Chapter 11
Recommendations

11.1. PROTECTION OF ENVIRONMENTAL RESOURCE AREAS

11.1.1 Reserved Forest/Protected Forests

The existing Bharatpur reserved forests within the city are to be protected from land use conversion. These forests also serve as elephant sapphire, popularly known as Chandaka Elephant Sanctuary. Also, the adjoining areas should be planned so as not to affect these areas.

11.1.2 Green Belts & Open Spaces

The green belts and open spaces in the city are not adequate. Extensive plantation is required to be carried out covering the entire city for providing the functions of aesthetics/landscaping, micro-climate control, control of pollution, buffer to sensitive areas such as monuments and sources of pollution including industrial areas and transportation zones and recreation.

Several areas in Bhubaneswar having potential for developing plantation, especially those along the banks of Kuakhai & Daya River, in the industrial areas, along the major roads, bypass roads that are under construction, and railway lines, along drains, within and around monuments and in the institutional areas.

The green belts scheme of Bhubaneswar should include various areas as below interconnected along roads or drains so that one can pass through the city on a cycle or by walk:

- around monuments (Heritage Zone)
- within industrial areas
- within commercial areas (Crafts Centres)
- along major roads
- along major drains

The green belts should be provided along all the major open drains in the city. (ref scheme -----)
11.1.2 Parks /Organised Open spaces

There is a need to look at the possibilities of upgrading the existing parks and gardens and creating more parks and gardens, especially within the residential areas and in their close proximity so as to provide accessibility to nature to the residents. Also, recreational areas are to be created for both residents as well as tourists. The recreational areas for tourists are to be properly planned and provided.

The areas those are lying vacant and can be changes to organized parks are: Saheednagar, Rasulgarh Jayadev Nagar, Behind Kalpana Cinema Hall Junction, In front of B.J.B College. (Arts Block), Neelakantha Nagar, Saheednagar Opposite Plot No.303 & 308, Bargarh Housing Scheme and near over bridge at Jaydev Nagar.

11.1.3 Temples & Monuments

The monuments & temples form an important source of heritage and have a very high tourism potential. However, the spaces within the monuments and outside are to be properly planned so as to ensure their protection and to put to tourism use.

The details of the environmental improvement around the temples and monuments are given in section 11.3.

11.1.4 Water Bodies, Lakes, ponds and natural wetlands

The numerous ponds and lakes have excellent potential to be integrated with tourism, as many important monuments are located along the banks of the river.

The lakes and the drains are being used as dhobighats, vehicle washing, fishing and open defecations. This is leading to growth algal bloom and eutrophication. Also, indiscriminate dumping of garbage, other solid waste materials and construction rubbles has added to the pollution and siltation problems in the lakes.

i. Improving storm water drainage and sewerage system around the lakes.

ii. The wetlands and the natural drains are facing maximum conversion and encroachments. Large-scale construction (especially for housing, roads and slums) is being carried on the drainage area. These natural drains and the wetlands are natural recharge zones and proper study is required before any landuse conversion is done.

iii. The large-scale encroachments of the lakes and ponds are affecting the lakes and the flora fauna thereby, affecting the ecology. The lakes and the wetlands should be protected in the master plan

iv. Thus, it is clearly demonstrated that there has been a large development in locations, which are flood prone and thereby marginally suitable for settlements. The development is going on a fast rate without any proper attention to green zones creation, sewage networking and natural drainage pattern.

