Nashik Fire Hazards Response and Mitigation Plan

Executive Summary

Introduction

1.0 In the past, the fire services in India were only entrusted with the role of Extinguishing Fires and protecting Life and Property during incidences of fire. However, the roles are being drastically changed now. The Fire Services are generally seen as the first Technical Responders; performing the tasks not only related to the Fire extinguishing and rescue and salvage from fires, but are also tasked to perform functions such as rescue from the debris of buildings and structures, rescue from water, control of leakages of Hazardous Material and evacuation of the victims, deal with rescue from the Landslides and also cases concerning sewerage. This has led to the change in nomenclature of these services to "Fire and Emergency Services".

2.0 The added responsibilities of the fire services entail reviewing the hazards, Vulnerability and Risk assessment of each city/ location where the Fire and Emergency Services (hereinafter called the FES) are required to be deployed and analyse the requirement of strengthening the services by way of facilities, Material, Manpower, Technical Support and Procedures, apart from Coordination between the FES and other departments.

3.0 **Aim of this project**:

In view of the present status of Nashik City and its probable growth, work out the Fire Hazard Response and Mitigation Plan for the city.

4.0 **Scope**:

The Project has the following Scope:-

(a) Study the present status of Nashik city (under the Nashik Municipal Corporation, the NMC) and its probable growth pattern.

(b) Analyse the Immediate Fire Hazards, Vulnerability and Risk that the city faces and work out the Response and Mitigation Plan for the FES.

(c) Take into account the future possible Fire Hazards, Vulnerability and Risks in line with the growth of the city and work out a futuristic Response and Mitigation plan.

(d) Take into consideration the present Capacities of the FES and other support services/ departments and identify Gaps **(Gap Analysis)** in the same and recommend enhancements ï immediate and in the next phase of development.

(e) Take a review of the technological advancements for Communication and Warning systems as well as control mechanisms for speedy planning and activation of response during emergencies.

(f) Suggest Response Strategies for implementation of the Response and Mitigation Plans and recommend structures that could facilitate such implementation through Standard Operating Procedures (SOPs).

5.0 **Growth of Nashik City and Future Projections**:

The city of Nashik is located in the Western Ghats at 19 deg N 73 deg E coordinates, on the banks of river Godavari. The city has a mythological and historical past and had always been a place of pilgrimage since ancient times. Mythology explains the dropping of nectar here while it was being carried by the Gods. A massive religious congregation takes place **every 12 years** at Nashik and is called **"Sinhastha Kumbha Mela".** The mythology also states that Lord Ram resided on the banks of Godavari River in the area that is now known as Panchavati, during his exile of 14 years. Hence, the city is revered by the Hindus as a place of importance. The British recognised the geographical importance of Nashik as a gateway between North and Peninsular India and had created a district here. Nashik City has grown in size and population over the past three decades. The expansion had earlier been based astride Agra ï Mumbai Road that runs North to South. The New expansions took place on the three major roads, the Trimbak Road, the Sharanpur Road, and the Gangapur Road, running towards west, emanating at right angles to the old Bombay Agra road. Nashik Road, a part of Nashik is situated on the cross section of Mumbai-Agra Road and Nashik ï Pune state highway and has the main railway track from Mumbai to New Delhi. A lot of development has come up in this section in the past three decades. This section has some important establishments like the ôCurrency Notes Pressõ, ôIndia Security Pressõ, Nashik Road railway Station and Artillery Centre as well as Aviation Wing of the Army. The industrial areas like Ambad and

Satpur, that were identified on the outskirts of Nashik city attracted new settlements and the city has grown beyond these limits. The industries attracted workforce from rural areas and Nashik became an urban agglomerate speedily, increasing its population to 10.7 Lac in 2001 and about 18 Lac in 2011. Though Nashik is an industrial city, it has got 13% working population in primary i.e. agricultural sector, and this is more than any of the large cities of Maharashtra. Nashik has 27% of working population in service sector, which is the second highest in Maharashtra. Hence Nashik is listed in ñIndustrial cum serviceò category. Nashik is now expanding in all directions along the main arterial roads. The housing areas and commercial establishments, shopping and services like schools, hospitals etc. are in the same zone. A number of dams constructed in the last 50 years have improved the availability of water. Nashik has the potential to develop to a considerable size at great speed due to the advantage of its proximity to Mumbai, Pune and Gujarat. In addition, Industrial Estate at Malegaon, Tal Sinnar and the SEZ established at Sinnar and the one that is proposed add to the overall industrial development of Nashik. Nashik city is also an educational hub in North Maharashtra with two universities, some International Schools and professional colleges dotting the landscape. Considering the rapid pace of development, the population projection for Nashik city for 2031 has been taken as 37.50 Lac. However, this could increase to about 40 Lac when the affiliated agglomerates like Eklahara, Bhagur and Devlali are considered along with the cantonment.

6.0 **Vulnerability of Nashik City from various Disasters/ hazards**:

The outline of hazards and vulnerability is mentioned here and details have been analysed subsequently.

(a) **Fires**:

These incidents are very frequent in Nashik. The episodes of fire could arise either in the household or in business centres/ industrial areas or even in the farms/ forests There are many roads and lanes that are narrow and accessibility is difficult. The old part of the city has vintage transformers and old network of

high tension wires that could cause sparking and act as initiators of fire or episodes of electrocution.

(b) **Floods**:

Godavari has caused flooding in the past. There are low laying areas on either banks of Godavari and the population residing within about 200 mtr of the banks is highly vulnerable to flooding. Waldevi and Nasardi rivers that flow through Nashik are also prone to floods. Darna River runs along the present southern boundaries of Nashik Municipal Corporation (NMC) and is also prone to flooding. Flooding is also likely to cause land subsidence and building collapse. About 10,000 to 20,000 population within the city stands vulnerable to the episode of floods.

(c) **Industrial Accidents**:

With rapid industrialization, industrial hazards have been identified in the form of Fires, Leakages of Chemical material. Though not very many chemical factories exist in Nashik, the industries do use chemicals during their production processes. In the past, major industrial fires have been experienced. Also, Dindori, Malegaon and Tal Sinnar are industrialised zone where chemical industries exist. The chemicals are transported through Nashik and accidental leakages are possible.

(d) **Geological hazards (earthquakes and Landslides)**:

Nashikôs geography/ geology is such that it is in Seismic Zone 3 and has hills of Sahyadri ranges so close that the population bases have touched the hill slopes. The hazards of earthquake and landslides exit in the city. The vulnerability due to landslides is minimal at present with only a few slums located on the slopes near Pandav caves (ñPandav Leniò). However, an EQ of magnitude 7.0 on the Richter scale is possible. Nashik also has many old buildings along the river Godavari in ôOld Nashikôcity and these buildings may suffer total or partial destruction resulting in almost 2 Lac population to become vulnerable.

(e) **Biological hazards**:

The religious events like Sinhastha Kumbh Mela attract almost 30 to 50 Lac people from across the country. The living conditions and intermingling could trigger following biological hazards:-

(i) Communicable diseases.

(ii) Water borne epidemics.

(iii) Food poisoning due to lack of control over unauthorised vendoursThe religious events like Sinhastha Kumbh Mela attract almost 30 to 50 Lac people from across the country. The living conditions and intermingling could trigger following biological hazards:-

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(ii) Water borne epidemics.

(iii) Food poisoning due to lack of control over unauthorised vendours.

(f) **Terrorism**:

Nashik being a developing city may attract terrorism in the near future. The terrorism may unleash in the form of IED explosions, Sporadic firing, Biological, radioactive or Chemical agents being released or even contamination of water.

(g) **Miscellaneous Episodes**:

Episodes of sewerage suffocation, communal violence, stampedes during religious festivities and cases of drowning of tourists/ devotees and road and rail accidents as well as air accidents do threaten the city.

7.0 **Present Strategies of Response and Mitigation**:

Presently, the response strategies are based on the old norms that have been existing for a long time. The present response is an isolated response by the responding agencies like the FES or Police and medical aid, based on the type of emergency. The response agencies are partly under the administrative control of the District Collector and partly under the control of the Municipal Commissioner. This has resulted into creation of facilities, resources and procedures in isolation. The characteristics of the present response strategies are as under:-

(a) The FES works on the principle of a 5 minute response time and 4 to 5 km of travel distance in urban areas and a 20 minutes response time for the rural areas. The location of the fire station is essentially based on the administrative divisions of Nashik and the resource availability is as per the population census of 2001.

(b) Information collection, hazard prediction, active preventive mechanism and use of technology is not yet been undertaken appreciably. The IT is being used in 'Stand Aloneômode, more for office automation than for response planning, response activisation and control mechanism.

(c) Civil Defence and Home Guards can act as Auxiliary Services and can add to the efforts of the FES. However, these services are controlled and administered by the District Administration. Their co-option needs to be done through a coordinated response philosophy.

(d) There is no centralised Command, Control, Communication, Coordination and Intelligence system existing in terms of response mechanism between the District Administration and the Municipal Corporations all over the country and Nashik is not an exception to that. The strategy for detailed coordination of response agencies has been explained in Para 8.0 below.

8.0 **Future Strategies of Response and Mitigation**:

The following strategies are needed to be followed in future, considering the need of Nashik City and taking into account the cityôs likely growth. The strategies will be sustainable throughout. Considering the traffic problems that may arise during emergencies, the response time should be modified to ñEarliest but not later than 5 minutesò

(a) **Strategy 1 (pre-Disaster Phase)**:

The Hazard Vulnerability and Risk Assessment will be carried out continuously in order to cater to the effect caused by continuous development of the city and posturing of response should be decided according to the changed situations. This should also include the aspect of Events that are conducted.

(b) **Strategy 2 (pre-disaster Phase)**:

The response forces have to train and prepare together, through Incident Response System with different ôOperational Headsôfor different emergencies. Joint ôMock Drillsôwill be conducted at all levels.

(c) **Strategy 3 (pre-disaster Phase)**:

ôCapacity Buildingôof the community needs to be done collectively by all response forces through a pre-decided schedule.

(d) **Strategy 4 (Preparedness)**:

(i) The Control Rooms of all response forces should be technologically and functionally upgraded and tied to a central ñGridòof EOCs that should include the EOC of the NMC and that of the District. The departmental or agency control rooms will function as subsidiaries of the EOCs.

(ii) Central listing of existing resources (District and Municipal Resource Data) should be available with all the control rooms and the EOCs.

(d) **Strategy 5 (preparedness)**:

Task Forces concept will be introduced for responding to disasters. Mutual common grid for communications will be established.

(e) **Strategy 6 (During Disasters)**: Response forces will react through a centralised strategy of ñTask Forceò functions and Tasking will be done by the ôOperational Headõ There is a need to have the Chief Fire Officer as the ñOperational Headòwithin the Jurisdiction of the NMC with other agencies acting as Auxiliary Agencies for certain emergencies requiring Search and Rescue should be established as part of a common grid, except the situation of Law and Order and Terrorism related emergencies, where the ñOperationalòwould be handled by the Police Commissioner of the city and other services acting as Auxiliaries. This system should be woven in the form of Incident Response System (IRS) that stands approved by the Government of India.

(f) **Strategy 7 (During Disasters)**:

ESF Concept will be activated whenever necessary and ESF departments will be accordingly warned by the Incident Commander. The ESF departments need to be also tied up between the District administration and the Municipal Corporation so that support during emergencies is smooth and continuous.

(h) **Strategy 8 (Post Disaster)**:

Post disaster event details and analysis will be recorded through ôControl Roomsõfor various departments and their Emergency Support Functions (ESF) as well as for the Fire and Emergency Services (FES) and will be centrally archived with the EOCs of the NMC and the District.

9.0 **Existing Status of Fire and Emergency Services**:

The existing status of fire brigade has been worked out based on 1991 census. Though the roles and responsibilities have been enhanced, the services have not been upgraded to meet the challenges of the next two decades, in terms of facilities available, the equipment profile and manpower. The essential element of communications through computers and lateral communications to other response agencies and the support services is absent. The present

communications are essentially based on landline and personal cell phones and no redundancy has been built. A mechanism to continuously monitor the changes in the Hazard, Vulnerability, Risk and Capacity of the city and emergency related monitoring of preventive and mitigation checks on the development is conspicuously missing.

10.0 **Recommendations**:

The recommendations for upgrades in Response and Mitigation have been based on the needs that are expected to arise due to all round development, strategies that have been identified above and establishment of complete synergy between all responding agencies and the support agencies controlled by different administrative heads.

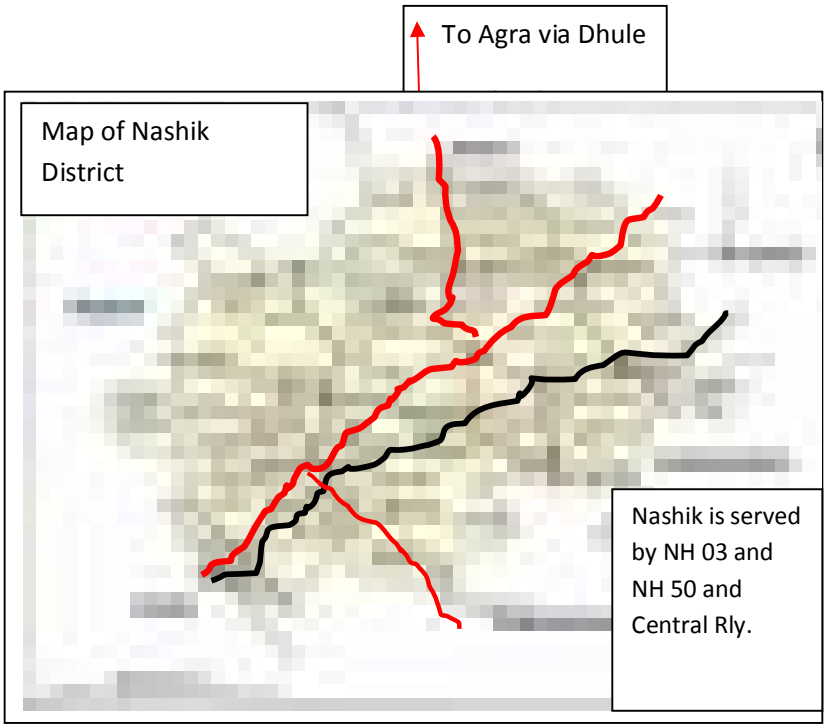
11.0 **How would the Proposal help Resolve the Present Situation and its Sustainability**:

The proposal would resolve the present situation and will also cater to sustainability through well knit command, control, communication and intelligence grid, resource adequacy and rational projection that takes into account the growth of the city over the next 10 years. It also caters to a unified system of response (IRS) such that the emergency situation could be brought under control expeditiously. Here, the synergy between all resources and agencies through the phases of Planning, Coordinating, Directing, Controlling and Review would be achieved to last for the next few years.

Part 1: A Profile of Nashik City

Brief Profile of Nashik City and its Importance

1.1 The city of Nashik is located in the Western Ghats on 19 deg N 73 deg E coordinates, on the banks of river Godavari and has become a center of attraction because of its religious importance due to observance of Sinhastha Kumbha Mela every 12 years, the newly coming up industries and pleasant climate.



Historically, the city has always been a religious center- it is one of the four cities in India that hosts the massive Sinhastha Kumbh Mela once in twelve years. Thus, it is considered as one of the holiest places by Hindus, all over the world. The population centre had probably been established in the pre-historic times and rose to prominence during the time of the ñPeshwasò, further boosted up by the British Raj. It was during the time of ñPeshwasòthat most of the ógHatsôand temples were constructed on the banks of river Godavari. The British administration realised the importance of this city as a nodal communication centre strategically located to connect Central India and South-Western India, on

the Eastern Flank of Sahyadri ranges. The British developed this city and it attained the status of a district during British period. Thus, administrative buildings had sprouted during that period. The city has many heritage sites, as a result of its long and deep history.

Area of Panchavati and Ram Kund where holy dip is taken by pilgrims

1.2 **Geology, Geography and Climatology**:

The city is located in the northwest of Maharashtra. The Sahyadri Ranges skirt along the Western borders of the city, in North-South direction, at a distance of roughly 15 km. This has made the geological structure of Nashik city based on basalt/ igneous rocks foundation on the West, tapering to a thicker foundation of Red Soil above the Basaltic base as the terrain slopes eastwards. The City is located on the brink of a possible fault line that runs along the Sahyadri Ranges. The climate of Nashik is moderate and pleasant round the year. It has a rainfall ranging from 60 inch to 100 inch and a salubrious climate round the year.

1.3 **Economic Growth of Nashik**:

Nashik has fertile land and perennial sources of water, making it a ñGrape Zoneò With good availability of water and electricity and road and rail connectivity with Mumbai, Pune and Northern part of India, industries have sprouted on the outskirts of Nashik with Satpur and Ambad as the main industrial areas. It is the

third most industrialized city of the State of Maharashtra after Mumbai & Pune, aided by the establishment of the MIDC and CIDCO. This has led to Nashik becoming an upcoming industrial conglomerate in the past three decades. Nashikôs contribution to the industrial and agriculture related GDP of Maharashtra is substantial. Nashik is also developing as an important political centre. Over the past one decade, infrastructure for education has grown manifold and the youth from Northern Maharashtra is getting attracted towards Nashik. Sinhastha Kumbh attracted almost over 30 Lac people from all over India in 2003 and the number is likely to increase substantially during the next such event in 2014.

1.4 Population Growth of Nashik City and Likely Expansion:

Nashik has shown a phenomenal population growth rate since 1941. Nashik Municipal Corporation was formed in 1982. Since the past three decades, Nashik has shown a decadal growth of about 60% in population, which is higher than any other city in Maharashtra. In 2001, Nashikôs population was 10,77,236 (excluding peripheral agglomerates). More areas have been added to the Municipal limits since then, to accommodate the natural rise in population as well as to cater for the incoming migrations. It is expected that the city would have nearly 17 to 18 Lac of population when the census of 2011 is completed. Making way for fluctuations in growth to a realistic figure of 40 to 50% decadal growth rate, Nashik would have nearly 26 Lac of population by 2021 and about 40 Lac of population by 2031, including neighbouring clusters. The rise in the population has also had an effect on the population density which stands at more than 105.0 at the moment and has resulted in the demand on civic infrastructure and would also have greater threats from natural and human created disasters. The growth of Nashik has been ñradialò and on both sides of River Godavari, with greater share of it on the Western and Southern sides. The following table indicates the growth of Nashik City:

Population and density as per census

Developable Area (Ha)	1991		2001	
	Population	Density	Population	Density
10240.5	656925	64.14	1077236	105.20

Composition of Growth

Year	1981-91	% of total	1991-2001	% of total
Natural Increase	116651	52%	210216	50.0%
In-Migration	38884	17%	210216	50.0%
Jurisdictional Change	69346	31%		
		100%		**100%**
Total Increase	224881		420432	

Nashikôs work force has been consistently increasing. An additional feature of the working population is that work force from outside the city limits, living on the periphery also creates a floating mass of population that visits Nashik City areas for employment purpose on daily basis. The following table shows distribution of the work force by sectors of work and does not include the floating population of unskilled workers and casual agriculture related work force

SECTORWISE WORKING POPULATION OF NASIK CITY

Sr.no	Occupation	YEAR 1981	YEAR 1991	% 1981	% 1991
1.	Cultivators	9872	13043	7.68	5.77
2.	Agri. Labourer	9764	11840	7.61	5.23
3.	Primary sector	19656	24883	15.39	11.00
4.	Household industry mfg., processing repairs, services	3963	65804	3.08	29.12
5.	Tertiary sector	104875	135286	81.63	59.98
6.	Total workers	128494	225973	29.74	31.15
7.	Total non workers	303554	499368	70.26	68.84
	TOTAL	**432044**	**725341**	**100.00**	**100.00**

Nashikôs population density has grown in such a manner that soon the city will experience de-cluttering through movement of people from densely populated areas to peripheral areas. The development plans also indicate demolition of old buildings, widening of the roads. However, the trend of high rise building in the main city area as well as the peripheral area is likely to be seen in the near future, posing greater challenges.

1.5 **Economic Growth of the City**:

Within the Municipal Limits, there are two main industrial agglomerates ï Ambad by Maharashtra Industrial Development Corporation (MIDC) and Satpur, established in 1962. Industrial estate NICE (Nashik Industrial Co-operative Estate) was formed in the co-operative sector in 1962. Hindustan Aeronautics Limited established unit for production of MIG fighters at Ozar, a village 20 km from Nashik. In 1967 SICOM (State Investment Corporation of Maharashtra) adapted Nashik as its growth center. All these events brought Nashik on the industrial map of India. MICO (now BOSCH) and ABB (Swedish multinational) established their production units. The industry that came to Nashik was mostly engineering, electrical and pharmaceutical. Crompton Greaves,

MICO, VIP, CEAT, Mahindra & Mahindra, GSK (formerly Glaxo) and Glenmark etc are other important industries.

