Environmental and Social Due Diligence Report

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INDIA: Accelerating Infrastructure Investment Facility in India – Tranche 3

Mytrah Vayu (Krishna) Private Limited (Part 2 of 10)

Prepared by India Infrastructure Finance Company Limited for the India Infrastructure Finance Company Limited and the Asian Development Bank.

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												iv. Solid waste strewn on the shore, 45 tonnes on any given day according to a study by the Central Pollution Control Board, also finds its way into the sea. v. Adding to the stress on coastal waters, the organic load from the thousands of workers living in cramped conditions with little or no sanitary facilities results in unacceptably high levels of BOD.
43.	53	Oil and gas extraction including CBM (offshore & on-shore extraction through drilling wells)	30	-	30	-	-	-	20	83	**R-R**	i. Mainly water polluting & hazardous waste generating. ii. The water pollution & HW generation scores are normalized to 100.
44.	36	Industry or process involving metal surface treatment or process such as pickling/ electroplating/paint stripping/ heat treatment using cyanide bath/ phosphating or finishing and anodizing / enamellings/ galvanizing	30	-	30	-	-	-	20	83	**R-R**	Mainly water polluting & toxic hazardous waste generating industry. Scores are normalized to 100.
45.	80	Tanneries	30	-	30	-	-	-	20	83	**R-R**	Mainly water polluting & hazardous waste generating industry. Scores are normalized to 100.
46.	65	Ports and harbour, jetties and dredging operations	30	10	40	15	10	25	20	85	**R-R**	This category contain all sorts of pollution.
47.	77	Synthetic fibers induding rayon ,tyre cord, polyester filament yarn	30	10	40	25	10	35	10	85	**R-R**	This sector generates all sorts of pollution problems.
48.	81	Thermal Power Plants	30	10	40	20	10	30	15	85	**R-R**	i. This industrial sector is the one among the '17 categories of Highly Polluting Industries'. ii. TPP generate all sorts of pollution problems.
49.	71	Slaughter house (as per notification S.O.270(E)dated 26.03.2001)and meat processing industries, bone mill, processing of animal horn, hoofs and other body parts	25	10	35	-	-	-	-	87.5	**R-R**	Mainly water polluting and obnoxious odour generating industry. The water pollution score is normalized to 100
50.	2	Aluminium Smelter	30	10	40	20	10	30	20	90	**R-R**	i. This industrial sector is the one among the '17 categories of Highly Polluting Industries'. ii. This sector is generating all sorts of pollution i.e. air, water and HW.
51.	12	Copper Smelter	30	10	40	20	10	30	20	90	**R-R**	i. This industrial sector is the one among the '17 categories of Highly Polluting Industries'. ii. Integrated Copper Smelters contain all sorts of

													pollution.
52.	20	Fertilizer (basic) (excluding formulation)	30	10	40	20	10	30	20	90	**R-R**	i. This industrial sector is the one among the '17 categories of Highly Polluting Industries'. ii. Generates all sorts of pollution.
53.	37	Iron & Steel (involving processing from ore/ integrated steel plants) and or Sponge Iron units	30	10	40	20	10	30	20	90	**R-R**	i. This industrial sector is the one among the '17 categories of Highly Polluting Industries'. ii. Such types of industrial sectors generate all sorts of pollution.
54.	61	Pulp & Paper (waste paper based units with bleaching process to manufacture writing & printing paper)	25	10	35	25	10	35	20	90	**R-R**	Waste paper based Pulp & Paper mills with bleaching process generate all sorts of pollution.
55.	85	Zinc Smelter	30	10	40	20	10	30	20	90	**R-R**	i. This industrial sector is the one among the '17 categories of Highly Polluting Industries'. ii. Integrated Zinc smelter generates all sorts of pollution problems.
56.	55	Oil Refinery (mineral Oil or Petro Refineries)	30	10	40	25	10	35	20	95	**R-R**	i. This industrial sector is the one among the '17 categories of Highly Polluting Industries'. ii. Such types of industrial sectors generate all sorts of pollution.
57.	59	Petrochemicals Manufacturing (including processing of Emulsions of oil and water)	30	10	40	25	10	35	20	95	**R-R**	i. This industrial sector is the one among the '17 categories of Highly Polluting Industries'. ii. Such types of industrial sectors generate all sorts of pollution. iii. The earlier red category industrial sector namely "Processing of Emulsions of Oil & Water " is merged with this industrial sector.
58.	60	Pharmaceuticals	30	10	40	30	5	35	20	95	**R-R**	i. This industrial sector is the one among the '17 categories of Highly Polluting Industries'. ii. Such types of industrial sectors generate all sorts of pollution.
59.	61	Pulp & Paper (Large-Agro + wood) , Small Pulp & Paper (agro based-wheat straw/rice husk)	30	10	40	25	10	35	20	95	**R-R**	i. This industrial sector is the one among the '17 categories of Highly Polluting Industries'. ii. Large /Small Agro based Pulp & Paper mills contribute all sorts of pollution problems.
60.	15	Distillery (molasses / grain / yeast based)	30	10	40	-	-	-	-	100	**R-R**	Mainly water polluting industry. Final score is the normalized water pollution score.

Note :

i. *Under the column Revised Category, the full forms of the abbreviations are as follows :*
   a. *R-R means original category was Red and revised category is also Red*
   b. *R-O means original category was Red and revised category is Orange*
   c. *O-O means original category was Orange and revised category is also Orange*
   d. *O-G means original category was Orange and revised category is Green*
   e. *O-W means original category was Orange and revised category is White*
   f. *G-O means original category was Green and revised category is Orange*
   g. *G-G means original category was Green and revised category is also Green*
   h. *G-W means original category was Green and revised category is White*

ii. *There are specific remarks in respect of some of the industrial sectors. These sectors are either merged with other relevant sectors or deleted due to duplication. The overall details are as follows :*

Sl No.	Original Sl No.	Industry Sector	Original Category	Remarks
1	14	Common treatment and disposal facilities(CETP, TSDF, E-waste recycling, CBMWTF, effluent conveyance project, incinerator, solvent/acid recovery plant, MSW sanitary land fill site)	R	i. All such facilities are classified as Red but special category projects as these are parts of pollution control facilities. ii. In case of CETP , the categorization will depend upon the category of member industries being served.
2	18	Processing of Emulsions of Oil & Water		It is a part of Petrochemical industries. Transferred and merged with the industrial sector namely 'Petrochemicals' at Sl. No. 54.
3	27	Heavy engineering including ship building (with investment on Plant & Machineries more than Rs 10 crores)	R	Most of the pollution generating processes / operations under this category are similar to the industry category namely "Automobile Manufacturing (integrated facilities)" at Sl . No. 1 and may be referred accordingly.
4	30	Hydrocyanic acid and its derivatives	R	Have been merged with the red category industrial sector namely " Basic chemicals and electro chemicals and its derivatives including manufacturing of acid " at Sl. No. 24
5	32	Industrial estates/ parks / complexes/ areas/ export processing zones/ SEZs/ Biotech parks/ leather complex	R	The classification will depend upon the category(ies) of the industries operating / proposed to be permitted in the area. In this context, guidelines prescribed in EIA Notification, 2006 shall be followed.
6	33	Industrial inorganic gases namely- a) Chemical gas- Acetylene, hydrogen, chlorine, fluorine, ammonia, sulphur dioxide, ethylene, hydrogen-sulphide, phosphine b) Hydrocarbon gases- Methane , ethane, propane	R	These gases are generally secondary products and produced alongwith other main products. To be classified as per the main parent plant.
7	69	Reprocessing of used oils & waste oils	R	i. The industry generates mainly the air pollution and oil bearing hazardous wastes. The normalized (air pollution & HW generation score is 58.33. ii. To be deleted as already covered under HW Recyclers / Re-processors (Used oils / Waste Oils) under Orange Category

Table G-3 : Final List of Orange Category of Industrial Sectors

Final Sl. No.	Orgnl S.No	**Industry Sector**	W1	W2	W	A1	A2	A	H	W+A+H	Revised category	Remarks
1.	20	Dismantling of rolling stocks (wagons/ coaches)	--	--	--	15	--	15	10	41.67	O-O	Emissions of dust and generation of waste oils take place during dismantling. Air pollution & HW generation scores (15+10=25) are normalized to 100.
2.	5	Bakery and confectionery units with production capacity > 1 TPD. (With ovens / furnaces)	20	--	20	15	--	15	--	43.75	O-O	
3.	10	Chanachur and ladoo from puffed and beaten rice(muri and shira) using husk fired oven	20	--	20	15	--	15	--	43.75	O-O	Normal water and air polluting.
4.	23	Coated electrode manufacturing	15	0	15	20	0	20	0	43.75	**G-O**	Preparation of core wire / rod, preparation of dry mix, preparation of wet mix, application of coating by extrusion, baking of coated electrodes
5.	24	Compact disc computer floppy and cassette manufacturing / Reel manufacturing	15	0	15	20	0	20	0	43.75	**G-O**	Generates waste-water and process emissions.
6.	24	Flakes from rejected PET bottle	20	-	20	15	-	15	-	43.75	R-O	Normal water & air pollutions are generated.
7.	30	Food and food processing including fruits and vegetable processing	20	--	20	15	--	15	--	43.75	O-O	Normal water and air polluting.
8.	40	Jute processing without dyeing	20	--	20	15	--	15	--	43.75	O-O	CPCB has notified standards for this category. Both air and water pollutions are generated.
9.	56	Manufacturing of silica gel	15	0	15	20	0	20	0	43.75	**G-O**	Waste-waters containing TDS and emissions of H_2SO_4 are generated.

10.	45	Manufacturing of tooth powder, toothpaste, talcum powder and other cosmetic items	20	--	20	15	--	15	--	43.75	O-O	Both air and water pollution are generated.
11.	55	Printing or etching of glass sheet using hydrofluoric acid	15	--	15	20	--	20	--	43.75	O-O	Both air and water pollution are generated.
12.	65	Silk screen printing, sari printing by wooden blocks	20	--	20	15	--	15	--	43.75	O-O	Wash-water and PM emissions from boilers .
13.	76	Synthetic detergents and soaps(excluding formulation)	20	-	20	15	-	15	-	43.75	R-O	i. This is the score for units having generation of waste-waters less than 100 KLD. ii. The units having waste-water generation more than 100 KLD will become mainly water polluting and accordingly normalized water pollution score will be 75 and be categorized as Red.
14.	71	Thermometer manufacturing	15	--	15	20	--	20	--	43.75	O-O	Process - making glass bulb, forming reservoir in the glass tube for fluid, inserting fluid, scale marking. Use of fuel to heat the glass tubes and hydrofluoric acid to seal the scaling. Small quantities of spent acids are generated.
15.	14	Cotton spinning and weaving (medium and large scale)	--	--	--	15	--	37.5	10	47.5	O-O	Mainly air polluting industry. Sources of air pollution (PM) are the fine particles of cotton from spinning process. Air pollution score is normalized to 100.
16.	1	Almirah, Grill Manufacturing (Dry Mechanical Process)	--	--	--	20	--	20	--	50	O-O	Air pollution due to spray painting (emissions of VOCs). Units without painting operations shall be categorized as White.

17.	2	Aluminium & copper extraction from scrap using oil fired furnace (dry process only)	--	--	--	20	--	20	10	50	O-O	i. Normalized Air pollution score. ii. Significant air pollution due to melting (emissions of SO2, PM).
18.	3	Automobile servicing, repairing and painting (excluding only fuel dispensing)	20	--	20	20	--	20	10	50	O-O	Normal water & air polluting and recyclable waste oil generating. If the waste water generation is more than 100 KLD, it will become mainly water polluting and Red category unit.
19.	4	Ayurvedic and homeopathic medicine	20	--	20	15	--	15	15	50	O-O	
20.	7	Brickfields (excluding fly ash brick manufacturing using lime process)	--	--	--	20	--	20	--	50	O-O	Significantly air polluting.
21.	8	Building and construction project more than 20,000 sq. m built up area	20	--	20	20	--	20	--	50	O-O	1. In the pre-construction stage , it is mainly air polluting due to generation of dust (PM) emissions. 2. After construction, it is mainly water polluting. If the discharge is more than 100 KLD, it will be having the normalized score of 75 and be categorized as Red.
22.	6	Ceramics and Refractories	-	-	-	20	-	20	-	50	R-O	i. Mainly air polluting industry. ii. This score is for the units having coal consumption < than 12 MT/day. iii. For the units having coal consumption > 12 MT /day, the normalized air pollution score will be 62.5 and shall be categorized as Red.

23.	11	Coal washeries	15	10	25	15	-	15	-	50	R-O	i. Wet washeries are mainly water polluting industry generating effluents which are having inorganic SS & TDS. Additionally, air pollution due to PM emissions is also generated. ii. Water & air pollution scores are jointly normalized to 100.
24.	16	Dairy and dairy products (small scale)	20	--	20	20	--	20	--	50	O-O	Water and air polluting both.
25.	18	DG set of capacity >1MVA but < 5MVA	--	--	--	20	--	20	--	50	O-O	Mainly air polluting . air pollution score is normalized to 100.
26.	17	Dry coal processing, mineral processing, industries involving ore sintering, pelletisating, grinding & pulverization	-	-	-	20	-	20	-	50	R-O	Mainly air polluting industry. Final score is the normalized air pollution score.
27.	19	Fermentation industry including manufacture of yeast, beer, distillation of alcohol (Extra Neutral Alcohol)	20	-	20	-	-	-	-	50	R-O	i. Mainly water polluting industry. This is the normalized water pollution score for units having discharge < 100 KLD. ii. For the units having discharge > 100 KLD, the normalized water pollution score will be 75 and shall be accordingly categorized as Red.
28.	21	Ferrous and Non- ferrous metal extraction involving different furnaces through melting, refining, re-processing, casting and alloy-making	-	-	-	15	5	20	10	50	R-O	i. Mainly air polluting. ii. This score is applicable to secondary production of ferrous & non-ferrous metals (excluding lead) up-to 1 MT/hour production.

													iii. For lead, the normalized air pollution score will be = (100*25)/40= 62.5 and is categorized as Red. iv. For Induction Furnace clubbed with AOD furnace – separate calculation shall be made based on the capacity of the furnaces. In such industries, the molten metal from induction furnace is transferred to AOD furnace where other metals like manganese and nickel are added to get the metal of desired constituents. The lime and silicon are also added for reduction of the metal oxides to the base metal. the normalized air pollution score will be = (100*25)/40= 62.5 and is categorized as Red.
29.	26	Fertilizer (granulation / formulation / blending only)	--	--	--	20	--	20	--	50	O-O	Air polluting.
30.	27	Fish feed, poultry feed and cattle feed	--	--	--	20	--	20	--	50	O-O	Obnoxious odour , H2S etc. AP score is normalized to 100
31.	28	Fish processing and packing (excluding chilling of fishes)	20	--	20	--	--	--	--	50	O-O	Mainly water polluting. WP score is normalized to 100.

32.	31	Forging of ferrous and non- ferrous metals (using oil and gas fired furnaces)	--	--	--	20	--	20	--	50	O-O	Heating furnace. Mainly air polluting.
33.	32	Formulation/pelletization of camphor tablets, naphthalene balls from camphor/ naphthalene powders.	--	--	--	20	--	20	--	50	O-O	Mainly air polluting. Emissions of Benzene, HC are expected.
34.	33	Glass ceramics, earthen potteries and tile manufacturing using oil and gas fired kilns, coating on glasses using cerium fluorides and magnesium fluoride etc.	--	--	--	20	--	20	--	50	O-O	Mainly air polluting. Emissions of SO2 are expected.
35.	35	Gravure printing, digital printing on flex, vinyl	20	--	20	20	--	20	10	50	O-O	Waste waters , emissions of VOCs
36.	36	Heat treatment using oil fired furnace (without cyaniding)	--	--	--	20	--	20	--	50	O-O	Mainly air polluting and noise generating. AP Score is normalized to 100.
37.	28	Hot mix plants	-	-	-	20	-	20	-	50	R-O	Mainly air polluting. Air pollution scores are normalized to 100.
38.	37	Hotels (< 3 star) or hotels having > 20 rooms and less than 100 rooms.	20	--	20	20	--	20	--	50	O-O	Mainly water polluting. WP score is normalized to 100.
39.	38	Ice cream	20	--	20	20	--	20	--	50	O-O	Wash-water and boilers / oven for pasteurization.
40.	34	Industries engaged in recycling / reprocessing/ recovery/reuse of Hazardous Waste under schedule iv of HW(M, H& TBM) rules, 2008 - Items namely - Paint and ink Sludge/residues	-	-	-	20	0	20	0	50	R-O	Mainly air polluting. Air pollution score is normalized to 100
41.	34	Industries engaged in recycling / reprocessing/ recovery/reuse of Hazardous Waste under schedule iv of HW(M, H& TBM) rules, 2008 - Items namely - Brass Dross ,, Copper Dross,, Copper Oxide Mill Scale,, Copper Reverts, Cake & Residues,, Waste Copper and copper alloys in	10	-	10	20	-	20	10	50	R-O	Mainly air polluting.

		dispersible form,, Slags from copper processing for further processing or refining „ Insulated Copper Wire,, Scrap/copper with PVC sheathing including ISRI-code material namely "Druid" „ Jelly filled Copper cables „ Zinc Dross-Hot dip Galvanizers SLAB,, Zinc Dross-Bottom Dross,, Zinc ash/Skimming arising from galvanizing and die casting operations,, Zinc ash/Skimming/other zinc bearing wastes arising from smelting and refining,, Zinc ash and residues including zinc alloy residues in dispersible from ,,										
42.	35	Industry or processes involving foundry operations	-	-	-	20	-	20	-	50	R-O	i. This score is valid for the foundries having capacity < 5 MT/hr as such units require the coal/coke @ < 500 kg/hr. ii. The units having capacity of 5 MT/hr and more, the coal/coke consumption will be more than 500 kg/hr and the normalized score will be 62.5 and classified accordingly as Red.
43.	40	Lime manufacturing (using lime kiln)	-	-	-	20	-	20	-	50	R-O	Mainly air polluting
44.	41	Liquid floor cleaner, black phenyl, liquid soap, glycerol mono-stearate manufacturing	20	--	20	20	--	20	--	50	O-O	Both air and water pollution are generated.

45.	42	Manufacturing of glass	10	-	-	20	-	20	-	50	R-O	i. Mainly air polluting (melting at 1500ºC and refining . ii. In case of lead glass , the score of A1 will be 25 and accordingly the normalized scores will be 62.5 i.e. Red .
46.	43	Manufacturing of iodized salt from crude/ raw salt	12	--	12	20	--	20	--	50	O-O	Boiling in Evaporators (multiple effect evaporators), centrifuging, iodization with KIO3 mixing . Mainly air polluting. Air pollution score is normalized to 100.
47.	42	Manufacturing of mirror from sheet glass	--	--	--	20	--	20	--	50	O-O	Evaporator & furnace for heating the metal to be applied as reflector on mirror. Mainly air polluting.
48.	44	Manufacturing of mosquito repellent coil	--	--	--	20	--	20	--	50	O-O	Mainly air polluting. Toxic fumes are expected.
49.	46	Manufacturing of Starch/Sago	25	-	25	15	-	15	-	50	R-O	i. Water and air polluting industry. Boiler is used for steam generation. ii. Water & air pollution scores are normalized to 100
50.	46	Mechanized laundry using oil fired boiler	20	--	20	20	--	20	--	50	O-O	Both air and water pollution are generated.
51.	47	Modular wooden furniture from particle board, MDF< swan timber etc, Ceiling tiles/ partition board from saw dust, wood chips etc., and other agricultural waste using synthetic adhesive resin, wooden box making (With boiler)	--	--	--	20	--	20	--	50	O-O	1. Mainly air polluting. Boiler as well as VOCs from use of adhesives. 2. Without boiler, it will be a Green category industry.
52.	50	New highway construction project	-	-	-	20	-	20	-	50	R-O	Mainly air polluting project.

53.	51	Non-alcoholic beverages(soft drink) & bottling of alcohol/non alcoholic products	20	-	20	15	5	20	-	50	R-O	i. Both air and water polluting. Score is normalized with air & water pollution. This score is valid for industries having waste-water generation < 100 KLD. ii. For the units having waste-water generation > 100 KLD the , normalized score would be 62.5 and categorized as Red.
54.	49	Paint blending and mixing (Ball mill)	20	--	20	20	--	20	10	50	O-O	Both air and water pollution are generated.
55.	62	Paints and varnishes (mixing and blending)	20	0	0	20	0	20	0	50	**G-O**	Waste-waters as well as fumes of VOCs due to solvents, pigments, varnishes.
56.	51	Ply-board manufacturing(including Veneer and laminate) with oil fired boiler/ thermic fluid heater(without resin plant)	0	--	0	20	--	20	--	50	O-O	Mainly air polluting because of use of boiler. AP score is normalized to 100
57.	52	Potable alcohol (IMFL) by blending, bottling of alcohol products	20	--	20	--	--	--	--	50	O-O	Mainly water polluting. WP score is normalized to 100.
58.	54	Printing ink manufacturing	20	--	20	20	--	20	--	50	O-O	1. Pigments, binders and solvents are used. 2. Boiler is also used. 3. Emissions of VOCs take place.
59.	70	Printing press	20	0	20	20	0	20	0	50	**G-O**	Colored waste-waters containing dyes and VOC emissions are generated.
60.	59	Reprocessing of waste plastic including PVC	20	--	20	20	--	20	--	50	O-O	Large quantities of wash-water and fugitive emissions are generated.
61.	61	Rolling mill (oil or coal fired) and cold rolling mill	10	--	10	20	--	20	--	50	O-O	Mainly air polluting. Air pollution score is normalized to 100. Others - cooling water and recyclable waste oils etc. are generated.
62.	67	Spray painting, paint baking, paint shipping	--	--	--	20	--	20	10	50	O-O	Mainly air polluting. Emissions of VOCs and HC are generated.