11.2 LANDUSE PLANNING & MANAGEMENT FOR ENVIRONMENTAL IMPROVEMENT

11.2.1 Master Plan

The Master Plan of Bhubaneswar is valid upto1968. Having planned development is an important aspect for Bhubaneswar for ensuring tourism and protection of the monuments. The Comprehensive Development Plan, which is under finalization, should ensure that the plan caters to the tourism and heritage aspects of the city and environment. The requirements in this regard are given below:
i. Overall planned development of the city
ii. Well planned and maintained areas in and around monuments, heritage sites and other tourist sites
iii. Well organized areas for manufacture and sale of crafts including its master crafts, silver filigree works, colorful appliqué works, stone images, wood carvings, patta paintings, brassware, horn works, bamboo articles and local textiles and handicrafts and integrating with tourism
iv. Efficient traffic and transportation system including public transportation, good road network, wide roads, pedestrian zones, walkways
v. Clean environment including clean air, safe drinking water
vi. Good surroundings including efficient drainage and sewage system, garbage collection and disposal
vii. Aesthetics – urban design elements such as parks, gardens, fountains
viii. Adequate greens, open spaces and recreational areas
ix. Amenities and facilities within reach
x. Adequate electricity and water supply
xi. Safety from hazards
xii. Lack of ugly scenes within visibility including waste dumps along roads, defecation along railway tracks, badly laid electricity wires/poles, overflowing sewage
xiii. Revival/preservation of cultural and historical heritage
xiv. Improved living conditions including appropriate employment opportunities to the local people compatible to tourism
xv. Banning of incompatible industrial activities, storage and handling of hazardous chemicals not suitable for the city (to its tourism and heritage).

The area requirements for various functions as above, including for sewage, drainage, water harvesting, greening etc. should be earmarked in the Master Plan. The city has been growing in spite of reduced industrial activity. There has also been increasing slum population. The revitalization of the city will lead to more population growth. Hence, there is a need to prepare a regional plan for the entire golden triangle so as to create more growth points in the region.

11.2.2 Activities to be relocated

The following activities are incompatible and are causing environmental problems. These activities need to be shifted.

- Wholesale vegetable godowns at Ashoknagar–Unit– 2 contributing to the problem of traffic congestion, unhygienic conditions in this residential area.

- Wholesale warehousing activities are presently continuing at Unit – II, III, Station Road and at Rasulgarh area.

- The burial ground at Satyanagar.

- The trenching ground located near Khandagiri. The disposal of garbage are also being carried out on the same ground with the proposal for development of a residential colony at Aiginia.

- The location of the slaughter House near Kalpana Cinema in Badagada is till operational. Also, the new slaughterhouse at Gadaa Gopinath Prasad needs to be upgraded and proper solid waste and drainage facility needs to be provided.

- There are a number of poultry farms, the more important among them being Central Poultry Farm of veterinary College, Siripur, Adivasipadia in Unit-I and at Laxmisagar.
Due to the OMFED Milk plan a number of gowalas are functioning on the available vacant space leading to unhealthy and in sanitary conditions. It would be desirable to shift these gowals to some identified location at the outskirts of the city and organized them through OMFED to ensure preservation and marketing of milk.

The land available from shifting of these activities should be used for developing into a “Crafts Centre” for developing manufacturing & sale activities related to local skills including its master crafts, silver filigree works, colorful appliqué works, stone images, wood carvings, patta paintings, brassware, horn works, bamboo articles and local textiles and handicrafts and organizing areas with pedestrian zones so as to attract tourists. This will help provide employment opportunity to the locally available skilled men and also act as one of the major economic activities. While designing these areas for the new activity, the following must be considered:

i. Greening up to 60% of the area and providing green belt and landscaping, wherever possible
ii. Improving traffic & transportation system including widening/improving of roads, pedestrian zones, parking facilities, signage, street furniture, traffic management etc.
iii. Urban renewal measures including removal of encroachments, installing urban design elements with appropriate streetlights, fountains, sculptures etc.
iv. Improving storm water drainage and sewerage system
v. Usage of non-conventional energy and eco-friendly materials for construction purposes

The restrictions on size of the industry/manufacturing unit apply as in 11.2.3 (i) & (ii).

