



EXECUTIVE SUMMARY

The summary of the EIA report has been presented in this chapter along with conclusions.

1. Introduction

Strategically located en-route from North India to Kandla and Mundra Ports, the proposed Halol-Savli SIR development is one such industrial regions, presenting the potential of intensively capitalizing on the development associated with the ongoing Dedicated Freight Corridor (DFC) and Delhi Mumbai Industrial Corridor (DMIC), the Free Trade Zone at Kandla Port and all related major infrastructure – roads, electricity, transport networks, water, etc. that will accompany these developments. Developing Halol-Savli as a Special Investment Region supports the Government of Gujarat's vision of developing the state as a global industrial and trade hub with world-class amenities and infrastructure.

Thus, in line with the above vision, policy and action plan of the state government, *Gujarat Industrial Development Corporation (GIDC)* has embarked upon to develop Halol-Savali industrial region into a Special Investment Region with world class infrastructure.

2. Project Description

GoG through its Industrial Development Corporation proposes to develop Halol-Savali Special Investment Region covering an area of 12297.7 ha in Halol & Kalol talukas and Savli taluka of Panchmahals and Vadodra districts respectively in the State of Gujarat, proposing mainly for Automobile and Engineering industries with modern infrastructure facilities.

Fully grown SIR with world class facilities in all respects would attract global corporate giants and certainly would lead to economic growth, social integration and environmental sustainability of the region in particular and the country in general.

In the proposed SIR there are two existing IE's namely Halol and Savli of GIDC located in two parts of SIR. Halol and Savli IE's are established in 1982 & 1992 respectively. Existing industries consist of mainly Auto & light engineering. General Motor is one of the major players in Halol delineated area. Proposed development of SIR includes Engineering zone, Light Engineering Zone, Service and Ancillary Industry Zone, Agro and Food Processing Zone, Non- Polluting Industrial zone in the category of industrial activity, Residential Zone, Gamtal Buffer Zone (village extension area), Central Business District (CBD) Zone, Commercial Zone, Institutional Zone, Recreational Zone, Eco Zone, Agricultural Zone, Eco Park, Logistic Park together with Amenities and Utilities Zone in the category of non-industrial activity.

These existing estates have water supply facilities from Narmada main canal for Halol IE with tapping point at Khakharia near Chandrapura village since 9th June, 2007 and Savli IE from Mahi River with tapping point at Parthanpura. The Mahi house has 18 MLD capacity with current demand being 5 MLD.



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There is a 220 KV power station and 220 KV power line passing through the delineated Halol site while there is a 132 KV substation and power line at Savli delineated industrial area. Apart from the 220 KV line there are two 66 KV substations in proposed Halol site. There is a continuous 3-phase, power supply in the region. Within the delineated site, 11 KV substations are in operation in the selected villages.

The region has sufficient amount of power availability. Even for agricultural use, 8 hour power supply is provided without any disruption. All the 66 KV substations are proposed to be interlinked to maintain the uninterrupted power supply.

Expected Power demand for proposed SIR would be 1190 MW (with assumption of 150 KW/ha.)

There is a Piped Natural Gas distribution line passing through the proposed Halol-Savli SIR, a tremendous advantage to the bulk consumers. The gas connectivity is laid and maintained by GSPC (Gujarat State Petroleum Corporation). There are many tapping points within the proposed SIR for provision of gas supply to industries.

This proposed SIR has a good Air connectivity. Domestic airport at Vadodara is at a distance of 35 km and Ahmedabad International Airport is at a distance of 135 km from the proposed HSSIR. Vadodara to Godhra route BG Railway line is passing adjacent to Savli delineated area and is about 1.5 to 2 km from Halol delineated area. The major seaports to this site are Dahej Cargo Port at a distance of 185 km, Dholera at a distance of 150 km and JNPT (Mumbai) at a distance of 450 km. Connectivity to the above seaports is possible through the Freight Corridor route and other road networks. Besides, it has very good network of roads, NH-8 from Delhi to Mumbai runs at a distance of 35 km from the Halol delineated area and 8 km from Savli delineated area connecting the SIR with major cities like Vadodara and Ahmedabad. The Halol and Savli sites are connected through a triangular mesh of state highways. The State Highways SH 87 connects Vadodara & Halol, SH 150 connects Halol & Savli and SH 158 connects Savli & Vadodara. The SH 158 is being 4-laned till the Savli GIDC Estate.