M.I.D.C and other Industrial areas in Nasik

Sr. no.	Name and location	Area in Ha.	Establishment year
1.	Satpur M.I.D.C, Nasik	636.98	1962
2.	NICE (Nasik Co-Op Industrial Estate)	135	1962
3.	Ambad, Nasik	519.55	1880

No of units and workers employed in the area

Area	Unit	Employment
Ambad	431	22244
Satpur	343	36551

Apart from the areas shown in the table, Nashik has adjoining areas of Ozar and Sinnar that have come up as industrial zones. These zones are speedily developing and are likely to impact the development and demand on civic facilities of Nashik City.

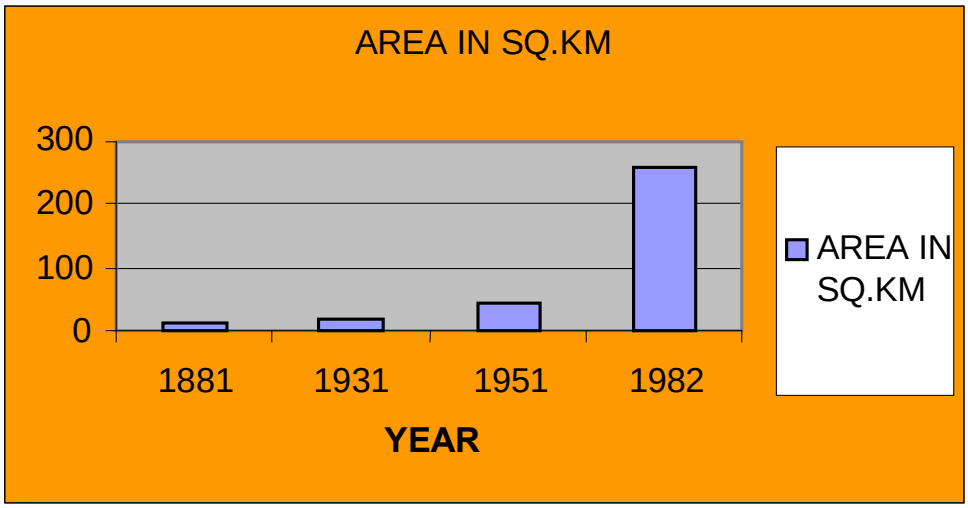
Nashik has been a place of attraction for tourists, mainly the religious tourists. Sinhastha has been attracting a huge population every 12 years. However, many tourists visit Nashik round the year to pay obeisance at the temples at the Ghats as well as at Trimbakeshwar. Industrial and educational tourism in Nashik City is on the rise.

Per capita income for Nashik District as per constant prices is Rs.13699 and Rs.14413 during 2003-04. Similarly, at current prices these figures are Rs.23377 and Rs. 25042. There is a rise of 7.12 % in the per capita income. Per capita income for the city is projected in the same way and at current prices it works out to Rs. 35000 (approx.).

1.7 Current Land Use Distribution:

1.7.1 **City Area**: The growth in population necessitated the expansion of city boundary from time to time to help provide and extend urban services to the people occupying the peripheral villages and make more land available for urban population. This increase in the area works out to 22 times in one hundred years. The population grew 30 times in same period.

The following Bar Chart shows the increase in the city's area in last 100 years:



1.7.2 **Land Use**: In 1985, the developed area was only 27% of the total available area and area under agriculture was 52.99% with 14.25% land kept vacant. However, having analysed the possible pace of growth, the present projection of land use area has been taken into account with frugal areas under agriculture. The following table shows the future projections:

Sr. No.	Land use	Area in Ha	% of DP	% of Total area
1	Residential	7347.68	51.80	27.39
2	Commercial	371.18	2.62	1.38
3	Industrial	1661.35	11.75	6.19
4	Public and Semi-Public	701.73	4.95	2.63
5	Public utility	173.34	1.22	0.65
6	Transportation	2156.58	15.22	8.04
7	Gardens, playgrounds & recreation	418.80	2.95	1.56
8	Military	943.70	6.68	3.52
9	CIDCO	398.00	2.81	1.48
	Total Developed area	14172.36	100.00	52.84
11	Water bodies	955.13		3.56
12	No development zone	11694.51		43.61
	Total area	26822.00		100.00

Note: As the above chart indicates, the population is accumulated in 52.84 % of the cityôs area while 46.17% of the cityôs area is under ñNon-Development Zoneô Out of a total of 260 sq km of area, 142.0 sq km area is urbanized and the balance area of 118 sq km is under ñNo-Development Zoneô

Part 2: Analysis of City's Disaster Challenges and Review of Existing Fire Services System in the City

Introduction

2.1 Nashik City has shown phenomenal growth rate over the past three decades. The growth in population and population densities, the increase in traffic, enhancement of industrial and other economic activities and a substantial change in climatic conditions has increased Nashik Cityôs challenges with regard to disasters. The rate at which the government capacity is being enhanced and the upgrades in the awareness level of the community and urge to abide by rules and regulations has been continuously falling behind the desired targets. The civic amenities of any developing city always fall behind the expected levels. Thus, the challenges are not only increasing in frequency but are also stiffer in intensity.

Disaster Profile of the past with respect to Growth and Composition of Population

2.2 In the past, Nashik has been experiencing stray incidents of fires that were mainly domestic in nature. However, since 1982, as the industrial growth has increased, the industrial fire incidents have appreciably increased. The floods are now a more regular and severe phenomenon. The increasing occurrence of floods may be due to restricted flow of the current because of development and vulnerability has increased because more population is now residing astride the rivers running through Nashik. Threats of electrocution have increased because of additional loading and failure to replace the old systems. There is a likelihood of cases of choking of the sewage lines. The population in-migration of economically deprived class has led to more slums and have resulted in greater threats. The slums have also gone to occupy hill slopes. The threat of landslides has increased because of scavenging of land and the vulnerability is more due to permanent presence of humans residing on the slopes. The possibility of terrorist attacks in the country has increased and developing cities offer lucrative targets, particularly the religious places. Nashik has a greater probability of such emergencies than ever before. All these challenges are not isolated cases and the city now faces the challenge of ñMulti-Disasteròepisodes ï multiple in locations and nature of emergencies. A record of calls that FES of Nashik has received in the past is given below in tabular form:

Statistics of Fire and Rescue Calls from 2005 to 2009 and the Results of Response							
Ser No	Response Function	2005	2006	2007	2008	2009	2010
1	No of Fire Calls Received	142	139	211	282	245	
2	No of Rescue Calls	29	17	67	45	41	
3	No of Gas Leaks	42	37	48	46	41	
4	Hazardous Material Calls	9	4	6	3	15	
5	Animal Rescue Calls	15	15	23	27	32	
6	Other Calls	58	67	7	13	0	
Analysis and Post Response Effects							
7	No of lives saved	19	16	19	21	11	
8	No of lives lost	1	7	7	10	5	
9	No of Injured	12	1	7	6	18	
Analysis of call patterns							
10	Ratio of Calls received between 0700 and 1900 hours To 1900 to 0700 hours (A:B)	7 : 5	7 : 4	5 : 3	6 : 3.5	6 : 4.5	

Hazard Profile of the City and Likely Challenges of the Future

2.3 Rapid development of Nashik city and adjoining areas have also created additional man-made hazards apart from the hazards that are naturally existing. With higher population mass, there is a greater vulnerability in terms of population numbers and greater chances of individual, societal and industrial processes going out of control. Obviously, because of the increase in the threats

in terms of intensity and frequency, the government stakeholders have to institute better quality of preventive and mitigation measures and upgrade the preparedness for unleashing swifter, more dynamic and adequate response system. Fire and Emergency Services are mandated to offer such response as part of the efforts by the Municipal Corporation of Nashik. Hence, there is a need to upgrade these services to meet the present and future requirements of Nashik City. The Hazard, Vulnerability and Risk analysis has been given at Appendix A to this chapter.

2.4 Present status of Fire and Emergency Services and Gap Analysis Based on Norms and Hazard Patterns

Presently, the FES has been organised to face the challenges that existed in pre-2001 decade. Since then, the additional roles and responsibilities have been added to the FES. The FES needs to be organised and equipped to face the present and future challenges. For this purpose, keeping in mind the scaling norms of manpower and equipment vis-à-vis the additional responsibilities and the futuristic trends of growth of the city and resulting threats have been analysed. The strategic issues have been discussed in detail in Part 4, later. However, the strategies have been kept in mind for the gap analysis. The analysis indicates two gaps ï firstly, the gap between existing manpower and equipment/ facilities and the present requirements of 2011 (as per the present status of the city) and secondly, the gap between the present status of FES and the future requirements to cater for a 20 year perspective of Nashik City. The gap analysis has been done in tabular form and details have been discussed subsequently.

2.5 Gap Analysis of Present Status of FES and the Requirements as of 2011:

(a) **List of existing Fire stations** :-

Ser No	Name of Fire station	Type of Construction	Location Address	Contact Nos
1	Fire Brigade Head Office	RCC	Shingada Talav Nashik- Pune road, Nashik	0253-25908710 Fax -2509766
2	Nashik Road Fire station	RCC	Gosavi Wadi, Nashik Road	0253- 2460379
3	Satpur Fire Station	RCC	MIDC, Trimbak road , Nashik	0253- 23503500

4	Panchavati Fire Station	Metal Shade+ RCC	Malegaon Stand Nashik	0253- 2512919
5	CIDCO fire station	Metal Shade+ RCC	Old SBI chowk, Mumbai- Agra highway, CIDCO Nashik	0253- 2393961

(b) **Requirement of Fire Stations** (as per the area distribution of 2001 development plan and estimated census figures of 2011): As per the development of the city, Out of a total area of 260 sq km, 52.84% is under urbanization (i.e. 142 sq km). The balance area of 118 sq km is under ñNo-Development Zoneò This has been taken as a base for working out the requirement of fire stations (Note: Population has not been taken into account as exact figures of 2011 census are not available as yet). As per the S.F.A.C norms, the working out is as under:-

(1 fire station per 10 sq km and in ñNo-development zone, 1 fire station for each 50 sq km as applicable to rural area has been taken into consideration).

142 sq km/ 10 = 15 Fire Stations.

118 sq km/ 50 = 3 Fire stations

Thus, total fire stations for urbanized area of Nashik city works out to 18 Fire stations.

(c) Existing Equipment, Facilities and Manpower profile and Requirement as per the norms and threats faced as of 2011:

Sr. No. (a)	Type of Vehicles (b)	Existing Nos. (c)	Actual Requirement as per SFAC (d)	Gap Analysis (e) = (d) – (c)/	Change from the present status
1.	Number of Fire Stations	05	18	13	6 are immediately required and 7could be sanctioned for provisioning by 2013 (keeping in mind Sinhastha).
2	Water Tenders	09	18	09	6 are immediately required and 3 could be sanctioned for 2013.
3	Emergency Rescue Van	01	02	01	Nil
4	Mini water tenders	--	18	18	. Immediate need is 9 and 9 could be sanctioned for 2013.
5	Hazmat Vans	--	01	01	There are already two industrial zones. Additional industrial zones are likely to come up in the near future. Also, the movement of HAZMAT carrying tankers along the highways need to be covered. (Please refer to Appendix A to analyse the areas where HAZMAT incidents are possible.
6	Turn Table Ladders	--	03	03	55 mtr height
7	Aerial Ladder Platform	1	03 ï .	02	55 mtr high. NMC has already sanctioned construction upto 40 mtr from ground level. Though only 451 buildings are

					above 15 mtr height as of now, the likelihood of more buildings getting constructed to height of 40 mtr is strong. Thus, keeping in mind the slant distance, one aerial ladder of 55 mtr height are desirable for conducting rescue. There is a need to have more platforms to cater for the needs till 2031.
8	Foam Tenders	01	03	02	
9	Smoke Blowers	01	01		Nil
10.	Control Post Vans	--	06	06	This is a mobile Command Post from where entire command, control coordination and communication can be operated in stand-alone mode as well as synergised IRS system. (Details of this requirement have been discussed in part 4, later.
11	Water Tankers	04	06	02	
12	Ambulances	-	6 *	06	* It should be noted that in efficient response systems, the task force concept is used. In a city, a task force comprises of FES, Medical and Police force. This force starts handling the emergencies within 5 minutes of getting the call. Today, the FES needs a dedicated medical service in terms of ambulances. At least 1 ambulance is required at each division. The response of ambulances from government and municipal hospitals and

					private operators may be delayed because of other commitments at the time of incidence.
13	Cars/ Jeeps	01	08	07	
14	High Pressure Portable Pumps	05	18	13	(one per fire station).
15	Breathing Apparatus Sets	Nil	36	36	
16	Breathing apparatus vans	Nil	01	01	
17	Communication Equipments: Wireless system with repeaters	Nil	166	141	20 base, 80 mobile/ vehicle mounted, 60 wacky talky, 6 repeater stations
19	Water Mist extinguishers	06	18	12	
20	Light Mast	05	18	13	
21	Fire Proximity Suits	Nil	1100	1100	

(d) Present Manpower status and shortfall as per five fire stations is given below:-

Sr. No	Name of Post	Grade	Manpower As per SFSC Norms	Manpower Available	Manpower Shortfall /Gap
1	Chief Fire Officer	I	01	01	Nil
2	Deputy Chief Fire Officer	II	01	Nil	01
3	Divisional Fire Officer	III	02	01	01
4	Station Officer	III	08	01	07
5	Sub Officer	III	20	02	18
6	Leading Fireman	III	57	08	49
7	Driver cum Operator	III	59	27	32
8	Fireman	IV	270+24	126	168
9	Senior Clerk	III	01	Nil	01
10	Junior Clerk	III	02	01	01
11	Peon	IV	08	03	05

(e) Manpower requirement as per projected 18 Fire stations and the shortfall related to it is given in the table below:-

Sr. No	Name of Post	Grade	Manpower Required	Manpower Available	Manpower Shortfall /Gap
1	Chief Fire Officer	I	01	01	Nil
2	Deputy Chief Fire Officer	II	02	Nil	02
3	Divisional Fire Officer	III	05	01	04
4	Assistant Divisional Fire Officer	III	08	Nil	08
5	Station Officer	III	22	01	21
6	Assistant Station Officer	III	24	Nil	24
7	Sub Officer	III	67	02	65
8	Leading Fireman	III	132	08	124
9	Driver cum Operator	III	134	27	107
10	Fireman	IV	756	126	630
11	Superintendent (Admin)	III	01	Nil	01
12	Assistant superintendent	III	01	Nil	01
13	Senior Clerk	III	03	Nil	03
14	Junior Clerk	III	09	01	08
15	Peon	IV	12	03	09

Note: Considering the requirements of the FES at Nashik, the following additional manpower in terms of specialists is recommended:-

- Training Officer - 1
- Lift Inspector - 1
- Chemical Expert - 1
- Safety Auditors - 2

(f)Other Capacities that the FES at Nashik has is indicated in the table below

1	**Staff Quarters in Fire Station premises**	Officer & Staff quarters Head Office Fire Station -14 Nos, Shingada Talav Panchavati Fire Station - 14 Nos Satpur Fire Station- 0 CIDCO fire Station- 0 Nashik Road fire stn-0.
2	**Parade Ground in Fire Station compound**	Will be made available at nashik Road Fire Station.
3	**Drill Tower in Fire Station compound**	Will be made available at nashik Road Fire Station.
4	**Static Water Tank in Fire Station compound with its capacity**	There are Fire Hydrants in all Fire Stations which are charged 24 hours. In addition the water tanks provided at Head Office Fire Station has 20,000 Lit & at Satpur Fire Station has 10,000 Lit capacity
5	**Facilities to arrange training classes in Fire Station premises.**	In Head office Building for 30 students. Training Centre shall be operational in two months time

(f) **Requirements and Gap Analysis for future (within 5 years)**:

This part only lists out additional equipment and facilities that Nashik FES would require, keeping in mind the likely growth of population and hazards:-

(i) Fire Stations - +13 (8 by 2012 and 5 by 2013)

(ii) Water Tenders - +9

(iii) Mini-water tenders - + 18

(iv) HAZMAT Vans - +1

(v)	Turn-table ladders	-	+3 (55 mtr)
(vi)	Aerial ladder Platform	-	+2 (55 mtr height)
(vii)	Water Tankers	-	+2
(viii)	Ambulance	-	+6
(ix)	Control Post vans	-	+6
(x)	Foam Tenders	-	+3
(xi)	Cars and jeeps	-	+7
(xii)	BA vans	-	+1
(xiii)	Escape Shoots	-	+6

Note: Manpower and other equipment would proportionately go up.

Additional Responsibilities outside the NMC Jurisdiction

2.6 The Nashik FES would have to answer the calls regarding the following incidents. This additional tasking also has to be catered for through equipment and facilities:-

(a) Incidents of Fires from additional areas of Sinnar, Dindori, Malegaon, Ozar and the cantonment areas of Nashik Road, Devlali and agglomerates of Bhagur and areas of Eklahare.

(b) Drowning incidents in Darna River and other minor rivulets outside the Municipal boundaries.

(c) Incidents of house collapse.

(d) HAZMAT incidents.

(e) Aviation related accidents, an Army Aviation base being situated in Nashik

(f) Road Accidents.

Support Available from other Services and Limitations due to Present Infrastructure

2.7 Whenever the FES responds to any incident, invariably, additional support is desirable from other response agencies. Presently, there are problems in this regard that the FES faces. The problems are mainly due to the fact that different

agencies are controlled by different administrative bodies and a detailed coordination and cooperative approach is lacking. The requirements of different support agencies are at times contradictory and the agencies have no much knowledge about the procedures and requirements of other agencies. An integrated approach towards Response and Mitigation would resolve the issues. The following support is desirable for the FES during Response and Mitigation:-

(a) Immediate establishment of mob and traffic control should come into force almost simultaneous to the response timings of the FES.

(b) Ambulance vehicles should be part of the response force. Presently, since the FES does not have its own ambulances, emergency calls have to be given to the government hospitals that may not have an ambulance free at the time. There is a need for the FES to have one ambulance at each fire station, under their own control.

(d) Support is also readily required from the PWD in mitigation phase for auditing the building structures. Support is also required during debris clearance after a collapse takes place.

(e) Support is required from water and town planning department in providing water hydrants in the city areas, especially closer to the hazardous areas of slums, industries and residential areas where the hydrants are not available.

(f) Mutual aid from other agencies like Mahagenco (MSEB), ISP/ CNP, HAL Ozar, Defence Organisation and other industries having their own fire services should be established for integrated response. For this, regular coordination meetings and integrated mock practices would be essential.

Issues and Prospects

2.8 Strategic issues for integrated response system, amalgamating or coordinating the response mechanism of the FES, Civil Defence and the Home Guards has been dealt with in part 4. Such a system already exists in the state of Karnataka and has been found effective. The services have been placed under an Additional DGP and funding, training, equipping is being centrally done for all the services.

Appendix A

Hazard, Vulnerability and Risk Analysis from the Perspective of Fire and Emergency Services

Role of Fire and emergency Services:

1. In the present context, the role of Fire and Emergency Services (FES) can be listed as under:-

   - Fire Fighting.
   - Search and Rescue in Emergency and Disaster Situation (i.e. Building Collapse due to Earthquakes/ Precipitation/ Explosions, Floods, Road accidents, Aviation Accidents, Rail accidents, Chemical spillage/Gas leakages, Landslides and Industrial Accidents etc).
   - Hazardous material incidents.
   - High angle rescue & confined space rescue incidents.

2. In addition to the above specified job they are also required to attend to

   - Animal Rescue.
   - Climbing on communication and Power transmission towers.
   - Searching and fishing out dead bodies from lakes/Wells.
   - Helipad Duties.
   - Rescue and Fire Fighting during terrorist attacks (supporting role) (As in the case of 26/11 Mumbai incident at Taj Intercontinental Hotel).
   - Mob Dispersal during communal or any other violence (supporting role if asked for by the Police).

