chowk and take them for final disposal at the landfill site at the Chakkarpur village which is close to the Gurgaon Faridabad Road.

Q.4 But people are protesting the site to be closed and shifted to a new place as it is a nuisance for the residents living close to it?

A.4 Yes, we are aware of that. Soon we plan to setup a new waste management plant which will take care of the garbage generated in the city and landfills will be soon a thing of past.,¹⁴

Q.5 Thanks for your valuable time and the information provide to me.

A.5 Thank you.

¹³ http://findarticles.com/p/news-articles/times-of-india-the/mi_8012/is_20110127/garbage-collection-doorstep-gurgaon/ai_n56755952/

¹⁴ Refer Appendix D

APPENDIX D

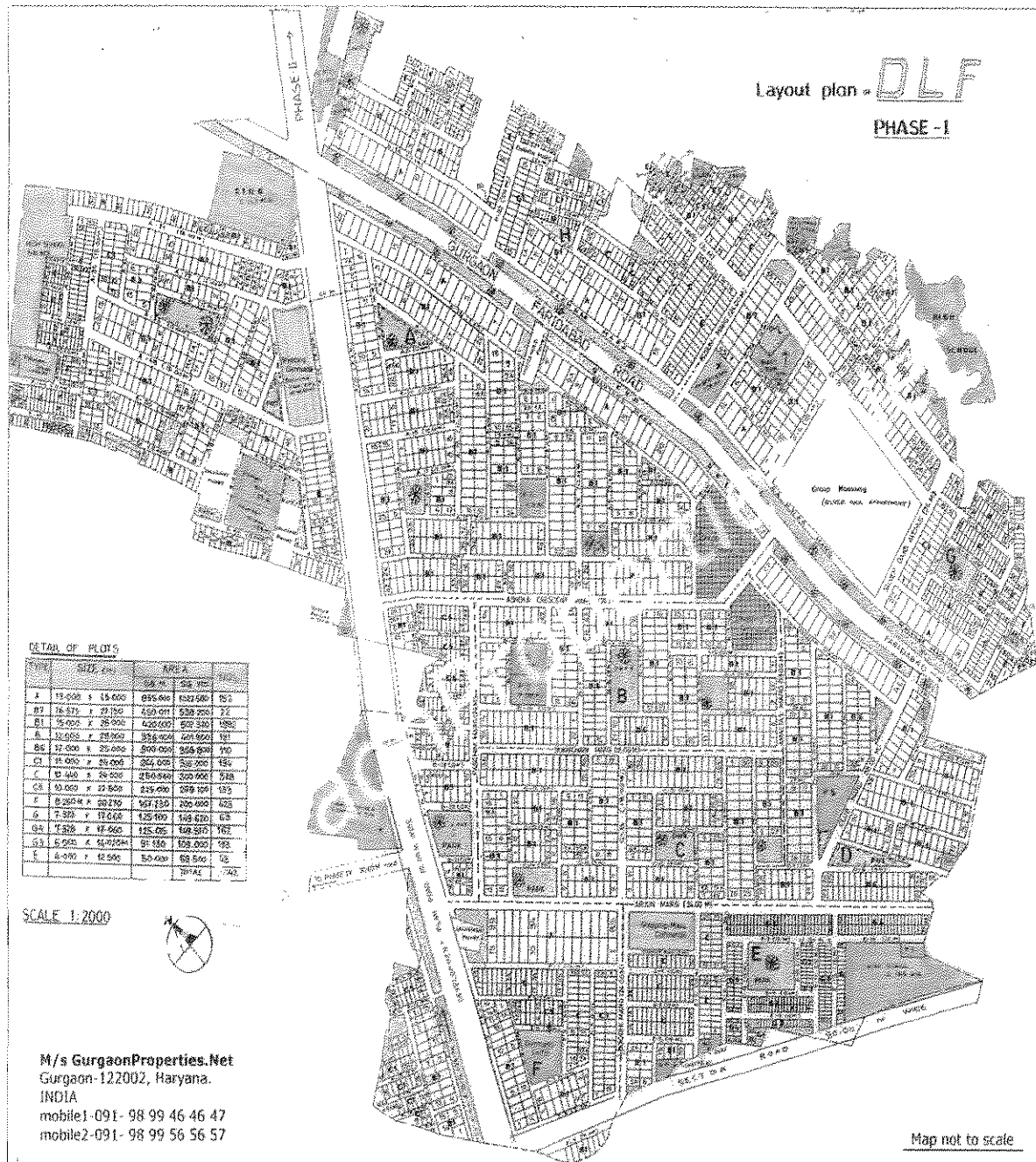
CHART OF MUNICIPAL CORPORATION OF GURGAON (MCG) DEPICTING TIME
SCALE AND ACTION PLAN FOR IMPLEMENTATION OF PROJECTS UNDER THE
MSW RULES¹⁵