3. Description of the Environment

The Halol delineated area of the project falls in Panchmahal district in Southern Gujarat. The average elevation of project site is 99 m above MSL with maximum 115m and minimum of 70m with slope towards N&NW. The natural gradient of project area is towards Karad River which is on northern side of SIR and is a tributary of Mahi River.

The Savli delineated area is located at a distance of about 15 km from Vadodara city. The slope in Savli area is towards West, with Maximum elevation is 50m and Minimum elevation is 40m above MSL. Mahi River lies on western side of Savli site and is flowing from North to South.

Both Halol and Savli delineated areas fall in Zone III of seismic zoning classification, which is considered as moderate stable zone. The soil mainly is brown and black in color comprising of



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sandy-clay-loam texture. The pH value, porosity, moisture content etc., in the study area show moderate to low productivity

The mean annual rainfall in this area is 850-950 mm. The temperature in the area varies widely. The average of maximum temperature is 45°C, while the average minimum temperature is 12°C. It may be observed that Predominant wind direction is from W, NW and N at Savli. In Halol predominant wind direction is from NE in December and January, NW in February, March and April. In summer, monsoon and post monsoon months SW is the most dominant wind direction.

It was observed that the temperature at the proposed site during the study period ranged from 21.2°C to 44.2°C, while the relative humidity ranged from 23% to 96%.

Predominant winds from SW direction, followed by West and NW of the total time, the clam conditions were observed for 8.70% of the total time during study period. Average wind speed recorded is 3.6 to 5.7 m/sec.

The ambient air quality at 8 stations in the study area was carried out for one non-monsoon season i.e., March-May 2012 for PM₁₀, PM_{2.5}, SO₂, NO_x and CO as per CPCB/MoEF guidelines. Average, Minimum, Maximum and 98%tile values of above parameters are presented in **Table-1**.



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Table-1: Summary of Ambient air quality results

Location Code	Location Name	PM ₁₀ (µg/m ³)				PM _{2.5} (µg/m ³)				SO ₂ (µg/m ³)				NO _x (µg/m ³)				CO (mg/m ³)		
		Min	Max	Avg.	98 %tile	Min	Max	Avg	98 %tile	Min	Max	Avg	98 %tile	Min	Max	Avg	98 %tile	Min	Max	Avg
Halol																				
	Dunia village																			
A1	(Base station)	52	90	74.8	90.0	22	55	40.5	55	7.9	14.7	10.5	13.7	14.6	22.1	18.2	21.9	1	1	1.0
A2	Fatepura village	35	91	62.8	90.1	28	52	37.4	49.2	7.4	16	10.5	15.4	13.9	24.2	17.4	23.8	1	1.1	1.1
A3	Ranipura village	65	95	82.5	94.7	25	52	39.4	51.6	5.5	11.2	8.7	10.7	10.3	15.6	13	15.3	1	1	1.0
A4	Halol Town	52	99	72.8	95.4	34.8	52	40.7	49.8	8	17	12.4	16.3	16.2	31.6	24.9	31	1	1	1.0
Savli																				
	Near Zumkal village																			
A5	(Base station)	56	92	76.7	90.6	25	57	41.5	55.6	7.8	16.6	11	15.2	14	24.9	17.7	23.6	1	1.2	1.1
A6	Sokhada village	31	91	52.4	87.3	15.6	54	30.2	51.2	7.4	16	10.1	15.2	7	13.3	9.7	13.1	1	1.1	1.0
A7	Chandranagar	65	96	83.5	95.6	25	54	39.7	52.6	8.6	13.8	10.4	13.5	10.3	23.2	14.3	20.9	1	1	1.0
A8	Tundav village	43.7	92	70.1	89.8	25.6	52	39.9	51.5	8	17.5	12.7	17.2	16	35.6	25.5	34.2	1	1	1.0
<i>NAAQ standards for Industrial, Residential, Rural & Other areas</i>				100			60				80				80				2.0	

Avg. 24hr



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Average Maximum value of PM_{10} is observed in Chandranagar ($83.5\mu\text{g}/\text{m}^3$) and Ranipura ($82.5\mu\text{g}/\text{m}^3$) villages which are in leeward direction of core areas of Savli (Zumkal) and Halol (Dunia) delineated areas. Average Minimum value of PM_{10} is observed in Sokhada ($52.4\mu\text{g}/\text{m}^3$) & Fatepura ($62.8\mu\text{g}/\text{m}^3$) villages which are in windward direction of core areas of Savli (Zumkal) and Halol (Dunia) delineated areas respectively