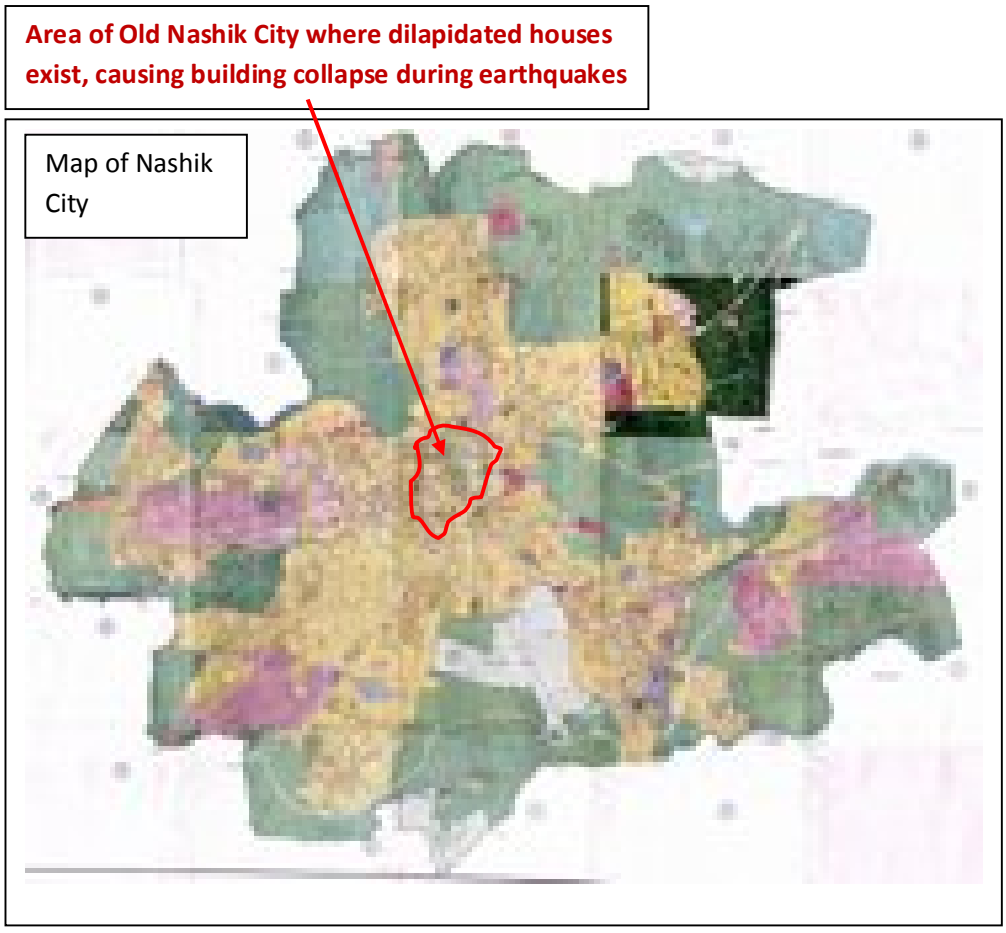
3. The variety of roles and the speed of response necessitates an organisationally strong and flexible, well equipped, well trained and correctly positioned FES. The Hazard, Vulnerability, Capacity and Risk assessment of Nashik City and the requirement of FES has been given in the succeeding Paragraphs. Present status, present and future requirements have been broadly discussed here under for each type of hazard and these have been given in a tabular form in Part 2, subsequently. Equipment requirement based on the roles and responsibilities also have been listed out in part 2.

Hazards faced by Nashik City and adjoining Areas:

Natural Hazards:

1. Earthquakes:

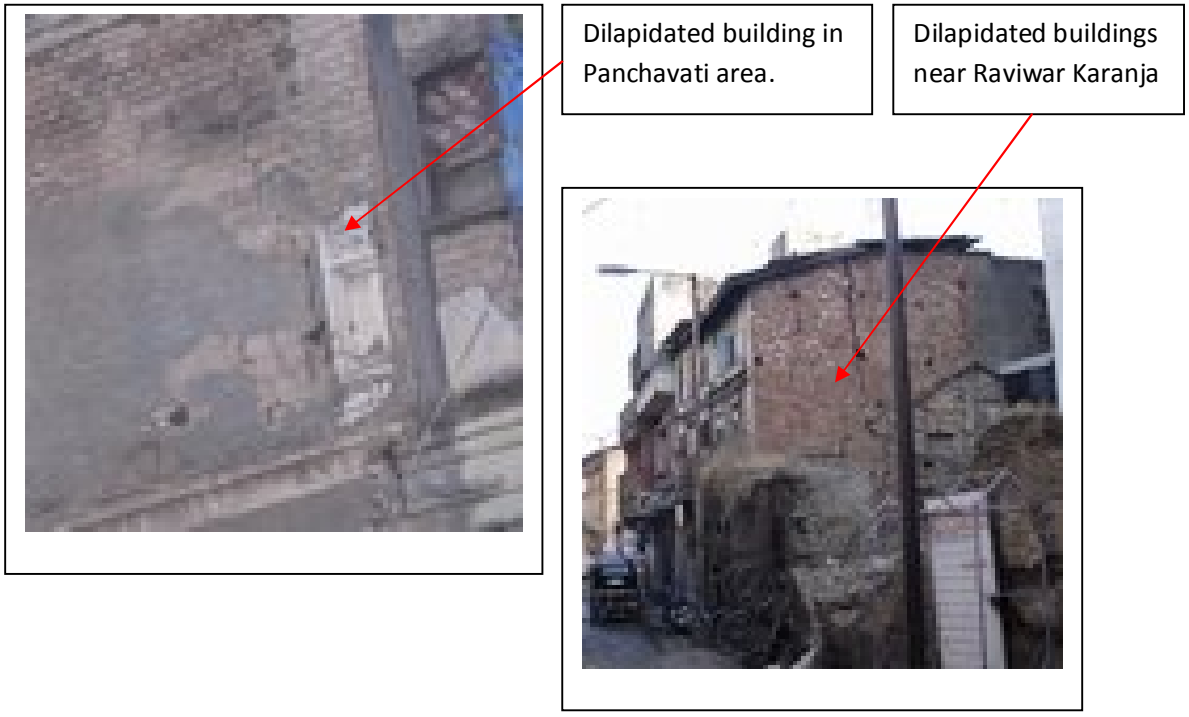
(a) Intensity and probability: Nashik is in Seismic Zone 3 where an EQ of a magnitude of approximately 7.0 on the Richter scale is possible. The probability of such a hazard striking the city is ñindeterminateòand can happen any time.



(b) Effects:

Total building structures in Nashik city are 258000. Nashik has many buildings that are not constructed as per Earthquake Resistant norms. Many of the buildings are old and require immediate retrofitting/ demolition. However, that

may take a long time to happen. Old part of Nashik city, in Nashik East Division and Panchavati Division, there are many old vintage buildings astride narrow alleys. Any collapse may result into collateral impact on neighbouring structures and would also block the roads causing delay in response. Considering the structural strengths of the buildings the incident of ñBuilding Collapseòwould be such that about 10% of the old buildings may face ôTotal collapseô, about 20% of the old buildings would have ómoderateôdamage and 10% old buildings may suffer from ópartial/ minorôdamage. Apart from this, there could be secondary hazards like fires, dam-bursts and bursting of water and sewage pipes and electrocution because of falling HT cables. (See a sample photograph of a building in the heart of the city, given below.)



(c) Vulnerability:

The vulnerability could be judged as Total Building Collapse as varying between 80 to 100 buildings and about 160 to 200 buildings suffering from moderate collapse. There may be collateral damage to neighbouring structures and the commuters on the road. A population of approximately 6000 to 8000 may be victimized because of such collapse of structures.

(d) Risk Analysis:

Death toll may accordingly be about 30% immediate deaths, 30% deaths within 24 hours and 40% persons may suffer from serious injuries. Apart from this, there will be chances of fires triggered as secondary hazards and electrocutions. The collapsed buildings may create road blocks at many places and reaching the victims within a short time frame may be extremely difficult, causing further risks due to delayed response. There may be cases of gas/ chemical leakage.

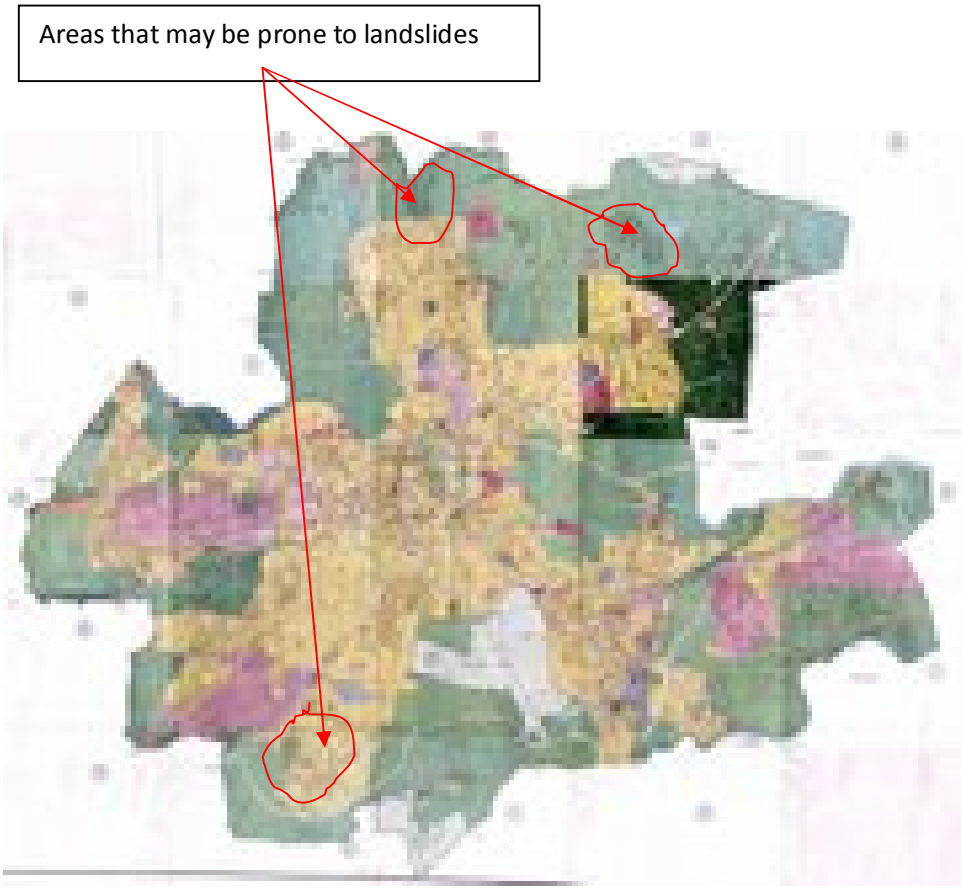
(e) Analysis of Requirements of the FES:

The FES will be required to carry out immediate duties, in conjunction with other response forces like - Search and Rescue through debris, evacuation and first aid, Fire fighting and Control of the Gas/ chemical leakages. For this duty, apart from the other response forces, estimated strength of the fire services will be to the tune of 20 teams, each having 8 persons with essential equipments for rescue from debris and additional teams would be required for fire fighting and control of Gas/ Chemical leakage, working for the first 8 critical hours. The government will be able to muster up 30 to 40 teams from the Civil Defence, Home Guards and other voluntary organisations within about 2 to 4 hours, till teams from other districts are assembled after about 6 to 8 hours. It is the initial capacity in Search and rescue that will make the difference to saving of lives. After 8 hours, the chances of finding survivors diminish greatly. Once the selective debris clearance task is undertaken by the PWD, the requirement of FES would be reduced. In addition, if the EQ also causes ìDam Burstsî, the requirement of the FES would go up appreciably.

2. **Landslides**:

(a) **Intensity and probability**:

On the outskirts of the city, there are hills astride Mumbai-Agra national highway, close to Ambad Industrial Zone. These hills have some slums on their slopes and in future as the urbanization progresses more slums are likely to get established as has been seen in Mumbai and Pune. Presently, the slope appear to be stable and the rock face has not been exposed appreciably. However, moderate to heavy precipitation in the region may result in the run-off soil and chances of mud-flow or rock fall may increase affecting the slums/ buildings at the base.



(b) **Effects**:

There may be mud flows or rock falls occurring. Houses may get buried/ destroyed or partially damaged. Population trapped in the houses may be buried under the mud flow or the debris of fallen houses causing deaths and injuries.

(c) **Vulnerability**:

The present vulnerability is of approximately 500 to 600 hutments (ñJhuggi-Jhoparió) located on the hill slopes. This may further rise to about 1000 hutments or more in the next few years. Thus a population of about 2000 ï 3000 may be vulnerable at present. There is also a slum rehabilitation project under JNNURM which is on the slope. This new construction is also endangered.

(d) **Risk Analysis**:

In case of such an incident occurring, there is a likelihood of 100 to 200 residents getting buried/ partially buried. (Refer to Jui Village landslide of July 2005 in Raigad District where 40 huts were affected killing 94 persons. Some were rescued by the local residents as no formal Search and Rescue teams could reach for the first 24 hours). This may result into probably 50% of the buried people succumbing and other 50% suffering from severe to moderate injuries.

(e) **Analysis of Requirements of the FES:**

In case of such events, the FES may be called upon to carry out Search and Rescue operations. There may be a requirement of at least 3 to 4 teams being pressed into operations with additional support from the district and the NGOs.

3. Floods:

(a) **Intensity and Probability**:

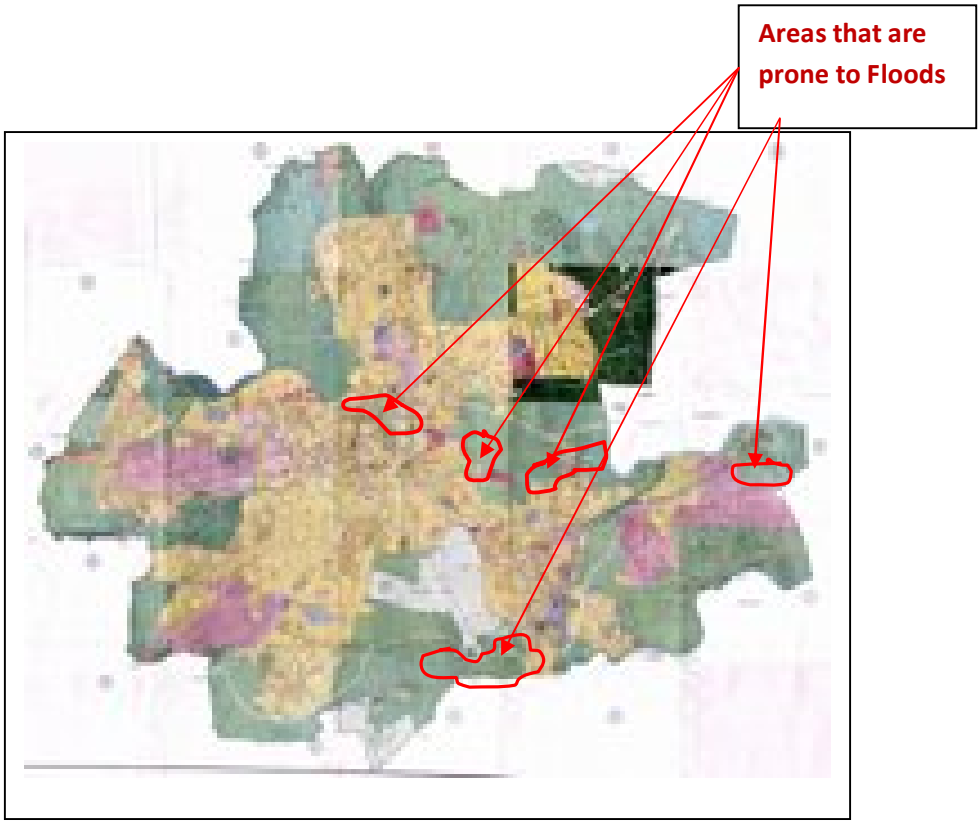
River Godavari and her tributaries have a long history of flooding. Severe floods (Intensity I3) have occurred every 5 years or so. Particularly due to changing climatic conditions in the peninsular India, the frequency of flooding has increased appreciably. Except the dam at Gangapur, some barrages and flood water drains no major anti-flooding measures have been instituted in Nashik District. Apart from this, there is a high probability of erosion of embankments.

(b) The effects would be of following types:-

(i) Submergence of land and houses, and washing off of population and animals. Agricultural crops may be affected and industries may be adversely affected because of water and mud, causing economic losses.

(ii) Inundation of embankments and certain low lying areas. This may also cause effects on foundations of structures.

(iii) Electrocution due to live wire currents.



(c) **Vulnerability**:

Nashik is served by perennial rivers like Godavari and its tributaries like Waldevi, Nasardi and Darna. Of these, Darna traverses outside the limits of NMC. However, demand for Search and rescue will still have to be undertaken by the FES astride Darna River. Total population within Nashik city that resides within the ôRed Lineô(i.e. area submerged by floods at max level) of these three rivers totals up to approximately 3 Lac. Inspite of the warning systems issued by the irrigation Dept, it would not be able to evacuate the entire population. In Nashik, there are some dilapidated structures that are not occupied fully. 20% of the structures are vacant. Out of the entire vulnerable population, even after safe evacuation, population that will be severely affected due to the following incidents can be categorised as ï Deep submergence would account for about 10,000 persons and structural collapse of weak structures would account for about 1000 additional population. Thus, approximately 11,000 people would require immediate assistance in terms of Search and Rescue and the rest would require evacuation to safety during warning period. (Width

of the areas upto ñRed Linesòof the three rivers and the length of the rivers running through Nashik City have been taken into account).

(c) **Risk Analysis**:

In case of no warning or less warning, the population that may get affected may be larger. In case of adequate warning, which may be the case most of the time, out of a total of 11,000 highly vulnerable populations, there may be cases of about 2% deaths i.e. 220. 5% population may suffer from serious injuries or post-submergence medical problems and the rest would suffer marginally.

(d) **Analysis of Requirements of the FES**:

The roles that are expected to be played by the FES will include the following with expected equipment and team sizes mentioned against each role:-

(i) **Search and Rescue of drowning victims**:

Over the entire length of the rivers, the expected rescue by boats is supposed to be carried out either through captive ferries or motorable boats. Motor Boats are supposed to be operated at a scale of one boat per 1 to 2 km length of any river line that can be safe for operating the boats. Thus, at least 3 to 4 teams will be required to be operated over 6 km of length of river Godavari for rescue operations. In Waldevi and Nasardi rivers, boating operations may not be possible. However, captive ferries may have to be operated. 2 to 3 such captive ferries will have to be launched after adequate reconnaissance. Over and above these teams, some man power will have to be dedicated for those portions where there is submergence without speedy current flow. These will be for manual prodding and search. These areas will have to be reconnoitered and teams deployed only in low-lying areas. Thus, there will be a requirement of 3 to 4 such teams, each comprising of 3 persons.

(ii) **Animal Rescue**:

One to two teams will have to be earmarked for animal rescue with adequate equipment.

(iii) **Building Collapse**:

The floods may result into building collapses. Such incidents would be in shallow waters for weak structures. One to two teams may have to

undertake this responsibility on occurrence. This will have to be done with support from PWD.

(iv) **Rescue of electrocuted victims**:

Due to current leakage, there may be cases of electrocution. Rescue tasks will have to be undertaken by one to two teams. The Power and health departments will have to provide adequate support. MSEDCL will also have to be co-opted for this purpose.

(v) **Rescue from heights**:

Some high rise buildings cemented buildings, though structurally safe, may be non-accessible due to water accumulation around the building and safe evacuation of stranded/ trapped people may have to be undertaken. Some teams will have to be employed for this purpose.

4. Lightning Strike:

(a) **Intensity and probability**:

The incidents of Lightening strikes resulting in casualties or damage to property are rare. However the tree cover enjoyed by the city makes the location susceptible to lightening strikes. The Old City area (old buildings) and slum locations are devoid of any lightening arrestors and hence prone to lightening strikes. The assessed probability of Lightning strike in the area is Low

(b) **Effects**:

There may be deaths due to lightening strikes. The strike may result in to Fire or partial damage to structures/ Infrastructures. The lack of/non maintenance of lightening arrestors in Industrial Zone may result in to major fire breakout in the area. The unauthorised electric connections in slums/sawmills can attract the lightning strike and result in to death/injury due to electrocution

(c) **Vulnerability**:

The present vulnerability is slums located on high grounds and structures without lightening arrestors

(d) **Risk Analysis**:

In case of such an incident occurring, there is a likelihood of death/injury to one or more persons. Old structures may suffer severe damage and at times result in to fires. Fires due to lightning strike in Industry can result in to heavy damage and loss of lives.

(f) Analysis of Requirements of the FES:

In case of such events, the FES may be called upon to carry out fire fighting operation or Search and Rescue operations in damaged structures. There may be a requirement of at least 1to 2 teams for this operation.

Man Made Hazards

5. Road Accidents:

(a) **Intensity and probability:**

The two National Highways and three State Highways passing through the city make the city vulnerable to road accidents. Though the internal roads are broad enough the mix of traffic operating within the city in future may be a cause of concern. The Intensity and probability of accidents within the City limits are moderate to Low.

(b) **Effects:**

The major accidents on National and State highways may result in to traffic block for a considerable time apart from loss of lives and damage to property. This may have economic impact on the road users. The vehicle accidents may require special tools and equipment for extrication of trapped personals. Accident also may result in to localized fire. It is possible that road accidents may occur in the hilly sections outside the city limits and the FES may be called upon to do rescue of victims from the low and restricted areas of shallow valleys.

(c) **Vulnerability**:

The vulnerability is varying from five passengers in a small vehicle/ truck to about 50 persons of a bus. The National and state highways have traffic that is fast moving and the accidents invariably would result into serious damage to vehicles where mangled metal and human bodies many have to be cleared.

(d) **Risk analysis**:

The risk of a few deaths and a few serious injuries is likely on the highways. Comparatively, accidents on the roads within the city area are likely to be less severe because of lesser speeds of vehicles.