63.	72	Steel and steel products using various furnaces like blast furnace /open hearth furnace/induction furnace/arc furnace/submerged arc furnace /basic oxygen furnace /hot rolling reheated furnace	10	-	10	20	-	20	10	50	R-O	i. Mainly air polluting. In the emissions, oxides of manganese, nickel etc. are also present. ii. Air pollution score is normalized to 100.
64.	73	Stone crushers	-	-	-	20	-	20	-	50	R-O	Mainly air polluting. Air pollution score is normalized to 100.
65.	75	Surgical and medical products including prophylactics and latex	20	-	20	20	-	20	-	50	R-O	Both air as well as water polluting. Air and water pollution scores are normalized to 100.
66.	85	Tephlon based products	0	0	0	20	0	20	0	50	**G-O**	Due to spraying applications, emissions (HC) are generated
67.	70	Thermocol manufacturing (with boiler)	--	--	--	20	--	20	--	50	O-O	Polystyrene is heated. Mainly air polluting with boiler.
68.	82	Tobacco products including cigarettes and tobacco/opium processes	20	-	20	20	-	20	-	50	R-O	Such industries generate both air as well as water pollution. These scores are normalized to 100.
69.	72	Transformer repairing/ manufacturing (dry process only)	--	--	--	20	--	20	10	50	O-O	Mainly air polluting because of ovens, shot-blasting etc.
70.	73	Tyres and tubes vulcanization/ hot retreating	10	--	10	20	--	20	--	50	O-O	Mainly air polluting . Emissions of PM, VOCs and obnoxious odour are generated.
71.	83	Vegetable oil manufacturing including solvent extraction and refinery /hydrogenated oils	20	-	20	15	5	20	10	50	R-O	i. All sorts of pollution are generated. ii. This score is valid for plants having waste-water generation < 100 KLD. iii. If the waste-water generation is more than 100 KLD, the unit shall be classified as Red.
72.	74	Wire drawing and wire netting	20	--	20	--	--	--	--	50	O-O	Mainly water polluting. WP score is normalized to 100.

73.	21	Dry cell battery (excluding manufacturing of electrodes) and assembling & charging of acid lead battery on micro scale	30	--	30	15	--	15	10	55	O-O	Water and air polluting both.
74.	50	Pharmaceutical formulation and for R & D purpose (For sustained release/ extended release of drugs only and not for commercial purpose)	20	--	20	20	--	20	15	55	O-O	i. All sorts of pollution are generated. ii. R&D activities are to be shifted to Red category.
75.	78	Synthetic resins	20	-	20	20	-	20	15	55	R-O	All sorts of pollution are generated.
76.	79	Synthetic rubber excluding molding	20	-	20	20	-	20	15	55	R-O	i. Most synthetic rubber is created from two materials, styrene and butadiene. Both are currently obtained from petroleum. ii. Process is similar to a part of Petrochemical plants.
77.	9	Cashew nut processing	25	--	25	20	--	20	--	56	O-O	Normal water and air polluting.
78.	12	Coffee seed processing	25	--	25	20	--	20	--	56	O-O	Normal water & air polluting industry.
79.	57	Parboiled Rice Mills	25	-	25	20	-	20	-	56	R-O	i. Rice Mills are generating both air and water pollution. Waste-waters are having high strength in respect of BOD. ii. This is the normalized air & water pollution score for units having waste-water generation < 100 KLD and fuel consumption less than 12 MTD. iii. For units having waste-water generation > 100 KLD or fuel consumption > 12 MTD or both , the unit shall be classified as Red.

80.	29	Foam manufacturing	--	--	--	20	--	20	15	58	O-O	i. Raw material is polyurethane, latex etc. ii. Emissions of VOCs and HAPs. CH3Cl2 and similar compounds as blowing agents. iii. Outdated raw materials and spoiled slots are discarded as HW.
81.	34	Industries engaged in recycling / reprocessing/ recovery/reuse of Hazardous Waste under schedule iv of HW(M, H& TBM) rules, 2008 - Items namely - Used Oil – As per specifications prescribed from time to time.	10	0	10	20	0	20	15	58.33	R-O	Mainly air polluting and hazardous waste generating industry. Air pollution & HW scores are normalized to 100
82.	34	Industries engaged in recycling / reprocessing/ recovery/reuse of Hazardous Waste under schedule iv of HW(M, H& TBM) rules, 2008 - Items namely - Waste Oil ---As per specifications prescribed from time to time.	-	-	-	20	0	20	15	58.33	R-O	Mainly air polluting and hazardous waste generating industry. Air pollution & HW scores are normalized to 100.
83.	56	Producer gas plant using conventional up drift coal gasification (linked to rolling mills glass and ceramic industry refectories for dedicated fuel supply)	--	--	--	20	--	20	15	58.33	O-O	Mainly air polluting & tar (HW) generating. SO2, CO, NOx are generated. Tar is the by-product and utilized by other industries in co-processing.

Note :

i. Under the column Revised Category, the full forms of the abbreviations are as follows :

a. R-R means original category was Red and revised category is also Red

b. R-O means original category was Red and revised category is Orange

c. O-O means original category was Orange and revised category is also Orange

d. O-G means original category was Orange and revised category is Green

e. O-W means original category was Orange and revised category is White

f. G-O means original category was Green and revised category is Orange

g. G-G means original category was Green and revised category is also Green

h. G-W means original category was Green and revised category is White

ii. There are specific remarks in respect of some of the industrial sectors. These sectors are either merged with other relevant sectors or deleted due to duplication / vague category. The overall details are as follows:

Sl No.	*Original Sl No.*	*Industry Sector*	*Original Category*	*Remarks*
1	*24*	*Excavation of sand from the river bed (excluding manual excavation)*	*O*	*Since such types of activities cause ecological disturbances, the instructions issued by the government from time to time be followed. To be categorized by MoEF&CC.*
2	*39*	*Infrastructure Development Project*	*O*	*Vast variety of such projects come under such category. This is to be decided by the concerned SPCB in line of EIA Notification , 2006.*
3	*53*	*Power press*	*O*	*Very vague term hence deleted. Such types of general engineering units have already been covered.*

Table G-4 : Final List of Green Category of Industrial Sectors

Sl. No.	Orgnl Sl. No.	**Industry Sector**	W1	W2	W	A1	A2	A	H	W+A+H	Revised Category	Remarks
1.	2	Aluminium utensils from aluminium circles by pressing only (dry mechanical operation)	--	--	--	10	--	10	--	25	**G-G**	Minor air pollution due to some fugitive PM emissions from buffing operations.
2.	6	Ayurvedic and homeopathic medicines (without boiler)	10	--	10	--	--	--	--	25	**G-G**	Small quantities of waste-waters are generated from washing operations.
3.	8	Bakery /confectionery /sweets products (with production capacity <1tpd (with gas or electrical oven)	10	--	10	--	--	--	--	25	**G-G**	Small quantities of waste-waters are generated from washing operations.
4.	6	Bi-axially oriented PP film along with metalizing operations	10	--	10	--	--	--	--	25	**O-G**	Mainly extrusion process involving Cooling water recirculation
5.	10	Biomass briquettes (sun drying) without using toxic hazardous wastes	--	--	--	10	--	10	--	25	**G-G**	Minor air pollution due to some fugitive PM emissions from pulverization / mixing operations.
6.	13	Blending of melamine resins & different powder, additives by physical mixing	--	--	--	10	--	10	--	25	**G-G**	Minor air pollution due to some fugitive PM emissions from pulverization / mixing operations.
7.	15	Brass and bell metal utensils manufacturing from circles(dry mechanical operation without re-rolling facility)	--	--	--	10	--	10	--	25	**G-G**	Minor air pollution due to some fugitive PM emissions from buffing operations.
8.	16	Candy	10	--	10	10	--	10	--	25	**G-G**	Small quantities of waste-water and minor

												PM emissions are generated.
9.	17	Cardboard or corrugated box and paper products (excluding paper or pulp manufacturing and without using boilers)	--	--	--	10	--	10	--	25	**G-G**	This score is valid with Small gas / electricity operated oven / furnace for making glue.
10.	18	Carpentry & wooden furniture manufacturing (excluding saw mill) with the help of electrical (motorized) machines such as electrical wood planner, steel saw cutting circular blade, etc.	--	--	--	10	--	10	--	25	**G-G**	Minor air pollution due to some fugitive PM emissions from cutting operations.
11.	19	Cement products (without using asbestos / boiler / steam curing) like pipe ,pillar, jafri, well ring, block/tiles etc.(should be done in closed covered shed to control fugitive emissions)	--	--	--	10	--	10	--	25	**G-G**	Minor air pollution due to some fugitive PM emissions from mixing operations.
12.	20	Ceramic colour manufacturing by mixing & blending only (not using boiler and wastewater recycling process)	--	--	--	10	--	10	--	25	**G-G**	Minor air pollution due to some fugitive PM emissions.
13.	11	Chilling plant, cold storage and ice making	10	--	10	--	--	--	--	25	**O-G**	Cooling water recirculation only.
14.	13	Coke briquetting (sun drying)	--	--	--	10	--	10	--	25	**O-G**	Mainly air polluting industry. Sources of air pollution (PM) are pulverizes and mixers. Air pollution score is normalized to 100.
15.	28	Cotton spinning and weaving (small scale)	--	--	--	10	--	10	--	25	**G-G**	Minor PM emissions from spinning process.
16.	17	Dal Mills	--	--	--	10	--	10	--	25	**O-G**	Some fugitive emissions of PM.

17.	29	Decoration of ceramic cups and plates by electric furnace	--	--	--	10	--	10	--	25	**G-G**	Fumes of enamels. Minor air pollution.
18.	19	Digital printing on PVC clothes	--	--	--	10	--	10	--	25	**O-G**	Minor emissions / odour generations are expected.
19.	25	Facility of handling, storage and transportation of food grains in bulk	--	--	--	10	--	10	--	25	**O-G**	Some fugitive emissions of PM during handling of grains.
20.	36	Flour mills (dry process)	--	--	--	10	--	10	--	25	**G-G**	Fugitive dust emissions.
21.	41	Glass , ceramic, earthen potteries, tile and tile manufacturing using electrical kiln or not involving fossil fuel kiln	--	--	--	10	--	10	--	25	**G-G**	Minor fugitive emissions only.
22.	34	Glue from starch (physical mixing) with gas / electrically operated oven /boiler.	--	--	--	10	--	10	--	25	**O-G**	Some fugitive emissions of PM during mixing of raw materials.
23.	42	Gold and silver smithy (purification with acid smelting operation and sulphuric acid polishing operation) (using less or equal to 1 litre of sulphuric acid/ nitric acid per month)	--	--	--	10	--	10	--	25	**G-G**	Minor fumes from cleaning process.
24.	36	Heat treatment with any of the new technology like ultrasound probe , induction hardening , ionization beam, gas carburizing etc.	10	--	10	10	--	10	--	25	**O-G**	• Cooling waters and minor heat fumes. • Finalization of categorization subject to field verification.
25.	46	Insulation and other coated papers (excluding paper or pipe manufacturing)	--	--	--	10	--	10	--	25	**G-G**	Minor fumes due to application of poly-urethane
26.	49	Leather foot wear and leather products (excluding tanning and hide processing except cottage scale)	--	--	--	10	--	10	--	25	**G-G**	Minor fumes due to use of adhesives / gums.

27.	50	Lubricating oil, greases or petroleum based products (only blending at normal temperature)	--	--	--	10	--	10	--	25	**G-G**	Minor fumes at the time of transfers from one container to other.
28.	54	Manufacturing of pasted veneers using gas fired boiler or thermic fluid heater and by sun drying	--	--	--	10	--	10	--	25	**G-G**	1. Minor fumes due to application of gums / adhesives / pastes etc. 2. This score is valid only for gas fired boiler.3. The units having coal fired boilers shall be categorized as Orange.
29.	59	Oil mill Ghani and extraction (no hydrogenation / refining)	10	--	10	--	--	--	--	25	**G-G**	Small quantities of floor washings & equipments washings are generated.
30.	48	Packing materials manufacturing from non asbestos fibre, vegetable fibre yarn	--	--	--	10	--	10	--	25	**O-G**	Some fugitive emissions of PM are expected.
31.	65	Phenyl/toilet cleaner formulation and bottling	--	--	--	10	--	10	--	25	**G-G**	Minor fumes of VOCs in the work zone
32.	67	Polythene and plastic processed products manufacturing (virgin plastic)	10	--	10	10	--	10	--	25	**G-G**	Cooling water & emissions due to mixing of raw materials.
33.	68	Poultry, Hatchery and Piggery	--	--	--	10	--	10	--	25	**G-G**	Obnoxious odour containing H_2S, CH_4 etc. and fugitive PM emissions
34.	69	Power looms (without dye and bleaching)	--	--	--	10	--	10	--	25	**G-G**	Minor emissions of PM.
35.	71	Puffed rice (muri) (using gas or electrical heating system)	--	--	--	10	--	10	--	25	**G-G**	Minor emissions of PM.
36.	57	Pulverization of bamboo and scrap wood	--	--	--	10	--	10	--	25	**O-G**	Some fugitive emissions of PM are expected.
37.	72	Ready mix cement concrete	--	--	--	10	--	10	--	25	**G-G**	PM emissions.
38.	73	Reprocessing of waste cotton	--	--	--	10	--	10	--	25	**G-G**	PM emissions.
39.	60	Rice mill (Rice hullers only)	--	--	--	10	--	10	--	25	**O-G**	PM emissions are generated. Mainly air

												polluting. AP score is normalized to 100
40.	62	Rolling mill (gas fired) and cold rolling mill	10	--	10	10	--	10	--	25	**O-G**	Mainly air polluting. AP score is normalized to 100
41.	75	Rubber goods industry (with gas operated baby boiler)	--	--	--	10	--	10	--	25	**G-G**	Some PM emissions and obnoxious odour.
42.	63	Saw mills	--	--	--	10	--	10	--	25	**O-G**	Mainly air polluting. PM and noise are generated.
43.	77	Soap manufacturing (hand made without steam boiling / boiler)	10	--	10	--	--	--	--	25	**G-G**	Small quantities of waste-water are generated.
44.	80	Spice grinding (upto-20 HP motor)	--	--	--	10	--	10	--	25	**G-G**	Small quantities of fugitive emissions of raw materials.
45.	66	Spice grinding (>20 hp motor)	--	--	--	10	--	10	--	25	**O-G**	Mainly air polluting. Fugitive emissions of PM.
46.	81	Steel furniture without spray painting	--	--	--	10	--	10	--	25	**G-G**	Obnoxious gases from welding as well as noise pollution.
47.	82	Steeping and processing of grains	10	--	10	--	--	--	--	25	**G-G**	Washing waters are generated.
48.	86	Tyres and tube retreating (without boilers)	--	--	--	10	--	10	--	25	**G-G**	Due to applications of binding gum / adhesives / cement, some obnoxious fumes may generate.
49.	22	Chilling plant and ice making without using ammonia	12	--	12	--	--	--	--	30	**G-G**	Cooling water and brine water circuits. Spillages / blow down may take place
50.	26	CO2 recovery	12	--	12	--	--	--	--	30	**G-G**	Normal water pollution from scrubbing action
51.	32	Distilled water (without boiler) with electricity as source of heat	12	--	12	--	--	--	--	30	**G-G**	TDS as distillation residues

52.	45	Hotels (up to 20 rooms and without boilers)	12	--	12	--	--	--	--	30	**G-G**	This score is valid for hotels having overall waste-water generation less than 10 KLD.
53.	53	Manufacturing of optical lenses (using electrical furnace)	12	--	12	--	--	--	--	30	**G-G**	Small quantities of waste-waters containing TDS, SS are generated.
54.	58	Mineralized water	12	--	12	--	--	--	--	30	**G-G**	RO Rejects.
55.	68	Tamarind powder manufacturing	12	--	12	15	--	15	--	33.75	O-G	• Dried tamarind fruits - cleaned and after soaking them in water they are boiled in steam jacketed kettle for about 40-45 minutes. Then pulp is extracted in pulper and dried in drum type drier and on cooling, the final product is packed. • Generates small quantities of waste waters and air emissions. Joint score is normalized to 100.
56.	15	Cutting, sizing and polishing of marble stone	15	--	15	--	--	--	--	37.5	O-G	Mainly water polluting . Water pollution score is normalized to 100.
57.	22	Emery powder (fine dust of sand) manufacturing	--	--	--	15	--	15	--	37.5	O-G	Air polluting. PM emissions take place during various stages of grindings of naturally occurring minerals.
58.	25	Flyash export, transport & disposal facilities	-	-	-	15	-	15	-	37.5	R-G	• This is mainly air polluting activity. • This is the normalized score based on air pollution.
59.	48	Mineral stack yard / Railway sidings	15	-	15	15	-	15	-	37.5	R-G	• Mainly air pollution due to loading, unloading, storage and transportation of the minerals.

												• Waste-water generation mainly during rains only.
60.	54	Oil and gas transportation pipeline	-	-	-	10	5	15	-	37.5	R-G	• Contains small gas based power plants up-to 5 MWs. • Air pollution score is normalized to 100. • In case , if these power plants are bigger / liquid fuel / oil based, scores will be calculated accordingly.
61.	64	Seasoning of wood in steam heated chamber	--	--	--	15	--	15	--	37.5	O-G	Air pollution due to use boiler for supply of steam. Air pollution score is normalized to 100.
62.	84	Synthetic detergent formulation	--	--	--	15	--	15	--	37.5	**G-G**	• This score is valid for the industries which are not manufacturing LABSA. It is procured from outside. • Small quantities of emissions are generated from mini boiler. • Air pollution score is normalized to 100.
63.	69	Tea processing (with boiler)	--	--	--	15	--	15	--	37.5	O-G	With boiler, it is an orange category industry. Without boiler, it will be green category industry.

Note :

i. *Under the column Revised Category, the full forms of the abbreviations are as follows :*
   a. *R-R means original category was Red and revised category is also Red*
   b. *R-O means original category was Red and revised category is Orange*
   c. *O-O means original category was Orange and revised category is also Orange*
   d. *O-G means original category was Orange and revised category is Green*
   e. *O-W means original category was Orange and revised category is White*
   f. *G-O means original category was Green and revised category is Orange*
   g. *G-G means original category was Green and revised category is also Green*
   h. *G-W means original category was Green and revised category is White*

ii. *There are specific remarks in respect of some of the industrial sectors. These sectors are either merged with other relevant sectors or deleted due to duplication. The overall details are as follows :*

Sl No.	Original Sl No.	Industry Sector	Original Category	Remarks
1	47	Jobbing and Machining	G	Vague category to be deleted, as such activities have already been covered in other categories.
2	66	Reel manufacturing	G	Already covered in other categories. Hence, deleted
3	1	Assembling of acid lead batteries (up to 10 batteries per day excluding lead plate casting)	G	Already covered in Orange category. Hence, deleted
4	5	Automobile fuel outlets (only dispensing)	G	Minor air pollution due to some fugitive emissions during fuel filling operations. May be exempted from the purview of Consent management.
5	30	Diesel generator sets (15 KVA to 1 MVA)	G	• Normal operation – 12 hrs a day. • Consumption of diesel = 1680 litres for 1 MVA DG set at full load @ 0.21 litres / KVA / hr. • Stand-alone DG Sets having total capacity 1 MVA or less and equipped with acoustic enclosures alongwith adequate stack height may be exempted from the purview of Consent management. Higher capacity DG sets have already been covered under Red / Orange categories .