11.2.3 Activities to be restricted

i. No new industry using more than 5 KW power or having more than 20 workers should be permitted in the areas other than the designated industrial areas (in the Master Plan). The existing industries not complying with this should be identified and actions initiated for shifting them to designated areas in about 2 years span. In case of other industries too that may or are likely to cause pollution also should not be allowed in areas other the designated industrial areas.

ii. No industry, operation or process with more than or equal to 1 KW power or more than 5 workers (that may or is likely to cause pollution) should be allowed in the residential areas. For the Small Scale Service and Business (industry related) Enterprises (SSSBEs), that are essentially required within the residential areas, areas should be designated within or close proximity to residential areas and should be allowed only in such areas. The list of recognized SSSBEs is given in Annexure II.

iii. Usage of furnace oil, coal, coke or any other solid fuel should be discouraged for industrial and commercial purposes. For industrial or commercial uses, only clean fuels may be considered.

iv. Fresh registration of two-stroke vehicles viz. motorcycles, scooters, 3wheelers should be restricted in Bhubaneswar.

v. Taxis and commercial vehicles older than 7 years should be banned in Bhubaneswar.

11.3. Area-wide improvement

11.3.1 Ekamrasheshtra

The monuments & temples form an important source of heritage and have a very high tourism potential. However, the spaces within the monuments and outside are to be properly planned so as to ensure their protection and to put to tourism use. The entire
temple complexes concentrate in the old city of Bhubaneswar. Historically, this old city is regarded as the Ekamrasheshta.

The Ekamrasheshta or the old temple town featured by conglomeration of temples, monuments, mandaps, heritage ponds etc., is bounded by Puri Road on the South/ South-East, railway line on the North/North-West and the low-lying land on the south side comprising Kapliprasad, Bhubaneswar, Goutam Nagar & Rajrani, Open space, Lakes and Ponds.

For achieving environmental improvement of Ekamrasheshta the following actions are needed:

i. Providing green belt and landscaping in the existing open spaces, around each of the monuments, along the roads etc., wherever possible.

ii. Improving traffic & transportation system including widening/improving of roads, pedestrian zones, parking facilities, signage, street furniture, traffic management etc.

iii. Urban renewal measures including removal of encroachments, installing urban design elements with appropriate streetlights, fountains, sculptures etc.

iv. Improving storm water drainage and sewerage system.

Also as most of the temples and the structures in the Ekamrasheshta or the old temple town are of the Archeological sites and are of national significance, any kind of interference with the temples, monuments and archeological sites has to be in consonance with the Ancient Monuments and Archeological Remains Act 1958.

The Ancient Monuments and Archeological Sites & Remains Act 1958 and rules 1959, 1992 states that:

- 100 m around the protected area is declared as ‘prohibited area’ where no new construction is allowed.

- 200 m of the prohibited area is declared as ‘regulated area’ where construction activities are regulated by controlling height of new construction.

The schematic details of the environmental improvement around the temples and monuments are given below. However, before giving these schematic diagrams into any physical shape a Detailed project reports (DPRs) for each of the acceptable developments or projects, decided based on preliminary proposals, should be prepared including project details, layout plans, designs and drawings, item-wise cost estimates, anticipated environmental improvement etc.

taking into consideration the rivers/water bodies/drains behaviour, historical character of the area including environmental aspects, land availability & land use assessment should be
made and vetted and approved by the concerned departments and authorities and should regulated by the Ancient Monuments and Archeological Sites & Remains Act 1958 and rules 1959, 1992.
11.3.2 Industrial Areas

Existing Situation around the Temples

- Uncontrolled slum development
- Improper access route
- Degradation of Temple ponds
- Obstructing visual linkage to the temple

Proposed Development

- Caring for the regional architectural style in design of new elements / spaces
- Development of pathways for easier access
- Revitalization of ponds
- Landscaping around the temple complex
Existing Scenario of Temple Complex

- Lack of organized landscaping
- Improper connection ways between various parts of Temple Complex

Proposed Development

- Improving linkage between various parts of temple complex
- Development of artificial pond
- Landscaping along the access way
The existing industrial areas at Chandraka, Rasulgarh, Bhaganwanpur and Mancheswar need to be improved. The improvements should include:

- Enhancing access to the tank
- Improvement of infrastructure facilities
- Development of pathway around the tank
- Development of kiosks
- Creation of recreational spaces
- Revitalization of Bindu Sagar Tank
- Landscaping around the Temple & Tank
Section of the Open Air Theatre along AA'

Plan of recreational space near Lingaraja Temple
Archways acting as entry to open space

Open space could be utilized for multipurpose activities by visitors

Paved pathways with trees & planter beds all around the open space

View of Open Space

Gazebo acting as resting area

Paved pathways with planter beds all around

View of Area near Gazebos
11.3.2 Industrial Areas

The area wide improvement should be taken up on priority in the Chandraka and Mancheswar Industrial Area.

i. Suitable plantation and greenbelt within and around each of the industrial areas to the extent possible;
ii. Providing of storm water drainage and sewerage system;
iii. Solid waste management; and
iv. Traffic & transportation system.

11.4. Road Network

11.4.1 Inter-City Traffic:

A network of new roads is proposed, including bypass roads as shown in the figure 11.2. The roads for through traffic include:

**Northern Bypass**

Widening of the road Chandaka to Gopalpur to serve as bye-pass for the inter city traffic.

**Eastern By Pass**

Construction of the existing unmetaled embankment to the road can serve as bye pass for traffic coming from Kolkata to Puri. This will also reduce the traffic load carrying sand from the mine areas the completion of the bridge over Kuakhai will increase the traffic movement.

**Southern By Pass**

Diversion of the traffic from the Baramunda Bus Stand through Ravi talks square will prevent the traffic passing through the city. This requires widening of the roads and a overbridge at Poonama gate. Southern Bypass for the through traffic from NH-203 to NH-5. Traffic from Puri shall divert from NH-203 (Samantaraypur) to meet NH-5 at Aiginia.

While planning these roads and future roads the following must be ensured:
- All new bypass roads should have 4 lanes with road dividers (2 lane each) with a green belt of atleast 50 m (preferably 100 m) on either side. No road links should made to these bypass roads within 3 km of one another. Parallel service roads should be made for the adjoining development. This is essential to prevent usage of bypass roads as service roads or internal roads.
- All new major roads proposed in the new Master Plan should have 50 m green belt with cycle ways.

11.4.2 Intra-City Traffic:

The roads for improving internal movement include:

i. There is no public transportation system. A ring road is proposed passing through the route is shown in fig 10.1. The town buses should pass from NH-5 at Achrya Vihar SQ to Gift Press to Baramunda SQ, Sirpur through Bapuji Nagar, Jayadeva Vihar to Acharya Vihar. SQ. Also, town busses on feeder routes passing through the old bus stand in Unit II, railway station and Puri Bus stand and touching inner ring road at suitable places may also run.

ii. Intersections at at Rasulgarh square (SQ), Vani Vihar SQ, Achrya Vihar SQ, CRP SQ, Khandagiri SQ, Fire Station, SQ, Raj Mahal SQ, Punamagate, Ravi talkies, Kalpana SQ and the Master Canteen.

iii. Road stretches from Vani Vihar SQ ↔ Rupali SQ ↔ Ram Mandir SQ ↔ Master Canteen SQ ↔ Rajmahal SQ Acharya Vihar SQ ↔ HUDCO SQ ↔ PMG SQ ↔ AG SQ ↔ Hospital SQ Rasulgarh SQ ↔ Bomikhal SQ ↔ Jharpada SQ ↔ Kalpana SQ ↔ Museum SQ

11.5. POPULATION

The city has been growing in spite of reduced industrial activity. There has also been increasing slum population. The revitalization of the city with improved environment and increased tourism activities will lead to more population growth. Hence, there is a need to prepare a regional plan for the golden triangle so as to create more growth points in the region.

The increased tourism activities will provide employment opportunities to the local people including the skilled men in stone inlay, appliqué, zari making etc. and in the service sector to considerable slum population.

Slums

Slum Population is 30% of total city population and is distributed throughout the city. Most of the slums of the city are located on unutilized Government land/ Railway land.