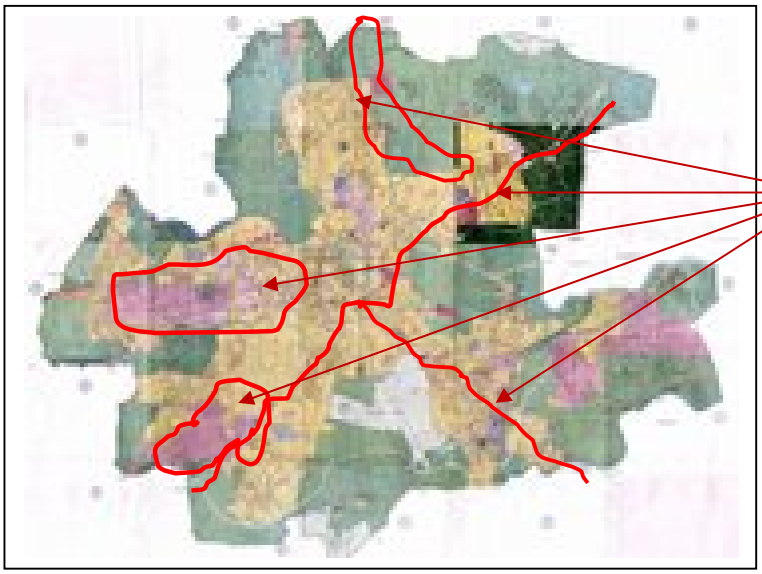
(e) **Analysis of Requirements of the FES**:

The FES would be required to undertake rescue of trapped passengers in the vehicles. There may be requirement of cutting metal to release the trapped victims. The team may have to conduct rescue from shallow valleys to haul the victims up or down. The FES will invariably have Police team for legal aspects and traffic control. There may be a requirement of heavy duty cranes for lifting mangled metal parts and ambulances for evacuation of casualties.

6. HAZMAT:

(a) **Intensity and probability**:

Within the jurisdiction of Nashik city, there are a total of 237 industries, distributed into two major industrial conglomerates of Ambad and Satpur. Though Nashik has not been declared as a Chemical Industry Zone, there are many units that use chemicals (like Pharmaceuticals, Paints and Polymers etc) for their processing of products. Even where industries are mechanical product industries, they do store hazardous and gaseous material in large quantum. These materials are stored inside the industries and are also carted through road transport. Thus, probability of hazardous discharge is highly probable. Also, Chemicals are transported between Dindori and Mumbai/ Pune. There is a probability that hazardous material leakage may take place due to transportation related accidents. Presently, there is no control over movement of transport carrying hazardous material. As a preventive measure, the tankers should only be allowed to move on specific roads during low traffic hours and that too without stoppages. In case of a breakdown of such a tanker, the driver should inform the FES and the Police. Ideally, a group of tankers should be moved together under escort. Also, industrial units should display prominent boards stating the types of chemicals that are being used and stored in their industry, indicating the maximum capacity of storage and the antidotes, inside all the entrances. This should become mandatory and a part of preventive inspection regime by the FES. As a secondary effect, fires may also ensue.



Most probable HAZMAT incidents areas:

Mumbai-Agra NH 03.

Nashik – Pune NH 50.

Road from Dindori to NH 03.

Satpur and Ambad Industrial Zones.

(b) **Vulnerability:**

Vulnerability would vary from incident to incident. In case of an industrial accident, the vulnerable population would be that of the industrial workers and adjoining population, may be numbering from as low as 10 in case of minor mishaps to 200 in case of a major incident. In case of an incident involving a tanker carrying hazardous material, the affected population may be that of passers-by numbering from as less as 10 to may be about 50 in case the traffic is immediately stopped.

(c) **Risk analysis:**

Fatalities may vary from 5 to 15 and serious suffering of health effects may be to the tune of 15 to 200 people in case of industrial accidents and upto 50 in case of a roadside incident.

(d) **Analysis of Requirements of FES**:

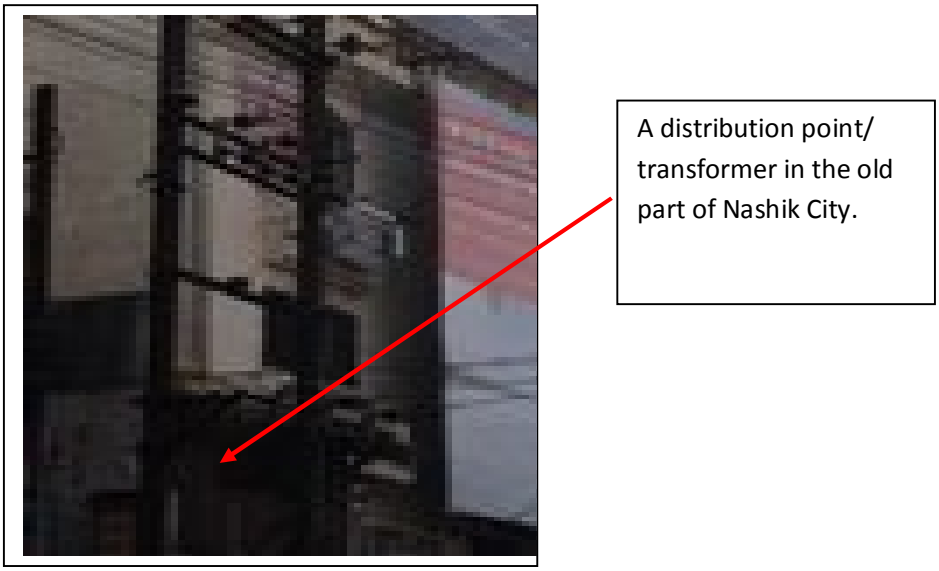
The incidents may not be multi-hazard incidents occurring at the same time. The possibility of explosion due to sudden release of chemicals and fire is not ruled out. The increasing industrialization warrants at least two HAZMAT teams to be pressed into action at any one time. Thus, the FES requires two HAZMAT vans with adequate equipment and two trained teams. The HAZMAT team needs protective gears too. The FES may also have to deal with fires that may result

from sudden leakage. These incidents could be more common during summer seasons.

7. **Electrocution**:

(a) Intensity and probability:

These incidents may occur randomly during rainy season. The old part of Nashik city has many old transformers that are at low level. The electric HT wiring is generally overhead and at many places, the criss-crossing of wiring is seen (See photograph shown below). This may result into breakage in the live wires or leakage due to rain. The transformers are neither protected from human interference guarded.



(b) Vulnerability and Risk Analysis:

The incidents are likely to be indifferent and stray, involving only one to two persons. The chances of survival are minimal.

(c) Analysis of Requirements of FES:

The FES is likely to be called only to remove the victim from the site, mostly in dead condition. Chances of a victim surviving with severe injuries would be remote, however, cannot be totally ruled out. One team is sufficient to deal with the incident.

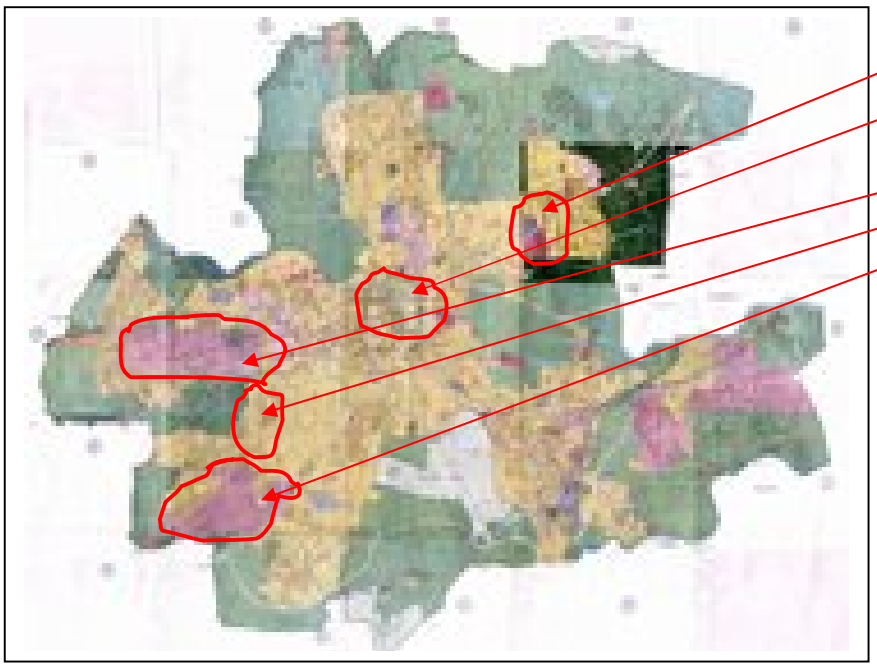
8. Fires:

(a) Intensity and probability:

Nashikôs growth pattern in terms of population, economic activities and industrialization poses threats of fire due to many triggers. In the past, there have been moderate to severe industrial fires. Most of the industries that have seen 15 to 20 years of operations have moved into ñProcess failure Time Zoneò(which is considered as 15 years as per industrial observations). The domestic fires and the fires in business centres are likely to increase in the coming decade. The details of number of calls have been given in this chapter separately. Old part of Nashik is full of narrow lanes and alleys. The approaches are difficult. This poses challenges in terms of response time. The fires could trigger from many other reasons like ï secondary hazard during earthquakes, blowing of transformers, communal violence, negligence at public utilities, living conditions in slums (mainly unauthorised tapping of electric supply lines) hazardous material leakage and during festivities etc. There are a very few öHigh Riseôbuildings above 15 mtr height in Nashik at the moment. However, with fast pace of development and more than 50% of the area coming under residential zone in the development plan, the number of high rise buildings is likely to increase. This would pose additional problems. Overall, the intensities of fire incidents could vary from I2 to I3. Probability of the occurrence is ñHighò Forest and farm fires are possible in summer months. The FES has no wherewithal to extinguish major forest fires.

(b) Vulnerability:

Vulnerability greatly varies. Domestic Fires raging in the slums and old parts of the city would entail fast spread and slow response. The vulnerability in slum areas may be as high as 50 to 100 hutments affecting about 500 people. The fires in old city area may render about 20 to 30 people vulnerable and in business markets, the same would entail a vulnerability of about 100 to 200 people. Industrial fires may be more serious, endangering almost the entire section of workers where the fire rages. There is also a danger of explosion of chemicals/ gaseous material causing building damage and additional casualties. Fires in school buildings may render a greater number of victims. Most schools being unprotected and unprepared from fires (particularly old school buildings under public sector) may result into fast spread and inability of the teachers and staff to evacuate the students may render the vulnerable number to 200 or so. (Refer to Fire in a school at Kumbhakonam and a fire during school function at Mandi Dabwali, Haryana, in 1995).



Fire is an omnipresent phenomenon. However, the most probable areas of intense fires are as indicated. These are:

Satpur and Ambad Industries, Link road between Ambad and Satpur, Old Nashik City, East Nashik Furniture industries.

(c) Risk Analysis:

Deaths due to smoke may be the main reason in industrial fires as well as fires in close confines like populated market places, exhibitions, schools etc. There may be a large number who would suffer from burn injuries and may succumb to death later, if not evacuated and treated immediately. The likely deaths due to fires may rise up to about 100 to 200 in the next decade in domestic fires and a similar number due to industrial fires.

(d) Analysis of Requirements of the FES:

The strategies have been discussed in detail in part 4, later. However, it is sufficient to mention here that the requirements have to be based not only on the population and area of the city, but more on the perceived threats, keeping in mind the likely development of the city. The scales laid down by NDMA guidelines should be treated as a broad guideline that cannot be neglected in scaling. However, where higher scales are warranted due to threat perception, the same should be adopted. Each city has its own specialty and that should be considered. The following issues warrant consideration:-

(i) To achieve a 5 minutes response time is only possible when the distance travelled is not more than 5 km in a city like Nashik. The speed reduces

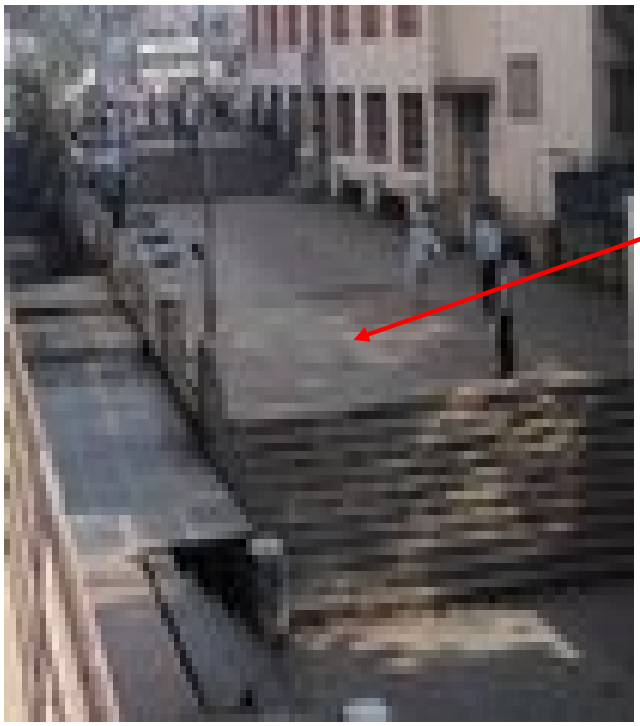
due to heavy traffic at times or even due to narrow approaches. Thus, actually, population should not be the only measure for deciding the final scale.

(ii) During incidents of heavy floods, trafficability between North and South of Godavari River is greatly hampered. Thus, pre-locating certain resources is recommended. Thus, more number of fire stations have been recommended. Nashik city has been divided into 10 sectors as per the vulnerability and each sector needs to have a fire station.

9. Stampedes:

(a) Intensity and Probability:

The probability of such an incident occurring is high only during religious congregations. Such an incident has occurred during Sinhastha of 2003. The road approaches to Panchavati being narrow and the overall space is not enough to accommodate the continuous flow of the pilgrims, it becomes very difficult to ensure smooth traffic control. Any small trigger could result into stampedes. Stampedes can also take place during rallies. Prevention of stampede would be mainly the responsibility of the Police department for traffic and mob control.



This narrow approach to Ghats is insufficient to accommodate the number of people and their flow.

(b) Vulnerability:

During any rallies, stampede may have about 100 to 200 people being affected. However, during religious festivities like ñSinhasthaò, the vulnerable population may go up to anything from 500 onwards.

(c) Risk Analysis:

Out of the vulnerable population, the actual death toll may be varying from 30 to 50 and the rest may suffer from serious injuries. The death toll will be higher in case of women and children.

(d) Analysis of Requirements of FES:

The FES would not be involved in preventive measures. However, one the incident occurs, the FES would be able to react with a max of one team immediately (due to mob) and evacuating the victims and offering first aid would be required to be done.

10. Terrorist Attacks:

(a) **Intensity and probability**:

Nashik is an upcoming city that is fast growing. Nashik is also a pilgrimage centre. Thus, non-Hindu fundamentalists may target Nashik in the near future and the probability of such attacks is much higher during festivities. The terrorist actions may include bomb explosions, random firing of automatic weapons, water contamination etc. If such an incident occurs during the festivities, the intensity is likely to be very high. The explosions may also result into fires.

(b) **Vulnerability**:

The vulnerability is likely to be as high as a few hundred of people being affected in case of bomb blasts and weapon firing. The water contamination may have thousands of people getting affected.

(c) **Risk Analysis**:

The bomb blasts or firing may result into deaths of a few hundred. Water contamination may result into deaths of many hundreds. This is one aspect which is indeterminate.

(d) **Analysis of Requirement of FES**:

The FES would be involved in following activities:-

(i) Fire fighting.

(ii) Rescue from debris.

(iii) Evacuation of victims trapped in buildings being under attack.

(iv) Giving first aid to the injured and evacuating them to the hospitals.

11. **Communal Violence**:

(a) **Intensity and Probability**:

In India, such incidents can occur any time. Depending upon the volatility, the intensity would vary. Probability is indeterminate.

(b) **Vulnerability**:

In an intense situation, vulnerability would be because of stone pelting, setting fire to buildings, material, vehicles and unauthorised fire arms use etc. Here the vulnerability would be over a large area and thousands of people would be vulnerable.

(c) **Risk analysis**:

Depending upon the time within which control established by the security forces (mainly the Police), the deaths would vary from 10 to 15 and injuries would be to a large number.

(d) **Analysis of Requirements of FES**:

The FES would be required to perform the following functions:-

(i) Fire fighting.

(ii) Mob Dispersal with water jets (if requested by the Police in support role).

(iii) Evacuation of population.

(iv) First aid and evacuation to hospital.

Part 3: Database for Fire hazard, Response and Mitigation Plan

3.1 The Current status of Fire and Emergency Services of Nashik have been given at Appendix B attached. This appendix may please be read in conjunction with the Chapter 2.

Appendix B

Database for Fire Hazard Response and Mitigation Plan

Nashik Municipal Corporation

FIRE HAZARDS, RESPONSE AND MITIGATION PLAN		
A	**LAW & AUTHORITIES: (Public relation & Crisis coordination with other govt. Agencies)**	
1	**Name of City**	Nashik
2	**Population of City as per 2001 Census**	10,77,236 as per Census 2001. As per the Census the population growth indicated in 2011 is 17.5 L , decadal growth of 62% and in 2031 with decadal growth 0f approximately 44.25% the expected population is 37.5 L.
3	**Area of City (In sq kms)**	259.12 sq. Km.
4	**Population density of City**	As per census of 2001 the population density is 105.20
5	**Name of authority maintaining Fire and Emergency services**	**Nashik Municipal Corporation,** Rajiv Gandhi Bhavan, Sharanpur Road, Nashik 422002.
6	**Are you maintaining Fire and Emergency Services as per Government of India guidelines**	Yes
a	Fire Engines: One fire engine for 50,000 population up to 3,00,000 population. From 3,00,000 upwards additional Fire Engine per lack of population or Fraction thereof.	Total 18 Fire Engines are required as per the S.F.A.C. norms to cover any potential hazard in City area. These are calculated as per the Gap Analysis considering projected population in 2011 is 17.5 Lac. As per 2001 census, 14 Fire engines were required.
b	One fire station for 10 sq. Km. (Nashik has an urban area of 14172.36 Ha or 142 sq km)	Considering the urban area of Nashik city as 142 sq km, the threat scenario, population pattern and travelling time the total fire station requirement works out to 15 Nos. Existing 05 Fire Stations + 10 additional out of which three have already been proposed.

c	One fire station for 50 sq. Km. of Rural area	The city has 118 sq km of ôNo-Development Zoneô which is as good as rural area. Thus, 3 more fire stations are required to cover this area. **(Thus, considering b and c above, a total 18 fire stations are required)**
d	Response time maximum 5 minutes in Urban area and 20 minutes in Rural area	Stipulated laid down timing can be attained if recommended fire stations are provided. Presently with existing resources, response time attained is between 5 to 20 minutes
7	**Administrative head of Fire and Emergency Service**	
a	Name	Shri B D Sanap
b	Designation	Municipal Commissioner
c	Address with PIN code	Nashik Municipal Corporation, Rajiv Gandhi Bhavan, Sharanpur Road, Nashik PIN 422002
d	Telephone No with STD code	0253- 2578206
e	Fax No with STD code	0253- 2577936/ 2315704
f	Mobile No	91-9403696699
g	E-mail	commissioner@nasikcorporation.com
h	Web site	www.nashikcorporation.gov.in
8	**Head of Fire & Emergency Service**	
a	Name	Shri Anil C Mahajan
b	Designation	Chief Fire Officer
c	Address with Pin code	Veer Bapurao Gaidhani Bhavan, Fire Brigade HQ, Singada Talao, Pune Road, Nashik 422002.
d	Telephone, Fax No. (with STD Code),	0253- 2509766
e	Mobile No.	91 9423179101
f	E-Mail	anilmahajan219@gmail.com / anilmahajan.cfo@gmail.com
9	**Name of Central Fire & Emergency Station,**	Central Fire Brigade HQ - Veer Bapurao Gaidhani Bhavan, Fire Brigade HQ, Singada Talao, Pune Road, Nashik 422002.
a	Fire and Emergency Service Head Quarters Address with PIN code	Veer Bapurao Gaidhani Bhavan, Fire Brigade HQ, Singada Talao, Pune Road, Nashik 422002.
b	Telephone No.(with STD code)	0253- 2509766
c	Fax No. (with STD code)	0253- 2509766
d	Mobile No.	9423179101
e	E-mail	Anilmahajan.cfo@gmail.com

10	**Do you conduct any fire safety training program or awareness program for the public?**	Yes. Municipal Corporation Disaster Management Unit conducts regular programs for staff and community. Fire Brigade participates in imparting the training on Fire and Life Safety Awareness. Independent Training programs are conducted during Fire Service Week or on demand. Awareness programmes are conducted in schools on regular basis.
11	**Do you carry out evacuation drills/ mock drills in vital installations/ industrial plants/ Govt. Buildings?**	Yes. Mock Evacuation and Fire Fighting drills are conducted under Disaster Management section of Municipal Corporation and Nashik Disaster Management District Project Officer in Govt. organization like NMC, Bus Stand etc., Industrial area and public places. There are three Industrial areas in Nashik Municipal Corporation and formation of MARG organisation is in progress however regular Mock Drills are conducted at industry level and Fire Brigade participate in the same.
B	**Risk prevention, Incident prevention & Mitigation of City: (Risk evaluation & Control)**	
12	**Is the Fire Approval Mandatory for construction of all types of buildings**	Yes. All plans are scrutinised by Fire Brigade department of NMC from Fire and Safety view point as specified in Maharashtra Fire Prevention and Life Safety Measures Act 2006. Plans meeting the stipulated parameters are issued Commencement Certificate.
13	**Are the Fire Approvals are as per the Provisions contained in National Building Code 2005.**	Yes. For approval of building plans where Building Construction are concerned, parameters as per NBC 2005 are checked by Fire Department.
14	**Is the central data of all fire approval is maintained in Head Quarters**	Yes. As per the existing practice the Central Data is maintained in hard copies in Fire Brigade headquarters.
15	**Please provide the copy of Development Control Rules of the city.**	DCR for NMC is attached.