Table G-5: Final List of White Category of Industries

Sl. No.	Orgnl Sl. No.	**Industry Sector**	W1	W2	W	A1	A2	A	H	W+A+H	Revised Category
1.	3	Assembly of air coolers /conditioners ,repairing and servicing	--	--	--	--	--	--	--	--	**G-W**
2.	4	Assembly of bicycles ,baby carriages and other small non motorizing vehicles	--	--	--	--	--	--	--	--	**G-W**
3.	7	Bailing (hydraulic press)of waste papers	--	--	--	--	--	--	--	--	**G-W**
4.	9	Bio fertilizer and bio-pesticides without using inorganic chemicals	--	--	--	--	--	--	--	--	**G-W**
5.	11	Biscuits trays etc from rolled PVC sheet (using automatic vacuum forming machines)	--	--	--	--	--	--	--	--	**G-W**
6.	12	Blending and packing of tea	--	--	--	--	--	--	--	--	**G-W**
7.	14	Block making of printing without foundry (excluding wooden block making)	--	--	--	--	--	--	--	--	**G-W**
8.	21	Chalk making from plaster of Paris (only casting without boilers etc. (sun drying / electrical oven)	--	--	--	--	--	--	--	--	**G-W**
9.	25	Compressed oxygen gas from crude liquid oxygen (without use of any solvents and by maintaining pressure & temperature only for separation of other gases)	--	--	--	--	--	--	--	--	**G-W**
10.	27	Cotton and woolen hosiers making (Dry process only without any dying / washing operation)	--	--	--	--	--	--	--	--	**G-W**
11.	31	Diesel pump repairing and servicing (complete mechanical dry process)	--	--	--	--	--	--	--	--	**G-W**
12.	33	Electric lamp (bulb) and CFL manufacturing by assembling only	--	--	--	--	--	--	--	--	**G-W**

13.	34	Electrical and electronic item assembling (completely dry process)	--	--	--	--	--	--	--	--	**G-W**
14.	23	Engineering and fabrication units (dry process without any heat treatment / metal surface finishing operations / painting)	--	--	--	--	--	--	--	--	**O-W**
15.	35	Flavoured betel nuts production/ grinding (completely dry mechanical operations)	--	--	--	--	--	--	--	--	**G-W**
16.	37	Fly ash bricks/ block manufacturing	--	--	--	--	--	--	--	--	**G-W**
17.	38	Fountain pen manufacturing by assembling only	--	--	--	--	--	--	--	--	**G-W**
18.	39	Glass ampules and vials making from glass tubes	--	--	--	--	--	--	--	--	**G-W**
19.	40	Glass putty and sealant (by mixing with machine only)	--	--	--	--	--	--	--	--	**G-W**
20.	43	Ground nut decorticating	--	--	--	--	--	--	--	--	**G-W**
21.	44	Handloom/ carpet weaving (without dying and bleaching operation)	--	--	--	--	--	--	--	--	**G-W**
22.	48	Leather cutting and stitching (more than 10 machine and using motor)	--	--	--	--	--	--	--	--	**G-W**
23.	51	Manufacturing of coir items from coconut husks	--	--	--	--	--	--	--	--	**G-W**
24.	52	Manufacturing of metal caps containers etc	--	--	--	--	--	--	--	--	**G-W**
25.	55	Manufacturing of shoe brush and wire brush	--	--	--	--	--	--	--	--	**G-W**
26.	57	Medical oxygen	--	--	--	--	--	--	--	--	**G-W**
27.	60	Organic and inorganic nutrients (by physical mixing)	--	--	--	--	--	--	--	--	**G-W**
28.	61	Organic manure (manual mixing)	--	--	--	--	--	--	--	--	**G-W**
29.	63	Packing of powdered milk	--	--	--	--	--	--	--	--	**G-W**
30.	64	Paper pins and u clips	--	--	--	--	--	--	--	--	**G-W**
31.	58	Repairing of electric motors and generators (dry mechanical process)	--	--	--	--	--	--	--	--	**O-W**
32.	74	Rope (plastic and cotton)	--	--	--	--	--	--	--	--	**G-W**

33.	76	Scientific and mathematical instrument manufacturing	--	--	--	--	--	--	--	--	**G-W**
34.	78	Solar module non conventional energy apparatus manufacturing unit	--	--	--	--	--	--	--	--	**G-W**
35.	79	Solar power generation through solar photovoltaic cell, wind power and mini hydel power (less than 25 MW)	--	--	--	--	--	--	--	--	**G-W**
36.	83	Surgical and medical products assembling only (not involving effluent / emission generating processes)	--	--	--	--	--	--	--	--	**G-W**

Note : Under the column Revised Category, the full forms of the abbreviations are as follows :

a. *R-R means original category was Red and revised category is also Red*
b. *R-O means original category was Red and revised category is Orange*
c. *O-O means original category was Orange and revised category is also Orange*
d. *O-G means original category was Orange and revised category is Green*
e. *O-W means original category was Orange and revised category is White*
f. *G-O means original category was Green and revised category is Orange*
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केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD
(पर्यावरण एवं वन मंत्रालय, भारत सरकार)
(MINISTRY OF ENVIRONMENT & FORESTS, GOVT. OF INDIA)

No. B-29012/ESS/CPA/2015-16

19.08.2015

Sub: "Harmonization of Classification of industries under Red / Orange / Green / White Categories".

During the Conference of the Environment Ministers of States held in New Delhi during April 06-07, 2015, it was resolved to adopt pollution potential criteria for categorization of Red, Orange & Green categories of industries and that a Committee be constituted with State representatives. Further, in the 59th Conference of Chairmen & Member Secretaries of Pollution Control Boards/PCCs held in New Delhi on April 08, 2015, it was agreed to constitute a Committee to look into categorization system of industries based on their respective pollution potential index.

2. Accordingly, a Committee comprising the Chairmen of CPCB, APPCB, TNPCB, MPPCB, MPCB, PPCB, WBPCB and MS, CPCB was constituted vide CPCB OM dated 23.04.2015 to review & classify industrial sectors into different categories based on criteria of respective pollution potential indices.

3. The existing Red (85 sectors) , Orange (73 sectors) and Green (86 sectors) industrial sectors have been assessed as per the proposed formula by a group of Scientists from CPCB . For this purpose , concerned Engineers / Scientists from the Member SPCBs of the Committee were also involved & consulted during May28-29, 2015.

4. After careful examination and consideration of the suggestions of concerned stake-holders the "Draft Document on Revised Concept of Categorization of Industrial Sectors " is prepared by the Committee .

In this context, the Undersigned is directed to forward a copy of the " Draft Document on Revised Concept of Categorization of Industrial Sectors to all the SPCBs, PCCs and concerned Ministries for their comments. Accordingly, the same is enclosed herewith and all the SPCBs, PCCs and concerned Ministries are, hereby requested to provide their comments by 04.09.2015. The comments may kindly be sent through hard copy as well as soft copy at e-mail: nkgupta.cpcb@nic.in , nkgcpcb@hotmail.com .

Encl : As above

[N.K. Gupta]
Incharge - ESS

To:

1. All the State Pollution Control Boards / Pollution Control Committees
2. The Secretary, Ministry of Micro Small and Medium Enterprises, New Delhi
3. The Secretary, Ministry of Heavy Industries & Public Enterprises, New Delhi
4. The Advisor & Incharge , CP Division, MoEFCC, New Delhi
5. CPCB Website

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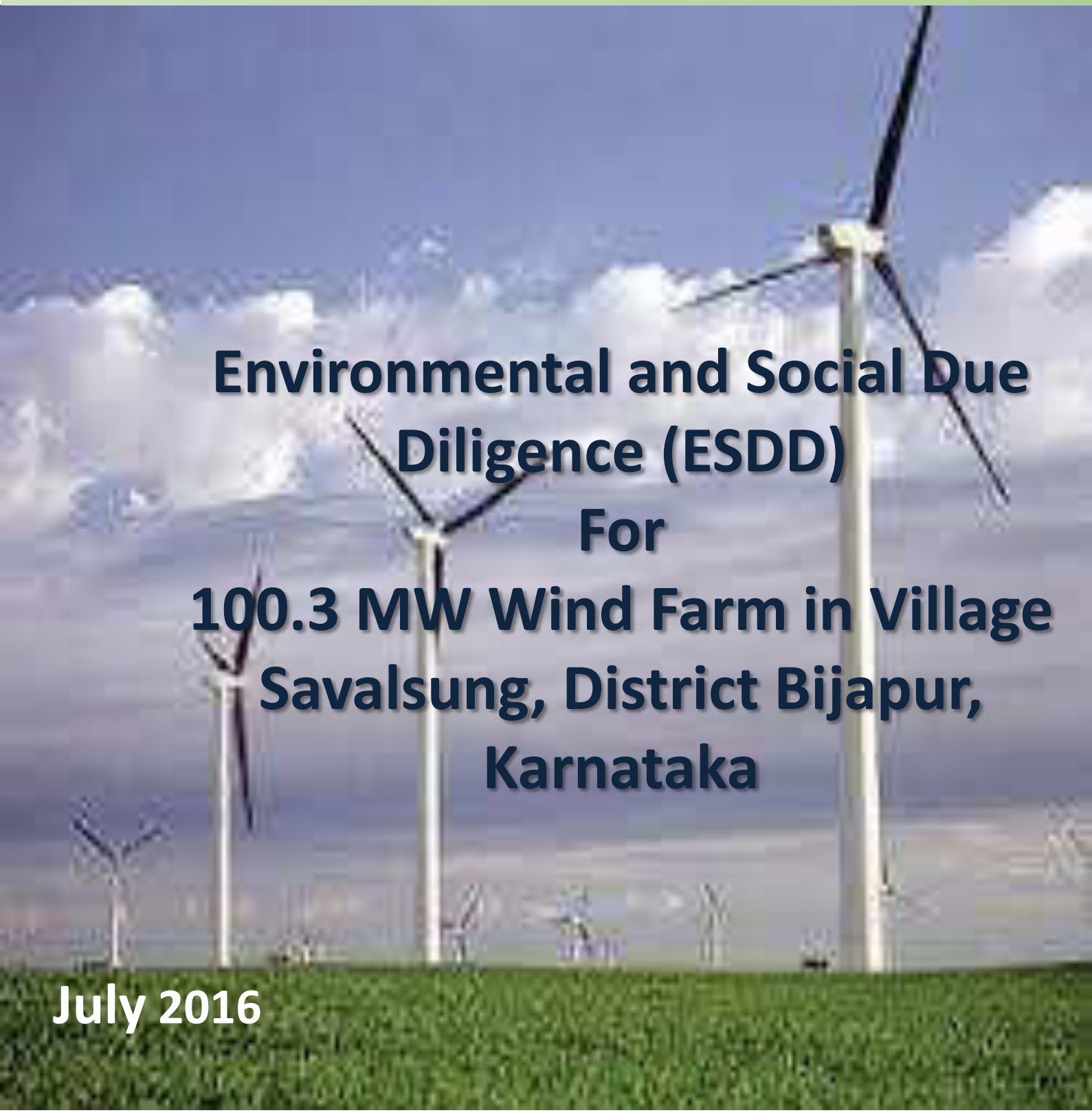

Environmental and Social Due Diligence (ESDD) For 100.3 MW Wind Farm in Village Savalsung, District Bijapur, Karnataka

July 2016

Submitted by

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ENVIRONMENTAL AND SOCIAL

DUE DILIGENCE REPORT

FOR

100.3 MW WIND FARM AT VILLAGE Savalsung, Bijapur, Karnataka

Project Name:	Environmental and Social Due Diligence (ESDD) Report for 100.3 MW Wind Power Plant at Savalsung, District Bijapur, Karnataka.
Project Code:	GUR/15-16/1608/EMS
Report Ref:	PO No. 9300001359 Dated 03.05.2016
Status:	Final
Client Company Name:	**Mytrah Vayu (Krishna) Private Limited**
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Document Revision Record

Issue No	**Date**	**Details of Revisions**
1	June 30, 2016	Draft Report
2	July 13, 2016	Final Report

ABBREVIATIONS

ADB	Asian Development Bank
KPCB	Karnataka Pollution Control Board
BOD	Biological Oxygen Demand
BPA	Business Partnership Agreement
BPL	Below Poverty Line
CEA	Central Electricity Authority
CHC	Community Health Centre
CPCB	Central Pollution Control Board
CSR	Corporate Social Responsibility
CTE	Consent to Operate
CTO	Consent to Establish
DISH	Directorate of Industrial Safety and Health
EAC	Expert Appraisal Committee
EHS	Environment, Health and Safety
EPC	Engineering Procurement and Construction
ESDD	Environmental and Social Due Diligence
ESMP	Environmental and Social Management Plan
ESZ	Ecologically Sensitive Zone
FGD	Focus Group Discussions
GRM	Grievance Redressal Mechanism
IFC	International Finance Corporation
IMD	Indian Meteorological Department
IPP	Independent Power Producer
MEIL	Mytrah Energy (India) Limited
MEL	Mytrah Energy Limited
MoEF & CC	Ministry of Environment, Forests & Climate Change
MSL	Mean Sea Level
MVKPL	Mytrah Vayu (Krishna) Private Limited
NAAQS	National Ambient Air Quality Standards
NABL	National Accreditation Board for Testing and Calibration Laboratories
NOC	No Objection Certificate
O&M	Operation and Maintenance
OBC	Other Backward Caste
PHC	Primary Health Centre
PS	Performance Standard
RTFCTLARR	Right to Fair Compensation and Transparency in Land Acquisition and Rehabilitation & Resettlement
SC	Scheduled Caste
SCADA	Supervisory Control and Data Acquisition
SEIAA	State Environment Impact Assessment Authority
SEMS	Social and Environmental Management System
SPS	Safeguard Policy Statement

SPV	Special Purpose Vehicle
ST	Scheduled Tribe
TDS	Total Dissolved Solid
VSPL	Voyants Solutions Pvt. Ltd.
WPR	Work Participation Ratio
WTG	Wind Turbine Generator

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1 INTRODUCTION

1.1 Project Background

Mytrah Vayu (Krishna) Pvt. Ltd. (MVKPL or Company) is a wholly owned subsidiary of Mytrah Energy (India) Limited ('MEIL' or 'Hold Co.' or Mytrah) to house 100.3 MW of Wind Power assets based in Savalsang site, which is located in Indi Taluka of Bijapur district, Karnataka.

Mytrah is a wind power developer with plans to become a leading renewable IPP in India. The Company intends to implement, own and operate 5 GW of wind energy generation capacity by 2017 through its various SPVs and to facilitate its plan, has entered into agreements with the leading wind turbine manufactures like, Suzlon and Gamesa for supply of WTGs. It aims to provide renewable energy to under the Power purchase agreements signed with various end users.

Mytrah is a wholly owned subsidiary of Mytrah Energy Limited (MEL) which is listed on AIM - a sub-market of the London Stock Exchange. MEL's investors include some of the largest funds such as Henderson, Eton Park, Capital International, and Blackrock. Mytrah has secured equity funding of INR.600 Crores from Indian Infrastructure Fund, IDFC and PTC India Financial Services in three tranches for Project Equity for existing and future projects. 340 MW are fully funded and are under different stage of implementation.

Mytrah plans to achieve its objective through a judicious mix of turnkey contracts and self-development model. The energy so produced from the wind farm is being sold out to the State Utility i.e. either ESCOMs of Karnataka under REC mechanism.

MEIL has entered into Multi Annual Agreement with Gamesa on 04th May 2011. MVKPL had issued a purchase order to supply and erect 118 numbers of G58 i.e. 100.3 MW wind power project at Savalsang site in the state of Karnataka.

1.2 PURPOSE OF THE REPORT

This Environment and Social Due Diligence of the project has been carried out by Voyants Solutions Pvt. Ltd (VSPL) in consultation with the Project Developer, MVKPL (100.3MW at Karnataka Bijapur) to assess the adequacy of the project with the applicable national regulatory requirement and International Finance Corporation (IFC), Asian Development Bank's (ADB) and Equator Principle Financing Institutions (EPFIs). The report has been prepared as per the documents received from project developer and site visit observations.

1.3 Scope Of Work

The due diligence report for project has the following scope of work:

i. Project description including details of adopted technology for wind power generation
ii. Baseline status of environmental and social profile of project area based on primary and secondary information and detailed site visits
iii. To list out flora and fauna at the project and surroundings based on primary and secondary survey
iv. Review of land documents and land acquisition process adopted for the project and impact of land acquisition
v. Environmental and Social impact (if any) for any applicable ROW
vi. Check and confirm if the project is properly following to the Environmental and Social good practices.
vii. Check and confirm if the project is compiling with the applicable Environmental and Social regulatory requirements.

viii. Assessment of EMP of proposed activity
ix. Public consultation with villagers and stakeholders considering EHS and Social impact
x. Review of Grievance redress mechanism policies
xi. Assessment of community development programme details
xii. Review of DMP

1.4 Approach and Methodology

The due diligence report has been prepared based on the scope of work of the consultancy service; Environmental and Social Safeguards Framework (ESSF) of IFC and operational policy documents of the ADB. The methods followed for the preparation of due diligence report has been discussed under following sections-

Activity 1: Review of documents

During site visit available reports and relevant documents related to environment and social safeguards with the developer have been reviewed. The documents included Information, Memorandum, Detailed Project Report, HSE documents, Training Schedules etc.

Activity 2: Consultations with the Developer

Two-stage consultation process has been conducted towards preparation of the due diligence report: -

- Consultation prior to the site visit to appraise about the project, and
- Consultation after the site visit to ascertain the compliance procedures adopted or planning to be adopted by the developer for various safeguard issues observed at the site.

Activity 3: Site visit and on-site observations

Visit to the project site is treated as an integral part of the preparation of due diligence report. Consultant team visited the project site on 30th May 2016 – 2nd June 2016 to collect all the relevant information related to this study. The visited team comprises of Environmental specialist, Social and R&R Specialist, Ecology and Biodiversity expert, Laboratory professional and project proponent.

Activity 4: Public Consultation and Stakeholders meeting

Stakeholders Consultation was carried out to obtain their opinion about the project. During consultation with village panchayat member and other people, the time and venue was scheduled as per the convenience of the stakeholders.

1.5 Project Documents Reviewed

The following documents were reviewed during the audit:

- QHSE policy of MEIL
- Gamesa India Road Safety guideline
- Social and Environment Management system of MEIL
- O & M contract document between MEIL & Gamesa Ltd
- Standard Operating Procedure for site
- Hazard Identification and Risk Assessment Manual

- Site emergency plan
- Power evacuation plan
- Details of subcontractor working at site and sample copy of their agreement
- Training records
- Possession letter for revenue land/sale deed
- Change of Land Use certificates
- Copies of different regulatory permission obtained for the projects
- Details of CSR activities conducted by MEIL for the local communities of the area
- Copy of authorisation under Hazardous Waste Management rule
- Disposal details of Hazardous wastes
- Grievance redressal mechanism

2 PROJECT DESCRIPTION

2.1 SALIENT FEATURES

The salient features of the project are illustrated below in **Table 2.1:**

Table 2:1: Salient Features of the Project

S. No.	Salient Features	Details
1.	Project location	Savalsung, Karnataka
2.	Total Project Capacity	100.3 MW
3.	Total number of WTGs	118
4.	Land required	118.85 acres
5.	Geographical Location of the Project	17^0 06'34.3"N 75^0 44'56.4"E
6.	Altitude above MSL	470 to 650 m
7.	Nearest Road & Highways	Solapur Mangalore Highway (NH-13)
8.	Nearest Railway Station	Bijapur Railway Station
9.	Nearest Airport	Pune Airport
10.	Seismic Zone	Zone III
11.	Project Cost in INR	INR 633 Crores

2.2 Project Location

The Savalsang wind farm site is located approximately 25 km in the Southwest of Indi, 40 Km from South of Bijapur and 300km west-south of Hyderabad as shown in Figure below.

The Savalsang Site lies on undulating hills oriented in north south direction, and with an elevation between 640 m to 550 m .It was observed that the area has a differential elevation of around 35 to 40m towards the west.

The ground cover at the site comprises largely of open agricultural land, and some scattered trees ranging from height of 2 m to 4 m.

1	State	Karnataka
2	District	Bijapur
3	City/Village(s)/Taluka	Bijapur/Savalsang/Indi
4	Project	Savalsang Phase 100.3
5	Nearest Railway station	Indi Railway Station, 7Km
6	Nearest National Highway	NH-13 approx 5Km
7	Nearest State Highway	SH-34 approx 25Km

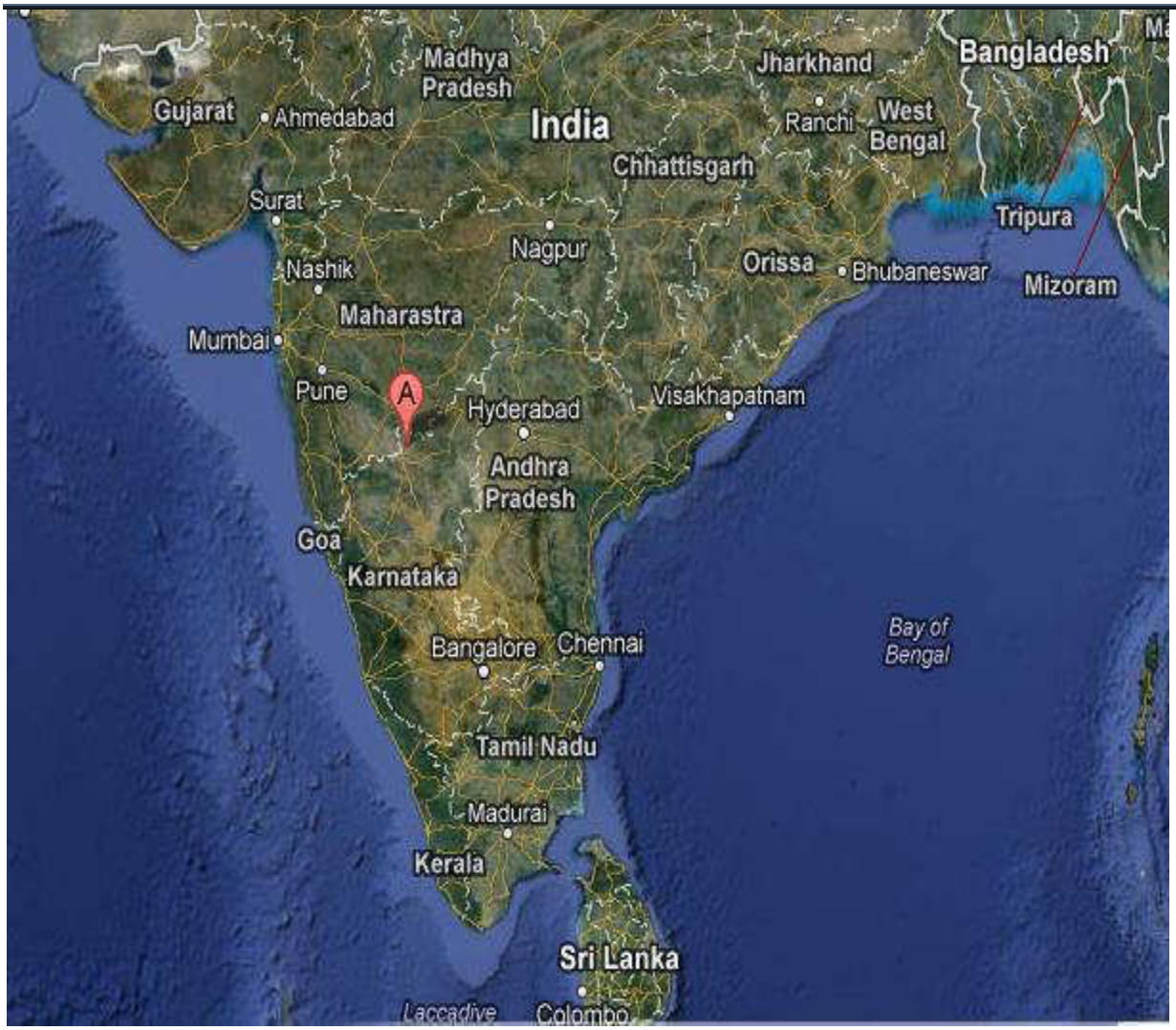


Figure 2.1: Location Map of the project Site

A detailed map showing the location of all the proposed Gamesa G58 turbines are presented in the figure below.