Average Maximum value of $PM_{2.5}$ is observed in Zumkal village ($41.5\mu\text{g}/\text{m}^3$) and Halol town ($40.7\mu\text{g}/\text{m}^3$) which are in core and crosswind direction. Average Minimum value of $PM_{2.5}$ is observed in Sokhada ($30.2\mu\text{g}/\text{m}^3$) & Fatepura ($37.4\mu\text{g}/\text{m}^3$) villages which are in windward direction of core areas of Savli (Zumkal) and Halol (Dunia) delineated areas respectively.

However, these values are within the prescribed national standards for Industrial, Residential, Rural and Other Areas prescribed by CPCB/MoEF. Similarly average Maximum & Minimum values of SO_2 , NO_x & CO are well within the national ambient air quality standards.

Noise levels were monitored at representative 8 locations in the study area covering residential and industrial zones as per guidelines of CPCB/ MoEF using Sound pressure level meter. These results were compared with the standards. The day time noise levels at Dunia village (Base station) is 48.3 dB(A) and at Zumkal village (Base station) is 64.0 dB(A) (industrial) and at all other locations were observed to be well within the prescribed limit of 55 dB (A) for residential and 75 dB (A) for industrial. The night time noise levels at all locations were observed to be on lower side as compared to prescribed limit of 45 dB (A) for residential and 70 dB (A) for industrial.

Mahi is the major river at a distance of 19 km from existing Savli Industrial Estate and lies on western side of Savli delineated area, flowing from north to south. Karad river flows from east to west and lies north of the SIR, which is a tributary to Mahi river. The Narmada main canal is passing along the western edge of the proposed Halol delineated area. Grab samples were collected at u/s and d/s with reference to this project of these rivers and canal and analyzed in accordance with the standard methods and procedures. Five Ground water samples were collected and analyzed at important locations of study area.

The pH value of the surface water was observed to be neutral to slightly alkaline in nature. Dissolved Oxygen observed at upstream and downstream of both the rivers and the canal was varied between 3.8 to 4.2 mg/L and falls in category C & D for designated best uses such as Drink water source with conventional treatment followed by disinfection and Propagation of wildlife, fisheries as per CPCB's categorization. BOD varied between 3 to 4 mg/L in both rivers, where as in Narmada main canal it was 3 and 8 mg/L up and down stream respectively. Other parameters were found within acceptable limits.

The pH value of the ground water was observed to be neutral and all other parameters were found within permissible limits for potable purpose.



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Flora in Halol study area consist of *Emblica officinaallis* (Amla), *Tamarindus indica* (Amli), *Acacia leucophloea* (Aniya), *Ailanthu excelsa* (Arduo), *Elacodendron glacucun* (Aslan), *Morinda tinctoria* (Aledi), *Magnifera indica* (Ambedo), *Dalbergia siso* (Sisoo), *Dalbergia latifolia* (Sisam) etc., in trees, *Cuscutta reflexa* (Amarvel), *Demia extensa* (Dodi), *celastrus paniculata* (Malkakani) etc., in climber, *Ahatoda vauca* (Adusa), *Datura inoxia* (Dhatura), *Caia tora* (puwad) etc., in shurbs and herbs, *Sorghum halepense* (Baru), *Bambua arundinacea* (katas amboo) etc., in Grasses to name a few.

Fauna in Halol study area consist of *Muntiac muntjak* (Barking dear), *Hyaena hyaena* (Hyaena), *Felias chaus* (Jungle cat) etc., in wild animal, *Dicrurus adimills* *Becstenin* (Black Drongo, King crow), *Oriolus xanthorns-Linnaeus* (Black headed Oriole) etc., in birds, *Cyprimus Carpio* (Common crap), *Wallago Attu* (Fresh water Shark), *Catla* (Catla) etc., in fishes, *Naja naja* (Cobra), *Bungarus caeruleus* (Common krait), *Natrix piscator* (Checkered keel black), *Plyas mucosus* (rat snake) etc., in snakes to name a few.