16	**Provide the details of potential fire risk in the city**	
a	Buildings	210350
	Upto 15 Meters	209899
	15 to upto 24 Meters	463
	Above 24 to upto 36 Meters	Municipal Corporation has commenced permission for construction of buildings up to a height of 40 mtr since Sep 2010.
	Above 36 to upto 45 Meters	
	Above 45 to upto 60 Meters	Nil
	Above 60 to upto 75 Meters	Nil
	Above 75 to upto 100 Meters	Nil
	Above 100 to upto 150 Meters	Nil
	Above 150 Meters above.	Nil
b	Industrial area/ Chemical zone	There are 3 Industrial Areas in Corporation limit namely, Satpur, Ambad and Nashik NMC. There is no chemical zone in NMC.
c	Cinema halls/ Malls/ Drama theatres	16
d	Public Gathering Places	148
e	Hazards Storage	78
f	Pilgrim Area (floating populations)	10 areas have been identified as pilgrim spots in corporation area. They are mainly astride the Godavari River. The floating population during regular religious congregation are approximately 2 lacks. During Sinhastha Celebration which comes after every 12 years (next in 2014) the floating population within the city is approximately 20 lacks. During the function approximately 100 livestock to include elephants, horses etc accompany
g	Exhibition/ Public Function Grounds where permission for erecting pedals for circus or any other religious / social functions are granted.	23 such places are in existence and prior sanction needs to be obtained from municipal corporation for using it.

h	Other Places	
	Note: All above buildings should be sub-classified on the basis of following classification as per Part 4 of NBC 2005:	
	Group A Residential Buildings	
i	Lodging or Rooming Houses	85
ii	One or two family private dwelling	175131
iii	Dormitories	
iv	Apartment Houses(flats)	23062
v	Hotels	451
vi	Hotels Starred	3
	Group B Educational Building	
i	School up to Senior Secondary Level	139
ii	All other Training Institutes (Medical, Engineering, Colleges)	35
iii	Institutional Buildings	
iv	Hospitals & Sanatorium	
v	Custodial Institutions	
vi	Penal & Mental Institutions	
	Group D Assembly Buildings	20
	Group E Business Buildings	
	Group F Mercantile Buildings	
	Group G Industrial Buildings	3130
	Group H Storage Buildings	139
	Group J Hazardous Buildings	
17	**Road Network**	
a	Any major National Highway passing though City	Mumbai ï Agra (NH 3) of approximately 24 Kms length, runs SW to NE through Nasik City and Nashik ï Pune (NH 50) of approximately 12 Kms length runs SE to NW.
b	Any State Highway passing though City	4 state highways. Nashik-Dindori-Wani(SH-11), Nashik- Peth (SH 12), Nashik-Aurangabad (SH 60) and Nashik- Trimbak (SH 4) forms arteries
c	Any Tunnels in the City	Nil
d	Major Bridges in the City	Total-28. Except for New Bridge(Holkar Bridge) near Ramkund (road running from Ravivar Karanja to Panchavati) rest of the bridges get submerged during heavy floods
e	Accident prone patches	Areas inside city limits have been identified The most prone areas are junctions and crossings of national and state highways.

		Area near Army aviation training school,
f	Roads in Hilly Areas or Hilly/Mountain Area in the City or near City	A 3 km stretch of Mumbai- Agra NH towards south of Ambad is running through the hilly area.
18	**Railway Network**	Central Railway Network
a	Mail/Express Train main stations	Nashik Road railway station. The only station existing in the area
b	Local Train stations	Nil
c	Metro train stations	Nil
d	Underground Metro Rail	Nil
e	Sky Bus	Nil
f	Mono Rail	Nil
19	**Airport**	
a	Domestic	Nil
b	International	Nil
c	Cargo	Nil
d	Helipad	Suitable locations for Temporary Helipads have been identified with in the city limits.
e	Air force Airbase	Yes. Aviation training academy
20	**Sea / River Port**	
a	Passenger Jetties	Nil
b	Container Jetties	Nil
c	Bulk Material Handling Jetties	Nil
d	Petroleum Products Handling Jetties	Nil
e	Chemical & Hazardous Goods Handling Jetties	Nil
f	Fishing Jetties	Nil
g	Ship Breaking Areas	Nil
h	Ship Building Docks	Nil
i	Naval Base	Nil
21	**Vital Installations in the City**	
a	Secretariat	Nil
b	Legislation Assembly	Nil
C	Bank Headquarters	Nil
D	HQôs of major Govt. & Semi Govt. Organizations	Hindustan Aeronautics Ltd, Currency Note Press, India Security Press, Police Training School, Revenue Commissioner office, IREEN, NTPS, Yashwantrao Chavan open university
E	Atomic Power Stations	Nil
F	Chemical Factories	3 Nos
G	Fertilizer Plants	Nil
H	Major Hazardous Units	There are 3 MHUs in NMC area.

I	Cross Country Pipelines	No
J	Petroleum Oil Companies like Refinery, Bulk Storages Depot-	No
K	Petroleum & Flammable Gas, ml LPG filling Stations	Yes. Approx 50
M	Domestic Gas Pipe Network	Reticulation in some individual buildings exist. Their network is likely to be enhanced.
N	Cylinder Gas Storage-outlets	Yes. Approximately 20.
22	**Temporary Structures such as Exhibition Halls, Circus tent, Pedals erected for religious activities**	Yes. Permission for Temporary erection of Pandals, Stage, Circus Tents, Exhibition centres etc. is given by concern authority for limited period with prior N.O.C. from the Fire brigade.
23	**Dilapidated & Unsafe Buildings in the City**	Yes. There are about 167 houses mainly in old Nasik and Panchavati area
24	**Unorganized Houses like Jhuggi Zopadi & Slum Area**	Yes. There are in all 164 slum areas and total hutments are 42262
25	**Geological Hazards Associated with City**	
a	Earthquake	Yes, located in Seismic zone 3
b	Tsunami	No
c	Landslide, Mudslides Subsidence	There are chances of landslides as the hill surface is getting exposed day by day
d	Glacier, Iceberg	No
26	**Meteorological Hazards Associated with City**	
a	Flood, Flash Flood, Tidal Surge	Prone to heavy River floods and High winds
b	Drought	Yes
c	Fire (Forest, range, urban, wild land)	Urban Fires and Wild land fires are possible in hilly/ forested area.
d	Snow, Ice, Hail, Avalanche	No
e	Windstorm, tropical, cyclone, hurricane, tornado, water spout, dust/ sand storm.	Windstorms
f	Extreme temperatures (Heat, cold wave)	Average Temperature during summer is about 42 deg C(between 41 to 44). With present development and climate change there are chances of increase in cases of Heat Strokes
g	Lightning strikes	Occasional
h	Famine	No
i	Geomagnetic storm	No
27	**Biological Hazards associated with the City**	
a	Emerging diseases that impact human or animal	Health Department of NMC has a regular check and spreads awareness about such hazards. City is prone to Bird Flu, Swine Flu, Malaria, Dengue,

b	Animal or Insect infestation or damage.	No major outbreak has so far been experienced
28	**Human Caused events such as the following**	
a	Accidental	
	i) Hazardous materials	explosive, flammable liquid, flammable gas, flammable solid, oxidizers, poison, corrosive related incidents can take place
	ii) Explosion / fire	Urban fires
	iii) Transportation accident	In absence of availability of By pass and link roads the carriage of hazardous material to other parts of the country from Mumbai is through Nashik City and hence vulnerable to such Hazards by virtue of the Tankers/ Trucks/ such like carrier vehicle accidents
	iv) Building / structure collapse	Yes. In old city area
	v)Energy / power/ / utility failure	Power failures because of load-shedding does interrupts the daily activities.
	vi) Fuel/ resource shortage	There are 50 Petrol Pumps in NMC area to cater the need of existing and floating vehicle population in city area.
	vii) Air/ water pollution, contamination	Water contamination during festive season is high on probability. Air Pollution caused by the Vehicle exhaust is observed. Area around mobile and satellite towers are monitored for ill effects on human body from Electromagnetic waves
	viii) Water control structure/ dam/ lever failure	Yes
	ix) Financial issues (economical depression, inflation, financial system collapse)	Yes
	x) Communication system interruptions	Yes
	xi) Misinformation intentional	Yes
	xii) Terrorism (explosive, chemical, biological, radiological, nuclear, cyber)	Nashik City is highly prone to acts of terrorism considering the importance of this place from heritage point of view and location of defence installations
	xiii) Sabotage	Yes
	xiv) Civil disturbance, public unrest, mass hysteria, riot	Yes

	xv) Enemy attack, war	indefinite
	xvi) Insurrection	Yes
	xvii) Strike or labour dispute	Yes
	xviii) Disinformation	Yes
	xix) Criminal activity (vandalism, arson, theft, fraud, embezzlement , data theft)	Yes
	xx) Electromagnetic pulse	Yes
	xxi) Physical or info security breach	Yes
	xxii) Workplace violence	Yes
	xxiii) Product defect or contamination	Yes
	xxiv) Harassment	Yes
	xxv) Discrimination	Yes
29	**Technological Caused events that can be unrelated to natural or human caused events, such as the following :**	
a	Central computer, mainframe, software, or application (internal / external)	Yes
b	Ancillary support equipment	Yes
c	Telecommunications	Yes
d	Energy / power / utility	Yes
	Note: Hazards have been covered in detail in part 2 of the report along with identification of vulnerable areas in City area	
30	**Analysis of Fire & Rescue Calls to Draw a Probability of Hazards.**	

Sr No	Particulars	2005	2006	2007	2008	2009	2010
1	Number of Fire Calls	142	139	211	282	245	417
	Number of Rescue calls	29	17	67	45	41	343
	Number of Gas Leaks	42	37	48	46	-	
	Animal Rescue Calls	15	15	23	27	-	
2	Number of Lives saved	11	19	16	19	21	
	Number of lives lost	1	7	7	10	-	
	Number of persons injured	12	1	7	6	-	
3	Property Saved(in lacks)	1996	1894	7012	6073	1024	
	Property Lost (in lacks)	314	269	824	756	92	

31	**Analysis of Incidents**						
	Particulars	2005	2006	2007	2008	2009	2010
a	Nos. of Fire/Rescue Calls received from 0700 hrs to 1900	172	174	245	271	231	577
b	Nos. of Fire/Rescue Calls received from 1900 hrs to 0700	123	108	130	145	145	183

32	**Please provide the copy of Disaster Management Plan of the city.**	Yes. NMC is in process of preparing Nashik City disaster management plan.
33	**Do you have any Mutual Aid with any Central or other State Govt. Authority for conducting fire & rescue operations Please provide details**	Yes. With agencies like Fire Services of the Air Force, NTPS, India Security press, M & M, HAL Ozar, BOSCH etc.
34	**Is on site and off site disaster managements Plan is in place for all vital installations, buildings and industrial plants. And is in sync with the district disaster management plan.**	
35	**Addresses of the Fire Stations**	

Sr. No.	Name of Fire Station	Type of Constrn of Fire Station i.e. RCC/Metal Shade / Temp Shade	Address	Telephone No.	Fax No.
1	Fire Brigade Head Office	RCC	Veer Bapurao Gaydhanee Bhavan, Fire Brigade headquarters, Shingada Talav Nashik- Pune road, Nashik	0253-25908710 Fax -2509766	
2	Nashik Road Fire station	RCC	Gosavi Wadi, Nashik Road (to be shifted)	0253- 2461379	

3	Satpur Fire Station	RCC	MIDC, Trimbak road , Nashik	0253- 2350500
4	Panchavati Fire Station	Metal Shade+ RCC	Malegaon Stand, Panchavati, Nashik	0253- 2512919
5	CIDCO fire station	Metal Shade+ RCC	Old SBI chowk, Mumbai- Agra highway, CIDCO , New Nashik	0253- 2393961

36 **Details of Fire and Rescue Appliances made available in the Fire Station**

Sr. No.	**Name of Fire Station**	Number of Water Tenders	Number of Rescue Tenders	Number of TTL/ ALP	Other Fire Rescue Appliances
1	Fire Brigade Head Office	1	2	1 ALP (32 mtr)	1- Foam 1- Tanker
2	Nashik Road Fire station	2	0	0	1- Tanker
3	Satpur Fire Station	2	0	0	1- Tanker
4	Panchavati Fire Station	2	0	0	1- Tanker
5	CIDCO fire station	2	0	0	1- Tanker

37	**Summary of Fire and Emergency Services**				
Sr. No.	Type of Vehicles	Existing Nos.	Total Additional Requirement		
			Immediate	by 2013	Total
a.	Number of Fire Stations	05	10	03	13
b	Water Tenders	09	06	03	09
c	Mini Water Tender	--	09	09	18
d	Emergency Rescue Van	02	Nil	Nil	Nil
e	Hazmat Vans	--	01	Nil	01
f	Turn Table Ladders	--	01	02	03
g	Aerial Ladder Platforms	01	01	01	02
h.	Foam Tenders	--	01	02	03
i.	Control Post Vans	--	03	03	06
j	Water Tankers	04	02	Nil	02
k.	Ambulances	-	03	03	06
l	Cars/ Jeeps	01	04	03	07
m	High Pressure Portable Pumps	05	07	06	13
r.	Water Mist Extinguishers	06	06	06	12
s	Breathing Apparatus Sets	Nil	18	18	36
t.	Fire Proximity Suits	Nil	400	700	1100
u.	Breathing Apparatus van	Nil	--	01	01
v	Light mast	02	08	08	16
w	Wireless set with repeaters	Nil	01 complete set		01

38	**Do you have Staff Quarters in Fire Station premises? Please provide numbers in each fire station**	Yes. Officer & Staff quarters Head Office Fire Station -14 Nos, Shingada Talav

		Panchavati Fire Station - 14 Nos Satpur Fire Station- 0 CIDCO fire Station- 0 Nashik Road fire stn-0.
39	**Do you have Parade Ground in Fire Station compound?**	Yes .only in Nashik Road Fire Station complex
40	**Do you have Drill Tower in Fire Station compound?**	NO.
41	**Is there Water Tank in Fire Station compound? If so please give its capacity**	Yes. There are Fire Hydrants in all Fire Stations which are charged 24 hours. In addition the water tanks provided at Head Office Fire Station has 20,000 Lit & at Satpur Fire Station has 10,000 Lit capacity
42	**Do you have facilities to arrange training classes in Fire Station premises? Please give its capacity**	Yes. In Head office Building for 30 students. Training Centre shall be operational in two months time

43. Details of Officers and staff attached to Fire and emergency Service: Please refer to Chapter 2, Para 2.5 (c).

D	**Response Mechanism (Communication, warning and Operational Procedures)**	
1	**Centralized Control Room/Emergency Operation Rooms for Handling Disaster is provided or in operation.**	Yes. Each Fire station has the Sub Control Room which is in coordination with the Head Office Fire Station
2	**Internet Connectivity is provided for all fire stations.**	No.
3	**Computerizations of centralized control room is done? i.e. all the fire stations are connected with internet to Centralized control room.**	No.
4	**Communication System (Like VHF/UHF with details of Frequency should be given.)**	Yes. VHF frequency band
5	**Any warning system is design to alert the occupants in case of disaster(Tie ups with Radio, TV channels, Cable Channels - Yes (DMP) Mobile service providers etc.)**	Civil Defence siren system is in existence(total 10 in Nashik City) . Necessary coordination has been tied up with mobile service provider and radio
6	**Is Standard Operating**	Disaster Management plan for NMC is

	Procedures(SOP's) are in place for responding to any emergency? Please provide copies of the SOP's	being prepared and SOPs are p[art of the project. Completion by May2011. SOP of fire brigade is attached at Chapter 5.
7	**Please provide cities digitized maps (which show road, rail, airports, sea ports, and other vital installations.)**	Not available
8	**Is all fire appliances are provided with Global Positioning System devices i.e. GPS system. Provide details.**	No. Planned for procurement in 2011-12
9	**Is all fire appliances are provided with Vehicle tracking system. Provide details**	No. Planned for procurement in 2011-12.
E	**Training, Exercises, Evaluation and corrective action**	
1	**Do you have any Fire and Emergency training School/ Centre for imparting training to your staff or public**	No. Training is conducted in the facility available at Head Office. Training Centre for Fire Brigade has already been approved.
2	**Type of training program conducted in training school/ centre**	Basic Firemanôs Course conducted by SFTC
3	**Is the residential facility available in the training centre**	Yes. Temporarily Dormitory is available for use, subsequently Training Centre earmarked has sufficient rooms for residential facility
4	**Number of class rooms available in the training centre**	Presently Two in Head Office. The training Centre has 4 class rooms and one conference hall
5	**Number of staff made available to the training centre**	There are 4 dedicated and 2 guest faculty available.
6	**Details of laboratory and Library facilities available**	Exhibition Hall is available in the Training Centre earmarked
7	**Any auditorium, Convention Hall available in the training centre**	One hall of 60 persons sitting capacity is available
8	**Does you impart training to outsiders or industries or public**	Yes. Only on demand or as a part of training conducted by Disaster Management unit of NMC
F	**Financial Management of Fire and Emergency Service (Fire Tax, Fire Cess, Capitation Fees, Service Charges etc.)**	
1.	**What are the statutory instruments (special Act, Corporation council acts/rules) to levy taxes/cess as device charge.**	(i) **Fire tax** as per Bombay Provisiional Municipal Corporation Act 1949. (ii) **Fire Prevention Fund**: As per Maharashtra Fire prevention and Life safety Measures Act 2006. (iii) Fees are charged to issue NOC, certificate etc under explosive Act, Petroleum Act, gas Cylinder act etc.

2.	**Do you recover Fire Tax or Cess from the properties in the city**	Yes. Fire tax at the rate of 2% of rateable value of the property is being collected.
3.	**Do you levy any other fees or tax for High Rise Building**	Yes. Orders exist on the subject regarding recovery of Fire Protection Fund/ Inspection fee
4.	**Any fees levied for grant of Fire approvals for building**	Inspection/ scrutiny fee is charged
5.	**Do you charge any special charges for standby duties or service rendered**	Yes
6.	**Do you have separate fund for up gradation of fire and emergency services**	Yes allotment is done in annual budget. Special Fire Prevention Fund is created under Maharashtra Fire Prevention and Life Safety Measures Act 2006
7	**Details of Expenditure of Fire Services**	(In Lakh)

S No	Year	Establishment Expenditure	Maintenance Expenditure	Civil Expenditure	Other Expenditure
1	2004-2005	186.56	N A	6.61	Nil
2	2005-2006	192.78	1.8	4.32	
3	2006-2007	203.83	2.63	6.44	
4	2007-2008	217.01	0.65	9.36	
5	2008-2009	287.87	N A	12.67	

8	**Details of Future Plan**

S No	Year	Rs in Lakhs	% of Expenditure of Fire Department with respect to funds allocated
1	2011-2012	5000.00	100%
2	2012-2013	10000.00	100%
3	2013-2014	10000.00	100%
4	2014-205	5000.00	100%

9	**Give details about the income received by your fire services**

S No	Year	Fire Tax	Fire Fee	Fire Service Charges	Capitation Fee	Any other
1	2004-2005	62.83	-	-	12.207	Capitation fee is inclusive of inspection / scrutiny fee
2	2005-2006	66.68	-	1.819407	10.20	
3	2006-2007	74.48	-	2.407	27.42	
4	2007-2008	89.11	-	2.886	23.927	
5	2008-2009	172.36	-	2.979	74.523	
6	2009-2010	113.25	-	5.824	74.176	

G	Human Resource Management	
1	**Manpower Planning**	
2	**Number of post sanctioned and vacant**	As per details mentioned above
3	**Recruitment Procedure**	As per recruitment rules framed by Nashik Municipal Corporation
a	**Recruitment Rules**	As per Government of Maharashtra rules on the subject. The candidates undergo obstacle course, written test, Interview and Medical
b	**Group Discussion**	No
c	**Personal Interviews**	Yes
4	**Training and Development**	
a	**Induction Training**	Employees are sent for training to NFSC Nagpur and SFTC Mumbai
b	**Refresher Training**	Yes at station level
c	**Motivation Training**	Yes at station level and NFSC
d	**Special skill training**	Hands on New Equipment training is given at NFSC and in station
e	**Any Other**	Disaster Management training
5	**Career and Success plan**	As per Recruitment Rules
6	**Mitigation plan**	No
7	**Retirement**	The retirement age is 58 years for all except class IV staff, which is 60 years.
8	**Plan for utilisation of retired persons services**	Retired and qualified persons are available however certain aspects of training can be well delivered by physically fit personal. Retired officers from other organisation with requisite qualification can be utilised as license agencies to inspect and certify the fixed installations in various buildings under Maharashtra fire Prevention and Life Safety Measures act 2006. Also they can be utilised for training purpose in training centre

DIVISONWISE DETAILS: NASHIK MUNICIPAL CORPORATION

Sr No	Details	Nashik East	Nashik West	Satpur	Panchvati	Nashik Road	CIDCO	TOTAL
1	Single/ Double Storey/Row Houses/ Bungalows	17781	9712	26384	49844	24803	46607	**175131**
2	Buildings 15 to 24 Mtrs							**463**
	Residential							264
	Commercial							67
	Mix (Res + Comm)							105
	Industrial							02
	Educational							19
	Assembly Buildings							20
	IT park, Hotels, Hospitals							06
2	Apartment Houses	14381	1935	1731	1268	1103	2644	**23062**
3	Commercial Buildings	2845	233	2022	6921	136	0	**12157**
4	Lodges	39	7	0	11	28	0	**85**
5	Hotels	94	104	54	28	90	81	**451**
6	Star Hotels	0	2	0	0	0	1	**3**
7	Petrol Pumps	13	7	14	5	11	0	**50**
8	Gas Go downs	15	3	3	0	7	0	**28**
9	Single Storey Schools	24	0	21	6	6	7	**64**
10	Multi Storey Schools	10	0	5	19	20	21	**75**
11	Colleges	3	12	7	7	4	2	**35**
12	Cinema Halls	5	6	1	2	2	2	**18**
13	Drama Halls	2	2	1	1	1	2	**8**
14	Marriage Halls/ Lawns	28	19	14	32	28	27	**102 +46**
15	Bus Depots	0	3	1	2	1	0	**7**
16	Hospitals	71	93	36	20	58	0	**278**
17	Pilgrim places	4	0	1	2	3	0	**10**
18	Open Places	21	2	0	0	0	0	**23**
19	Saw Mills	41	0	8	1	11	0	**61**
20	Dangerous Buildings	345	180	0	0	81	0	**606**
21	Jhuggi Jhopadi Slum Areas	1232	3049	2	45	6411	0	**10739 164**
22	Industries	0	0	1590	0	2	1538	**3130**

Part 4: Strategies for Fire and Emergency Services towards Effective Mitigation and Response

Introduction

4.1 This chapter deals with strategies that the FES is required to adopt to meet the present needs of its roles and responsibilities and brace up to take challenges of the future. These strategies involve organisational strengthening and procedures that are to be followed during all phases of disasters, particularly the Pre-Disaster and During- Disaster phases. The strategies also involve following of a concept of integration between various agencies and resources, to deal with the challenges with complete synergy.