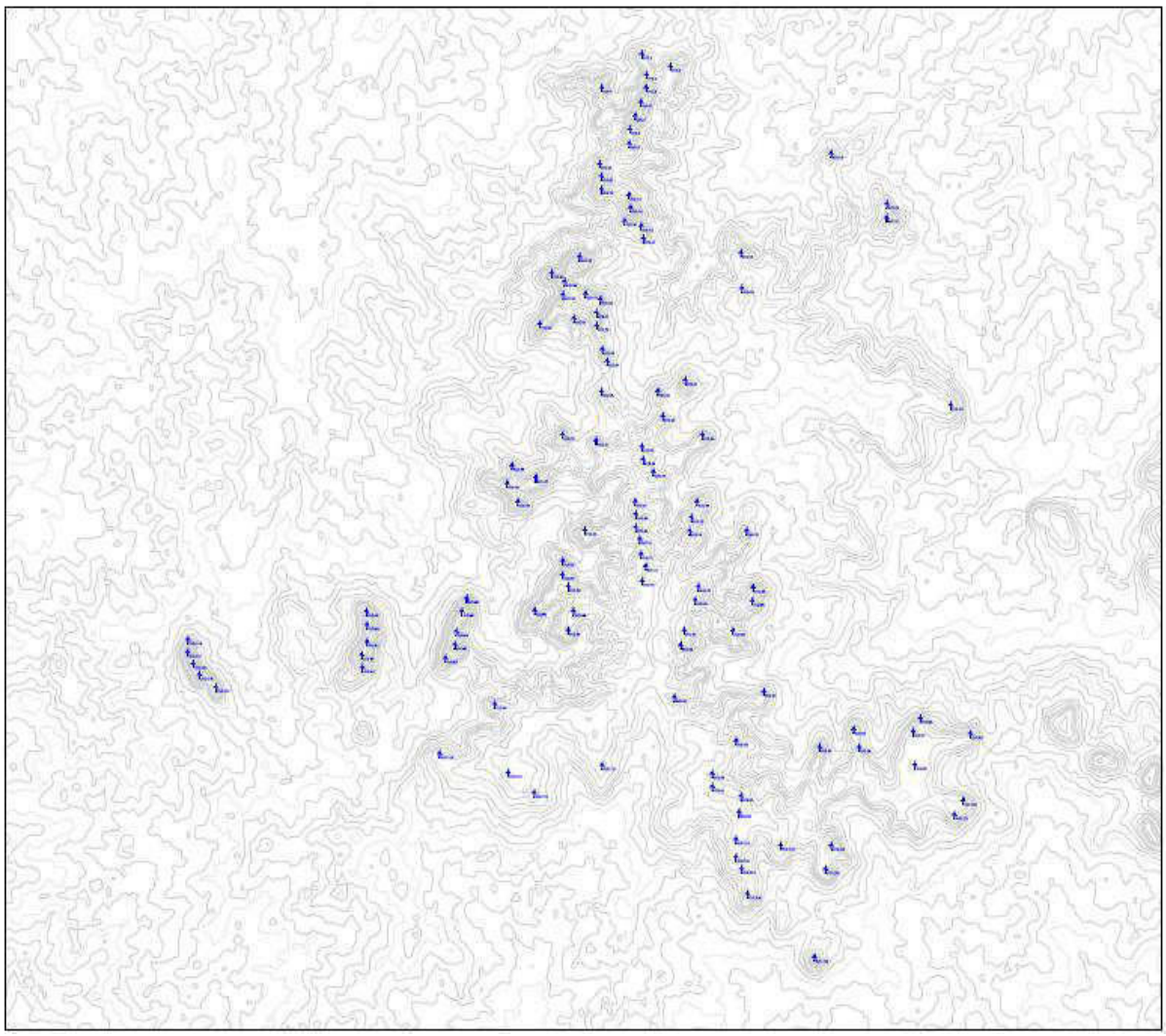
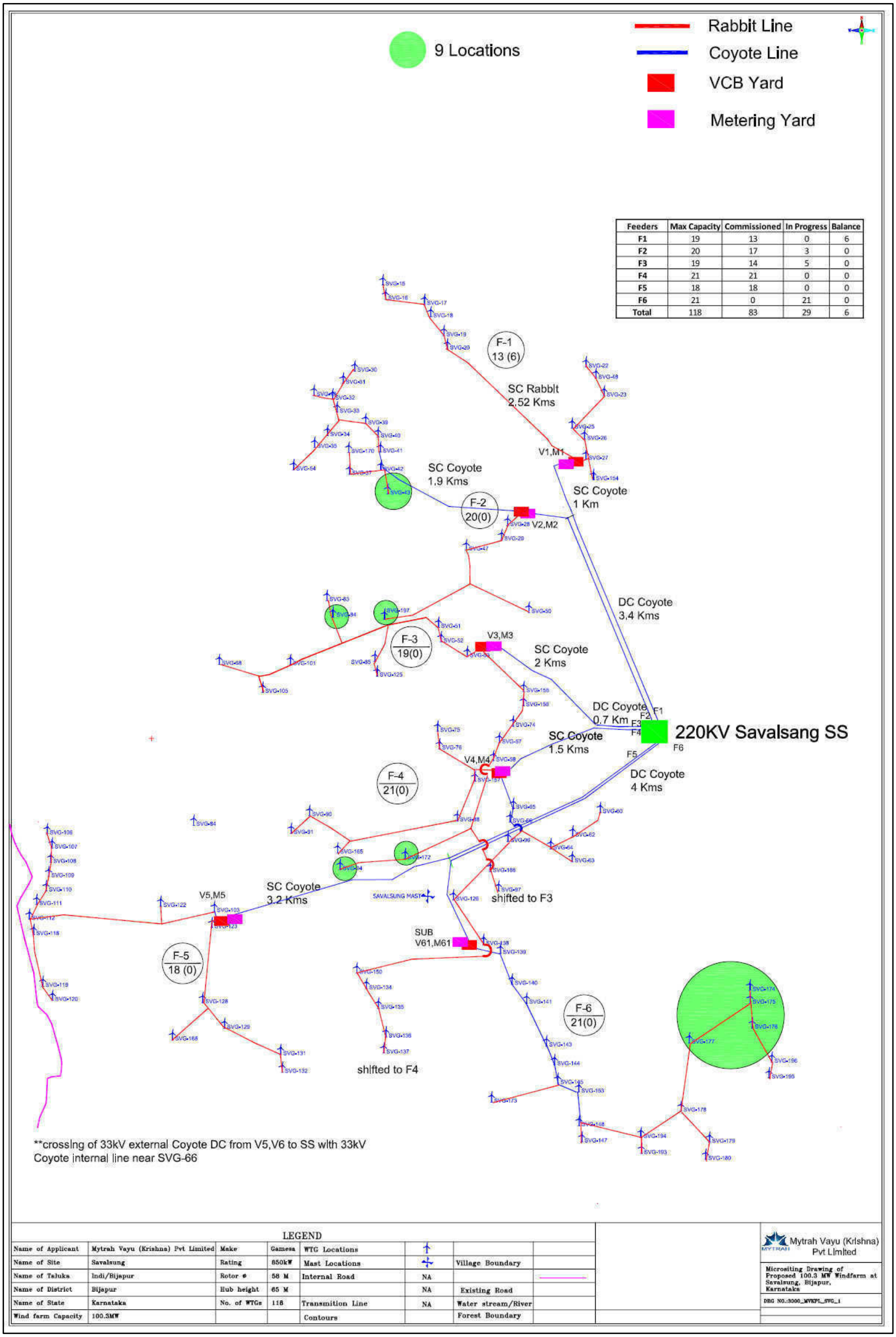


Figure 2.2: Location of WTGs at the project site



Feeders	Max Capacity	Commissioned	In Progress	Balance
F1	19	13	0	6
F2	20	17	3	0
F3	19	14	5	0
F4	21	21	0	0
F5	18	18	0	0
F6	21	0	21	0
Total	118	83	29	6

LEGEND

Name of Applicant	Mytrah Vayu (Krishna) Pvt Limited	Make	Gamesa	WTG Locations			
Name of Site	Savalsung	Rating	850kW	Mast Locations		Village Boundary	
Name of Taluka	Indi/Bijapur	Rotor ø	58 M	Internal Road	NA		
Name of District	Bijapur	Hub height	65 M		NA	Existing Road	
Name of State	Karnataka	No. of WTGs	118	Transmition Line	NA	Water stream/River	
Wind farm Capacity	100.3MW			Contours		Forest Boundary	

Mytrah Vayu (Krishna) Pvt Limited

Micrositing Drawing of Proposed 100.3 MW Windfarm at Savalsung, Bijapur, Karnataka

DRG NO.:3000_MVKPL_SVG_1

Figure 2.3: Micro siting Map of WTGs at the project Site

The location map of the proposed project site is showing in Figure 2.1: whereas the below photographs depict the project site and its vicinity in the photolog listed in Figure 2.4

	
West Direction from the Project Site	**East Direction from the Project Site**
	
North Direction from the Project Site	**South Direction from the Project Site**
	

Figure 2.4: Vicinity of the project Site

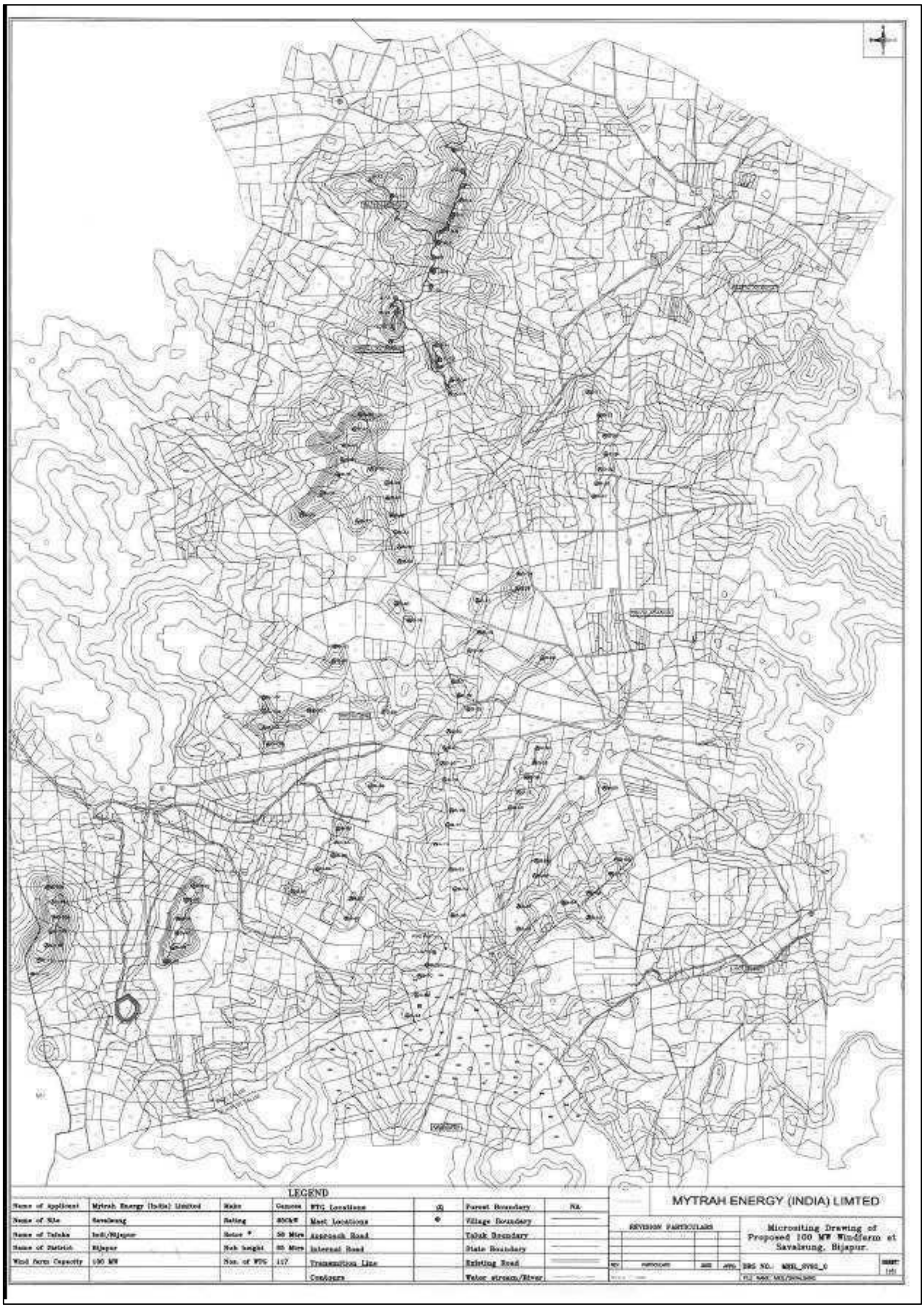


Figure 2.5: Contour Map of the project Site

2.3 Technical Components of Project

Gamesa G 58 Tech Specification

Table 2:2 : Gamesa G58 Tech Specification

S. No	Item	Specifications
1.	Rotor diameter	58.0 m
2.	Maximum electrical output	850 KW
3.	Cut-in wind speed	4.0 m/s
4.	Cut-out wind speed	25 m/s
5.	Rated wind speed	12 m/s
6.	Rotor swept area	2642 m^2
7.	Rotational speed	19.44 to 30.8 rpm.
8.	Rotor material	Hub – Cast iron as per EN-GJS-400-18U-LT Blade – Fiber glass pre-impregnated with epoxy resin.
9.	Power Regulation	Pitch System
10.	Generator	Doubly fed machine
11.	Rated output	850 KW
12.	Operating voltage	690 V (+/-10%)
13.	Frequency	50 Hz
14.	Protection class	IP 54
15.	Cooling system	Air Cooled; Forced Air-Air Cooled.
16.	Slip Control	Flexi Slip Control System
17.	Gear box	1:61.74
18.	Yaw drive system	Active electric yaw drive having electric motor with brake, gearbox & pinion
19.	Yaw bearing	Slide bearing with gear ring
20.	Aerodynamic Brake	Three simultaneous pitching blades
21.	Mechanical brake	Hydraulic Disc brake, activated by Hydraulic Pressure
22.	Tower	Tubular tower with welded steel plates
23.	Type	Steel Tubular Tower
24.	Certifications	CWET
25.	Presently Running at	Maharashtra, Tamil Nadu, Gujarat
26.	Clients Using	SSM Group of wind mills.

Source: Karnataka 100.3 MW, Detailed Project Report (DPR)

Land

The land acquired for this project is basically private land. The topography of the area is rocky and hilly terrain The land acquisition for the project was carried out in eight villages. These WTG;s are spread over in villages namely Hadalasang, Inchageri, Jigjivanagi, Kannur, Kolurgi, Inchageri, Mahaveeranagar, Satalago in District Bijapur. Land details are attached as Annexure V.

Wind Data

The wind data was obtained from the site. The annual mean wind speed in this area is measured to be around 6.2 m/s at 65 m height and 7 m/s at 90m height.

Wind Turbine Generator

After thorough technical evaluation and past performance of various wind turbine generators that are in operation in India it was decided to use the 118 numbers. of Gamesa G58 with 850 kW capacity Wind Energy Convertors for this project.

Infrastructure Facilities

Infrastructure amenities like approach roads, field offices, stores building, communication and network equipment's are constructed for the project. Evacuation facility comprising of Transmission lines, Sub-Station, terminal bay expansion, etc. and Power Collection Network etc. are also constructed and are as part of associated facilities.

Electrical Installation

Each Wind Energy Converter of 850 KW are connected to a 690V/33kV, 950 kVA 'outdoor' type, and Step-up transformer. Each HT side of the transformer is connected with HG fuse as a protection scheme.

33 kV electrical lines from each VCB / Metering yard either Single circuit or Double circuit is brought to the pooling Sub-Station of MVKPL and such line is called as feeders. There are many number of 33 KV feeders which are brought to the Sub-station depending on the capacity and geographical spread of the WEC's. MVKPL carries out all the electrical works through a licensed electrical contractor who has adequate experience in electrical installations. As per Karnataka Transmission Corporation Limited (KPTCL) policy bulk meter has to be provided at 220kV Indi KPTCL Substation.

From the pooling substation of MVKPL, power is being evacuated to 220KV KPTCL's Indi substation through 220 KV D/C tower line using ACSR DRAKE conductor and to a distance of around 23 Kms.

Civil Works

The roads are constructed for heavy vehicular movements and appropriate dimensions are provided for cranes and other heavy trucks to pass through. The road construction had been undertaken by a third party. The soil testing as well as mix design is being done by third parties and verified by MVKPL and Gamesa. Foundations are constructed by MVKPL through their contractor while the supply and erection are done by Gamesa.

Storage Yards

Gamesa shall be able to stock 20 sets of WTG components at storage yard provided by Mytrah at sites and such storage yard with required facilities are provided by Mytrah (Facilities not limited to Fencing with gate, Security room, Leveled Ground surface for materials unloading and movement of cranes and trailers, closed storage for handling ground panels and pallets, Light arrangements in yard for handling materials in storage yard) Gamesa also have their own container office.

2.4 Current status

At the time of the study the project was fully operational. During site visit, it was reported that about 86 persons are employed at site including engineers, security personnel and other different support staff, maximum of which are through turn-key contractors; Out of which only 22 are Mytrah's direct Employees. Refer Table 5.1

2.5 ORGANIZATIONAL STRUCTURE

The site in charge is overall responsible for Environment, Health and Safety Management System at the project site. The site engineer from MVKPL is designated with additional responsibility of supervising and coordinating Environment, Health and Safety Management System at project activities at site.

2.6 Project Categorization

The projects are screened on the following criteria for the project classification system of ADB and to establish ADB's safeguard requirements:

Environment: Proposed project is screened according to type, location and scale of the project, as well as sensitivity and magnitude of their potential environmental impacts including direct, indirect, induced and cumulative impacts.

Involuntary Resettlement: The involuntary resettlement impacts of an ADB funded projects considered significant if 200 or more persons are physically displaced from home or lose 10% or more of their productive or income generating assets.

The projects which involve involuntary resettlement, a resettlement plan are need to be prepared that should be commensurate with the extent and degree of the impacts.

Indigenous People: The impacts of an ADB funded project on indigenous people is determined by assessing the magnitude of impacts in terms of:

- Customary right of use and access to land and natural resources;
- The right of cultural and communal integrity;
- The level of vulnerability of the affected Indigenous people's community;
- Socio-economic status;
- Health, education, livelihood and social security status; and
- The recognition of indigenous people

As per these criteria projects are classified into four categories: A, B, C and F1which are described as follows:

Category A Projects: Projects which are likely to have significant adverse environmental and social impacts that are irreversible, diverse, or unprecedented.

Category B Projects: Projects with potential adverse environmental and social impacts that are less in number, generally site-specific, mostly reversible and readily addressed through mitigation measures;

Category C Projects: Projects with minimal or no adverse environmental and social impacts;

Category FI Projects: Projects which involve investment of ADB funds to or through a financial intermediary.

1.1.1. IFC Categorization Criteria

As part of its review of a project's expected social and environmental impacts, IFC uses a system of social and environmental categorization. This categorization is used to reflect the size of impacts understood as a result of the client's social and environmental assessment and to specify IFC's institutional requirements. The following categories are used by the IFC:

Category A Projects: Projects with potential significant adverse environmental and social impacts that are diverse, irreversible or unprecedented;

Category B Projects: Projects with potential limited adverse social or environmental impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures;

Category C Projects: Projects with minimal or no adverse social or environmental impacts, including certain financial intermediary (FI) projects with minimal or no adverse risks;

Category FI Projects: All Financial Intermediary (FI) projects excluding those that are Category C projects.

IFC therefore categorizes projects primarily according to the significance and nature of impacts. IFC defines the project's area of influence as the primary project site(s) and related facilities that the client (including its contractors) develops or controls; associated facilities that are not funded as part of the project (funding may be provided separately by a client or a third party including the government), and whose viability and existence depend exclusively on the project and whose goods or services are essential for the successful operation of the project; areas potentially impacted by cumulative impacts from further planned development of the project; and areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location. The area of influence does not include potential impacts that would occur without the project or independently of the project.

The major observations of the proposed project are as follows.

- The project is a green-field project. No resettlement and rehabilitation or involuntary resettlement is proposed for the project.
- The land for the project is devoid of any natural forest or ecology of great concern. Hence no significant impact on ecological balance of the area is expected. The project is located away (10km surrounding the project boundary) from all ecologically sensitive areas like national parks, wildlife sanctuaries, scheduled areas and critically polluted areas.
- No specific group of community is likely to be get affected by the project.
- The site is devoid of any settlement. Hence, no impact on nearby settlement is expected due to project activities.