Flora in Savli study area consists of *Tectona grandis* (Teak), *Tamarindus indica* (Imli), *Emblica officinaallis* (Amla) etc., in trees to name a few

Fauna in Savli study area consists of *Presbytis entellus* (common langur), *Rattu species* (Rats), *Herpestes Edwards* (Mongoose) etc., in mammals, *Naja tripudians* (Nag), *Eryx jonii* (Andi) etc., in Reptiles, *Anhinga rufa* (snake bird), *Ana crecca* (Comon teal), *Grus antligone* (Crane) etc., in birds to name a few.

From the studies it is evident is richer in ecological aspects this may be due to forest in the district near Halol town in Pavagadh area. The study area does not have endangered species of flora and fauna.

4. Anticipated Impact Assessment & Mitigation Measures

Impacts

Development of this SIR to its full potential will take longer time and it will be in phases. It includes forward and backward integration of the units along with ancillaries. Since the development extends over a period of time, impacts on environment during construction would be of marginal in nature. However, these impacts would be on Air due to fugitive dust, transportation of construction materials, vehicular movements etc., and noise due to operation of dozers, scrapers, concrete mixers, generators, vibrators and power tools etc.

The impact on water quality during construction due to discharges from construction and construction camps may contain mainly suspended impurities.

Impacts on terrestrial ecology during construction would be due to excavation of earth, leveling and cutting of shrubs at site to facilitate construction of roads, drains and other infrastructure facilities at industrial zones.



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Impact on demography, socio economics and cultural will be marginal during development phase. Economies of the locals will improve due to the development activities.

During operations there will be discharge of pollutants due to combustion of fuels at boilers furnaces, DG sets, etc. It is assumed that the new industries will have state-of-art technologies and the emission would be well within the norms. It is estimated that large scale units in industrial cluster-park will have one furnace and medium and small scale units will have electric furnace. The total emission loads of PM, SO₂ and NO_x would unlikely to exceed the assimilative capacity of the area. It is assumed that emissions will be discharged through stacks of around 40 m height and impact would not go beyond 1km from such stacks. The emissions at both Savli & Halol estate are likely to be low as most of the Automobile Engineering & Engineering based industries are only planned and are at the centre stage of the development.

In Automobile & Engineering industries, no extensive noise generation will take place except during running of Diesel Generator Sets. The sources of noise generation will be exhaust fans, compressors, etc. During operation, maximum noise level within the unit premises is expected to be about 70 dB(A).

The existing water supply infrastructure is adequate for Savli site. The water for industrial requirements is being sourced from Mahi River. Augmentation of water for additional requirement can be met from the Narmada canal. Only orange and green industries are going to be established in the proposed Savli and Halol industrial estates. Therefore, most of the units will generate small quantities of liquid effluents. However, those generating will install their own ETP to meet the regulatory discharge standards. Since effluents will meet the discharge standards specified by CPCB, no impact on surface water quality is anticipated.

The impact on the terrestrial ecosystem due to operation of the proposed project would mainly occur from deposition of air pollutants. Gaseous emissions are major pollutants from the proposed project. These gaseous pollutants will affect biotic and abiotic components of the ecosystem individually and synergistically. Chronic and acute effects on plants and animals may be induced when the concentration of these pollutants exceed threshold limits.

As discussed on 'Impact on Water Quality', no tangible effects are expected to be felt on the water quality due to proposed Industrial zones as treated effluents shall meet standards of SPCB/CPCB and will be mainly recycle and reused. Further, non-polluting industries, service industries and logistic park are planned which will have 1/3 of the proposed industrial zone. These fall in green category and will not generate liquid effluents. Hence no impact on aquatic ecology is expected.

Operation of the proposed project will require a significant number of skilled and semi-skilled workforces. Moreover, a sizeable number of service class people who are directly connected with the operating personnel of the project, e.g. house servants, washermen, shop keepers etc will flow in from the neighboring areas.



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At both the sites, industries are already functioning and substantial socioeconomic development of Halol, Manjusar and Savli towns are evident. The functioning of these proposed estates at Halol and Savli will result into development of commercial centres similar to Vadodara which is about 15 km from Savli site and 35 km from Halol site.