Strategy 1 (pre-Disaster Phase) - The Strategy of Continued HVRC Resulting into Prevention and Mitigation related Decisions:

4.2 The Hazard Vulnerability and Risk Assessment will be carried out continuously in order to cater to the effect caused by continuous development of the city and posturing of response will be decided according to the changed situations. This should also include the aspect of Events that are conducted from time to time. The continuous HVRC analysis will lead to the following decision-making processes:-

(a) Resource Allocations to various Fire Stations ï for speedy response the appropriate resources (e.g. HAZMAT Van) can be pre-located in the areas where specific hazards exist. This is probability based and has to be logically worked out (instead of mathematical distribution).

(b) Identification of Mitigation measures like demolition/ retrofitting of buildings, relaying of HT cables, accessibility of sewers and training of response forces and building up capacity of the population.

(c) Study of traffic patterns and realignment of traffic flow for preventing accidents and ensuring speedy movement. It also indicates the need for traffic control and monitoring mechanisms.

(d) Indicates the locations and extent of various facilities that need to be established, including water hydrants, OH water tanks and their security and open spaces etc.

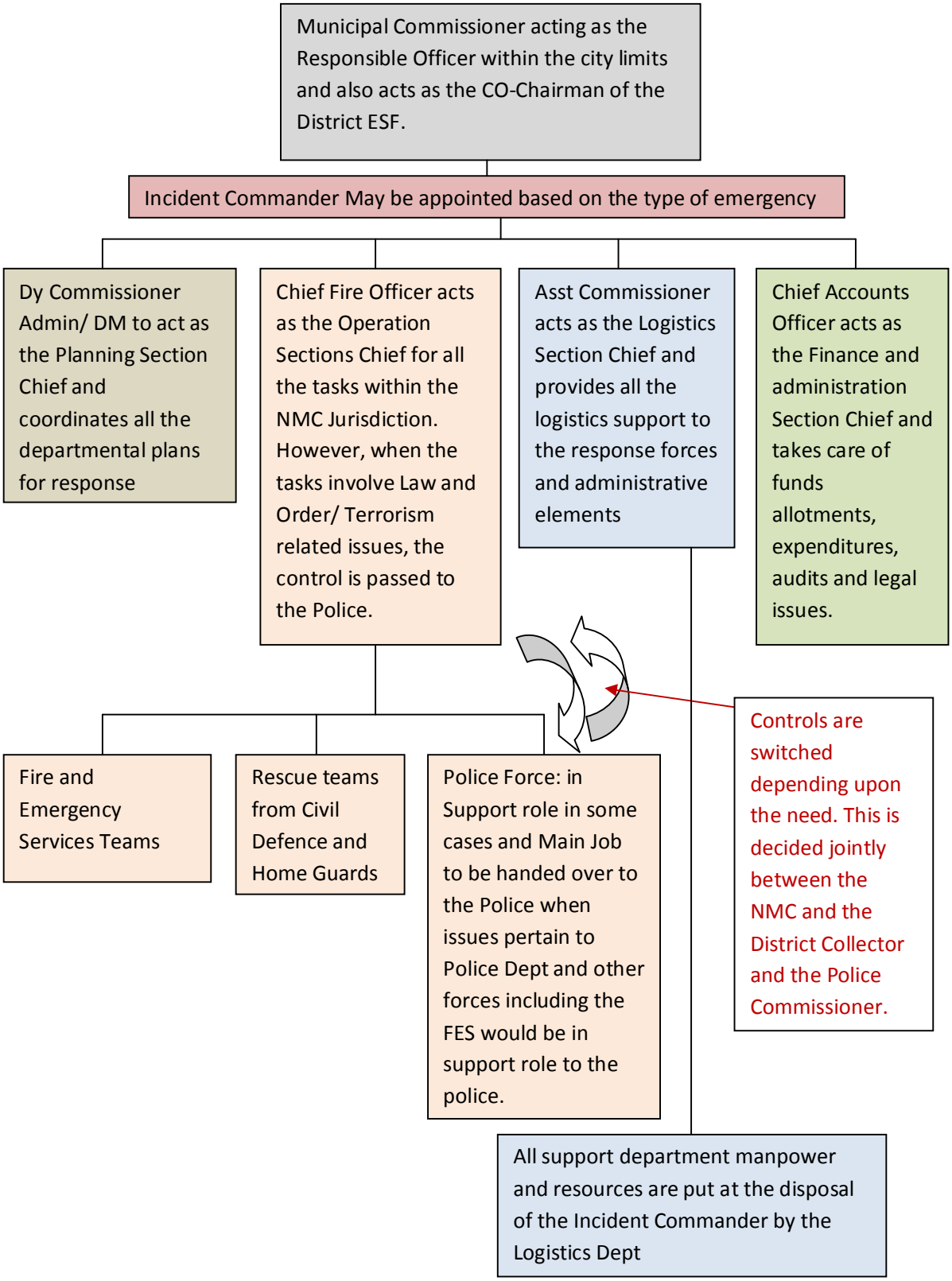
(e) It suggests the need for de-silting, construction and development of embankments, construction and alignment of water channels etc.

(f) Routes for movement of Hazardous material carrying vehicles.

4.3 For the HVRC to be authentic, there would be a need to have an audit staff at the FES (refer to tables on manpower in Part 2) and an integrated team at the NMC to include similar teams from PWD, Water, Electricity and Town Planning dept and also inclusion of the Police dept.

Strategy 2 (pre-disaster Phase): **Formation of a Joint Command to operate an Integrated Response structure at city level to deal with the incidents wholesomely**:

4.4 Incident Response System (IRS) is a concept that has been accepted the world over (albeit under different names and titles). It has been observed in the past that the response forces, controlled by different administrative heads react differently to a situation. Thus, for a common incident response, planning, reporting, resource deployment is highly compartmentalized causing disjointed efforts and resulting in lesser effectiveness. The departmental boundaries are too rigid and water-tight. At NMC level, an IRS structure should be operated such that it establishes adequate coordination and orderly response functions and extracts the required support from all the concerned departments. The IRS philosophy that has been accepted by the NDMA has been used for suggesting the structures given below (It is pertinent to note that the armed forces have been using a Joint Command Concept for quite some time during operations. The Integrated System of response has been practiced in the developed world effectively for the past one decade):-



4.5 The response forces integrating mutually must know each otherśrequirements and capabilities and procedures. They would have to operate the command and control systems jointly, including radio procedures and one common grid of radio network. The collaborative efforts would also entail joint operational training, ability to cross attach manpower/ resources/ teams under the control of other departmental heads/ response teams/ divisions/ groups only for operational purpose for a short time, creation of joint strategic plans and adopting a synergized regime of objectives as well as operational methods (It is pertinent to note that operations against Veerappanś Gang succeeded only after a ójoint Commandôwas created). The response forces would have to undergo joint mock drills periodically. The Control Room coordination and EOC concepts have been explained in Part 5, later.

Strategy 3 (pre-disaster Phase): Capacity Building of the Community:

4.6 ó Capacity Buildingôof the community needs to be done collectively by all response forces through a pre-decided schedule. The following table indicates desirable sections of the community and the type of training:-

Ser	Sections of the Community	Type of Training	Duration and approx number to be trained
1	Home Guards and Civil Defence	Basic Fire Fighting course and operating of radio communications. To be jointly conducted by FES and Civil Defence. First aid course. To be conducted by authorised Emergency management teams from Hospitals for all response forces including Police	Two weeks course for a batch of 50 trainees. At least 4 such courses should be conducted. Five days duration per course. At least 100 volunteers from each force should be trained each year.
2	School and College Teachers and staff	Rescue, Fire Fighting, Evacuation and First Aid	Five days course with practical orientation and a

			case study of one of the schools. Five such courses should be conducted each year for a batch of 50 teachers, during Summer and Winter vacations.
3	Architects, Engineers and Masons	Technical course on building bye-laws and the impact of design and construction on disaster effects and response system.	A three day course for 50 architects, engineers and masons, separately. Three to four such courses should be conducted.
4	Sensitisation Course for employees of PWD, Water, Electricity and Power, irrigation dept	Disaster Overview and support system duties by all departments	A 3 day course separately for each department should be conducted through experts from outside NMC.
5	Radio Operators from Police wireless, FES, Civ Defence and Home Guards	Radio procedures, maintenance of radio sets and batteries, Charging of batteries.	3 day course. About three to four courses should be conducted.
6	Housing Societies	• Handling of domestic LPG • First aid	1 days workshop in different housing societies and slums. -DO-
7	Industrial shop floor Managers	Industrial Safety	2 days workshop for the shop floor managers and foreman categories. 5 to 10 courses should be

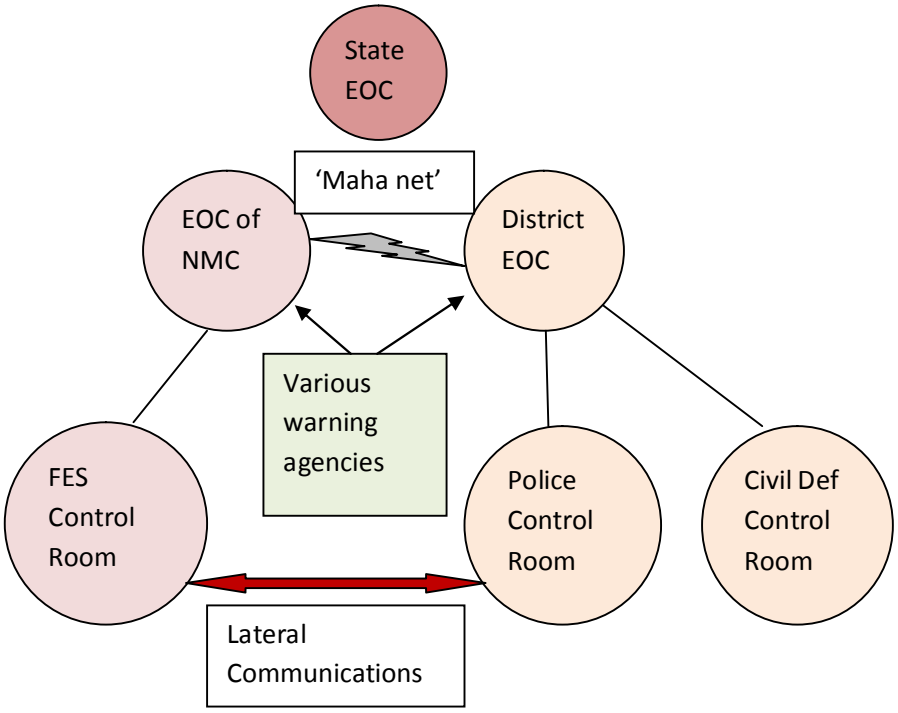
			conducted each year for Industries in Satpur and Ambad

Note: Many more courses could be thought of. These should be conducted in-situ or at the training facility of the FES.

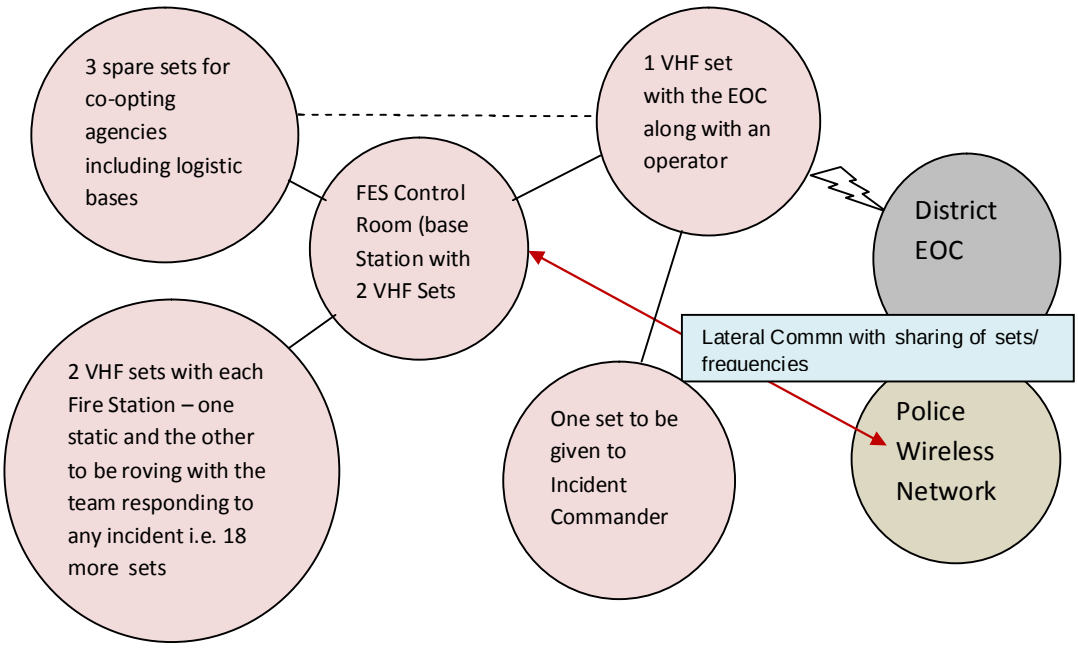
Strategy 4 (Preparedness): Integration of Communication Systems for Coordinated Response:

4.7 Integrated communication system is the bedrock of efficient response and effective control over the operations. The FES already operates VHF sets and 3 base stations are permitted. Case for sanctioning of enhancements in number of VHF sets and base stations could be taken up. The communication system should be integrated with the Control Rooms and EOCs at all levels.

4.8 A diagram showing networking of all Controlling facilities is shown below:-



4.9 The following diagram depicts captive communication systems of the FES and the EOC of the NMC:-



Note: In minor incidents, the FES continues to act as the control However, in a major disaster, the control would pass to the EOC and the Chief Fire Officer would in fact act as the Operational Head for the NMC.

Strategy 5: Centralised Data Sharing:

4.10 At the level of the District, a master resource data should be collated giving the details of resource id, type and capacity of resource, quantity and the location in terms of controlling authority of the resource. A copy of the same should be available with the EOC of the NMC which should act as an alternate EOC for the district.

Strategy 6 (During Disasters): Task Force Concept of Response

4.11 The response during any type of emergency necessitates various functions being carried out by different agencies with utmost coordination. This helps better synergy and results into greater effectiveness. Thus, assembling of various forces and placing them under a task force commander at different places and for different tasks is essential. (e.g. During religious festivities like ñSinhasthaò there may be multiple incidents of different nature occurring at different places simultaneously. In such an eventuality, police will be the main controlling agency for stampedes while the FES and medical services may be in a supportive role. At the same time, a fire might ensue at a different location where the FES would

be the central agency for response and police, home guards etc may be in supportive role. Thus, composition of the task force and control may have to be flexible and organised by the ñOperational Headò. There is a need to have the Chief Fire Officer as the ñOperational Headòwithin the Jurisdiction of the NMC with other agencies acting as Auxiliary Agencies for certain emergencies requiring Search and Rescue should be established as part of a common grid, except the situation of Law and Order and Terrorism related emergencies, where the ñOperationsòwould be handled by the Police Commissioner of the city and other services acting as Auxiliaries. This system should be woven in the form of Incident Response System (IRS) that stands approved by the Government of India.

Strategy 7 (During Disasters): Support Functions Performed through the Concept of ESF

4.12 ESF Concept will be activated whenever necessary and ESF departments will be accordingly warned by the Incident Commander. The ESF departments need to be also tied up between the District administration and the Municipal Corporation so that support during emergencies is smooth and continuous. The SOPs on these functions have been spelt out in Part 5.

Strategy 8 (Post Disaster): Records and Analysis

4.13 Post disaster event recording and analysis will be recorded through ñControl Roomsôfor various departments and the ESF and will be centrally archived with the EOCs of the NMC and the District. The analysis will lead to not only accurate damage assessment but also help in changing earlier methods of operations, help in reviewing the HVRC and acquiring better equipment systems. May be DM Plans could undergo some modifications as a result of the analysis.

Sectoral Division of Nashik City based on Geography, Threats and Response Requirements:

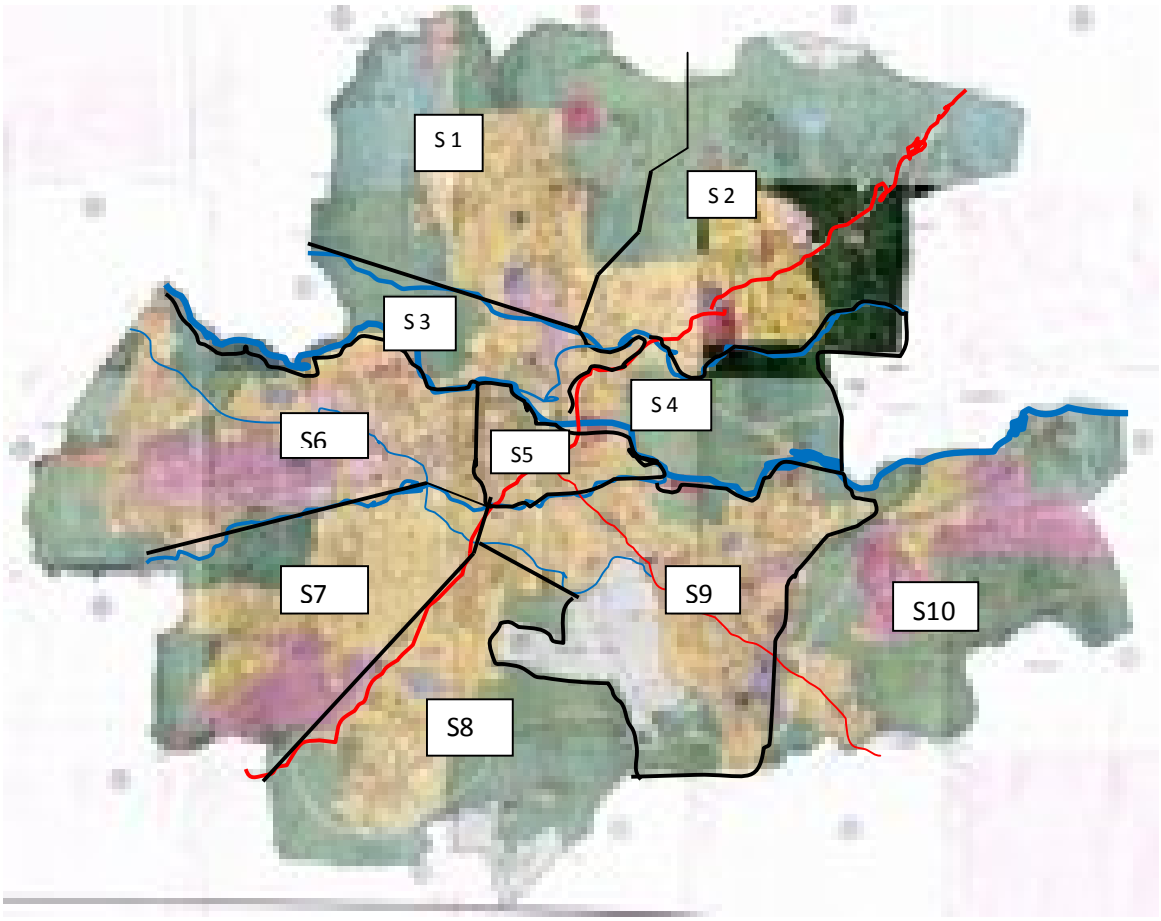
4.14 Though Nashik city has been administratively organised into six divisions, the Hazard profile and geography and spread of the city dictate that the city should presently be divided into 10 sectors. These have been shown on the map given below. Fire stations should be established at the scale of at least one per sector. The factors that affect this suggestion are as under (can be refined along water bodies and roads for easier demarcation. Only rough alignment has been drawn here):-

(a) Spread of the city and the road distances available to the response force and resultant response time.