On the basis of above observations project is categorized as **'Category B'.**

3 BASELINE CONDITION OF PROJECT AREA

3.1 Soil

The district has two types of soil. first one is deep black soil (or yearibhoomi), which is good for the crops like jawar, wheat, pulses, sunflower, etc. The major portion of the district consists of this kind of soil which has a great moisture-holding capacity. Second one is red soil (or masaribhoomi), which is generally poor, good for irrigation and horticulture.

3.2 Rainfall

The district has 34 rain gauge stations. The average annual rainfall for the whole district is 552.8 mm, with 37.2 rainy days. The monsoon generally reaches the district by June and lasts till October. Though the total rainfall is not high, the district benefits both from the south-west and the north-east monsoons. The annual rainfall varies from place to place within the district.

Source: Wikipedia

3.3 Rivers

Krishna river, which is the most important river of the district. It flows about 125 miles in the district. A dam is built across the river at Almatti, Bhima river flows in northern part of district for about 20 miles. It overflows in the rainy season and spreads over a wider area, which is thereby rendered extremely fertile land. In central part of district Doni River flows.

3.4 Climate and Temperature

Bijapur has a semi-arid climate. It is located at 16.83°N 75.7°E. It has an average elevation of 606 metres (1988 ft).

The climate of Bijapur district is generally dry and healthy. In summer, especially in April and May it is too hot; at that time the temperature lays between 40 degree Celsius to 42 degree Celsius. In winter season, from November to January the temperature is between 15 degree Celsius to 20 degree Celsius. Usually the district has dry weather, so the humidity varies from 10% to 30%.

Table 3:1: Climate Data for Bijapur

Climate data for Bijapur													
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Average high °C (°F)	29.2 (84.6)	32.8 (91)	35.9 (96.6)	37.9 (100.2)	37.5 (99.5)	34.0 (93.2)	31.1 (88)	31.0 (87.8)	31.1 (88)	31.0 (87.8)	29.5 (85.1)	29.0 (84.2)	32.5 (90.5)
Average low °C (°F)	15.5 (59.9)	17.6 (63.7)	22.6 (72.7)	24.0 (75.2)	25.0 (77)	23.0 (73.4)	22.2 (72)	22.0 (71.6)	22.7 (72.9)	20.2 (68.4)	16.7 (62.1)	13.0 (55.4)	20.37 (68.69)
Average rainfall mm (inches)	8.6 (0.339)	3.1 (0.122)	6.0 (0.236)	10.0 (0.394)	16.2 (0.638)	61.1 (2.406)	77.1 (3.035)	74.5 (2.933)	62.0 (2.441)	51.6 (2.031)	27.2 (1.071)	3.5 (0.138)	400.9 (15.784)

Source: Wikipedia

3.5 Geography

Bijapur District has an area of 10,541 square kilometres. It is bounded on the east by Gulbarga District, on the southeast by Raichur District, on the south and southwest by Bagalkot District, and on the west by Belgaum District, and by the Maharashtra of Sangli on the northwest and Sholapur on the north, Sangli on the north-west (both of Maharashtra state).

It consists 5.49% of Karnataka state area. It lies between 15 x 50 and 17 x 28 North Latitude and 74 x 54 and 76 x 28 East Longitude. The administrative headquarters and chief town is Bijapur.

Geographically, the district lies in the tract of the Deccan Plateaus. The lands of the district can be broadly divided into three zones: the northern belt consisting of the northern parts of Bijapur Taluks of Indi and Sindagi; the central belt consisting of Bijapur city; the southern belt consisting of the rich alluvial plains of the Krishna Rivers parted from the central belt by a stretch of barren Trap. The northern belt is a succession of low rolling uplands without much vegetation, gently rounded and falling into intermediate narrow valleys. The upland soil being shallow, the villagers are generally confined to the banks of the streams and are far away from one another. The Don River Valley has plains and consists of rich tracks of deep black soils stretching from west to east in the central part of the district. Across the Krishna River is a rich plain crossed from west to east by two lines of sandstone hills. Further south towards Badami and southwest to east by two lines of sandstone hills are present. Further south towards Badami and southwest of Hunagund, the hills increase the number and the black soil gives way to the red.

There are 34 rain gauge stations in Bijapur District. The average annual rainfall for the district is 553 mm with 37.2 rainy days. The monsoon generally breaks in the district during June and lasts till October. The highest mean monthly rainfall is 149 mm in the month of September and lowest is 3 mm in February. The annual rainfall variation in the district is marginal from place to place.

The soils of Bijapur District can be categorized as a low to moderately yielding area (1000 to 8000 L/h) 72.2% of district falling in this category. From considerable part of the district (9%) poor yielding (less than 1000 L/h sources) or non–feasible areas have been reported. The talukas having largest poor yielding area, are Muddebihal (19%) followed by Indi (15%), Bijapur and sindagi (13% each), Basavan Bagewadi (4%). Low yielding areas (1000 to 4000 L/h source) in the district constitute about 40% of the district, with the largest being Basavan Bagewadi (54%) and smallest in Indi taluka Moderate yields (4000 to 8000 L/h source) are reported from 36% of the district, highest being in Bijapur with 70% of the area, and lowest being in Sindagi with 19% of the taluka. High yielding areas (more than 8000 L/h sources) occupy over 15% of the district. The smallest area under this category are in Sindagi Taluka (2% each) and largest is in Muddebihal (29% each) where very lengthy contact zones occur between traps and other formations

On the basis of projections from this information, the main parameters affecting water quality in Bijapur can be expected to be brackishness (salinity) and hardness (PH). Salinity affects the district in high to low groundwater problem areas and occurs in areas all along the major and minor river courses and stream courses.

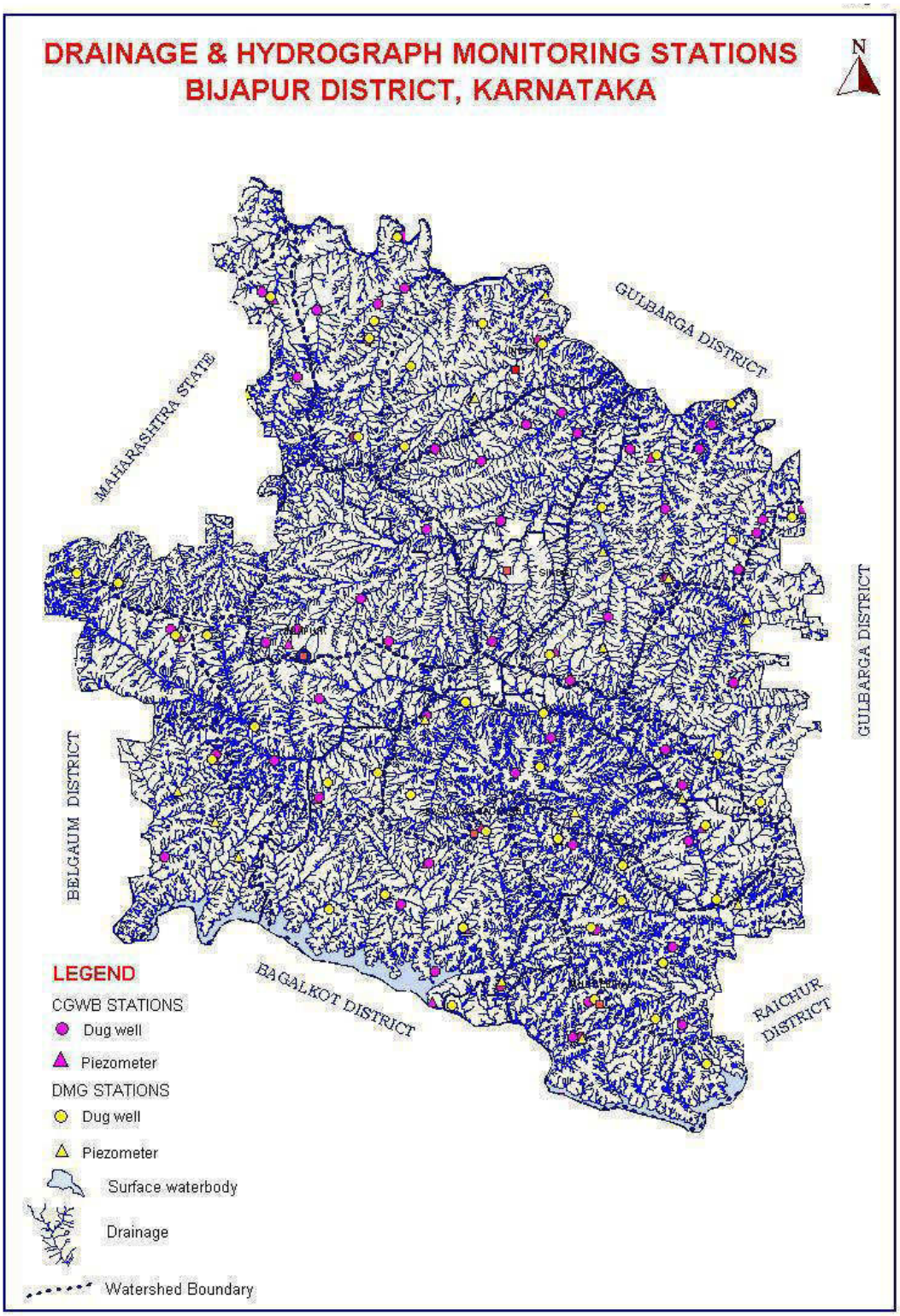
Figure 3.1: Political map of the Bijapur district

In 2014, Sajjade Peeran Mushrif became the first Mayor of the historical City Bijapur.

3.6 Drainage

The Krishna River forms the southern boundary with Bagalkot district and Bhima river forms northern boundary with the Maharastra State. Southern part of Bijapur district forms a catchment area of the Krishna while northern part forms catchment area of Bhima. Bhima River is an important tributary of the Krishna River. A major dam has been constructed across the Krishna River near Almatti in the district. Don River is the tributary of the Krishna and flows for about 160 kms in a meandering course from west to east in the central part of the district. The water of this river is generally brackish; it becomes saline at several places during dry months of the year, resulting salt encrustations on the banks of dry beds. During the rainy seasons the river is subjected to flash floods. The drainage pattern is sub-dendritic to sub-parallel in nature and the drainage density varies from 0.49 to 1.02 km/km^2. The drainage network of the district is shown in Figure -3.2.

Figure 3.2: Drainage Pattern of the project Site



Source: Central Ground Water Board (CGWB)

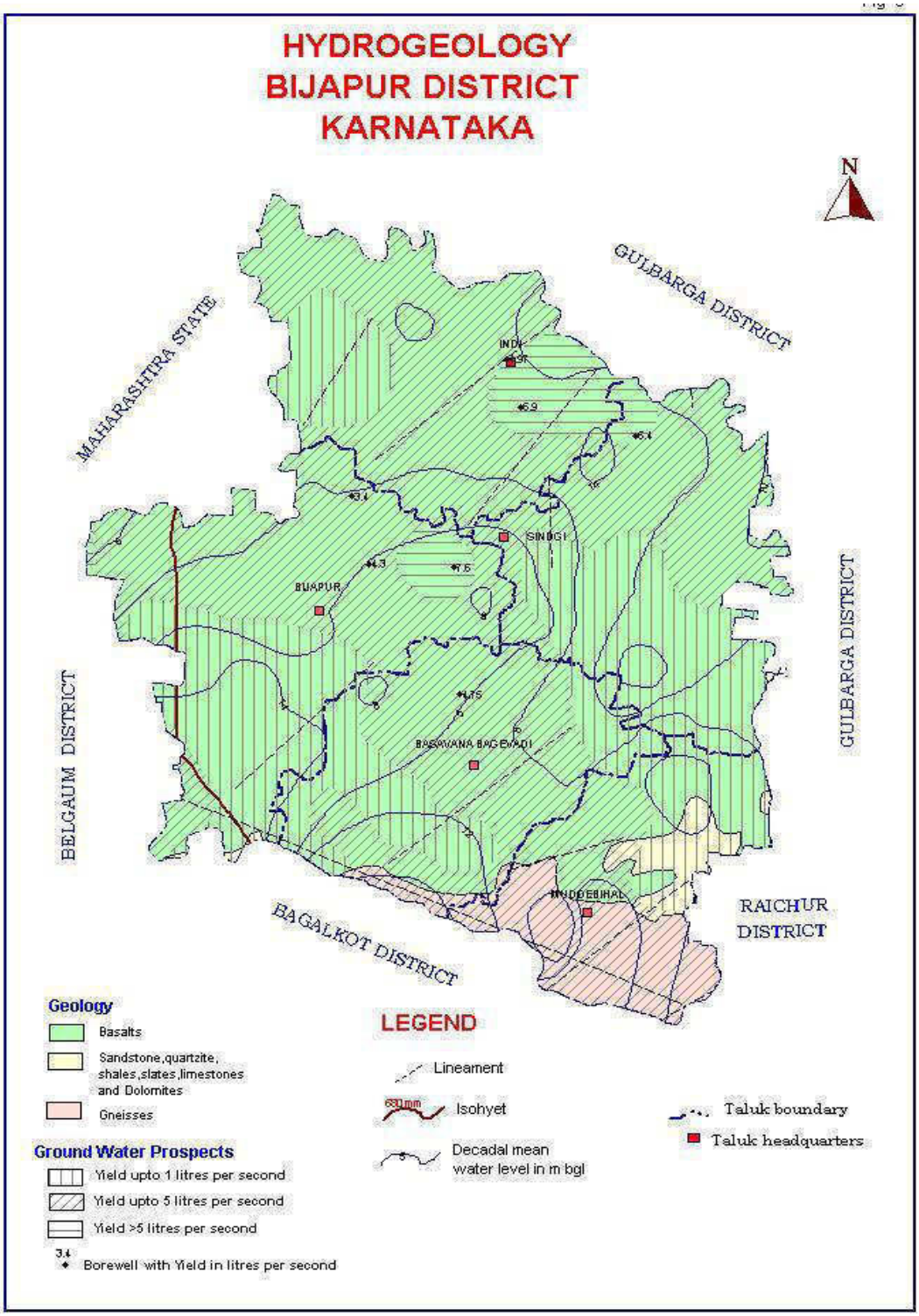
3.7 Geomorphology and Soil Types

The entire district is categorized as Deccan Pediplain. Physiographically, it can be divided into four physiographic units viz., residual hills, pediments, pediplains and valleys. The ground altitude varies from 470 to 650 m above MSL. The ground surface is flat, gently sloping forming broad valleys and flat-topped hills. Flat topped hills with step like sides exhibit the terraced landscape. The northern belt is a succession of low rolling uplands devoid of vegetation. The district is occupied by three types of soils viz. Black soils, Red sandy soils and mixed soils. Formation of various types of soils is a complex function of chemical weathering of bedrocks, vegetative decay and circulation of precipitated water. Soils are mostly in-situ in nature. Black soils derived from basaltic bedrock. These soils in upland areas are shallower and are deeper in valley portions. The Don River valley has plains and consisting of rich tracks of deep black cotton soils stretching from west to east in the central part of the district. The infiltration characteristics are poor to moderate. The constant rate of infiltration in these soils varies from 0.75 to 2.5 cm/hr. These soils are alkaline in nature, low in potassium and nitrogen. Black cotton soils with high clay and humus content in low-lying areas. They have high moisture holding capacity and on drying up these soils develop open cracks. Red soils, which are sandy in nature derived from granites, gneisses and sandstones, are found in southern part of Muddebial taluk of the district. The infiltration rates of these soils range from 2.6 to 3.8 cm/hr. Mixed soils are derived from the fringe areas of Deccan traps and granites, gneisses, lime-stones and sandstones in Muddebial and Basavana Bagewadi taluks of Bijapur district. These are dark greyish brown and dark brown to dark reddish brown in colour. Their texture varies from loam to clay. The infiltration characteristics of these soils are moderate to good in nature.

3.8 Hydrogeology

The hydrogeological map of Bijapur district has been shown in Figure3.3, which depicts isohyets, depth to water levels contours and yields of bore wells.

Figure 3.3: Water Level Contours Map of the project Site



Source: Central Ground Water Board (CGWB)

3.9 Air Environment

The monitoring of the ambient air quality (AAQ) in and around the project site has been carried out for one week from 30th May 2016 – 5th June 2016by Vison labs, recognised by NABL and MoEF. Sampling at each location and analysis has been carried out as per guidelines of Central Pollution Control Board and as per the requirements of MoEF&CC.

S.No	Village	Direction	Station
1.	Site Office	Centre	AAQ1
2.	CMC Building	Upwind	AAQ2
3.	Kannur Village	Downwind	AAQ3

Kannur

Site Office

	
Site Office	**CMC Building**

Table 3:2: Ambient Air Quality at AAQ1- Site Office (in ug/m^3)

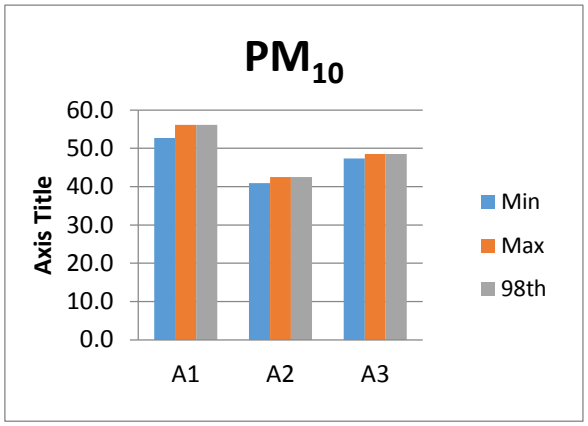
Date of Sampling	SO_2	NO_X	PM_{10}	$PM_{2.5}$	CO
31.05.2016	6.7	14.1	52.7	25.0	<1.0
01.06.2016	6.3	15.8	56.2	26.3	<1.0
MIN	6.3	14.1	52.7	25.0	<1.0
MAX	6.7	15.8	56.2	26.3	<1.0
AVG	6.5	14.9	54.4	25.6	<1.0
10th	6.4	14.3	53.0	25.1	<1.0
20th	6.4	14.4	53.4	25.2	<1.0
30th	6.5	14.6	53.7	25.4	<1.0
50th	6.5	14.9	54.4	25.6	<1.0
80th	6.7	15.4	55.5	26.1	<1.0
98th	6.7	15.7	56.1	26.3	<1.0
AM	6.5	14.9	54.4	25.6	<1.0
GM	6.5	14.9	54.4	25.6	<1.0
Standard Deviation	0.3	1.2	2.5	1.0	<1.0

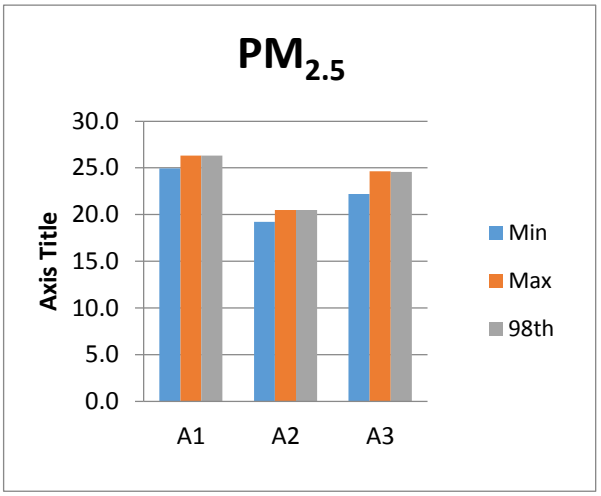
Table 3:3: Ambient Air Quality at AAQ2- CMC Building (in ug/m^3)

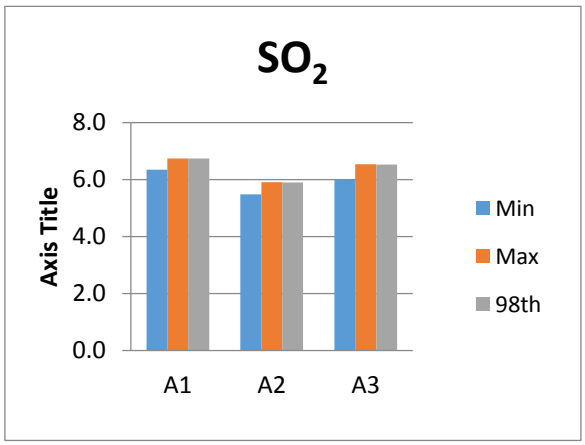
Date of Sampling	SO_2	NO_X	PM_{10}	$PM_{2.5}$	CO
31.05.2016	5.5	11.5	42.5	20.5	< 1.0
01.06.2016	5.9	12.6	40.9	19.2	< 1.0
MIN	5.5	11.5	40.9	19.2	<1.0
MAX	5.9	12.6	42.5	20.5	<1.0
AVG	5.7	12.1	41.7	19.9	<1.0
10th	5.5	11.6	41.1	19.3	<1.0
20th	5.6	11.7	41.2	19.5	<1.0
30th	5.6	11.8	41.4	19.6	<1.0
50th	5.7	12.1	41.7	19.9	<1.0
80th	5.8	12.4	42.2	20.2	<1.0
98th	5.9	12.6	42.5	20.5	<1.0
AM	5.7	12.1	41.7	19.9	<1.0
GM	5.7	12.0	41.7	19.8	<1.0
Standard Deviation	0.3	0.8	1.1	0.9	<1.0

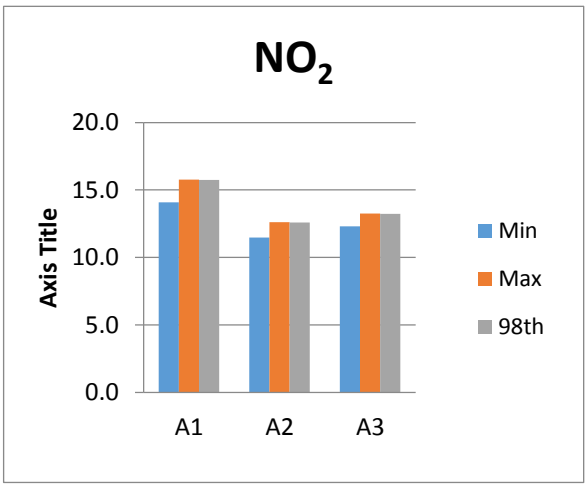
Table 3:4: Ambient Air Quality at AAQ3- Kannur Village (in ug/m^3)

Date of Sampling	SO_2	NO_X	PM_{10}	$PM_{2.5}$	CO
31.05.2016	6.5	12.3	47.4	22.2	< 1.0
01.06.2016	6.0	13.2	48.6	24.6	< 1.0
MIN	6.0	12.3	47.4	22.2	<1.0
MAX	6.5	13.2	48.6	24.6	<1.0
AVG	6.3	12.8	48.0	23.4	<1.0
10th	6.1	12.4	47.5	22.4	<1.0
20th	6.1	12.5	47.6	22.7	<1.0
30th	6.2	12.6	47.7	22.9	<1.0
50th	6.3	12.8	48.0	23.4	<1.0
80th	6.4	13.1	48.3	24.1	<1.0
98th	6.5	13.2	48.5	24.6	<1.0
AM	6.3	12.8	48.0	23.4	<1.0
GM	6.3	12.8	48.0	23.4	<1.0
Standard Deviation	0.3	0.8	1.1	0.9	<1.0









Inference:

As per field data collection and analysis, PM_{10}, $PM_{2.5}$, SO_X, NO_X are well below the prescribed limit, which implies that the air quality is within prescribed standards in the project site area.