Mitigation

During dry weather conditions, the dust suppression will be carried out by sprinkling water. Construction materials will be transported with closed/tarpaulin covered vehicles. Only PUC certified vehicles be allowed to operate. “Type Approved” and “Conformity of Production” certified DG sets, as specified by CPCB/MoEF, will be allowed to operate. Employees working in noise work zone will be provided ear muffs/PPE.

All the effluents generated from various units of proposed industries including sanitation waste will be diverted to ETP/STP through the well equipped drains within the units. The treated effluents will be reused and recycled within their units so as to achieve zero discharge which is possible being engineering units. However, the treated effluents will meet GPCB specified standards laid in the consent orders. Further, the domestic waste generated from residential zones will be treated in STP’s to the standards laid by the GPCB.

The used oil generated in proposed each member of automobile and engineering units will be collected, stored and disposed to registered authorized recyclers as per GPCB/CPCB. Waste oil will be sent to the approved TSDF for its incineration. Also other hazardous wastes, if any, will be sent to TSDF of M/s. Nandesari Environment Control Limited at Vadodara and TSDF of M/s. Bharuch Enviro Infrastructure Limited at Ankleshwar. The conventional solid waste will be disposed off at solid waste disposal site to be developed within the industrial zone.

Units having appropriate process technologies with adequate pollution control equipment will be allowed to operate in the industrial zones so as to meet the statutory norms.

5. Analysis of Alternatives (Technology & Site)

The proposed SIR has Low cropping intensity, sparsely populated, not falling in the Forest area and command area of Narmada canal and also falls in the influence zone of Dedicated Freight and Delhi Mumbai Industrial Corridor having very good network of roads and rail connectivity are some of the main reasons of selecting this region for proposed development into SIR node. And Piped Natural Gas (PNG) is passing through the proposed SIR with multiple tapping points for supply of Gas to bulk consumers.

6. Environmental Monitoring Programme

Environmental monitoring will be conducted on regular basis by individual units to assess operational efficiencies, compliance of statutory conditions and the pollution level in and around the project area as specified in the consent order by SPCB as well as permissions issued by the RDA.



7. Additional Studies

The delineated site for Industrial Area has a rural population a little over 53000 people spread over 26 villages. The economic base of the population is chiefly agrarian even though the agriculture produce is only once in a year. With the onset of industrialization in Halol-Savli industrial estates, more and more manpower is being utilized as unskilled & semiskilled labor in the manufacturing units and thereby improving their income levels as well as paving for overall development of the region.

8. Project Benefits

Development of this SIR results in Enhancement of Physical Infrastructure facilities in the area, improvement in direct and indirect employment potential.

Since the proposed project falls in the influence zone of DFC and DMIC it has many benefits to offer to the national and international markets. Since it is being developed as global hub with world class infrastructure facilities, it will demonstrate to the others in the country to emulate similar developments. It will attract foreign direct investment in various sectors in the zone. It will be an economic growth engine for taking India on a high growth trajectory.

Thus, in a nutshell, it may be said that it will provide economic growth, social inclusion and environmental sustainability of the region and nation.

9. Environmental Management Plan

In this SIR there is very robust management system in place. GIDB is the Apex Authority which is chaired by the Chief Minister himself while minister of the state, industries is the vice chairman with ministers and secretaries of relevant ministries and subject experts are members of this authority. This board is supported by an executive committee headed by the minister of state industries. This executive committee is assisted by a CEO. Halol-Savli Regional Development Authority has been constituted which is the regulating authority for this SIR, which takes instructions on policies and regulations from the Apex Authority. There is a nodal company called Gujarat Infrastructure Construction Company (GICC) to provide and facilitate infrastructure facilities for the SIR.

RDA has formulated Gujarat Development Control Regulations (GDRCR) has formulated for this SIR with stringent norms for Development Requirements for Industrial zone, other than industrial Zone, for natural growth of Gamtal in the buffer zone, for residential townships, for special structures, for general building, for parking, for low cost housing/redevelopment of slum, for fire safety, for utility and infrastructure etc.



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Compliance of these regulations together with the Statutory Environmental Norms will constitute the Environmental Management Plan of individual proposed units in the HSSIR. Development Regulations will be monitored by the RDA while statutory Environmental Norms will be monitored by the SPCB/CPCB/MoEF. It may be worth noting that this is a 3-tier monitoring and management plan i.e., Self monitoring and control by the individual units with their environmental cells, development regulations by RDA and environmental norms by SPCB/CPCB.