Action Plan for Execution of Integrated Municipal Solid Waste Management System in Gurgaon

[illegible]

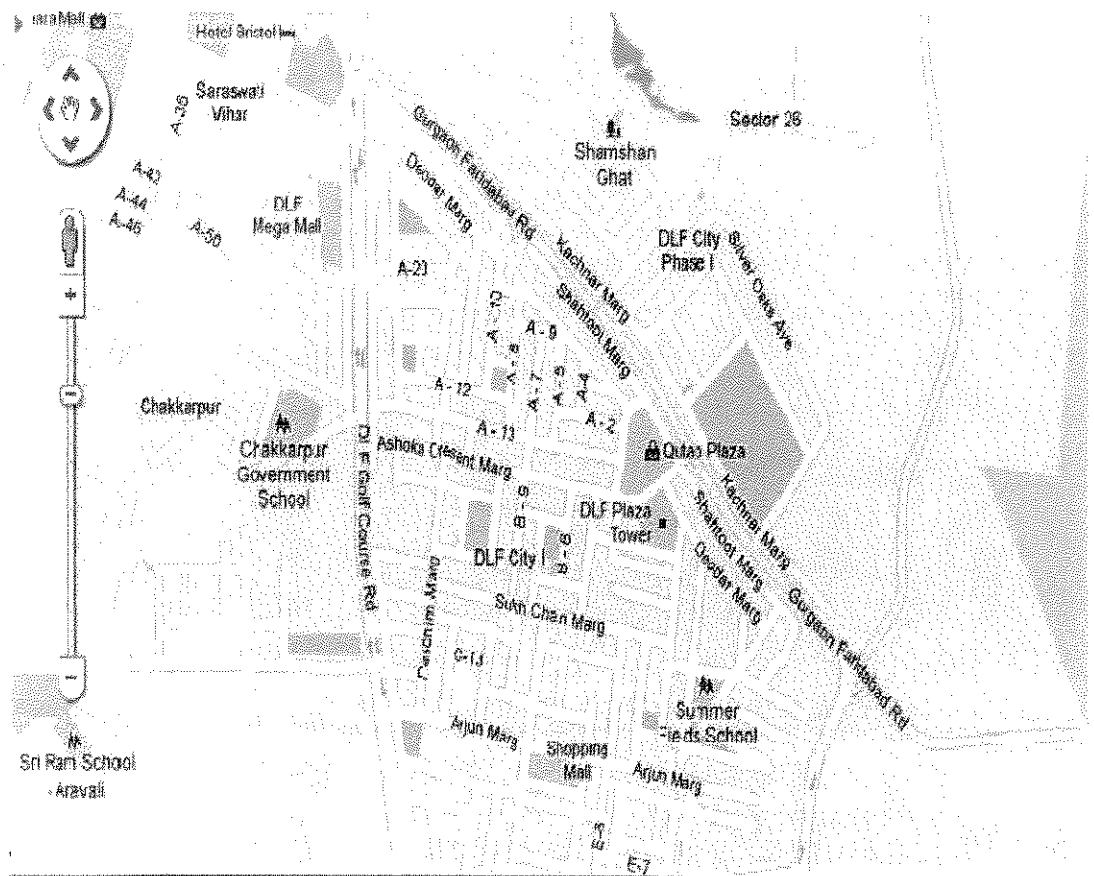
¹⁵ www.mcg.gov.in

APPENDIX E
MAPS OF DLF 1



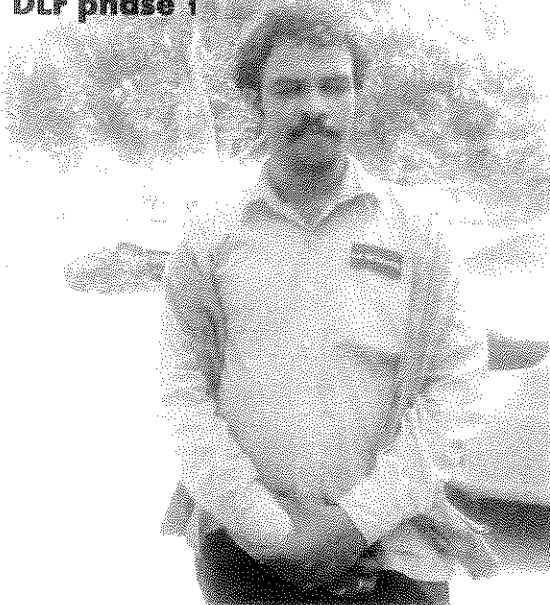
MAP 1 SHOWING MASTER PLAN OF DLF PHASE 1¹⁶

¹⁶ <http://www.gurgaonproperties.net/>



MAP 2: GOOGLE MAP OF DLF 1 AND ADJOINING AREAS

Arjun Desai
(sweeper)
working with a pvt. firm at
DLF phase 1



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