3.10 Noise Environment

Locations for noise monitoring are identified based on the criteria same as those used for air monitoring. As per the noise level data collection and analysis, day and night time noise levels are well within prescribed limit as per the standard of CPCB.

Table 3:5: Noise Quality in the Study (in decible)

S. NO	Location Name	Coordinates		Location Code	Date of Monitoring
1	Site Office	17^0 06'34.3" N	75^0 44'56.4" E	N1	31.05.2016
2	CMC Building	17^0 07'04.9" N	75^0 42'57.3" E	N2	01.06.2016
3	Kannur Village	17^0 03'31.6" N	75^0 43'55.9" E	N3	02.06.2016
4	Inchageri Village	17^0 06'23.3" N	75^0 41'17.1" E	N4	03.06.2016

Noise- Inchagiri

Noise- Kannur

Noise- CMC Building

Noise- Site Office

Noise- Site Office

Table 3:6: Noise Sample

	Leq DAY	Leq NIGHT	Leq DAY NIGHT
N1- Site Office	51.8	37.4	50.8
N2- CMC Building	50.8	36.7	49.8
N3- Kannur Village	53.7	38.8	52.6
N4-Inchageri Village	52.6	38.0	51.5

Inference:
Inchageri is the nearest village to the WTG and is the residential area. The prescribed standard for equivalent noise levels residential areas are 55 dB (A) for day time (0600 to 2200 hours) and 45 dB(A) for night time (2200 to 0600 hours) as CPCB. The monitored noise levels were within the prescribed limits of the CPCB norms with respect to noise at all locations. MVMPL will also follow OHSAS norm of 8-hour exposure to 85 dB which is Occupational Noise Exposure. The Noise in day time are within the prescribed limit but in night time it is more than the prescribed limit.

3.11 Water Environment

Ground water samples are collected from borewell at the site whether surface water samples were collected from Jigjeevagi lake on 31stMay, 2016. The physical and chemical parameters of the collected samples were tested as per established standard methods and procedures. As per field data collection and analysis of ground water and surface water, all the parameters are within permissible limit in both the places except

Ground Water- Site Office

Surface Water- Jigjeevagi lake

Table 3:7: Ground Water Quality in the Study

S.No	Parameter	Unit	Site Office Bore well Water N 17o06'33.0" E 75o44'57.0"	
			GW 1	Range
1	pH at 25 deg C	--	8.2	6.5-8.5
2	Turbidity	NTU	<1.0	5-10
3	Conductivity at 25 deg C	µMho/cm	454	
4	TSS	mg/L	2.2	
5	TDS	mg/L	280	
6	Total Alkalinity as $CaCO_3$	mg/L	110	
7	Chlorides as Cl^-	mg/L	55	250-1000
8	Sulphates as SO_4^{-2}	mg/L	31.2	200-400
9	Nitrates as NO3	mg/L	3.8	40-100
10	Phosphates as PO_4	mg/L	<0.02	
11	Total Hardness as $CaCO_3$	mg/L	40	200-600
12	Calcium as Ca	mg/L	12	75-200
13	Magnesium as Mg	mg/L	2.4	30-100
14	Sodium as Na	mg/L	82.8	
15	Potassium as K	mg/L	1.9	
16	Flourides as F^-	mg/L	0.3	1-1.5
17	Iron as Fe	mg/L	0.08	0.3-1
18	Phenolic Compounds	mg/L	<0.001	0.001-0.002
19	Cyanide as CN^-	mg/L	<0.001	0.005
20	Residual Chlorine as Cl^-	mg/L	<0.001	0.2
21	Cadmium as Cd	mg/L	<0.001	0.01
22	Total Chromium as Cr	mg/L	<0.001	0.05
23	Lead as Pb	mg/L	<0.02	0.05
24	Zinc as Zn	mg/L	0.008	5-15
25	Manganese as Mn	mg/L	<0.001	30-100
26	Copper as Cu	mg/L	0.01	0.05-1.5
27	Nickel as Ni	mg/L	<0.001	3.0-5.0
28	Colour	Hazen	<01	5.00
29	Taste	-	Agreeable	Agreeable
30	Odor	-	Unobjectionable	Unobjectionable
31	Boron	mg/L	<0.001	1.00
32	Anionic Detergents	mg/L	<0.001	0.20
33	Mineral Oil	mg/L	<0.001	0.01

S.No	Parameter	Unit	Site Office Bore well Water N 17o06'33.0" E 75o44'57.0"	
			GW 1	Range
34	Aluminium as Al	mg/L	<0.001	0.03
35	Mercury as Hg	mg/L	<0.0002	0.00
36	Pesticides	mg/L	<0.001	Absent

Table 3:8: Surface Water Quality in the Study

Sr.No	Parameter	Units	IS:2296 Class C Limits	SW 1
				Jigjeevangi Lake Water N 17°09'04.1" E 75°39'56.3"
1	pH at 25 deg C	-	6.5 – 8.5	8.3
2	Color	Hazen units	300	200
3	Conductivity at 25 deg C	mS/cm	$	1164
4	Dissolved Oxygen	mg/L	4 min	5.1
5	BOD (3 days at 27°C)	mg/L	3	24
6	Total Dissolved Solids	mg/L	1500	720
7	Total Hardness	mg/L	$	140
8	Chloride as Cl	mg/L	600	70
9	Fluorides as F^-	mg/L	1.5	0.5
10	Sulphate as SO_4^{--}	mg/L	400	95.1
11	Alkalinity	mg/L	$	380
12	Nitrates as NO_3	mg/L	$	4.6
13	Cyanides as CN	mg/L	0.05	<0.001
14	Calcium as Ca	mg/L	$	32
15	Magnesium as Mg	mg/L	$	14.4
16	Sodium as Na	mg/L	$	199.4
17	Potassium as K	mg/L	$	2.5
18	Iron as Fe	mg/L	50	0.12
19	Chromium as Cr	mg/L	0.05	0.012
20	Cadmium as Cd	mg/L	0.01	0.02
21	Lead as Pb	mg/L	0.1	0.004
22	Copper as Cu	mg/L	1.5	0.072
23	Arsenic as As	mg/L	0.2	<0.001
24	Selenium as Se	mg/L	0.05	<0.001

25	Phenolics as C_6H_5Oh	mg/L	0.005	0.02
26	Zinc as Zn	mg/L	5	1.1
27	Mercury as Hg	mg/L	$	<0.0002
28	Aluminum as Al	mg/L	$	<0.001
29	Anionic detergents as MBAS	mg/L	0.12	0.04
30	Oil and grease	mg/L	0.3	1.2
31	Sodium Absorption Ratio	meq/L	-	3.8
32	Insecticides	mg/L	Absent	Present
33	Coliform Organisms	MPN/100 ml	Should not exceed 5000	180

3.12 Soil Environment

The soil samples have been collected from site office with following a depth profile of 30 cm, 60 cm, and 90 cm respectively on dated 31st May 2016. Characterizations of soil samples was performed by adopting methods prescribed under relevant parts of IS: 2720, "Indian Standard Methods of Test for Soils". Soil is Sandy Clay in texture, alkaline in nature and Sodium Absorption Ratio (SAR) is comparatively high which shows the soil is not suitable for agriculture.

Soil- Site Office

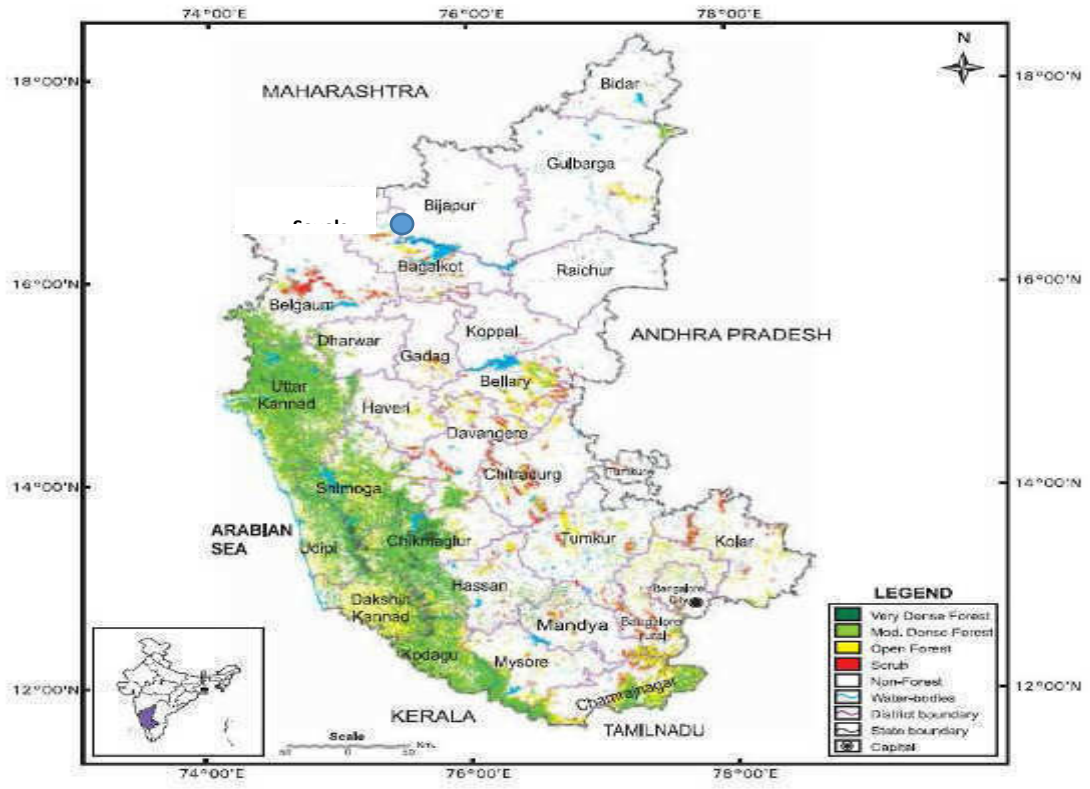
Table 3:9: Soil Quality in the Study

Sr. No.	PARAMETERES	UNIT	Site Office N 17°06'31.8" E 75°44'57.3"
			RESULTS
1	Texture	-	**Clay**
	Sand	%	20
	Silt	%	24
	Clay	%	56
2	pH (10% Slurry)	-	8.12
3	Conductivity	µmhos/cm	220
4	Moisture	%	6.2
5	Organic Matter	%	3.8
6	Bulk density	gram/cc	1.46
7	Porosity	% v/v	46
8	S.A.R	meq/kg	0.12
9	Infiltration capacity	mm/h	38.4
10	Carbonates	mg/kg	5
11	Sodium as Na	mg/kg	1.1
12	Potassium as K	%	2.2
13	Phosphorus as P	%	0.84
14	Chloride as Cl	mg/kg	3.2
15	Zinc as Zn	mg/kg	4.2
16	Copper as Cu.	mg/kg	0.13
17	Iron as Fe	mg/kg	0.08
18	Nitrogen as N	%	5.1
19	Sulphate as SO_4	mg/kg	0.25
20	Boron as B	mg/kg	0.09

3.13 Ecology and Biodiversity

Ecology and Biodiversity

The project district, Bijapur is spread over an area of 10,494 Km^2 which is 5.47% of the total geographical area of the State. The forest cover in the district based on India State of the Forest Report (Forest Survey of India, 2011) is only 12.00 Km^2 which is 0.03% of the total Forest cover 36,194 Km^2 of the state. There is no recorded dense, moderate dense forest in the district. The forest cover (12 Km^2) present in the district is classified as Open Forest as per the India State of the Forest Report (Forest Survey of India, 2011). Figure-4.3 exhibits the Forest Cover Map of Karnataka highlighting the project site in the project district.



Source: India State of the Forest Report, 2011

Figure 3.4: Forest Cover Map of Karnataka

Table 4.10 exhibit the total forest cover of Bijapur district as follows

Table 3:10: Total Forest Cover Bijapur district

District	2011 Assessment (Area in Km^2)							
	Geographical Area	Very Dense Forest	Mod. Dense Forest	Open Forest	Total	Percent of GA	Change	Scrub
Bijapur	10,494	0	0	12	12	0.11	0	0

Source: India State of the Forest Report, 2011

Floral Diversity

The project site located at Savalsung Village in Bijapur (Vijayapura) district of Karnataka between Latitude 17°06'33.9" North and Longitude 75°44'56.6" is mix of plain land and hill blocks having differential elevation of about 40 - 80 mtrs. The hill blocks are barren having simple contours and without any vegetation except understorey herbaceous flora.

The ground cover at the site and its environs comprises largely of open agricultural land, and some scattered trees and scanty vegetation of common occurrence. The following floral vegetation were observed in the site and its environs during the site visit:

Table 3:11: List of Plant Species observed during the Site Visit

S.No.	Common Name	Botanical Name	Family	Habit	World IUCN Status
1.	Mango	*Mangiferaindica* L.	Anacardiaceae	T	DD
2.	Tylophora	*Tylophoraindica* (Burm.f.) Merr.	Apocynaceae	C	NE
3.	Crown Flower	*Calotropisgigantea*(L.) W. T. Aiton	Apocynaceae	S	NE
4.	silver date palm, Khajoor	*Phoenix sylvestris*(L.) Roxb.	Arecaceae	T	NE
5.	Sisal, Rambansa	*Agave americana*L	Asparagaceae	S	NE
6.	black jack, burr marigolds,	*Bidensbiternata* (Lour.) Merr. and Scherif	Asteraceae	H	NE
7.	Congress Grass	*Partheniumhysterophorus* L.	Asteraceae	H	NE
8.	clotbur	*Xanthium indicum* Koen.	Asteraceae	H	NE
9.	Cactus	*Opuntiaelatior* Mill.	Cactaceae	S	LC
10.	pink morning glory, Beshram	*Ipomoea carnea*Jace	Convolvulaceae	S	NE
11.	Kudaliya	*Desmodiumtriflorum* (L.) DC.	Fabaceae	H	LC
12.	Kasood Tree	*Senna siamea* Lam.	Fabaceae	T	NE
13.	Tamarind, Neem	*Tamarindusindica* L	Fabaceae	T	NE
14.	Gulmohar	*Delonixregia* (Boj. ex Hook.f.) Raf.	Fabaceae	T	LC
15.	Avaram	*Senna auriculata* L.	Fabaceae	T	NE
16.	Shisham	*Dalbergiasissoo*Roxb. ex DC	Fabaceae	T	NE
17.	Simalu, Chinese chastetree	*Vitexnegundo* L. var. negundo	Lamiaceae	S	NE
18.	Pipal, Bodhi Tree	*Ficusreligiosa* L.	Moraceae	T	NE
19.	Doob Grass	*Cynodondactylon* (L.) Pers.	Poaceae	H	NE
20.	Surattense nightshade	*Solanumvirginianum* L.	Solanaceae	H	NE
21.	Lantana	*Lantana camara* L	Verbenaceae	S	NE

***NE=Not Evaluated, LC=Least Concern, DD=Data Deficient**

A total of 21 species belonging to 14 families were recorded during the field survey from the wind farm site and its environs. Family Fabaceae represented maximum 06 species in the site and its adjoining areas followed by Asteraceae (03 species) Apocynaceae (02 species) and Anacardiaceae, Arecaceae, Asparagaceae, Cactaceae, Convolvulaceae, Lamiaceae, MoraceaePoaceae, Solanaceae and Verbenaceae (01 species each) respectively Figure 3.5.

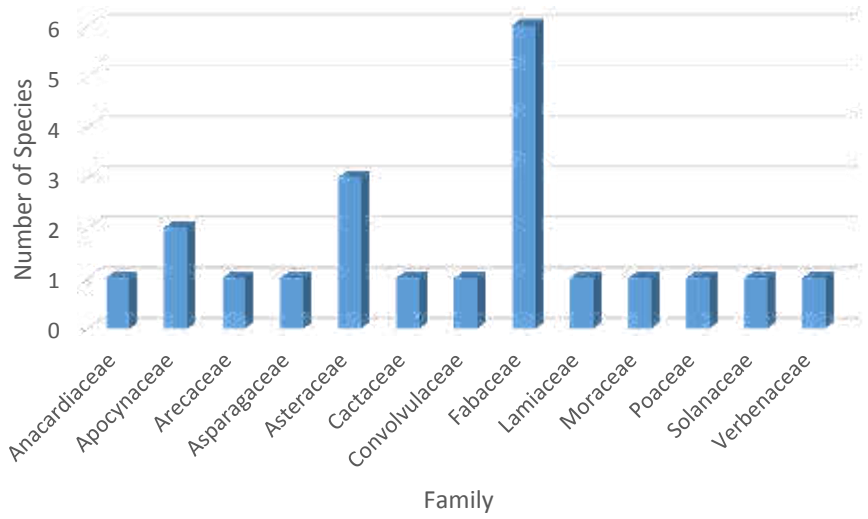


Figure 3.5: Floral Diversity of the site and its environs

As per the Word IUCN Red List (http://www.iucnredlist.org), no species of significant ecological importance such as Threatened, Vulnerable and Endangered was recorded in the site and its environs (Table 4.12). Out of the 21 species, 17 species (81%) were found to be species which are yet Not Evaluated (NE) by IUCN followed by 03 Species (14%) were found to be of Least Concern (LC) and 01 Species (5%) were found with Data Deficiency (DD) respectively Figure 3.6.

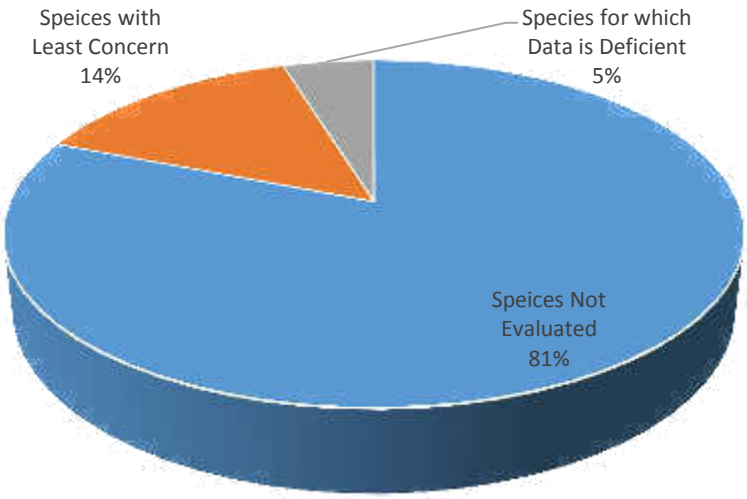


Figure 3.6: Percentage population of Floral diversity of Concern in the Study Area

Faunal Diversity

As the site is mix of plain land and hill blocks with dry and tropical conditions with very sparse vegetation and no surface water body in the proximity, no significant ecologically important species were recorded into the site and its proximity during the site visit. However as per IUCN Red list a total of 21 avifaunal species (70%), 01 invertebrate species (3%) and 08 Mammalian species (27%) of possible occurrence are reported into the project site and its vicinity.