The slums are usually devoid of services, prone to all types of natural hazards, have poor living conditions and hence can pose severe environmental problems, including health risks. They have also spread all around the temple areas, which are devoid of development by the local bodies.
In addition to the sprawl of slums all along the railway line these areas have become dumping grounds for solid waste, creating unhygienic living conditions and giving an ugly image of the city.

The following features can come up in the slum areas:

- Relocating the slums, which are causing severe threat to the environment of the locality, else taking up slum-improvement, site & services program.
- Preventing dumping of solid waste along the railway track.
- Providing for low height retaining wall all along the railway line with creepers passing over it.

![Existing Situation along the Railway Track](image)

![Proposed Development](image)
• Creating buffer zones along the railway track in form of parks comprising of cycling and pedestrian tracks.

• Taking up area wide developmental works around the temple complexes.

11.5 ECONOMIC ACTIVITY

11.5.1. Industry:

1. The industries of red category as given in Annexure I should be restricted from Bhubaneswar.

2. No new industry using more than 5 KW power or having more than 20 workers should be permitted in the areas other than the designated industrial areas (in the Master Plan). The existing such industries should be shifted in 2 years span. Also, in case of other industries that may or are likely pollution also should not be allowed in areas other the designated industrial areas.

3. No industry, operation or process with more than or equal to 1 KW power or more than 5 workers (that may or is likely to cause pollution) should be allowed in the residential areas. For the small scale service an business (industry related) enterprises (SSSBEs), that are essentially required within the residential areas, areas should be designated within or close proximity to residential areas and should be allowed only in such areas. The list of recognized SSSBEs is given in Annexure XII.

4. No new industrial area should be designated within 15 km of Ekamrasheshtra.

5. No industry, operation or process with more than or equal to 1 KW power or more than 5 workers (that may or is likely to cause pollution) should be allowed in the residential areas. For the small scale service an business (industry related) enterprises (SSSBEs), that are essentially required within the residential areas, areas should be designated within or close proximity to residential areas and should be allowed only in such areas. The list of recognized SSSBEs is given in Annexure XII.

11.5.2. Tourism:

The proposed activities for tourism improvement include:

a. Preparing an integrated tourism plan for Bhubaneswar, together with the neighboring areas, viz. Konark and Puri have very high potential to attract more tourists, both local and international. These areas need to be connected with proper roads (4 lanes with 50 m greenbelt) and infrastructure provided in all these areas so as to attract more tourists and facilitate their longer stay and to distribute the tourist load on Agra.

b. Develop Ekamresheshta and Crafts Centre as proposed above.

c. Develop road network, green belts as proposed above.

d. Improve environment through the proposed solutions including Ekamresheshta, sewerage system, air pollution control, water pollution control etc.,

11.5.3 Trade & Commerce:

Shift wholesale markets at Ashoknagar—Unit— 2 and the wholesale warehousing activities are presently continuing at Unit – II, III, Station Road and at Rasulgarh area. Ifrom the heart of the city, as proposed above and develop Crafts Centres. A layout plan and the schematic diagram showing the area wide improvement of the existing markets are given below.

The following features can come up in the market areas:

☑ The spaces need to be organized.
It would be advisable to pedestrianize the whole market areas and provide bollards to restrict the entry of vehicles including 2 wheelers into the markets.

Provide for elements, which can enhance the character of the space and give a feeling of openness.

Providing for collection niches wherein the collection of garbage is done so that it is easy to maintain the whole space. Open drains would be provided with grated covers to rain of surface run off and wastewater.