(b) Chances of the different sections getting cut off and isolated from the response force in case of intense large area disastersôlike the Earthquake and Floods.

(c) Distribution of specialised equipment based on the Hazard profile.

Suggested Sectors of Nashik City



4.15 Suggested Distribution of major Equipments by Sectors:

This is based on the hazard profile and the distribution of major facilities is given in the table below

Ser No	Sector No	Equipment profile	Remarks
1	Sector No 1: Nashik North West	Fire Station ï 1, Water tenders ï 2	
2	Sector No 2: Nashik North East	Fire Station ï 1 Water tenders - 2	
3	Sector No 3: Panchavati West	Fire Station ï 1 Water tenders ï 2	
4	Sector No 4: Panchavati East	Fire Station ï 1 Water tenders ï 2 Aerial Platform - 1	
5	Sector No 5: Nashik Central	Fire Station ï 1(and HQ FES) Water Tenders ï 3 Ladder turn table ï 1 Aerial Platform ï 1 Boat -1	
6	Sector No 6: Satpur Industrial	Fire Station ï 1 Water tenders ï 2	Ideally, a HAZMAT van should be given. However, Sect 7 and Sector 5 can send

		Foam Discharger ï 1	their vans.
7	Sector No 7: Ambad Industrial	Fire station ï 2 Water tenders ï 2 Foam Discharger ï 1 HAZMAT Van - 1	Industrial and slums fire, HAZMAT cases
8	Sector No 8: Nashik South West	Fire stations ï 1 Water Tenders - 2	Should also be given tools for rescue in landslides and major road accidents as well as slum fires.
9	Sector No 9: Nashik Road	Fire Station ï 2 Water tenders ï 2 HAZMAT Van ï 1 Boat - 1	Covers Bhagur, Devlali and Sinnar also
10	Sector No 10: Nashik East	Fire Stations ï 1 Water tenders - 2	Mainly to cover farm fires

Sustainability

4.16 The above strategies have been a part of well developed response systems in the developed world. These strategies would have a greater flexibility, better coordination and result into a more efficient response. These promote the accountability of all the departments of the government and strengthen the credibility of the system. If adopted, these strategies would be highly sustainable over the foreseeable future. Since many proven management principles are enshrined in these strategies, these would pass the test of time and would be ôSystem Drivenôand not ôPersonality Drivenô

Part 5: Standing Operating Procedures for Integrated Response system

Introduction

5.1 This part enumerates Standing Operating Procedures (Not tactical methods), at FES level and also covers the mutuality of activities that are required to be undertaken in different disaster scenarios by different departments/ agencies, basically during the response phase (where essential pre and post response phase actions have also been covered).

Actions of FES during Pre-Disaster Period

5.2 The FES is required to perform the following activities in re-disaster period:-

(a) Continuous HVRC of Nashik City through inspections in each ward.

(b) Granting permissions for buildings from Fire Safety perspective (Please refer to the GoI norms laid down vide National Building Code 2005 and mentioned by the Codes laid down by the BIS). The necessary checks and certifications will be followed in accordance with the above. The FES will retain a copy of the design of all high rise buildings (above 15 mtr).

(c) Checking of old and dilapidated building in conjunction with the PWD team or even independently and submit report to the PWD and also to the MC.

(d) Continuous operation of the Control Room.

(e) Allocation of resources under command to different fire stations.

(f) Conducting upgradation training of own staff and conducting training for capacity building of the community.

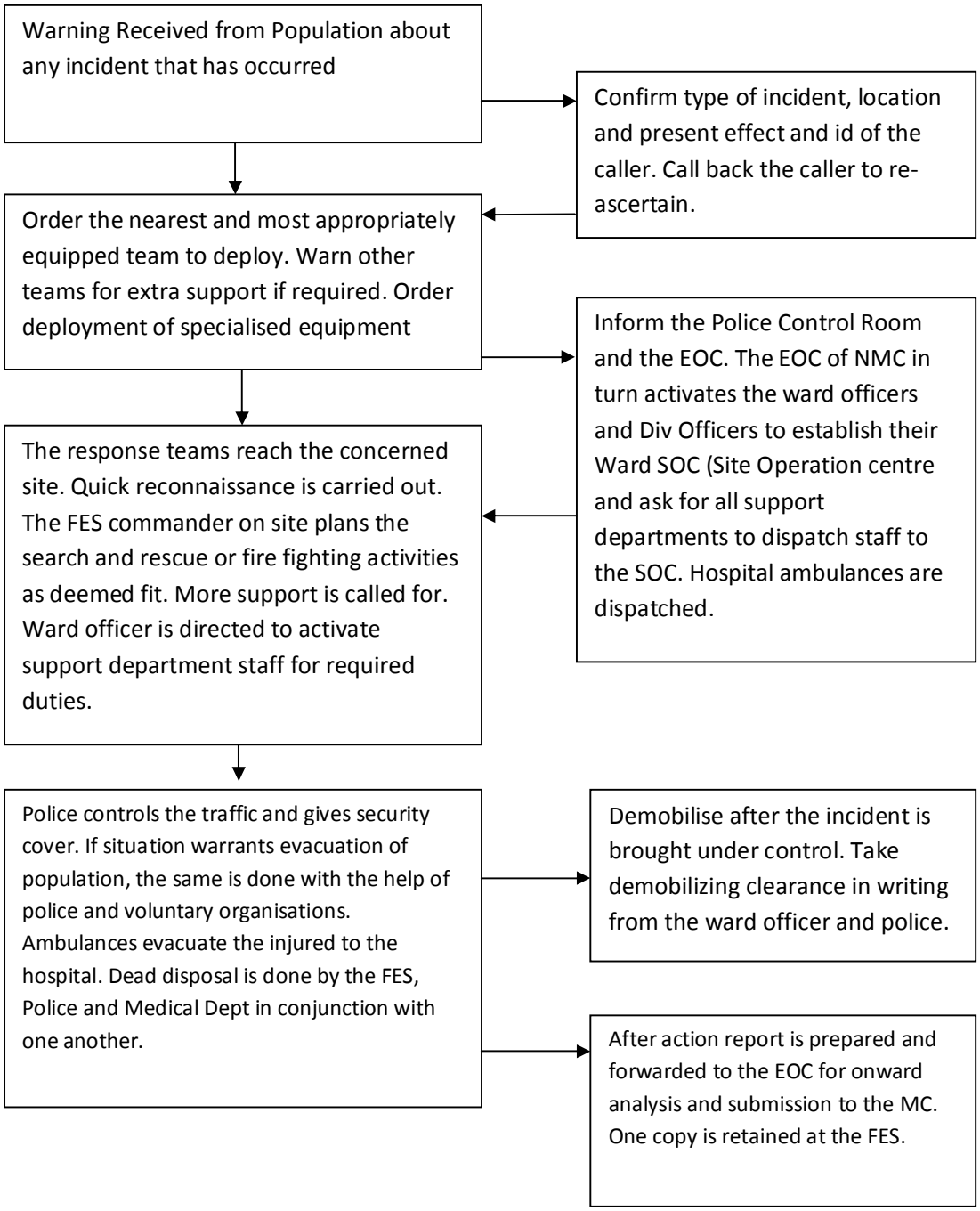
(g) Upgrade EOC information at the NMC and accordingly upgrade information in the control room.

(h) Close coordination with the other response agencies and conduct of mock practices at departmental level and also in conjunction with the other co-opting agencies.

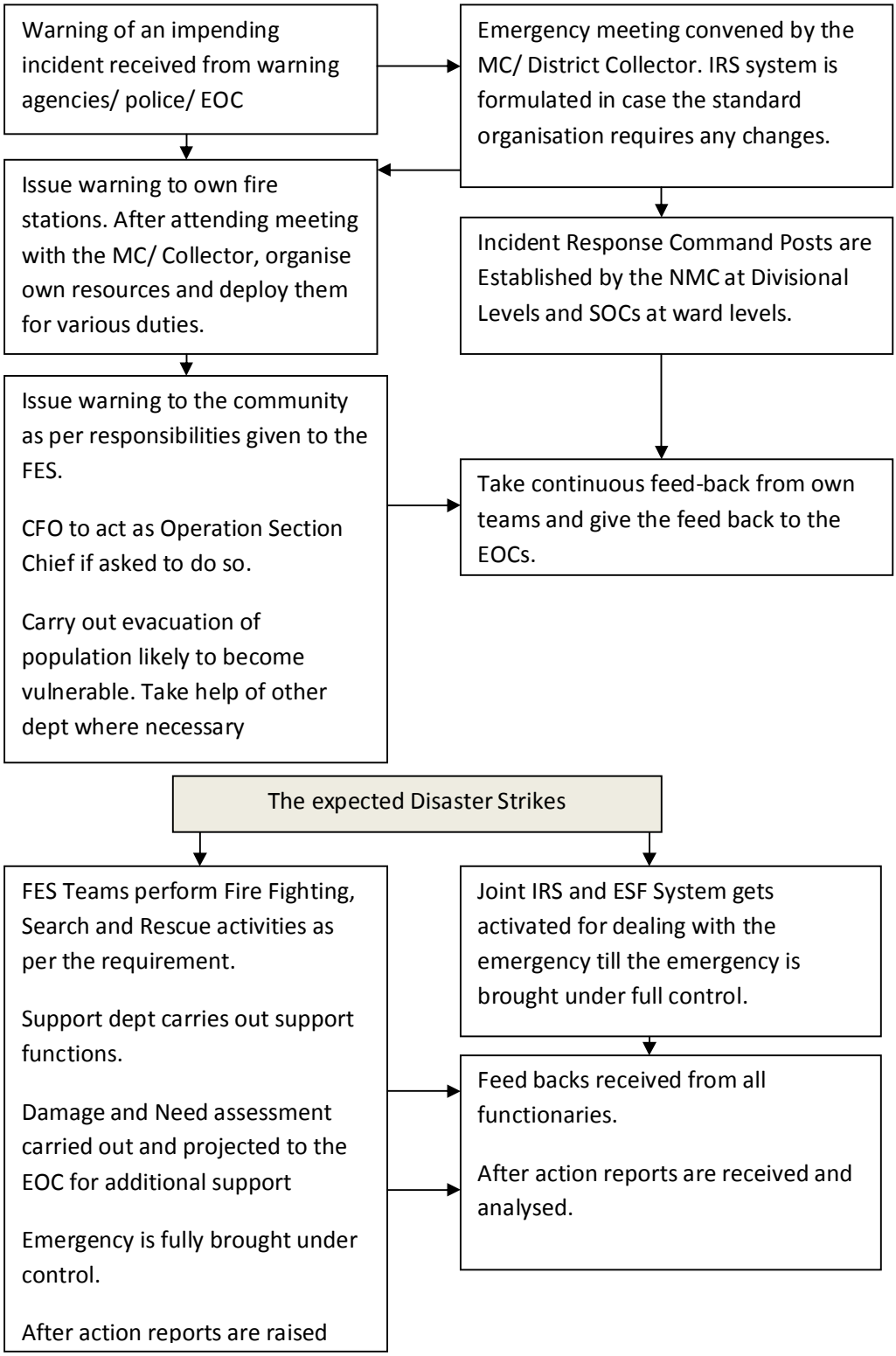
(j) Granting permission to tankers carrying HAZMAT and allot timings and routes. This function is yet to be allotted to the FES, but needs to be included in their jobs by the NMC.

Basic Flow of Actions from Warning Stage onwards:

5.3 **Case1**: The flow diagram below shows actions to be taken in case of any calls received for response about individual incidents:-



5.4 Case 2:When a larger disaster is likely to happen and a warning about it has been issued or when warning is not received and a disaster strikes



Procedures and Responsibilities of Support Departments during Different Disasters

5.5 It should be noted that the FES, Civil Defence, Home Guards, Police, NGOs and other support departments are ñTactical Resourcesôthat are active to establish control over any emergency. The inter-force control can get shifted based on the type of emergency. The Command structure of one tactical force cannot be handed over to the other tactical force. Only support and coordination is feasible. At strategic level, the stake-holders who have greater command responsibilities can only handle the strategic planning, decision-making, deciding on the objectives and arrange for wholesome logistics, administration and financial backing. At District level, it is the District Collector who ñCommandòall these functions. Where the Municipal Commissioner is senior to the District Collector, the Command may be mutually passed to the Municipal Commissioner within a cityôs jurisdiction. Thus, a Police Force cannot command an FES or Civil Defence or Home Guards or an officer from the FES cannot be placed in command of other agencies for tactical actions. The legality and administrative functioning of the country and the line authorities have to be essentially maintained even during emergencies. What is highly desirable is the issue of handling of tactical functions in a coordinated manner. Depending upon a situation, some agency may be the Primary Agency and others perform Secondary (supportive) roles. In a different situation, the Primary Agency may change and undertake supportive role. This aspect needs to be clearly understood by all agencies.

5.6 **Fires**:

(a) **Response Functions of FES:**

(i) Firefighting.

(ii) Search and Rescue.

(iii) Salvaging of dangerous and important material.

(iv) First aid, Carriage of casualties and evacuation.

(b) **Other supporting agencies**:

(i) Water dept to ensure availability of water through hydrants or OH tanks.

(ii) Police to establish traffic control and rerouting of traffic, dispose the dead.

(iii) Health/ Medical dept would provide ambulances for casualty evacuation and medical aid and carry out disposal of the dead. .

(iv) Other agencies are generally not active during such incidents.

5.7 **Floods**:

(a) **Response Functions of FES:**

The FES is expected to perform the following functions:-

(i) Fixing of Captive ferries and operating mobile ferries as required.

(ii) Search and Rescue of Humans and animals from water.

(iii) First aid and carriage of casualties.

(iv) Evacuation of trapped victims.

(v) Dealing with electrocution cases.

(vi) Disposal of dead.

(vii) Rescue from sewerage lines.

(b) **Support given by other depts. And agencies**:

Support given by other dept and agencies will be on the same lines as that mentioned at 5.5 above. However, tactical actions may differ. During floods, the there is likely to be only one major link (Holkar Bridge) between South and North side of Godavari River through the most affected area. Thus, movement of response teams and departmental teams is likely to be restricted. The agencies will have to work in penny-packets and no large scale recycling of resources is possible.

5.8 **HAZMAT Incidents**:

(a) **Response Functions of FES:**

(i) Use anti-HAZMAT tactics to plug the leakages or neutralize the leakage.

(ii) Rescue of victims and first aid.

(iii) Evacuation of victims.

(b) **Involvement of other dept/ agencies**:

(i) Police dept to warn and evacuate population from the areas likely to be affected (the area will be spelt out by the FES). It would also do traffic control and re-routing. Will perform disposal of the dead.

(ii) Health/ Medical dept would evacuate the victims by ambulances and give medical treatment. Do disposal of the dead.

(iii) Expert shall be made available by the Directorate of Industrial Health and safety.

5.9 Earthquakes (and also in case of building collapse or Landslides):

(a) **Response Functions of FES**:

The FES may be required to undertake the following functions:

(i) Search and Rescue through debris of fully or partially damaged buildings.

(ii) Evacuation of trapped victims from structures that are partly collapsed or endangered.

(iii) Firefighting (in case fires trigger due to secondary effects).

(iv) First aid in-situ and Casualty carriage.

(v) Dealing with rescue after electrocution.

(b) **Support given by other dept and agencies during tactical operations by the FES**:

(i) Ward Offices will be established in the form of SOC. The ward officers will allot all the resources and technical help required by the FES as under:-

- Water dept staff to control water flow and plug water leakage in case any pipes are broken. It would also help in providing water for any fire fighting tasks.
- Sewage dept would support by plugging any broken pipelines that may interfere in the search and rescue.
- Health/ Medical dept would provide ambulance vehicles and mobile medical teams for treating the casualties on site and evacuation of the injured. Disposal of the dead.
- Electrical Dept would cut off the main supplies. MSEDCL would also be activated by the EOC/ District admin.

They would also cut the loosely hanging wires and restore electricity soonest for night operations.

- PWD would help in debris clearance and provide the essential machinery. Technical advice would also be provided by PWDôs engineers regarding stabilizing of overhangs.
- Civil Defence and Home Guards would assist in Search and rescue and casualty carriage as well as first aid. These functions will be coordinated by the FES.
- Help from pre-identified NGOs to help the FES in Search and rescue and casualty carriage.

(ii) **Support from the Police dept**: The following support would be given by the police dept:-

- Traffic control and cordoning the area of damage.
- Force unwilling community to evacuate to safety.
- Routing of public traffic on safer routes.
- Keeping routes for response forces open.
- Disposal of the dead.

5.10 Road/ rail/ Aviation accidents:

(a) **Response Functions of FES:**

(i) Search and Rescue. (Tactical operations like metal cutting etc may be required).

(ii) Firefighting.

(iii) First aid, casualty carriage and evacuation.

(iv) Recovery of dead bodies.

(b) **Functions of other dept/ agencies**:

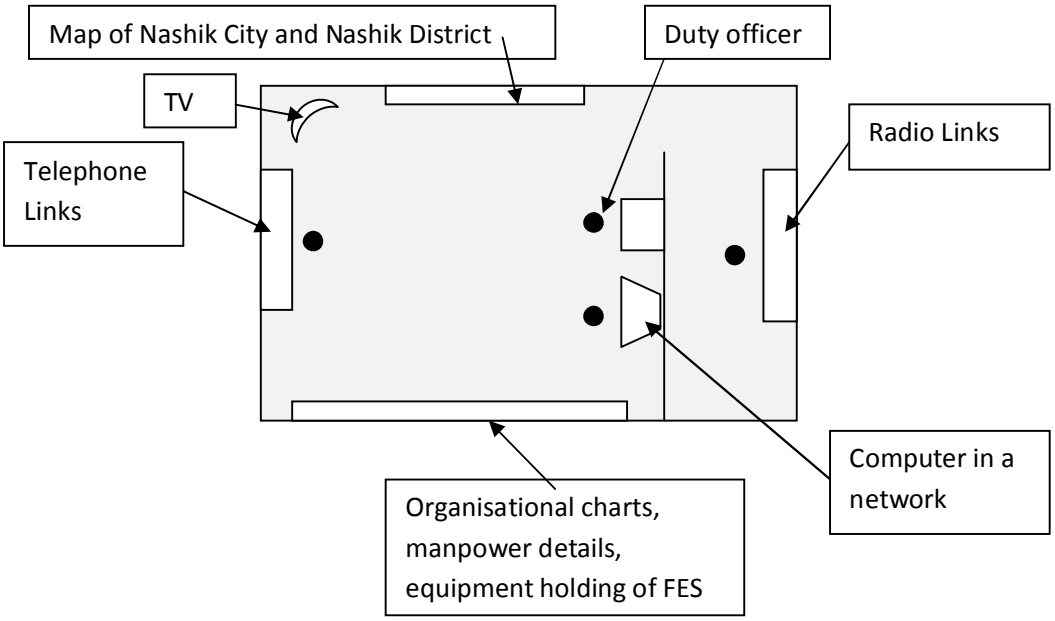
(i) Police dept would provide crane, control the traffic and ensure security of area and do disposal of the dead.

(ii) Health/ Medical would evacuate casualties, provide medical aid and do disposal of the dead.

5.11 In the cases of Terrorist attacks, Communal violence and Stampedes etc the FES will be in supportive role and Police would perform the Primary role. The details have already been covered at Appendix A to Part 2.

Organisation of Control Room of the FES

5.12 The FES would be required to organise a control room at its HQ. The control room will function as a subset of the EOC established by the NMC and will function 24 X 7. The control room will have the following structure:-



5.13 **Equipment Profile of the Control Room**: The control room of the FES must have the following equipment:-

(a) Computer server and a terminal - 2 computers, one will be a server. The server will be connected to the EOC of NMC on WAN.

(b) VHF Radio sets - 2 and wireless base stations ï 1.

(c) Line linkage to all response forces. Hotline with the EOC and Police control room. Emergency lines 101 and 102 provided by service providers.