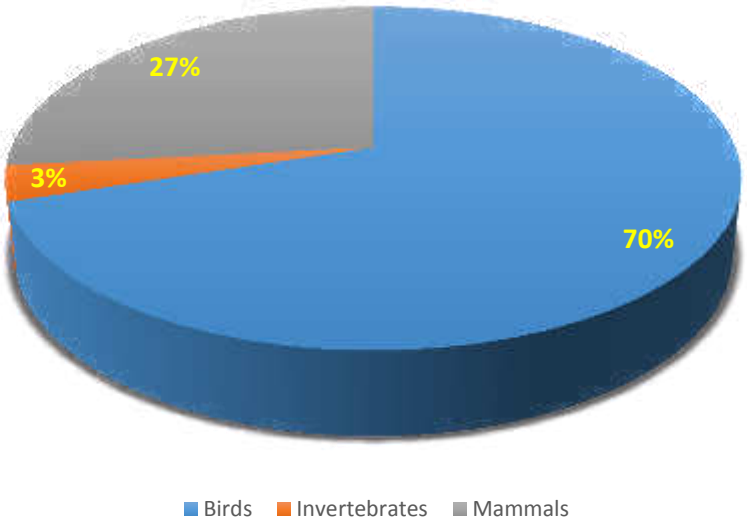


Figure 3.7: Faunal Diversity of Possible Occurrence in Savalsang Village and its environs

Table 3.12 enumerated the list of all the faunal species reported into the site and its environs as per the IUCN Red Data List.

Table 3:12: List of Faunal Species of Possible Occurrence in Savalsung Villages and its environs

S.No	Common Name	Species	IUCN Red List
BIRDS			
1.	Oriental Darter	*Anhinga melanogaster*	NT
2.	Indian Spotted Eagle	*Aquila hastata*	VU
3.	Great Indian Bustard	*Ardeotisnigriceps*	CR
4.	Pallid Harrier	*Circus macrourus*	NT
5.	Black-necked Stork	*Ephippiorhynchusasiaticus*	NT
6.	Laggar Falcon	*Falco jugger*	NT
7.	White-rumped Vulture	*Gyps bengalensis*	CR
8.	Indian Vulture	*Gyps indicus*	CR
9.	Grey-headed Fish-eagle	*Ichthyophagaichthyaetus*	NT
10.	Lesser Adjutant	*Leptoptilosjavanicus*	VU
11.	Black-tailed Godwit	*Limosalimosa*	NT
12.	Painted Stork	*Mycterialeucocephala*	NT
13.	Egyptian Vulture	*Neophronpercnopterus*	EN
14.	Spot-billed Pelican	*Pelecanusphilippensis*	NT
15.	Tytler's Leaf-warbler	*Phylloscopustytleri*	NT
16.	Red-headed Vulture	*Sarcogypscalvus*	CR
17.	Black-bellied Tern	*Sterna acuticauda*	EN
18.	River Tern	*Sterna aurantia*	NT
19.	Lesser Florican	*Sypheotidesindicus*	EN
20.	Black-headed Ibis	*Threskiornismelanocephalus*	NT
21.	Sociable Lapwing	*Vanellusgregarius*	CR
INVERTEBRATES			
1.	-	*Indothemiscarnatica*	NT
MAMMELS			
2.	Blackbuck	*Antilopecervicapra*	NT
3.	Asian Small-clawed Otter	*Aonyxcinerea*	VU
4.	Striped Hyaena	*Hyaenahyaena*	NT
5.	Smooth-coated Otter	*Lutrogaleperspicillata*	VU
6.	Thick-tailed Pangolin	*Maniscrassicaudata*	NT
7.	Rusty-spotted Cat	*Prionailurusrubiginosus*	VU
8.	Sambar	*Rusa unicolor*	VU
9.	Four-horned Antelope	*Tetracerusquadricornis*	VU

*CR=Critically Endangered, EN=Endangered, NT=Near Threatened, VU=Vulnerable

*Source: https://www.ibat-alliance.org/ibat-conservation/ibat/gridfactsheet.php?gid=68779

Out of the 30 species, 15 species (50%) are classified under Near Threatened Category of IUCN followed by 7 Species (23%), 5 species (17%) under Critically Endangered Category and 3 Species (10%) under Endangered Category of IUCN. Please refer the Figure 3.8 as follows:

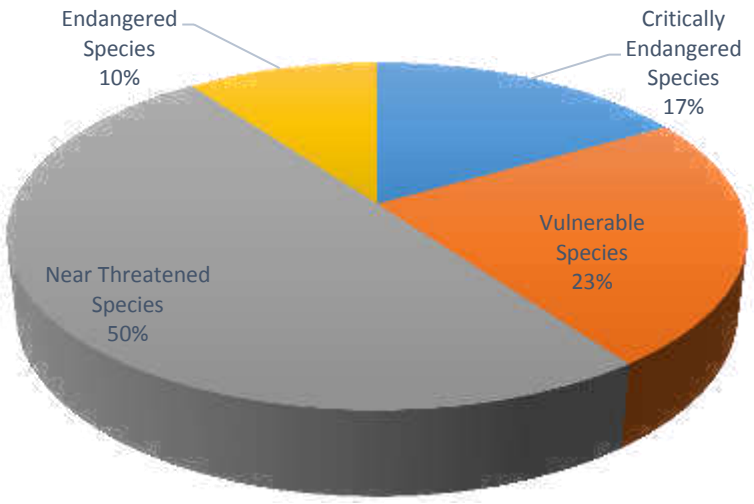


Figure 3.8: Percentage population of Faunal diversity of Concern in the Study Area

3.14 SOCIO ECONOMIC PROFILE

The key objective of the present study is to assess possible impact of the project on socio-economic life of the people in the neighbourhood of the project.

The study has been conducted based on primary and secondary data. Primary data has been collected through group discussions and the individual interviews in the nearby villages with the help of open-ended questionnaire and check-list. Secondary data has been collected from the administrative records of the Government of Karnataka, Census of India 2011, district statistical hand book, state and district portal. The details regarding population composition, number of literates, workers, etc. have been collected from secondary sources, Census of India 2011, and analysed.

The data collected during the above survey was analysed to evaluate the prevailing socio-economic profile of the area. Based on that, impacts due to project operation on the community have been assessed and recommendations for improvement have been made. The impact from the project (Wind Farm) is very minimal and limited to maximum1 km from the project boundary.

3.15 Baseline of the Study Line

State Profile: Karnataka

Karnataka is a state in south western region of India. As per Census 2011, total population of Karnataka is 61,095,297 of which male and female are 30,966,657 and 30,128,640 respectively. In 2001, total population was 52,850,562 in which males were 26,898,918 while females were

25,951,644. The total population growth in this decade was 15.60 percent while in previous decade it was 17.25 percent. The population of Karnataka forms 5.05 percent of India in 2011. In 2001, the figure was 5.14 percent.

District Profile: Vijayapura (Bijapur)

Vijayapura, formerly Bijapur, located in the northern most plateau of Karnataka State, lies between the north latitude 16^0 11' and 17^0 33' and east longitude 76^0 28' and 75^0 19'. Vijayapura district is bounded on the North West and North by the districts of Sangli and Sholapur of Maharashtra State. On the east Gulbarga and Yadgir district, on the south-east by Raichur district on the south by Bagalkot and on the west by Belgaum district. The district covers a geographical area of 10,498.00 sqkm. It has an extent of 143 sqkm from north to south and 116 sqkm from east to west. The most conspicuous areas of very high and very low areas of the district are located at 500 and 650 metres of contour lines above the mean sea level respectively.

Geographically, the district lies in the dry and arid tract of the Deccan plateau. The lands of the district can be broadly divided into three zones: the northern belt consisting of the northern part of Vijayapura taluk besides Indi and Sindgi, the central belt consisting of the Don valley region which begins to the south of Vijayapura city and the southern belt consisting of the rich alluvial plains of the Krishna river separated from the central belt by a stretch of barren trap. The northern belt is a succession of low billowy up lands bare of trees, gently rounded and falling into intermediate narrow valleys. The up-land soil being shallow, the villages are generally confined to the banks of the streams and are far away from one another.

Demographic Profile

As per Census of India, 2011, total population of Vijayapura district is 2177331 in which males are 1111022 (51.03) and females are 1066309 (48.97) with the gender ratio of 960 females per thousand males. The 0-6 child sex ratio is 931 female children to 1000 male children in the district. The district has a population density of 207 inhabitants per square kilometer. Its population growth rate over the decade 2001-2011 was 20.50%. The decadal growth rate increased by 3.0 percent compared to the previous growth rate between 1991-2001.

Literacy

As per Census 2011, literacy rate of Vijayapura district is 67.15% as against 57% in2001, an increase of 10.2 percent during the decade. The gap in male – female literacy rate narrowed down to 20.5 percent in 2011 Census compared to 26.5 percent in 2001. This gap has reduced both in rural and urban areas.

Scheduled Caste and Scheduled Tribes

Total Scheduled Castes (SCs) population reported in the district is 4,42,773 persons, constituting about 20.34% of total population of the district. The decadal growth rate of Scheduled Castes as per 2011 Census is 32.5%. The proportion of Scheduled Castes in the district to total SCs in the State is 4.2 percent. The growth rate of Scheduled Tribes (STs) during the decade 2001-2011 is 30.8 percent and about 1.8 percent of the district's total population are Scheduled Tribes. The share of district's

STs to total Scheduled Tribes in the State is 0.9 percent. The decadal change in the growth rate of SCs and STs in urban areas has reported to be very high compared to the growth rate in rural areas, more significant is the growth rate among the STs in urban areas which is 14.8 percent compared to 17.8 percent in rural areas.

Work Participation Rate

As per Census 2011, of the total population in the district, 42.6% are workers in which male and female workers are 52.2% and 32.6% respectively with 19.60% of gender gap. The workers were further classified as main workers and marginal workers. The main workers are persons who worked for 6 months or more during the reference period and persons worked for less than 6 months are marginal workers. As classified above, of the total workers, 81.9 percent are main workers and 18.1 percent are marginal workers. The gender composition of workers as per Census classification further explains that male main workers are comparatively higher than female main workers and female marginal workers are good in number than male marginal workers.

Agriculture

Agriculture occupies a vital place in the economy of the district. Majority of population depend on agriculture for their livelihood in addition to handloom weaving and inland fishing. According to the final figures of the Census 2011, 28.3 percent of the total workers are cultivators and 37.9 percent are agricultural labourers. Vijayapura is mainly a food grain producing area, the main food crops are jowar, bajra, wheat, maize, paddy etc. in the district. The main pulses grown are bengal gram, horsegram, tur etc.

The main non-food crops are groundnuts, sesame, linseed, sunflower, castor, cotton and safflower. Tobacco and betel leaves are also grown in small areas. Sunflower is the second largest oil seed crop in Vijayapura district. Important condiment crops like chillies, turmeric, coriander, garlic are also grown in the district.

Natural Wealth

Though the district as a whole is poor in mineral deposits, a few minerals of economic importance like limestone, asbestos and various types of other rocks suitable for construction purposes occur in large quantities. These include many kinds of ornamental stones, sands, lime stones, flooring and roofing slates, etc. Rich deposits of good quality of high grade limestone occur in the taluks of Vijayapura, Muddebihal and Sindgi. In addition to this, small quantities of calcite, granite manganese, iron and copper ores occur in the district, the mining of which is not economical.

Industries

Though agriculture is a predominant activity in the district, the growth in industrial sector is fast developing. The flourishing industries in the district are cotton ginning and pressing, vegetable oil industry, Cement industry, slate factories, glass, bricks and flies, village industries like handloom wool weaving, carpentry, black smithy, rope-making and other miscellaneous industries like bangle making, pottery, basket and broom making, bass and copper ware manufacture. Decortications of

ground nuts is a small scale industry recently developed in the district. The industrial units comprise of textiles, chemicals and engineering units in the district.

Electricity and Power

Karnataka has a place of pride in the history of power generation in the country. KPTCL (Karnataka Power Transmission Corporation Limited) (erstwhile KEB) is mainly vested with the functions of transmission and distribution of power in the entire State. The Corporation has been attaching great importance to electrification of villages and hamlets, tribal colonies and harijan basthis and energisation of irrigation pump sets. Besides this, with a view to benefit weakest among the section of society schemes called BhagyaJothi/KutirJyothi have been introduced. Statement given below shows taluk wise number of villages electrified and taluk wise energisation of IP sets and number of Bhagyajyothi connections in the district.

Table 3:13: Tehsil-wise Details of No. of Villages Electrified and Energised IP Set-2009-2010

S. No.	Tehsil	No. of Villages Electrified	No. of IP Set energised	No. of Bhagyajyothi connections
1.	Vijayapura	130	29009	24966
2.	Indi	129	32690	20330
3.	Sindagi	149	16176	25041
4.	BasavanaBagevadi	123	13942	21043
5.	Muddebihal	148	6245	21897
Total		**679**	**98062**	**113277**

Source: Census of India, 2011

3.15.1 Project Influence Area

The existing Project 100.3 MW Wind Farm turbine has been scattered in and around 09 villages (Domanal and Kannur of Vijayapura*Tehsil*; Hadalasang, Inchageri, Jigajeevani, Koluragi, Mahaveernagar, Satalagaon[P.B.] and Savalsang of Indi *Tehsil*)of Vijayapura district. Villages of core zone have been considered for the present study.

Population:

As per Census of India 2011, the total population of the study area is **35070** in which 51.49% are males and 48.51% are females. An average gender ratio of the study area is approximately942females per 1000 males. The study area falls under rural settlement. Approximately15.97% of the total population belongs to 0-6 age group. The sex ratio of this age group is 935 female children per 1000 male children.Village-wise break-up of population data for the study area has been presented in Table 1 of Annexure I.

Households and Household Size:

The entire population of the study area has been grouped into 6502households and the average size of household is approximately 5.39 persons/ household. During site visit it was observed and noted that most of the houses of the study area are made of bricks and cement and of semi-pacca type.

Village-wise break-up of demographic profile for the study area has been presented in Table 1 of Annexure I

Schedule Caste and Schedule Tribes:

Total population of Scheduled Caste is 12274 (35%) of the total population of the study area in which males are 6287 (51.22) and females are 5987 (48.78). Total population of Scheduled Tribes in the study area is 134 (0.38%) in which male and female are 69 (51.49%) and 65 (48.51%) respectively. Village-wise break up of distribution of Scheduled Caste and Scheduled Tribe population in the project area is shown in Table 2 of Annexure I.

Literacy Rate:

The average literacy rate of the study area is 61.43% (18103) in which male's literacy is 71.45% with respect to the male population as against 50.81**%** for females with respect to the female population, creating a gender gap of 20.64%. The break up distribution of literacy, literacy rate and gender gap in literacy rate in the project area (village-wise) is shown in Table 3 of Annexure I.

Workers and Work Participation Rate:

The total number of workers in the study area is 16666 and WPR is 47.42% in which males are 52.79% with respect to the male population and females are 41.94% with respect to female population. Among the total workers 86.88% are main workers and the remaining 13.12% are marginal workers.

Further main worker has been categorized in Cultivator, Agricultural Labourers, Household Industrial Workers and Other Workers. As per **Table 6 of Annexure I,** most of the main workers of the study area are agricultural labourers with 44.66% followed by cultivator 39.69%, other workers 14.30% and household industrial workers 1.34%.Likewise, in marginal worker, most of the worker are agricultural labours with 61.68%. Details of work participation rate, work culture of the study area has been presented in Table 4, 5, and 6 of Annexure I.

Drinking Water Facility:

As reported during consultation, there is acute shortage of water in the villages of the study area and ground water level is up to 600 to 800 feet. In every village, there is water tank constructed by villages panchayat and water for drinking and other domestic use has been supplied by pipeline.

Health:

There is no any epidemic or chronic diseases have been reported in the study area during consultation with local villagers except general fever, cough and cold. As per Census 2011, 3 numbers of Primary Health Centres, 3 Maternity and Child Welfare Centre and 4 Veterinary Hospitals are available in the study area of the project. Details of health infrastructure with doctors have been presented in the Table 8 of Annexure I.

Education:

Considering the educational facilities in the study area, Govt. Primary School, Upper Primary School

and *Anganwadi* is available in every village of core zone. As per Census 2011, there are 32 Govt. Primary School, 18 Govt. Middle School, 7 Govt. Secondary School and 1 Govt. Senior Secondary School are available in the villages of the study area. Details of existing educational institutes have been presented in the Table 9 of Annexure I.

3.16 Public Consultation

A site visit was undertaken by the Environmental and Social safeguard specialists on May 30 to June 2, 2016 for field verification and environment and social safeguards related aspects of the projects. During the site visit, the project O&M team, which included Site In-charge of MVKPL and Gamesa's Site Safety officer were consulted regarding environmental and social safeguards related measures implemented at the project sites. The site visit photographs are given in Photo Log annexed as **Annexure II**.

The consultant team has also conducted focused group discussion/public consultation with local villagers, village *sarpanch, panchayat* members and daily wages labours in the villages falling in the study area. WTGs of existing Wind Farm are spread on undulating dry hill. During public consultation with the affected landholders, it was found out that the land sold to MVKPL was non-agricultural and barren. Land procurement process was done on willing buyer and willing seller basis. Discussion also revealed that agriculture is the primary livelihood in the area. Agriculture is dependent on rain water and it yield one crop/year. Jowar, bajra, wheat, maize and ground nut are the main crops grown in the study area. No grievances were reported during the stakeholder's consultations.

3.17 Local Employment Potential

Approximately,86 persons are being utilised to continue providing the following services during Plant's operational period.

Table 3:14: Employment Details during Operation Period

S. No.	No. of Personnel	Purpose
1	1	Site Incharge
2	2	Mechanical and Electrical Engineer
3	19	Operators
4	15	Gamesa Staff
5	49	Security and site personnel

3.18 R&R Issue

As discussed above, the project area is located on undulating dry hill. It was reported during consultations with local that there were no inhabitants on the land. Hence relocation of settlements was not required for the projects.

3.19 Grievance Redressal Mechanism Followed for the Project

As informed by the site in-charge, the grievance register has been maintained for recording the grievances, request, demands etc. of the local community, which is shared by them as sample copy. The grievances, if received, are addressed by the site in-charge. It has also been informed by the site in-charge that till date 5 numbers of grievances have been received from the local people for the projects regarding balance payment of land, request for drainage system in the village and training for safety etc. and which was disposed. Sample of Grievance Redressal Form has been annexed as **Annexure II**.

3.20 Details of Community Welfare Measures

MVKPL has conducted Road Safety Training as part of CSR activity in the project impact area. Further as per MEIL's CSR Policy, MVKPL has already conducted need based assessment in the villages of project impact area and in the present financial year (2016-17), will implement the community development programme accordingly.

Few more CSR activities were performed for which photo document is provided below;

1. Construction of Madhayand Temple at Inchagere
2. Construction of Inchagere Panchayat road work with cement pipes provided
3. Concrete road development at Inchagere Village

	
Madhavanand Temple Inchagere	Inchagere Panchayat road work Cement pipes provided

	
Concrete road photo 1	Concrete road photo 2

4 LEGISLATIVE FRAMEWORK

4.1 INTRODUCTION

This section highlights the environmental and social regulations applicable to the proposed Wind farm project. The section broadly focuses on the institutional framework, applicable environment, health and safety and social legislative requirements and ADB Safeguard Policy Statement relevant to the proposed Project. At the outset, it should be emphasized that this administrative framework focuses on:

- Applicable environmental and social regulations and policies in India and the state of Karnataka;
- Institutional framework for the implementation of the regulations; and
- International Standards and conventions including:

i. Applicable Indian National, state and local regulatory requirements;
ii. ADB safeguard policy statement, 2009;
iii. ADB policy on Social Protection Strategy, 2001;
iv. ADB policy on Public Communication Policy, 2011;
v. IFC Performance Standard, 2012;
vi. IFC and World Bank General EHS Guidelines, 2007;
vii. IFC and World Bank EHS Guidelines for wind Energy Project, 2007;
viii. IFC and World Bank EHS Guidelines for Electric Power Transmission and Distribution, 2007; and
ix. Relevant ILO conventions rectified by Host country covering core labour standards and basic terms and conditions of employment (limited to operational phase of the proposed project).

4.2 NATIONAL REGULATIONS

As per EIA Notification, 2006 and its amendments, the Wind Power Project does not require any environmental clearances from the MOEF & CC or Karnataka State Environmental Impact Assessment Authority (SEIAA). As per the revised classification of industries into Red, Orange, Green and White Category, issued by Central Pollution Control Board dated 29th Februaury 2016, the solar power generation through solar photovoltaic cell and Wind Power are classified under White Category Industries and do not require Consent to Establish and Consent to Operate under Water (Prevention and Control of Pollution) Act, 1974.

This project falls under White category. Hence, exempted from Consent to Establish & Consent to Operate process. Refer Karnataka Renewable Energy Policy 2014-21. Wind Farm project shall be exempted from obtaining clearances of Pollution Control Board)

Applicability analysis of existing legislative framework in context of the proposed project has been elaborated in the Table below:

Table 4:1 : Environmental Regulations and Legislations

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
A	**ENVIRONMENT & FOREST**			
A-1	Environmental (Protection) Act, 1986	To protect and improve overall environment, this umbrella act imposes certain restrictions and prohibitions on new projects or activities, or on the expansion or modernization of existing projects or activities based on their potential environmental impacts. It is a comprehensive act covering overall objective to improve environment by prevention and control of air, water, soil pollution etc. Clearances from different authorities are independently obtained. Effective from 1986. The act was last amended in 1991.	MoEF&CC	Environmental statements to be submitted annually for operational sites.
A-2	Environmental Impact Assessment (EIA) Notification, 2006	Environmental Impact Notification S.O.1533 (E), dt. 14thSeptember 2006, as amended in 2009, issued under Environment (Protection) Act 1986, has made it mandatory to obtain environmental clearance for scheduled development projects. The notification classifies projects under two categories 'A' and 'B'. Category A projects (including expansion and modernization of existing projects) require clearance from MoEF& CC, GoI and category B from State-level SEIAA, constituted by Government of India. 39 categories of projects are covered under this notification.	MoEF& CC–Expert Appraisal Committee (EAC) and State Environmental Impact Assessment Authority (SEIAA)	As per the EIA notifications 2006, wind farm projects are exempt from obtaining prior environmental clearance.
A-3	Forests (Conservation) Act, 1980 and Rules 1981 as amended 2004	The Forest Conservation Act (FCA) was adopted in 1980 to protect and conserve forests. The Act restricts the powers of the State in respect of de-reservation of forests and the use of forestlands for non-forest purposes. An advisory committee has been created to oversee the implementation of the statute. The FCA is relevant for the power sector for the siting guidelines for solar power plants, and for passage of transmission through forest areas, since it would involve use of forestland for "non-forest" purposes. According to Section 2 of the Act "notwithstanding anything contained	State Forest Dept./ MoEF& CC	Not applicable to site. No forest land has been taken either for plant site or for substation and transmission line pathway.