However, before giving these schematic diagrams into any physical shape a Detailed project reports (DPRs) for each of the acceptable developments or projects, decided based on preliminary proposals, should be prepared including project details, layout plans, designs and drawings, item-wise cost estimates, anticipated environmental improvement etc. taking into consideration the rivers/water bodies/drains behaviour, historical character of the area including environmental aspects, land availability & land use assessment should be made and vetted and approved by the concerned departments and authorities.
Existing Scenario of the Main Commercial Street

Proposed Improvement
**Existing Scenario of Commercial / Residential Area**

- Improper Signage System
- Haphazard layout of Service Lines
- No proper demarcation for pedestrian & Vehicular movement
- Congestion due to on street parking
- Encroachment by informal outlets

**Proposed Improvement**

- Provision of proper space for signage
- Provision of off-street parking
- Provision for underground cabling
- Pedestrian pathways along both sides of the road
11.6 INFRASTRUCTURE

11.6.1 Roads

i) Construct/widen roads as proposed above in the section 11.4

ii) Shift the bus terminals (3 nos) (Old Bus Stand, Puri Bus Stand).

11.6.2 Water Supply:

i. The piped network should be improved for reducing water transmission losses. The rusted pipes are leading to iron content on the receiving end. Such pipes are to be identified and replaced.

ii. The source of water supply is Kukahai, which has Patia drain 500m upstream. There should be sewage treatment plant at the outfall of the Patia drain. The water treatment plant needs to be of state-of-the art with automated controls for treatment and controlling quality. It is advisable to find an alternate source of water supply either through water harvesting or recharging bed or from another source.

iii. The wells/pumps used by individuals are to be checked for water quality and instructions issued for stopping the use if the water is found unfit.

iv. Water harvesting facility should be installed in all the major institutional areas, green belt areas and monument areas.

11.6.3 Parking

The areas at Raj Mahal Chawk up to A. G. Crossing, Janpath, Sahidnagar market, the Unit IV Market and Unit I market, Pandit Jawaharlal Nehru Marg, Cuttack-Puri Road from Satyanagar Level Crossing to Kalpana Square, Old Town Vegetable market, D.A.V. School, Stewart School, Central School and Rama Devi College, Swasti Hotel, Bapuji Nagar severely facing parking problems.

11.6.4. Sewerage:

i. The entire city needs to be sewered for 100% satisfaction on priority. The trunk sewer could be aligned along the existing drains and eventually branch sewers laid. Trunk sewers should be laid along the drains to collect sewage and then discharge to a trunk sewer to be aligned along the major drains.

ii. The storm water drains should not be used as sewers. Considerable amount of land in Bhubaneswar is well drained. The storm water drains should be constructed and should be of appropriate design so that the garbage/solid waste is not thrown into it and also it does not take along the solid waste during rains.

iii. The sewer system should be as far as possible put under the ground. Especially along the monuments, tanks it might come to visual conflicts between the sewer and tourist attractions like the monuments or riverside promenades. It should follow as far as possible the natural slope to minimize technical structures and the expenses for maintenance. Certain areas (see 2.5.4), for example with industry or trade might require special techniques for sewage treatment.

11.6.5. Housing:

The following housing areas need improvement on priority with better roads, sewers, garbage collection, drainage system, and greening:

i. Sikharachandi, Patia Hadi Sahi, Patia Bhoi Sahi, Radhakrushna Lane (Near Patia), Rasulgarh Bhoi Sahi, Sabarsahi, Sameigadia, Chakeisiani Tangi Sahi, Pandara, Brahmeswar Patna Bhoi Sahi, Jambeswar Patna (Behera Sahi and Bharati Matha Bhoi Sahi), Kapilaprasad Bhoi Sahi,
Nuagaon Khuruda Sahi, Nuagaon Jena Sahi, Kapileswar Bhoi Sahi, Nuagaon Upper Sahi, Pokhariiput Bhoi Sahi, Jadupur (A & B), Jadupur Begumia, Puruna Sahi, Odia Sahi, Aiginia Bhoi Sahi, Dumuduma Raghunath Nagar and Bhoi Sahi

ii. Very old and congested residential areas where most of the houses are in the state of dilapidation, congested roads, poor ventilation, mixed use with commercial activity etc. and very new housing localities with no basic infrastructure, the developing areas around the village settlements within the city boundary include IRC Village, N2, N3, Bargarh Brit, Nageswar Tangi, VSS Nagar, Bargarh, Laxmisagar, Old Town, Bomikhal, Rasulgarh, Cuttack Road.