(d) TV set. Additional TV set will be provided in HODõs office.

(e) Map board having a map of Nashik City at 1:10,000 scale and a district map at 1: 1,000,000 scale.

(f) A board giving information on organisation, equipment and manpower power profile of FES.

5.14 **Manpower profile and functioning of the control room**:

The control room will always be manned by a duty officer, a radio operator, telephone operator and a computer operator. Any calls received there will be recorded and action of response generated by ordering the appropriate teams. The following will be the functional aspects of the control room:-

(a) All calls will be also informed to the NMCôs EOC and after action reports will be submitted to the EOC.

(b) The calls will be entered in a database of calls with details given for analysis.

(c) Following records will be maintained:-

(i) Duty rosters.

(ii) equipment profiles.

(iii) Tele Nos of all response agencies.

(iv) Tele Nos of all important functionaries of NMC and District.

(v) Tele Nos of all hospitals and Armed forces units

(d) Database will be created for equipment capabilities, antidotes of hazardous Material, Information about industries in Nashik, their products and raw materials.

(e) Database of all permissions granted to buildings and records of inspection.

(f) Hazard, Vulnerability, Risk and capacity analysis records.

(g) Important Vas and VPs, their locations and facilities.

(h) Locations of Water tanks, Hospitals, Fire Hydrants.

(e) Details of slums.

5.15 **Technological Enhancements**:

The technology of GPS and GPRS is essential for the FES. Also, it is desirable to have digitized maps issued by survey of India with the required layers (Not CAD/ CAM Maps). The computer operator should be able to manipulate the digitized maps.

Part 6 – Recommendation

Introduction

1. The fire services in Nashik City in todayûs scenario are working with lot of constraint and need immediate revamping to enable them to carry out the specified responsibilities efficiently. As assessed by Central agencies the shortfall observed in India as per fire preparedness is concerned are:-

   (a) Fire Stations - 97.54%
   (b) Fire Fighting & Rescue Vehicles - 80.04%
   (c) Fire Personnel - 96.28%

2. Fire Service setup in any area is mainly based on Population, Response Time and Risk Hazard Analysis. The Risk Hazard Analysis brings out the requirement of specific and special equipment required at a particular Fire Station. This aspect needs to be constantly reviewed on the basis of growing hazards and thus needs to be dynamic in nature. Considering the Risk and Hazard assessment and the visualised development up to 2031 of Nashik City, the following points need consideration:-

   (a) The expanding role of FES requires well equipped and fully trained response force, having a well structured and integrated organisation structure.

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   (b) Considering the present pattern of development of Nashik City, it is estimated that the decadal growth rate is likely to be 40 to 50%. Nashik would have nearly 26 Lac of population by 2021 and about 37 to 40 Lac of population by 2031, including neighbouring clusters. The rise in the population will result in the demand on civic infrastructure and would also have greater threats from natural and human created disasters.

   (c) Considering the population growth the residential area development will take place enhancing the need of more FES support.

   (d) Industrial growth and increasing floating population at the pilgrim centres of Panchavati and Trimbakeshwar during normal periods and also during celebrations like Sinhastha will definitely attract the threat of Terrorism/ Stampede and CBRN related disasters, necessitating equipping of response agency with specialised equipments.

   (e) Increase in traffic density within the city limits is likely to create road accidents and some of these may involve Hazardous material related road accidents. This needs to be taken care of.

3. The deductions from the above are:

   (a) Considering hazard profile, there is a need of suitably locating fire stations in the City limits.

   (b) Creation of Integrated FES in line with Govt of Karnataka fire service structure i.e. to bring Fire Brigade, Civil Defence and Home Guards under one banner. This will aid existing Response Structure to efficiently carry out additional responsibilities assigned to the FES independently during initial phase

   .

   (c) Equipping FES with essential specialised equipments.

   (d) Creating training facility at each division level, to ensure knowledgeable, trained and competent manpower for launching effective response.

   (e) Strengthen bye laws and levying penalties to defaulters in the local DCR

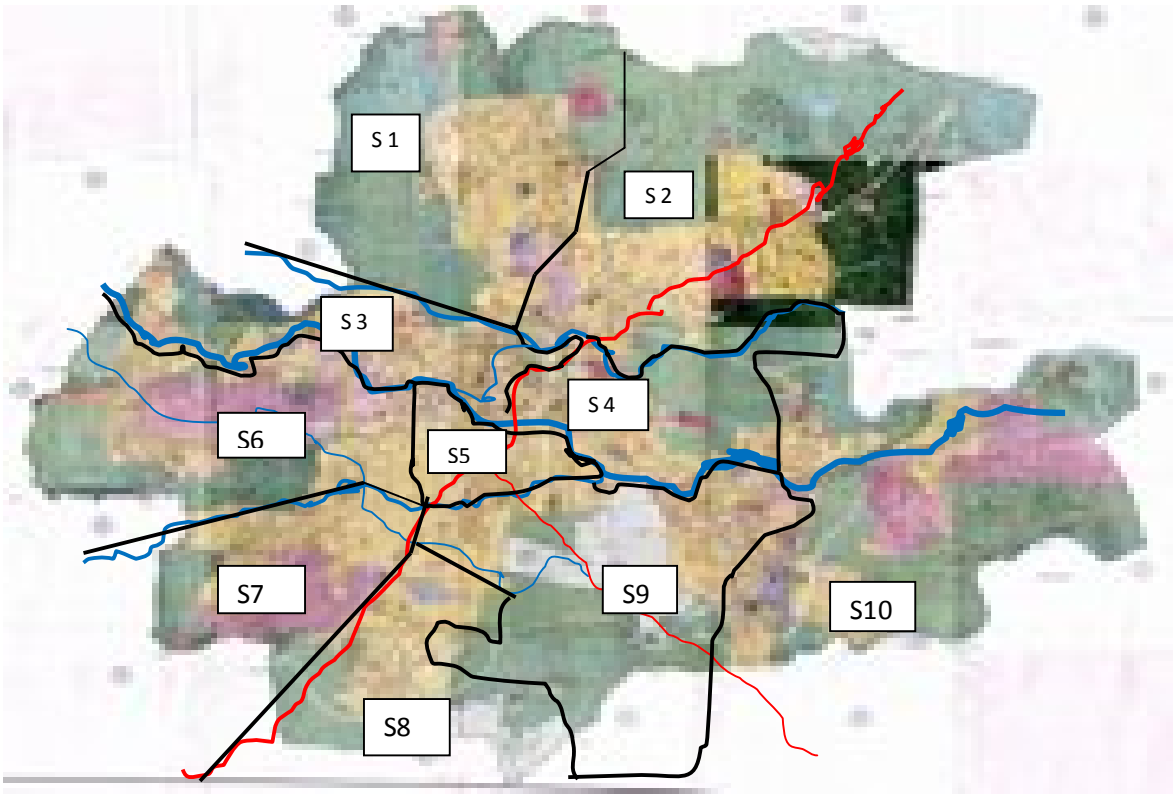
   (f) Creating integrated/ third party monitoring agency.

4. As per the guidelines issued, the measures to be implemented on priority at NMC level are Infrastructural Development and Revamping of organisation in terms of Manpower and Equipment. Once this framework is in position local level initiatives of training, dynamic evaluation of local threat scenario, Command and Control Structure for responding to disasters (IRS system) can be implemented concurrently or subsequently.

Existing Status and additional requirements concerning Infrastructure of FES

4. The infrastructural development should meet the prerequisites of FES response strategy while selecting the locations. The requirement in Urban area is FES services should be able to reach the site within 5 minutes or population of the area as norms. Considering the threat analysis the Nashik City in present scenario should be divided in to 10 Sectors and each Sector should have one Division. Each Division may have more number of Fire stations and each Fire Station could have one or more water tenders and other equipment.

Suggested Sectors of Nashik City:



Considering the above the Infrastructure requirement for NMC is as under:

6. Presently Nashik FES existing infrastructure is organised as under:

(a) FES headquarters, co-located with one of the fire stations which is not a neat arrangement because of the inherent interference in command functions from the tactical activities of the fire station.

(b) Five divisions, co-located with the fire stations (one of the divisions is co-located with the HQ).

(c) Inadequate number of quarters for the present staff. As the staff goes up (Refer to manpower requirement given at Appendix C.

(d) Training Institution does not exist at present.

7. Requirement of Infrastructure for 2011 status is as under:-

(a) Headquarters Office - 1 separate infrastructure.(additional).

(b) Division Headquarters Offices - 6 (5 additional).

(c) Fire Stations - 18 (13 additional).

(d) Additional staff quarters -

(i) 3 ½ BHK 1 No.

(ii) 3 BHK 7 Nos

(iii) 2 ½ BHK 31 Nos

(iv) 2 BHK 24 Nos

(v) 1 ½ BHK 64 Nos

(vi) 1 BHK 1022 Nos.

(e) Training Institution - Approximately 2000 sq mtr.

8. As per 2031 estimates, the number of fire stations, water tenders, divisional offices will be much more. However, the same is not being considered for sanction at the moment. However, these should be sanctioned by the end of 2021, considering the status at that time.

9. **Cost Analysis of the Additional Infrastructure that needs immediate sanction and action for establishment**: The costing for the above works out as under:-

S No	Infrastructure Details	Land Requirement	Already in possession	Total Required	Cost per Sq Mtr(Rs)	Total Cost in Rs. Crore for additional Requirement
1	Land for Fire Station Additional Infrastructure Recommended 1. 1XHead Quarter= **8000 Sq Mtr** 2. 5XDivison Office-6000 Sq Mtr per Div= **30000 Sq Mtr** 3. 13XFire Stations-4000 Sq Mtr per Fire Stn= **48000 Sq Mtr**	86,000 Sq Mtr	26,000 Sq Mtr	60,000 Sq Mtr	15,000/-	90
2	Construction of Fire Stations. Training Institution etc (refer sub paragraph a, b, c and d above)	Construction of five division offices and 12 fire stations and allied structures/ facilities				40
3	Family Quarters for Staff	3½ BHK = 1 No, 3 BHK = 7 Nos, 2 ½ BHK = 31 Nos, 2 BHK = 24 Nos 1 ½ BHK = 64 Nos,1 BHK = 1022 Nos.				40
		TOTAL (Rs. In Crores)				**170**

10. Command and Control Mechanism:

(a) Presently, out of all the response forces, the FES is under the administrative control of the NMC, the Civil Defence and Home Guards are under the District Administration and the Police force is commanded by the Police Commissioner and the Health and Medical services are split between the District and Municipal administrations. Such split in command of Search and rescue related response forces creates many problems in synergised operations. The Karnataka State model has been very effective whereby the FES, Civil Defence and the Home Guards have been grouped together under a common Command structure and placed under one DG at State Level. There is a conceptual case that needs to be taken for restructuring of these forces. However, it is a command decision that can only be taken at the level of Maharashtra State.

(b) For Nashik, there is a need to have a Grouping of Fire Brigade, Civil Defence and Home Guards under one command and control structure with the Chief Fire Officer acting as the Head within the limits of Nashik City. This concept has been effectively followed in Karnataka.

(c) State of art control room connected with EOC of Municipal Corporation and stakeholders is warranted. The details with cost estimate are attached at Appendix D.

(d) Implementation of IRS based response structure should be created at Nashik Municipal Corporation and co-opted with the District IRS, suitably as the District Collector is the Chairman of the DDMA.

11. Human Resources

The present state of Manpower available with Fire Brigade of NMC is insufficient. SFSC has already laid down guidelines on manpower authorisation. The shortfall of manpower considering the requirement of additional fire stations, water tenders and other equipment is given at Appendix C.

12. Equipment Profile

Considering the tasks assigned to Fire Services the desired equipment profile has been covered in the main text. It is recommended that when fire services are called upon for mitigating disasters like CBRN, Terrorism etc. Specialised equipments need to be catered for by District/ State EOC till it is made available to Fire Services. The present shortfall of equipment as per SESC guidelines is at Appendix D.

Service Level Benchmarking:

13. The following is recommended for manpower benchmarking:-

(a) **Firemen**:

(i) Entry Level: 10th standard passed and Basic Course of Fireman. Higher qualification like H.Sc.(Science) would be preferred.

(ii) Should be medically fit, agile and having strength and stamina (laid down standards of performance prescribed by Director, Maharashtra Fire & Emergency Service should be followed).

(iii) Adequate opportunities should be made available subject to acquiring higher qualification, performance and outstanding meritorious service credentials

(b) **Sub-Officer**:

(i) Science Graduate and qualified from State Fire Academy or sub-officers course of the NFSC..

© **Asstt. Station Officer:**

B.Sc. with First class(A-Group) and qualified from State Fire Academy or sub-officers course of the NFSC..

(d) **Divisional officers**:

Direct recruitment with qualifications B.E. (Fire) or A.M.I. (Fire) E. from UK or India. General B.E. candidates would have to undergo course from State Fire Academy or sub-officers course of the NFSC.

Note:-For All officers cadre there shall be ratio for direct induction and by promotion based on merit cum seniority.

14. Benchmarking for Fire stations:

(a) Following of SFAC guidelines for planning of one fire station within 10 sq km and response time of 5 min for urban areas and 20 minutes for rural areas should be strictly adhered to and checked through observations. Efficiency check norms should be laid down for each fire station to check reaction time for leaving the fire station after receiving a call, time of reaching with respect to the distance, adequacy of actions on reaching the site and teamwork standards should be laid down.

(b) Maintenance of the equipment should be done at Fire Station level. There should be a separate workshop for repair and maintenance of the equipment and vehicles.

(c) Provision of residential quarters for the entire staff of the fire station should be available at the fire station itself.

Appendix C

Nashik Municipal Corporation

Shortfall in Manpower for Existing Five Fire Stations (in Present Scenario) for Fire Response and Mitigation

Sr. No	Name of Post	Grade	Recommended pay Band & Grade Pay (Rs.)	Manpower As per SFAC Norms	Man power Available	Man power Short fall /Gap as per SFAC	Monthly salary Approx. (Rs.)	Additional Yearly Expenditure (Rs. In Lacks)
1	Chief Fire Officer	I	9300ï 34800(Grade Pay- 5400)	01	01	Nil	-	N/A
2	Deputy Chief Fire Officer	II	9300ï 34800(Grade Pay- 4800)	01	Nil	01	35000	004.20
3	(Divisional) Fire Officer	III	9300ï 34800(Grade Pay- 4200)	02	01	01	33000	003.96
4	Station Officer	III	5200ï 20200(Grade Pay- 2800)	08	01	07	25000	021.00
5	Sub Officer	III	5200ï 20200(Grade Pay- 2400)	20	02	18	22000	047.52
6	Leading Fireman	III	5200ï 20200(Grade Pay- 2400)	57	08	49	20000	117.60
7	Driver cum Operator	III	5200ï 20200(Grade Pay- 2400)	59	27	32	20000	076.80

8	Fireman	IV	5200ï 20200(Grade Pay- 1900)	270+24	126	168	15000	302.40
9	Senior Clerk	III	5200ï 20200(Grade Pay- 2800)	01	Nil	01	22000	002.64
10	Junior Clerk	III	5200ï 20200(Grade Pay- 2400)	02	01	01	20000	002.40
11	Peon	IV	5200ï 20200(Grade Pay- 1800)	08	03	05	15000	009.00
					TOTAL			**587.52**
					Extra expenditure for Uniform, shoes, ex gratia etc			060.00
					GRAND TOTAL			**647.52**
					Approximately Rs. 7 Crore			

NASHIK MUNCIPAL CORPORATION

Ideal Manpower Requirement as per SFSC Norms for Fire Response and Mitigation

(As per population and Area of operations specified in SFAC Norms)

Sr. No	Name of Post	Grade	Recommended pay Band & Grade Pay (Rs.)	Man power Required	Man power Available	Man power Short fall /Gap	Monthly salary Approx. (Rs.)	Additional Yearly Expenditure (Rs. In Lacks)
1	Chief Fire Officer	I	15600ï 39100 (Grade Pay-7600)	01	01	Nil	40000	N/A
2	Deputy Chief Fire Officer	II	15600-39100(Grade Pay-6600)	02	Nil	02	35000	0008.40
3	Divisional Fire Officer	III	9300ï 34800(Grade Pay- 5400)	05	01	04	33000	0015.84
4	Assistant Divisional Fire Officer	III	9300ï 34800(Grade Pay- 4800)	08	Nil	08	30000	0028.80
5	Station Officer	III	9300ï 34800(Grade Pay- 4400)	22	01	21	25000	0063.00
6	Assistant Station Officer	III	9300ï 34800(Grade Pay- 4200)	24	Nil	24	24000	0069.12
7	Sub Officer	III	5200ï 20200(Grade Pay- 2800)	67	02	65	22000	0171.60
8	Leading Fireman	III	5200ï 0200(Grade Pay- 2400)	132	08	124	20000	0297.60

9	Driver cum Operator	III	5200ï 20200(Grade Pay- 2400)	134	27	107	20000	0256.80
10	Fireman	IV	5200ï 20200(Grade Pay- 1900)	756	126	630	15000	1134.00
11	Superintendent (Admin)	III	9300ï 34800(Grade Pay- 4400)	01	Nil	01	30000	0003.60
12	Assistant superintendent	III	9300ï 34800(Grade Pay- 4200)	01	Nil	01	25000	0003.00
13	Senior Clerk	III	5200ï 20200(Grade Pay- 2800)	03	Nil	03	22000	0007.92
14	Junior Clerk	III	5200ï 20200(Grade Pay- 2400)	09	01	08	20000	0019.20
15	Peon	IV	5200ï 20200(Grade Pay- 1800)	12	03	09	15000	0016.20
					TOTAL			**2095.08**
				Extra expenditure for Uniform, shoes, ex gratia etc				0200.00
					GRAND TOTAL			**2295.08**
					(Rs. in Crores)			**23.00**

Appendix D

NASHIK MUNCIPAL CORPORATION

Recommended Cost Approvals of Equipment Required for FES, Nashik

S.No.	Description	Admissible/ required	Available	Gap	Cost per unit (in Lacs)	Total Cost in Crores	Remarks
1	Water Tender	18	09	09	30	2.7	
2	Mini Water tenders (water Mist Type)	18	-	18	30	5.4	
3	Water Tankers/Bowers (capacity 12/ 16 KL)	06	04	02	30	0.6	
4	Emergency Rescue Van	02	01	01	200	2.0	
5	HAZMAT Van	01	-	01	200	2.0	
6	Foam tender	03	01	02	40	0.8	
7	Aerial Ladder Platform	03	01	02	750	15.0	
8	Turn table Ladder	03	-	03	700	21.0	
9	Control Post van	06	-	06	25	1.5	One per Div
10	B.A. Van	01	-	01	50	0.5	
11	Ambulances	06	-	06	8.5	0.50	
12	Cars/ Jeep	08	01	07	6.0	0.42	
13	HP Portable Pump	18	05	13	7.5	0.97	

14	Light mast	18	02	16	3.0	0.39	
15	Fire Proximity Suits	1100	-	1100	0.40	4.4	
16	B.A. Sets	36	-	36	1.25	0.45	
17	Escape shoots	06	-	06	8.00	0.48	
18	Wireless system with repeaters	01 set	-	01 set	0.10	1.50	20 base stations, 60 mobile and 60 Walkie-talkies and 6 repeater units.
19	Water Mist extinguishers	18	06	12	3.50	0.39	
					Total Rupees in crores	**61.50**	

NASHIK MUNCIPAL CORPORATION

Recommended Cost Approvals of Equipment Required for FES, Nashik

(FOR EXSTING FIVE FIRE STATIONS)

Sr. No.	Description	Admissible/ required	Available	Gap	Cost per unit (in Lacs)	Total Cost in Crores	Remarks
1	Mini Water tenders (water Mist Type)	05	00	05	30	1.50	
2	Emergency / Flood Rescue Van	01	00	01	200	2.00	
3	Aerial Ladder Platform (55 Mtrs.)	03	01	02	750	15.00	
4	Turn table Ladder	03	-	03	700	21.00	
5	Control Post van	01	00	01	25	00.25	
6	Ambulances	06	-	06	8.5	00.50	
7	Cars/ Jeep	04	02	02	6.0	00.12	
8	Light mast	05	02	03	3.0	00.06	
9	Wireless system with repeaters	40 set	15	25 set	0.10	00.50	
					Total Rupees in Crores	**40.93**	

NASHIK MUNCIPAL CORPORATION

SUMMARY

Sr. No.	Description	Cost in Crores	Remarks
01	**Infrastructure Cost** (Land + fire station construction including quarters)	**170.00**	
02	**Equipments Cost**	**061.50**	As per S.F.A.C. Norms
03	**Cost for E-governance for Fire Brigade**	**001.00**	**For computerization, Vehicle tracking system through GPRS**
04	**Additional equipments** required for **existing Five fire Stations**	**040.93**	For existing 5 fire stations
05	Additional manpower cost as per S.F.A.C. Norms **(per annum)**	**023.00**	Extra cost **for total 18 fire station**
06	**Additional manpower cost** for existing Five fire Stations as per S.F.A.C. Norms **(per annum)**	**007.00**	**For existing 5 fire stations**