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
		in any other law for the time being in force in a State, no State Government, or other authority shall, except with the prior approval of the Central Government, make any order directing: De-reservation of a reserved forest Use any forest land for any non -forest purpose Assign any forest land to any private person or entity not controlled by the Government Clear any forest land of naturally grown trees for the purpose of using it for reforestation		
A-4	Wildlife (Protection) Act 1972	The Act provides for the protection of wild animals, birds and plants; and for matters connected therewith or ancillary or incidental thereto. Birds are covered under this Act making it illegal to catch, keep, kill, buy / sell birds or damage their nests. All indigenous bird species are covered under this Act including peacocks. The application of the Order of the Honorable Supreme Court in WP 460 of 2004 dated 04.12.2006 in the matter of Goa Foundation v. Union of India and other wherein the Honorable Supreme Court has directed that all projects which require environmental clearance and are located within the distance of 10km of National Park and Sanctuaries must be placed before the standing Committee of the National Board for Wildlife constituted under the Wildlife (Protection) Act, 1972.	Chief Conservator Wildlife, State Forest Department & MoEF& CC	This act is not applicable for this project as no wild life / eco-sensitive zone has been reported within the study area.
A-5	Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008 as	The Hazardous Wastes (Management, Handling and Trans boundary Movement) Rules, 2008 are promulgated under Environment (Protection) Act 1986, which was further amended in July 2009, September 2009, March 2010 and August 2010. With the recent amendment, these rules have become quite comprehensive. The rules define responsibility of hazardous wastes generators, require safe	CPCB, SPCBs	Hazardous waste is being stored separately and is disposed off to the authorized vendor as per the law of the land.

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
	amended in 2009 and 2010 underEPA, 1986 (HWMRules, 2008)	handling practices and maintenance of manifest system during transport of hazardous waste and also describe technological aspects to be followed up by re-refiners and recyclers of hazardous wastes. The rules also cover liabilities of occupier, transporter and operator of a facility for any damages caused due to improper handling and disposal of hazardous wastes by reinstating or restoring environmental damages caused.		
A-6	Batteries (Management and Handling) Rules, 2001 and further amendments	The Rules identify specific responsibilities for consumers and bulk consumers, manufacturers, importers, assemblers, re-conditioners, dealers, recyclers, and auctioneers involved in the processing, trade and use segments of the lifecycle of a lead-acid battery. Used Lead acid batteries if generated should not be disposed of in any manner other than depositing with the dealer, manufacturer, importer, assembler, registered recycler, reconditioned, or at the designated collection centers.	SPCB	This rule is applicable for this project. Batteries used for power back-up should be disposed off through authorized vendor.
A-7	The Air (Prevention and Control of Pollution) Act, 1981 Including Rules 1982and 1983	The Act prohibits the construction and operation of any industrial plant without the consent of SPCBs. The Act assigns powers and functions to the CPCB and the SPCBs for prevention and control of air pollution and all other related matters. For the prevention and control of air pollution, the State Government, in consultation with the SPCB has the powers to set standards for emissions from automobiles, impose restrictions on use of certain industrial plants and prohibit emissions of air pollutants in excess of the standards laid down by the SPCB. It can also make an application to the court for restraining persons from causing air pollution. In addition, it also has the power of entry and inspection, power to obtain information and power to take samples of air emissions and conduct the appropriate follow up. The	SPCBs	This project falls under White category. Hence, exempted from Consent to Establish & Consent to Operate process. Refer Karnataka Renewable Energy Policy 2014-21. Wind Farm project shall be exempted from obtaining clearances of Pollution Control

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
		CPCB, as well as the SPCBs are eligible for contributions from the Central as well as the State Government, respectively, to perform their functions appropriately. The Act also allows for appropriate penalties and procedures for non-compliance.		Board)
A-8	The Noise Pollution (Regulation and Control) Rules, 2000 and the Noise Pollution (Regulation and Control) Amendment) Rules, 2010	As per the Noise Pollution (Regulation and Control) Rules 2000, every operating facility is required to take all possible steps to meet the ambient noise level standards prescribed in the Rules. The rules prescribe maximum permissible values of day and night time noise levels for zones A, B, C and D representing industrial, commercial, and residential and silence zone respectively.	SPCB	Applicable. Noise is generated but it is within prescribed limits of CPCB.
A-9	Water Prevention and Control of (Pollution) Act, 1974 including Rules, 1975 (as amended up to1988)	This Act provides for the prevention and control of water pollution and maintaining or restoring good water quality for any establishment. The Act assigns functions and powers to the CPCB and SPCBs for prevention and control of water pollution and all related matters. Subject to the provisions of the Act, the functions and powers of CPCB as well as the SPCBs have been delineated individually and with respect to each other.	Center Pollution Control Board (CPCB), State Pollution Control Board (SPCBs)	Exempted form CTE and CTO. This project falls under "White Category". Refer Karnataka Renewable Energy policy 2014-21. Wind Farm project shall be exempted from obtaining clearances of Pollution Control Board) for exemption clause.
A-10	The Water	This Act provides for levy and collection of Cess on water consumed	SPCB	Exempted form CTE

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
	Prevention and Control of Pollution), Cess Act, 1977 including Rules 1978 and 1991	and water pollution caused. It also covers specifications on affixing of meters, furnishing of returns, assessment of Cess, interest payable for delay in payment of Cess and penalties for non-payment of Cess within the specified time. Industries consuming water less than $10m^3$/day have been exempted from levy of cess provided they are not generating hazardous wastes.		and CTO. This project falls under "White Category". Refer Karnataka Renewable Energy policy 2014-21. Wind Farm project shall be exempted from obtaining clearances of Pollution Control Board) for exemption clause.
A-11	Electricity Act, 2003	The sections of the Electricity Act, 2003 that are relevant for laying (and repairs) of transmission lines for the supply of energy are described as following: Section 67 details the provisions (a) to open and break up the soil and pavement of any street, railway or tramway; (b) to open and break up any sewer, drain or tunnel in or under any street, railway or tramway; (c) to alter the position of any line or works or pipes, other than a main sewer pipe; (d) to lay down and place electric lines, electrical plant and other works;(e) to repair, alter or remove the same; (f) to do all other acts necessary for transmission or supply of electricity. Section 159 describes that no person shall be engaged in the generation, transmission, distribution, supply or use of electricity, in any way injure any railway, highway, airports, tramway, canal or water-way or any dock, wharf or pier vested in or controlled by a local authority, or obstruct or interfere with the traffic on any railway, airway, tramway, canal or water-way.	Electrical Inspector	Applicable.

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
		Section, 160(1) describes that every person generating, transmitting, distributing, supplying or using electricity (hereinafter in this section referred to as the "operator") shall take all reasonable precautions in constructing, laying down and placing his electric lines, electrical plant and other works and in working his system, so as not injuriously to affect, whether by induction or otherwise, the working of any wire or line used for the purpose of telegraphic, telephone or electric signaling communication, or the currents in such wire or line. Section 34 describes that every transmission licensee shall comply with such technical standards, of operation and maintenance of transmission lines, in accordance with the Grid Standards, as may be specified by the Authority. Section 53 (1) describes that the Authority may in consultation with the State Government, specify suitable measures for –(a) protecting the public (including the persons engaged in the generation, transmission or distribution or trading) from dangers arising from the generation, transmission or distribution or trading of electricity, or use of electricity supplied or installation, maintenance or use of any electric line or electrical plant; (b) eliminating or reducing the risks of personal injury to any person, or damage to property of any person or interference with use of such property ; (c) prohibiting the supply or transmission of electricity except by means of a system which conforms to the specification as may be specified; (d) giving notice in the specified form to the Appropriate Commission and the Electrical Inspector, of accidents and failures of supplies or transmissions of electricity; (e) keeping by a generating company or licensee the maps, plans and sections relating to supply or transmission of electricity; (f) inspection of maps, plans and sections by any person authorized by it		

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
		or by Electrical Inspector or by any person on payment of specified fee; (g) specifying action to be taken in relation to any electric line or electrical plant, or any electrical appliance under the control of a consumer for the purpose of eliminating or reducing a risk of personal injury or damage to property or interference with its use; Section 165 (1) In section 40, sub-section (1) of clause (b) and section 41, subsection (5) of the Land Acquisition Act, 1894, the term "work" shall be deemed to include electricity supplied or to be supplied by means of the work to be constructed. (2) The Appropriate Government may, on recommendation of the Appropriate Commission in this behalf, if it thinks fit, on the application of any person, not being a company desirous of obtaining any land for its purposes, direct that he may acquire such land under the provisions of the Land Acquisition Act, 1894 in the same manner and on the same conditions as it might be acquired if the person were a company.		
B. Land and Labor				
B-1	Land Acquisition Act 1894 (Amended in 1984) and The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013	Land Acquisition Act 1894 was passed with the purpose of enabling the procurement of land for the purpose of activities which are in the interests of the country. These include procedures for the acquisition of land, declaration of acquisition intent, hearing of objections, and final possession of the land amongst others. In last decade, the LA Act 1894 has been debated over for its archaic characters, which do not fit into the current realities. The current reality surrounding the process of land acquisition has changed tremendously, and therefore, the need was felt for the passing of a new law. A new Land Acquisition Resettlement and Rehabilitation Bill (LARR) 2011, which was renamed to The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement	Local Administration District Collector Revenue Officer	The process of land acquisition has been completed with following MVKPL framework and all the applicable Act/guidelines of state/central government.

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
		Act (the LARR Act), was passed by both the houses of Parliament and given the President's assent on 26th September 2013. The new law came into force in January 2014 and is applicable to the project. The new law stipulates mandatory consent of at least 70% of affected people for acquiring land for Public Private Partnership (PPP) projects and 80% for acquiring land for private companies. It also requires that payment of compensation for the owners of the acquired land will be four times the market value in rural areas and twice in urban areas. It also stipulates that the land cannot be vacated until the entire compensation is awarded to the affected parties. The law has the provision that the companies can lease the land instead of purchasing it. Besides, the private companies will have to provide for rehabilitation and resettlement if land acquired through private negotiations is more than 50 acres and 100 acres in urban and rural areas, respectively.		
B-2	The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 & rules 2007	The act basically vests the forest rights and occupation in forest land in forest dwellers (ST and other traditional forest dwellers) who have been residing in forests for generations but whose rights could not be recorded. The act provides a framework for recognizing the forest rights and the nature of evidence required for such recognition and vesting of forest land. Some of the key rights so vested are as follows Right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for livelihood by a member or members of a forest dwelling Scheduled Tribe or other traditional forest dwellers; • Community rights such as nistar, by whatever name called, including those used in erstwhile Princely States, Zamindari or such	Ministry of Tribal Affairs Tribal Welfare Department	Not applicable as land procured do not belong to any scheduled tribe or traditional forest dwellers.

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
		intermediary regimes; Right of ownership, access to collect, use, and dispose of minor forest produce which has been traditionally collected within or outside village boundaries; Other community rights of uses or entitlements such as fish and other products of water bodies, grazing (both settled or transhumant) and traditional seasonal resource access of nomadic or pastoralist communities; Rights including community tenures of habitat and habitation for primitive tribal groups and pre-agricultural communities; Rights in or over disputed lands under any nomenclature in any State where claims are disputed; Rights for conversion of Pattas or leases or grants issued by any local authority or any State Government on forest lands to titles; Rights of settlement and conversion of all forest villages, old habitation, unsurveyed villages and other villages in forests, whether recorded, notified or not into revenue villages; Right to protect, regenerate or conserve or manage any community forest resource which they have been traditionally protecting and conserving for sustainable use; Rights which are recognized under any State law or laws of any Autonomous District Council or Autonomous Regional Council or which are accepted as rights of tribal's under any traditional or customary law of the concerned tribes of any State;		
B-3	The Provision of the Panchayats (Extension to the Scheduled Areas)	The Act provides extension of the provisions of Part IX of the Constitution relating to the Panchayats to the Scheduled Areas. Scheduled Areas are defined as per the Clause (1) of Article 244 of the Constitution. The act gives special powers to the Panchayats in case it	Gram Panchayat	Not Applicable

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
	Act, 1996	has been classified as Schedule V area by the constitution. The Panchayats are expected to have special powers given to them through the state Legislatures like: The power to enforce prohibition or to regulate or restrict the sale and consumption of any intoxicant; The ownership of minor forest produce; The power to prevent alienation of land in the Scheduled Areas and to take appropriate action to restore any unlawfully alienated land of a Scheduled Tribe; • The power to manage village markets by whatever name called; • the power to exercise control over money lending to the Scheduled Tribes; The power to exercise control over institutions and functionaries in all social sectors; The power to control over local plans and resources for such plans including tribal sub-plans; The administration and management of the Panchayat is similar to the non-schedule areas, but the Panchayat has immense powers in case of Scheduled Area.		
B-4	The Indian Factories Act, 1948 and State Rules	The Indian Factories Act was promulgated in 1948, to ensure general welfare of the industrial workers. The Act is divided into nine chapters with three chapters exclusively on health and safety (H&S) issues. The Act in its preamble states that "it is the general duty of the occupier (defined in the act as person having the ultimate control over the affairs of the factory) to ensure as far as practicable health, safety and welfare of all workers while they are at work in the factory". A general policy with respect to H&S of the workers at work should be	Directorate of Industrial Safety and Health (DISH)	Applicable

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
		in the form of a written statement and brought to the notice of the workers per the provision of the Act. The Act in its Chapter 4 deals with the provisions relating to Safety. The specific areas of safety are those relating to the usage of machinery, handling of hazardous substances and the latest amendments include safety measures for hazardous processes. For the usage of machinery there are Acts related to the fencing, casing of the machinery. Restriction of young persons and the employment of women and children to work on machines that is dangerous in nature. The Act also has regulations for working near machinery in motion; development of adequate safety measures during installation and various types of operation of the machinery. The Act also explains preventive and protective measures in safety including proper consideration of explosive or inflammable substances so that the workers are not exposed to hazards during operation. Some of the sections deal with various precautions that are required for handling pressure plants, fire, inflammable dust, gas or explosive. The factory occupier is responsible to maintain safety of the buildings and machinery per this legislation. The Act also gives power to States to make relevant rules to supplement the need of safety in the facility. The Act also covers provisions for hazardous processes for an occupier to take all practicable measures to ensure prevention of any sorts of explosion due to manufacturing process, which are hazardous. There are permissible limits for exposure of chemicals and toxic substances in the workplace. Workers have the right to know about imminent danger and their participation in safety management. The Act also requires medical check-ups of workers with access to workers to look for outcome of the medical reports.		

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
		An occupier is to develop a safety policy and form safety committees and provide power to the Central Government to appoint inquiry committee if some extraordinary situation had occurred in the factory which is engaged in the hazardous process.		
B-5	The Bonded Labour System (Abolition) Act 1976	The Bonded Labor System (Abolition) Act 1976: States that all forms of bonded labor stands abolished and every bonded laborer stands freed and discharged from any obligations to render any bonded labor (Ch II, Section 4)	Ministry of Labor & Employment	Applicable to Wind Farm project.
B-6	Minimum Wages Act, 1948	Minimum Wages Act, 1948 requires the Government to fix minimum rates of wages and reviews this at an interval of not more than 5 years. The minimum wage as prescribed for the industry by the government is required to be paid by the employers to the staff.	Ministry of Labor & Employment	Applicable to Wind Farm project.
B-7	The Workmen's Compensation Act, 1923	The Workmen's Compensation Act, 1923 requires if personal injury is caused to a workman by accident arising out of and in the course of his employment, his employer shall be liable to pay compensation in accordance with the provisions of this Act. Applicable to employees with less than or equal to a maximum of basic salary of INR 8000 per month	Ministry of Labor & Employment	Applicable to Wind Farm project.
B-8	The Contract Labor (Regulation & Abolition) Act, 1970 and Rules	As per the contract labor act, every principle employer is required to get the establishment registered before employing any contract labor. The contractors are also required to provide at minimum amenities like canteen, urinals, restrooms or alternate accommodation (if night halting labor), first aid, safe drinking water, etc. in case of contractor's failure to provide these amenities, the principle employer is liable to provide such amenities at its cost.	Ministry of Labor & Employment	Applicable to Wind Farm project.
B-9	The Child Labor	A child is defined as a person who has not completed 14years of age.	Ministry of Labor	Applicable to Wind

S. No	Act/Law	Description/purpose	Responsible Authority	Applicability
	(Prohibition and Regulation) Act, 1986	The Act prohibits employment of children in certain occupation and processes (part II, Section 3). The Act also specifies conditions of work for children, if permitted to work. These include a working day of maximum of 6 hours a day (including rest), no work period exceeding 3 hours at a stretch, and no overtime (Section 7). The Act requires maintenance of a register for employed children (Section 11).	& Employment	Farm project.
B-10	ESI Act, 1948 (Employees State Insurance Act, 1948)	The ESI Act provides for certain benefits to employees in case of sickness, maternity and employment injury. These includes periodical payments to any insured person in case of his sickness certified by a duly appointed medical practitioner, periodical payments to an insured woman in case of confinement or miscarriage or sickness arising out of pregnancy, confinement, premature birth of child, periodical payments to an insured person suffering from disablement as a result of an employment injury sustained as an employee, or periodical payments to such dependents of an insured person who dies as a result of an employment injury sustained as an employee amongst others. Applicable to employees with less than or equal to a maximum of basic salary of INR 15000 per month	Ministry of Labor & Employment	Applicable to Wind Farm project.

4.3 Land acquisition

As informed by MVKPL during site visit, the land purchased for 100.3 MW Wind Farm at village Savalsang, tehsil Indi, District Vijayapura was 218.85acres. The land required for the project has already been purchased from private land owners on willing seller-willing buyer basis and it is undulating, dry and hilly in nature. Based on discussions with village sarpanch, Villagers and Land seller, it was recorded that the land sold to MVKPL by the land sellers was barren and un-cultivated. Furthermore, this project does not involve any resettlement in terms of physical and economical aspects hence do not attract Resettlement plan as per applicable national/state legislation. The land price was decided after considering willing seller and willing buyer negotiation. Land procurement did not involve any indigenous people also.

After the identification of the sites, negotiations were carried out with the interested parties. The land title documents and land title clearance certificate was sought for and post satisfactory perusal of the documents, the sale deed were registered in the Company's name and the possession of the land was taken by the Project Team after paying the compensation for the land to the landholder. The land procurement team of the project handled the mutation process for the land, wherever required.

As informed by the developer, the land titles were transferred in the name of the Company after the purchase of land from the titleholders. The Title Deeds in the name of Company is deposited with Security Trustee which is appointed by the lenders and is the custodian of all the securities of the company including the land title, on behalf of the lender. The Company has carried out legal vetting from Legal department internally before acquiring the land. This was followed by preparation of Title search report of the Project land by empanelled lawyer of the Bankers to the Project. At time of registration of sale deed, witnesses have signed on the sale deed which may also be considered as third party confirmation on payment to seller of land on 'willing buyer willing seller' basis.

Compensation for the Land

The land for the proposed projects is private owned land which was purchased by MVKPL on willing seller-willing buyer process. The land originally was barren, undulating and dry hilly and hardly used for agriculture. The land was procured by MVKPL directly from land owners. As informed by the project in-charge, the compensation was decided based on the prevailing market rate, in consensus with the land owners. No grievances were reported during the stakeholders consultations with the Village Head and local villagers, regarding the land transaction and compensation which indicated broad community support for these projects.

Impact on Indigenous People

As information provided by MVKPL, the existing 100.3 MW Wind Farm did not involve land acquisition from indigenous people and thus these projects do not have any impact on the indigenous people.

5 GAP ANALYSIS WITH RESPECT TO INTERNATIONAL STANDARDS

Gap analysis activities were performed in respect to IFC Performance Standards and ADB Safeguard policies. Extensive assessment of the project was made in respect to these policy requirements. Detailed assessment is tabulated below:

Table 5:1: Environmental and Social Gap Assessment as per IFC Performance Standards (2012) and ADB Safeguard and Social requirement

S. No.	IFC Requirements in context of MVKPL	ADB Requirements	Remarks (where required)	Observation/Gap	Recommendation
		Requirements under Public Communications Policy, 2011			
		Information Disclosure to Stakeholders: The borrower (i.e. MVKPL in this case) should provide relevant environmental information in a timely manner, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods should be used.	MVKPL is already having regular interaction with the stakeholders.	MVKPL should further extend the consultation and disclosure process for operation phase.	
		Consultation and Participation: MVKPL should carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation.			
		Timing and Frequency for consultation and participation: Meaningful consultation begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle.			
1	**IFC PS1: Assessment and**	**ADB SPS Environmental Safeguards**			