11.7. AIR POLLUTION

11.7.1. Stone Crushers

Stone crushers are the major contributors PM about 1869 T/Day of PM are generated each day. The stone crushers should be shifted out and relocated sufficiently away from the Bhubaneswar Development Area. The proposed Chhatabar Site to be developed for the stone crushers unit should have proper environmental improvements. The improvements should include:

- Modern State of art Dust control System. A separate study should be done the design of the dust containment and dust suppression systems from the stone crushers
- Efficient traffic and transportation system with facilities for parking, loading and unloading of the stones and the products.
- A suitable greenbelt around each of the clusters to the extent possible;
- Greening upto 25% of the total area;
- Solid waste management; and
- Traffic & transportation system.

11.7.2. Brick Kilns

The brick kilns are established mainly in the low line areas of the Kuakhai River and Daya. They are catering to the requirements of Bhubaneswar City. Presently about 45 of them are operating within the city having no pollution control device

The major pollutants from this sector are SPM & NOx. The quantity of SPM generated is about 398 T/Day and NOx of 19 T/Day. By stopping the uses of coal and adopting natural gas can bring down the air pollution load considerably.

The brick kilns should have efficient traffic and transportation system with facilities for parking, loading and unloading of the bricks. A suitable greenbelt around each of the brick kilns to the extent possible.

11.7.3 Industries

Further siting of polluting industries as at Annexure I should be restricted in the city. For siting of industrial areas and industries, suggestion made in the above Sections should be followed.

11.7.4 Domestic

The source of this emission is coal, coke, firewood, cow dung used by the households, mainly the slum population and the roadside eateries, for cooking purposes. LPG should be made available to the slum dwellers and usage of biomass by eateries and commercial establishments should be banned.

The slums to be taken up on priority include areas adjoining Sikharachandi, Patia Hadi Sahi, Patia Bhoi Sahi, Radhakrushna Lane (Near Patia), Rasulgarh Bhoi Sahi, Sabarsahi, Sameigadia, Chakeisiani Tangi Sahi, Pandara, Brahmeswar Patna, Bhoi Sahi, Jambeswar Patna (Behera Sahi and Bharati Matha Bhoi Sahi), Kapilaprasad Bhoi Sahi, Nuagaon Khuruda Sahi, Nuagaon Jena Sahi,
11.7.5 Vehicular

The pollution load from vehicles in Bhubaneswar includes 0.63 t/d of PM, 0.35 t/d of SO2, 3.67 t/d of NOx, 4.35 t/d of HC and 7.21 t/d of CO. The CO emission from vehicles is very high. The major contributors are three wheelers followed by two wheelers and trucks.

For vehicular pollution control the suggestions covering the followed already made in the other Sections of this report should be taken up:

- Construction/widening of roads for inter city and intracity traffic;
- Improved traffic and transportation system in Heritage Zone, Crafts centers, and other existing industrial areas;
- Shifting of bus terminals form the core city;
- Phasing out of commercial vehicles older than 7 years;
- Stopping registration of 2-stroke motor cycles, scooters and 3-wheelers;
- Parking facilities;
- Shifting of markets;
- Pedestrian zones, cycle ways in Ekamrashehra

To cope up with restriction on registration of vehicles and banning of old vehicles, battery operated 3 wheelers, mini-four wheelers, and fleets (for private ownership, one fleet is 100 buses or multiples thereof) public transport buses should be introduced. Also, a pre-feasibility report for introducing MRTS in Bhubaneswar should be prepared. This city cannot survive only on road transport.

The areas needing respite from the above solutions include congested stretches in Bhubaneswar include intersections at Rasulgarh square (SQ), Vani Vihar SQ, Acharya Vihar SQ, CRP SQ, Khandagiri SQ, Fire Station, SQ, Raj Mahal SQ, Punamagate, Ravi talkies, Kalpana SQ and the Master Canteen at Vani Vihar SQ ↔ Rupali SQ ↔ Ram Mandir SQ ↔ Master Canteen SQ ↔ Rajmahal SQ, Acharya Vihar SQ ↔ HUDCO SQ ↔ PMG SQ ↔ AG SQ ↔ Hospital SQ Rasulgarh SQ ↔ Bomikhal SQ ↔ Jharpada SQ ↔ Kalpana SQ ↔ Museum SQ

11.7.6 DG Sets

i. The usage of fuels other than 0.05%S for DG Sets should be banned in the city.

ii. Infrastructure for transmission and supply of electricity should be augmented so that there is uninterrupted power supply.

The major areas of impact due to emissions from DG sets include Nayapalli, Chandrasekharpur, Sahid Nagar, Bapujee Nagar, Old Town, Unit – IX, CRP Square, Ashok Nagar, Vani Vihar, PMG Square, Power House Junction.

11.8 SOLID WASTE

For municipal solid waste management, following actions are needed:

- The vehicles (nearly 20) including tractors, tippers, loaders etc. that are presently not in working condition needs to be repaired. If required, the workshop facilities should be upgraded.
- The number of vehicles for collection and transportation (tractors, tippers, loaders and refuse collectors) should be doubled form the existing 44 to about 90.
- Mechanisms for ensuring proper and regular collection of garbage including:
  - Residential societies to ensure collection and disposal to the collection centers;
- Private micro-enterprise formed by economically weaker section people in need of job, to be brought in commercial and institutional areas;
- Adequate collection bins to be placed within reach of the colonies, institutional and commercial areas;
- Frequency of collection and disposal to be improved through additional vehicles;
- Waste disposal site to be identified based on EIA.

11.9 WATER POLLUTION

The suggestions regarding sewerage, drainage and water supply are made in Infrastructure Section.

11.9.1 Lakes, Tanks & Ponds

i. There should be complete check of the municipal sewage entry into the ponds and lakes. Complete drainage of the existing water, desilting and cleansing of bottom debris and filling the tanks with fresh water.

ii. Arrangement for regular flushing of fresh water in temple ponds with provision of outlet.

iii. Arrangement should be made to provide Sulabha Souchalaya in the vicinity of these ponds preferable on all sides and connecting those with main sewer.

iv. Strict control on throwing of ritual offerings which include rice milks, sugar and candy, flowers etc into the ponds.

v. Attempts should be made to clear the algal bloom preferable by mechanical means, by use of suitable algaecide and by introducing suitable fish varieties that are capable of scavenging biological, organic and inorganic loads of the ponds.

vi. Repair of damaged walls and steps, filling water in the tank (de-silting of tanks if required), outlet channel renovation and dewatering arrangement and taking adequate measures to maintain the quality of water including improvement of surrounding areas;

vii. To develop the area to demonstrate the area wide environment improvement so as to promote tourist activities for revenue generation to the municipality, create employment opportunities through tourism and commercial activities and encourage use of environment friendly materials and technology.

11.9.2 Storm Water Drain/Open Drains

i. The storm water drains should not be used as sewers. The drains should be tapped through trunk sewers and treated at downstream of Daya river. Branch sewers should be laid connecting these trunk sewers.

ii. The drains can be developed into recreational zones by providing pathways and landscaping along their banks. At some stretches they are wide enough so that they could be widened and developed as ground water recharge areas or stagnant water pools.
iii. All the major drains (9 in number) can be supplemented by water harvesting or alternative treatment measures, to extent the function of the systems. (as shown in fig above). All new structures, like houses, roads, walk ways, etc. need either be connected to this system or designed to relieve by active or passive water harvesting (see above).

Before giving the above schematic diagrams into any physical shape a Detailed project reports (DPRs) for each of the acceptable developments or projects, decided based on preliminary proposals, should be prepared including project details, layout plans, designs and drawings, item-wise cost estimates, anticipated environmental improvement etc. taking into consideration the rivers/water bodies/drains behavior, historical character of the area including environmental aspects, land availability & land use assessment should be made and vetted and approved by the concerned departments and authorities.